

<b>TAB</b>	<b>DESCRIPTION</b>	<b>ACTION</b>
1	IRSA – ESTABLISHED PROGRAM TO STIMULATE COMPETITIVE RESEARCH (EPSCOR) ANNUAL REPORT	Information Item
2	IRSA – HIGHER EDUCATION RESEARCH COUNCIL (HERC) ANNUAL REPORT	Information Item
3	IRSA – SEMI-ANNUAL REPORT OF APPROVED PROGRAM REQUESTS	Information Item
4	PPGA – UNIVERSITY OF IDAHO ANNUAL REPORT	Information Item
5	PPGA – NORTH IDAHO COLLEGE ANNUAL REPORT	Information Item

**SUBJECT**

Established Program to Stimulate Competitive Research (EPSCoR) Annual Report

**REFERENCE**

August 2016	EPSCoR provided their annual report to the Board
October 2017	EPSCoR provided their annual report to the Board
October 2018	EPSCoR provided their annual report to the Board
October 2019	EPSCoR provided their annual report to the Board
October 2020	EPSCoR provided their annual report to the Board
October 2021	EPSCoR provided their annual report to the Board
October 2022	EPSCoR provided their annual report to the Board
October 2023	EPSCoR provided their annual report to the Board
February 2025	EPSCoR provided their annual report to the Board

**APPLICABLE STATUTE, RULE, OR POLICY**

Idaho State Board of Education Governing Policies & Procedures, Section III.W. Higher Education Research

**BACKGROUND/DISCUSSION**

The Established Program to Stimulate Competitive Research (EPSCoR) is a federal-state partnership designed to enhance the science and engineering research, education, and technology capabilities of states that traditionally have received smaller amounts of federal research and development funds. Through EPSCoR, participating states are building a high-quality academic research base that is serving as a backbone of a scientific and technological enterprise.

Idaho EPSCoR is led by a state committee composed of 16 members, appointed by the Board, with diverse professional backgrounds from both the public and private sectors and from all regions in the state. The Idaho EPSCoR committee oversees the implementation of the Idaho EPSCoR program and ensures program goals and objectives are met. The Idaho EPSCoR office and the Idaho EPSCoR Project Director are located at the University of Idaho. Partner institutions are Boise State University and Idaho State University.

The purpose of EPSCoR awards is to provide support for lasting improvements in a state's academic research infrastructure and its research and education capacity in areas that support state and university Science and Technology Strategic Plans. Idaho EPSCoR activities include involvement in K-12 teacher preparation and research initiatives and projects ranging from undergraduate research through major state and regional research projects.

Consistent with Board Policy III.W.2.d., EPSCoR has prepared an annual report regarding current EPSCoR activities that details all projects by federal agency source, including reports of project progress from the associated external Project Advisory Board (PAB).

**ATTACHMENTS**

- Attachment 1 – EPSCoR Annual Report FY2025
- Attachment 2 – External Project Advisory Board (PAB) Report

**STAFF COMMENTS AND RECOMMENDATIONS**

A full presentation and discussion of the EPSCoR Annual Report was provided to the Instruction, Research, and Student Affairs Committee on April 2, 2026.

**BOARD ACTION**

This item is for informational purposes only.



IDAHO  
**NSF EPSCoR**  
ADVANCING GEOGRAPHIC DIVERSITY IN STEM



# Idaho Established Program to Stimulate Competitive Research (EPSCoR):

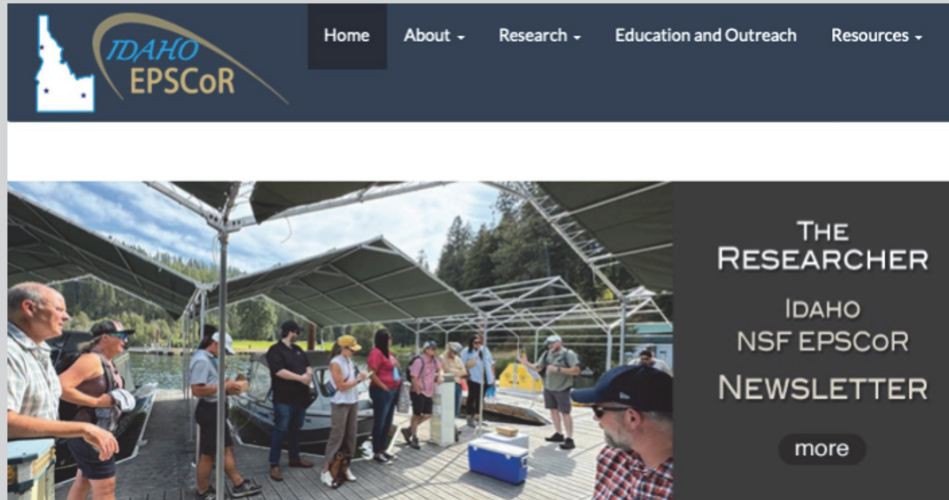
## Annual Report-2025

**DAVE TUTHILL, IDAHO EPSCOR COMMITTEE CHAIRMAN**  
**ANDREW KLISKEY, PROJECT DIRECTOR**  
**RICK SCHUMAKER, ASSOCIATE PROJECT DIRECTOR**

**IDAHO STATE BOARD OF EDUCATION: IRSA COMMITTEE**  
**April 2, 2026**

## Idaho EPSCoR - 2025 Annual Report

- EPSCoR/IDeA National Context
- NSF RII Track-1 update “I-CREWS”
- Idaho post-Track-1 research ecosystem development



[www.idahoepscor.org](http://www.idahoepscor.org)



[www.idahocrewws.org](http://www.idahocrewws.org)



# Idaho EPSCoR - 2025 Annual Report

## Federal EPSCoR / IDeA Funding for All Eligible States

Agency	FY23 Enacted	FY24 Enacted	FY25 Enacted	FY26	FY27 Coalition Goal
NSF	\$245	\$250	\$250	\$250	\$270
NIH	\$426	\$431	\$431	\$451	\$475
DOE	\$35	\$35	\$35	\$35	\$40
USDA	15%	15%	15%	15%	15%
NASA	\$26	\$26	\$26	\$26	\$30
DOD	\$20	\$20	\$20	\$20	\$40
<b>Total</b>	<b>\$752+</b>	<b>\$762+</b>	<b>\$762+</b>	<b>\$782+</b>	<b>\$855+</b>

Dollars in Millions.  
Source: EPSCoR/IDeA



## Idaho EPSCoR - 2025 Annual Report

### Creating Helpful Incentives to Produce Semiconductors (CHIPS) Act 2022 – H.R. 4346

#### NSF (Section 10325)

- 20% set aside for **EPSCOR** states, but ramps up from 15.5% to 20% over 7 years;
- Set aside relates to Congress' allocation under the Research and Related Activities and STEM Education Accounts (minus the Antarctic Facilities) only, rather than the whole of NSF.

?	FY22: -	<b>(13.7%)</b>
?	FY23: 15.5%	<b>(15.9%)</b>
?	FY24: 16%	<b>(19.6%)</b>
?	FY25: 16.5%	
?	FY26: 17%	
?	FY27: 18%	
?	FY28: 19%	
?	FY29: 20%	



## Idaho EPSCoR - 2025 Annual Report

### Recent active awards resulting from new EPSCoR-related Opportunities

**\$7,442,092**

**Faculty win largest National Science Foundation award in university history to create semiconductor workforce center**

September 17, 2025

<https://www.boisestate.edu/news/2025/09/17/faculty-win-largest-national-science-foundation-award-in-university-history-to-create-semiconductor-workforce-center/>

**U of I lands \$1.4M grant to train next generation of wildland fire scientists**

NSF EPSCoR Fellowship will support strengthening research and community resilience across Idaho and beyond

August 5, 2025

<https://www.uidaho.edu/newsroom/wildland-fire-doctorates>

**Idaho State Among First Institutions to Receive NSF EPSCoR Graduate Fellowship Program Grant**

October 9, 2025

<https://www.isu.edu/news/2025-fall/idaho-state-among-first-institutions-to-receive-nsf-epscor-graduate-fellowship-program-grant.html>



# Idaho EPSCoR - 2025 Annual Report



**NSF EPSCoR**  
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## Active EPSCoR/IDeA Awards in Idaho: NSF Track-1 and Track-2 FEC

Agency	Title	Years	Institution(s)	Award Amount
NSF	<b>Track-1:</b> Idaho Community-engaged Resilience for Energy-Water Systems (I-CREWS)	2023-28	U of I (w/ Boise State, Idaho State, CDA Tribe, S-B Tribes)	\$20,000,000
NSF	<b>RII FEC:</b> Intermountain Natural and Working Lands: Sustainable Practices for Ecosystems and Resilience Enhancement	2024-28	U of I w/MT, Tribes in MT and ID	\$2,999,956
NSF	<b>Track-2 RII FEC:</b> Local and Place Based Adaptation to Climate Change in Underserved Rural Communities	2023-27	U of I w/ NV, SC	\$2,435,509
NSF	<b>Track-2 RII FEC:</b> Developing a Circular Bio-Based Framework For Architecture, Engineering and Construction Through Additive Manufacturing	2021-25	U of I w/AL	\$3,974,309
NSF	<b>RII FEC:</b> Good Fire: Enhance Spatial and Temporal Efficacy of Prescribed Fire and Managed Wildfire Use	2025-29	Boise State, w/ID,NM,OK	\$3,999,959
NSF	<b>RII FEC:</b> Transforming wastes Into Economic Assets for Sustainability, Resilience, and Prosperity by a Novel Negative Emission Technology	2024-28	U of I w/AL, NM	\$1,005,042



# Idaho EPSCoR - 2025 Annual Report



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## Active EPSCoR/IDeA Awards in Idaho: NSF Track-4 Research Fellows

Agency	Title	Years	Institution(s)	Award Amount
NSF	<b>RII Track-4: EPSCoR Research Fellows:</b> NSF: Enhancing Water Budget Simulations across CONUS: Modeling Vegetation Uptake of Rock Moisture	2025-27	U of I	\$300,000
NSF	<b>EPSCoR Research Fellows:</b> Incorporating Knowledge Graphs and Reasoning Capabilities for Enhanced Visual Data Exploration in Mineral Evolution	2025-26	U of I	\$213,433
NSF	<b>EPSCoR Research Fellows:</b> NSF: Modeling Human Preparation and Anticipation Processes	2025-26	U of I	\$164,597
NSF	<b>EPSCoR Research Fellows:</b> NSF: Heterogeneous Integration of Wide Bandgap Semiconductor Chips for High Temperature Applications	2025-26	U of I	\$299,938
NSF	<b>EPSCoR Research Fellows:</b> NSF: Enhanced Predictive Understanding of Wildfire Ignitions in the Face of Changing Socioenvironmental Landscape	2024-26	Boise State	\$297,813
NSF	<b>EPSCoR Research Fellows:</b> Obtaining Data Science Expertise to Support Evidence-based Policymaking for Public Lands Counties	2025-27	U of I	\$178,506



# Idaho EPSCoR - 2025 Annual Report



**NSF EPSCoR**  
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## Active EPSCoR/IDeA Awards in Idaho: NSF Graduate Fellowship Program (EGFP)

Agency	Title	Years	Institution(s)	Award Amount
NSF	EPSCoR Graduate Fellowship Program (EGFP): Idaho Student Excellence in Education and Research (I-SEER)	2025-28	Idaho State	\$954,000
NSF	EPSCoR Graduate Fellowship Program (EGFP): Idaho WildFIRE QUEST	2025-28	U of I	\$1,431,000

Total award amount for currently active direct NSF EPSCoR program-funded awards:

**\$38,254,062**



# Idaho EPSCoR - 2025 Annual Report

## Active NSF EPSCoR Co-Funded Awards to Idaho

Start Year	# Co-Funded Awards	*NSF CAREER	Total Project \$
2020	2	2	\$1,096,552
2021	2	-	\$19,287,470
2022	5	2	\$2,059,895
2023	10	1	\$4,767,906
2024	14	3	\$7,493,986
2025	3	2	\$1,478,965
<b>Total</b>	<b>36</b>	<b>10</b>	<b>\$36,184,774</b>

Total award amount for NSF EPSCoR Co-funded awards:

**\$36,184,774**

- Includes 10 prestigious NSF CAREER awards to early-career faculty at Boise State and U of I



Megan Cattau



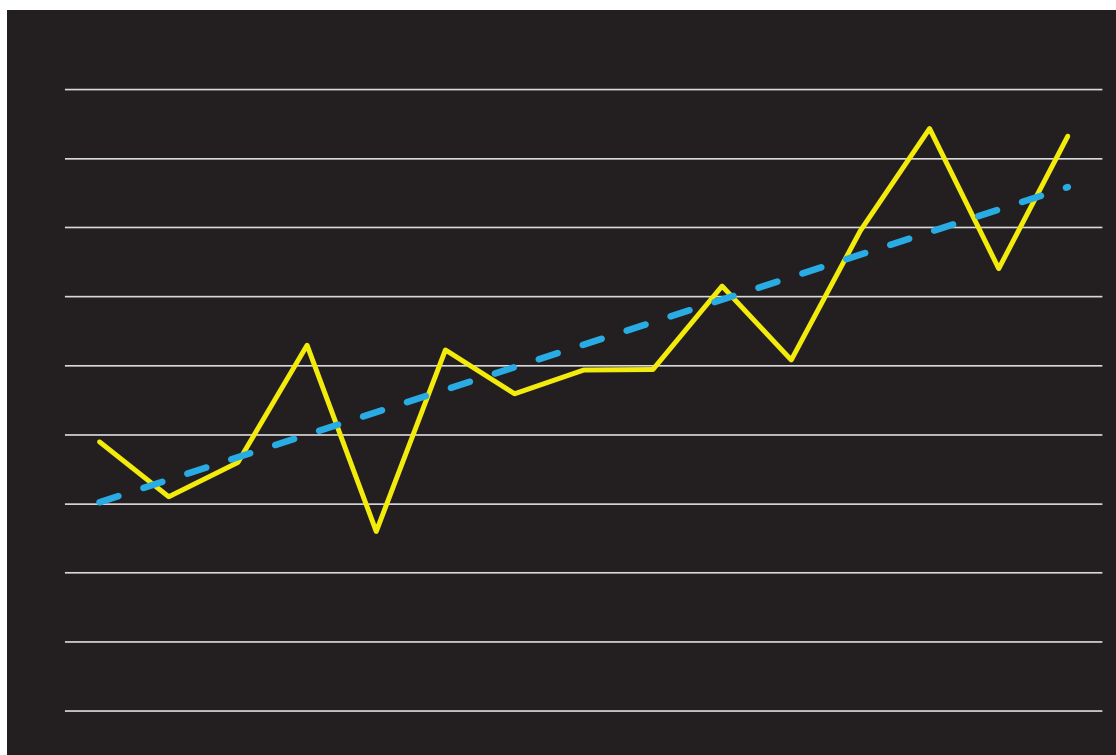
Leonora Bittleston

- 2 awards to NSF EPSCoR Track-1 GEM3 Project New Hires (2018-2024)



# Idaho EPSCoR - 2025 Annual Report

## Idaho's Growing Research Competitiveness at NSF



Total NSF funding to Idaho (FY24) = **\$41.6M**,  
68% increase from FY18

**18%** of Idaho's total NSF FY20-24 funding is EPSCoR (down from 22% thru FY19)

NSF EPSCoR eligibility is <0.75% share of total NSF funding, excluding EPSCoR RII+  
Idaho's share (FY20-24) = **0.36%** (up from 0.33% for FY19-23)

See: <https://www.nsf.gov/funding/initiatives/epscor/epscor-criteria-eligibility>



# Idaho EPSCoR - 2025 Annual Report



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

## Active EPSCoR/IDeA Awards in Idaho: Department of Energy

Agency	Title	Years	Institution(s)	Award Amount
DOE	Neuromorphic Systems for Power Grid Cyber-Resilience	2022-26	Boise State	\$708,985
DOE	Mechanistic and Kinetic Analysis of Polymer Deconstruction and Modification by Irradiation for Polymer Upcycling	2022-26	Idaho State	\$583,930
DOE	DNA-Controlled Dye Aggregation – A Path to Create Quantum Entanglement	2019-26	Boise State	\$12,500,000
DOE	Effect of the Electrical Double Layer (EDL) in Understanding the Correlation of Metal Plating/Stripping and Electrolyte Decomposition at Metal/Electrolyte Interfaces	2025-27	Boise State	\$2,400,006

Total award amount for currently active DOE EPSCoR awards:

**\$16,192,921**



# Idaho EPSCoR - 2025 Annual Report



BASIC RESEARCH | RESEARCH DIRECTORATE  
OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH & ENGINEERING

## Active EPSCoR/IDeA Awards in Idaho: Department of Defense

Agency	Title	Years	Institution(s)	Award Amount
DOD	Unraveling the Molecular Basis for Superior Ice Nucleation Activity	2024-27	Boise State	\$578,389
DOD	Enhancing Research Capacity for Microelectronics in Extreme Conditions	2025-27	Boise State	\$1,495,564

Total award amount for currently active DEPSCoR awards:

**\$2,073,953**



# Idaho EPSCoR - 2025 Annual Report



## Active EPSCoR/IDeA Awards in Idaho: National Institutes of Health

Agency	Title	Years	Institution(s)	Award Amount
NIH	Idaho INBRE	2001-2030	U of I lead	\$109,757,454
NIH	COBRE: Convergent Engineering and Biomolecular Science (Phase 1)	2023-28	Boise State	\$10,211,743
NIH	COBRE: Modeling Complex Interactions (Phase 1, 2, 3)	2015-30	U of I	\$28,482,623
NIH	COBRE: Matrix Biology (Phase 1,2,3)	2014-29	Boise State	\$28,047,940
NIH	COBRE: Nutrition and Women’s Health (Phase 1)	2024-29	U of I	\$11,928,535
NIH	CTR-D: Healthy Idaho Clinical & Translational Research Development Program	2025-30	Boise State, ISU, U of I, VAMC	\$10,650,149

**Four institutions form Healthy Idaho Clinical and Translational Research Development Program with \$10.7 million from NIH** -November 3, 2025

<https://www.boisestate.edu/news/2025/11/03/>

Total award amount for currently active continuing NIH IDeA awards:

**\$199,078,444**



# Idaho EPSCoR - 2025 Annual Report



## Active EPSCoR/IDeA Awards in Idaho: NASA

Agency	Title	Years	Institution(s)	Award Amount
NASA RID	Research Infrastructure Development (RID)	2022-27	U of I	\$1,000,000
NASA Research	Cryoldaho: Building Idaho's Cryosphere Research Community through Analysis of Terrain Effects on Snow and Ice Meltwater Fluxes	2021-25	Boise State	\$750,000
NASA Research	On-Demand Manufacturing of Smart Systems for Structural Health Monitoring	2022-26	Boise State	\$750,000
NASA Research	IDEAS: LA: IDaho Exploration And Science Lunar Analog	2023-26	Idaho State	\$750,000
NASA Research	Improving global dryland streamflow modeling by better characterizing vegetation use of deepwater resources using NASA's GRACE/GRACE-FO, SWOT, and LIS	2025-27	U of I	\$750,000
NASA Research	Advanced 3D Packaging and Integration of SiC and Emerging Ultrawide-Bandgap Semiconductors for Extreme Venus Surface Missions	2025-28	U of I	\$750,000



# Idaho EPSCoR - 2025 Annual Report



## Active EPSCoR/IDeA Awards in Idaho: NASA

Agency	Title	Years	Institution(s)	Award Amount
NASA – ISS Flight Op	Evaluation of Biofilm Resistant Coatings for Spacecraft Water Systems	2022-26	U of I	\$100,000
NASA – R3	Detection and Characterization of Spore-Forming Anaerobic Bacteria in an Aerospace Clean Lab	2024-25	Idaho State	\$100,000
NASA – R3	Effects of Lunar and Martian Regolith Simulants on Growth, Survival, and Fitness of Vertebrates: Acute and Chronic Exposure Zebrafish Models	2023-26	Idaho State	\$100,000

Total award amount for currently active NASA EPSCoR awards:

**\$5,050,000**



# Idaho EPSCoR - 2025 Annual Report



## ACTIVE EPSCoR/IDeA Awards in Idaho: USDA

Agency	# EPSCoR of AFRI Awards	Years	Institution(s)	EPSCoR Award Amount (\$)
USDA	3 of 3	FY20	U of I	\$10,995,000
USDA	3 of 6	FY21	U of I	\$1,122,733
USDA	5 of 11	FY22	U of I, Boise State	\$2,799,817
USDA	10 of 14	FY23	U of I, Boise State	\$4,955,794
USDA	9 of 13	FY24	U of I, Boise State	\$4,116,363
USDA	1 of 2	FY25	U of I	\$53,801

AFRI = Agriculture and Food  
Research Initiative

**\$24,043,508**

in EPSCoR set-aside funds to Idaho in currently active awards



# Idaho EPSCoR - 2025 Annual Report



## ACTIVE EPSCoR/IDeA Awards in Idaho - combined

Agency	# EPSCoR of Awards	Institution(s)	EPSCoR Award Amount (\$)
Department of Energy (DOE)	4 awards	BSU & ISU	\$16,192,921
Department of Defense (DOD)	2 awards	BSU	\$2,073,953
National Institutes of Health (NIH)	6 awards	BSU, ISU, & U of I	\$199,078,444
National Aeronautics and Space Administration (NASA)	9 awards	BSU, ISU, & U of I	\$5,050,000
United States Department of Agriculture (USDA)	31 awards	BSU & U of I	\$24,043,508

**\$246,438,826**

funds to Idaho in currently active awards



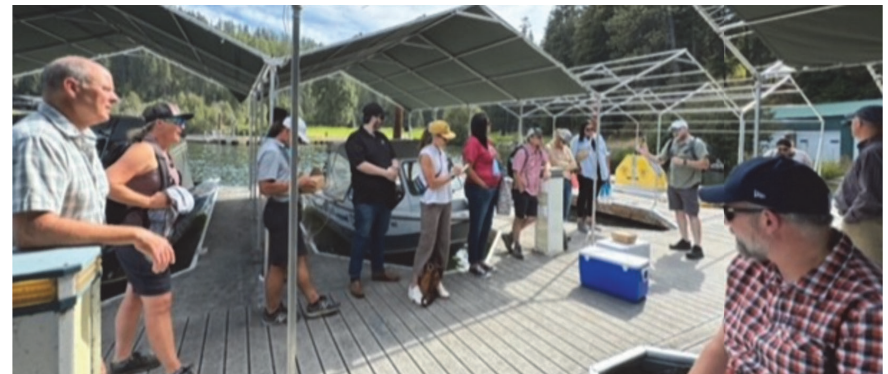
# Idaho EPSCoR - 2025 Annual Report



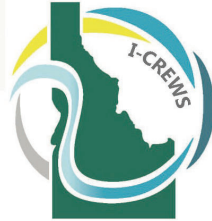
## Idaho EPSCoR: Infrastructure Improvement Strategy



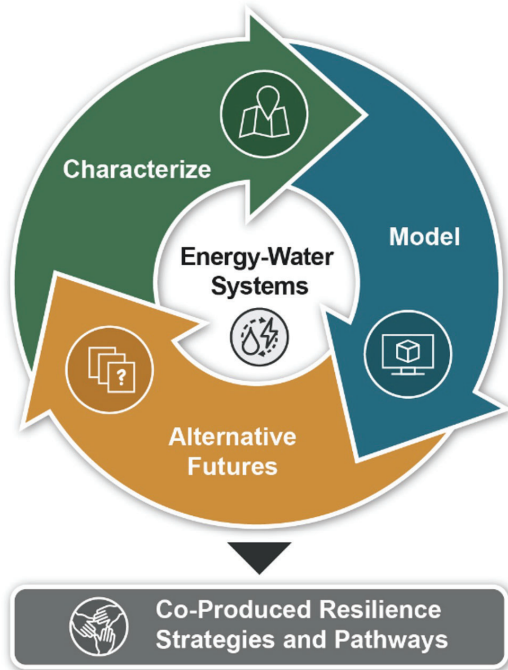
- I-CREWS Track-1: Year 3
- Capacity-building – education, research, WFD, broadening participation, partnerships



# Idaho EPSCoR - 2025 Annual Report



## RII Track-1 Current Award: Idaho Community-Engaged Resilience for Energy-Water Systems (I-CREWS)



**Critical national and state need:** enhancing access for communities to diagnostic science for proactively addressing impacts of climate, population, and technological change on the interplay between energy and water

**Scientific vision:** build a world class capacity to characterize, model, and assess a range of futures to promote the resilience of E-W systems to climate, population, and technological change

**Awarded:** Aug 1, 2023 (thru July 31, 2028)



# Idaho EPSCoR - 2025 Annual Report

## I-CREWS Student Research Stories



**Kent Merrill,**  
Undergraduate Student at Idaho State University  
Research Focus: Earth and Environmental  
Sciences  
Hometown: Rupert, ID

### Research focus:

Kent's summer research explored the role of persistent springs in ensuring reliable water flows during dry summers and droughts. Mountain springs create a refugia for organisms throughout Southern Idaho's semi-arid climate and its dry summers. By understanding water sources, we can better predict areas that will contain a larger amount of biodiversity in both plants and animals. We can also predict how springs will be affected by the ever-changing climate.

*"I have an affection for water quality and how the organic and inorganic processes contribute to the health of water which ultimately impacts the ecosystem it provides for. By studying mountain springs, I am able to study both the water quality and its effects on the ecosystem."*



**Kaleb Rounsevel,**  
Undergraduate Student at University of Idaho  
Research Focus: Water Science and Management  
Hometown: St. Maries, ID

### Research Focus:

Kaleb's research interest is in applying a unique, holistic approach to the challenges of hydrology, specifically concerning water quantity and quality in the face of new environmental challenges. The research addresses the critical need to understand how the Palouse Basin aquifer is recharged by analyzing wells located at the mountain-basin interface. This research helps to create targeted strategies that protect our most vital recharge areas, ensuring the long-term security of the water that sustains our communities.

*"My ultimate goal is to work in direct partnership with communities to listen to their concerns, understand their priorities, and work together to develop monitoring and management strategies. By combining my technical and scientific skills with their local knowledge, I aim to help communities navigate a future of increasing hydrologic uncertainty and build more resilient systems."*



# Idaho EPSCoR - 2025 Annual Report

## I-CREWS Student Research Stories



**Jade Mokry,**  
Undergraduate Student at University of Idaho  
Research Focus: Ecology and Ecosystem Sciences,  
Aquatic Emphasis  
Hometown: Coeur d'Alene Indian Reservation, ID

### Research focus:

Jade's research involved exploring satellite-derived indices for assessing crop field performance in the Hangman Creek Watershed on the Coeur d'Alene Indian Reservation. The Hangman Creek agricultural field study provided insight into relative field-level crop productivity to guide future land management practices. As a culturally significant watershed, this work is important to understand and identify agricultural lands suitable for decommissioning to support the Coeur d'Alene Tribe's restoration goals of improving the ecosystem's water quality and reintroduction of salmon to the area.

*"I want to be a good citizen to my tribal, local, and worldwide community. I hope to use my Traditional Ecological Knowledge and growing Western education to guide stewardship and restoration practices in aquatic ecosystems."*



**Erica Stryker,**  
Undergraduate Student at Lewis Clark State  
College  
Research Focus: Bioinformatics  
Hometown: Pullman, WA

### Research Focus:

We are studying air quality and its impacts on communities across Idaho. This includes air toxics in wildfire smoke, other air pollutants, and meteorological events that can increase the concentration of these pollutants in our atmosphere. My project focused on modelling temperature inversions in the Lewis-Clark Valley and the effects of inversions on particulate matter concentration in the air.

This research impacts communities across Idaho. While the Lewis-Clark Valley is particularly prone to temperature inversions, inversion events can happen anywhere and are especially common in valley communities such as Boise or Twin Falls. Temperature inversions can concentrate particulate matter and exacerbate poor air quality from wildfire smoke and other pollutants. Knowing when inversions are likely to occur can help vulnerable populations in these communities better plan for these events.



## Idaho EPSCoR - 2025 Annual Report



**Tapiwa Mwila,**

Graduate student at Boise State University  
Mathematical Sciences (emphasis in Data Science)

**I-CREWS Research focus:**

Tapiwa Mwila, a third-year graduate student in Boise State University's Computing PhD Program, joined I-CREWS in 2024. Upon earning her master's degree in mathematical sciences (with an emphasis in data science) from the African Mathematical Institute (AIMS) in Kigali, Rwanda, Mwila then traveled to Boise, Idaho for her graduate work, allowing her to apply her knowledge of mathematics and data science for I-CREWS.

Working alongside researchers from Boise State, Idaho State University and the University of Idaho, the team works to compile, compute and create data models that will inform state energy-water projects. Focusing on the Treasure Valley Region—specifically, Ada and Canyon counties—Mwila has been studying data related to groundwater flow and resource consumption. The team compared trends in usage rates to population shifts and water policy. This approach allows the modeling team to train machine learning models which forecast future usage.

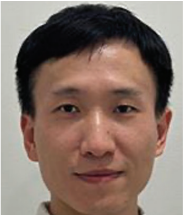
The I-CREWS team is breaking new ground in how science, technology, and community knowledge come together to solve some of Idaho's biggest challenges in energy and water management. Over the past years, researchers have made major progress toward a key goal—integrating qualitative insights and quantitative data to better model resilience across the state's energy–water systems.

*"I really love that we get to work with real-time data," Mwila stated. "I've pictured myself taking up a career in modeling, especially for machine learning. So, I'd say what I'm currently doing is completely in line with my career goals."*



# Idaho EPSCoR - 2025 Annual Report

## I-CREWS New Faculty Hires



### Boise State University:

- Data scientist / statistician [Dr. Michael Perlmutter, hired Aug 2023]
- Environmental governance [Dr. Stephanie Lenhart, hired Aug 2025]
- Systems engineer [Search in progress]

### Idaho State University:

- Resilience social scientist [Dr. Georgia Hart-Fredeluces, hired Oct 2024]
- Environmental civil engineer [Dr. Tao Huang, hired Aug 2025]

### University of Idaho:

- Environmental historian [Dr. Alyssa Kriekemeier, hired Aug 2024]
- Power and water systems modeler [Dr. Angel Monsalve, hired Jan 2024]
- Energy-water resource scientist [Dr. Shanny Spang Gion, hired Aug 2025]



# Idaho EPSCoR - 2025 Annual Report

## Jean'ne M. Shreeve NSF EPSCoR Research Excellence Award



**2025 Award Recipient**  
Professor Jennifer Forbey  
Boise State University

- Alistair Smith (2023)
- James McNamara (2022)
- John Kalivas (2021)
- Lillian Alessa (2020)
- Colden Baxter (2018)
- Lisette Waits (2017)
- Ronald Hardy (2016)
- Sanford Eigenbrode (2016)
- David McIlroy (2014)
- Alex Punnoose (2012)
- Jean'ne M. Shreeve (2011)



Jean'ne M. Shreeve NSF EPSCoR Research Excellence Award



## Transition from RII Track-1 Program to Multi-Program

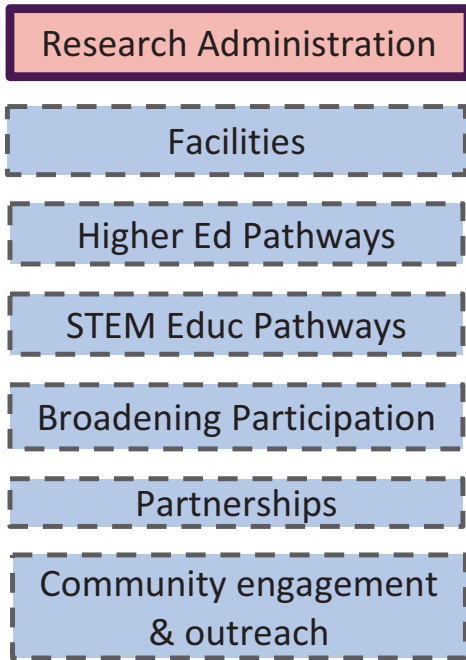


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### EPSCoR E-CORE

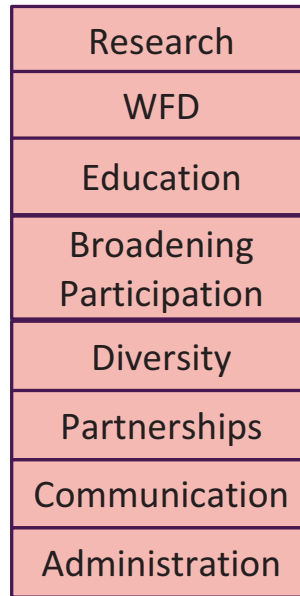
Builds capacity in 1 or more targeted research infrastructure cores



4 years (\$10M) + 4 Years (\$8M)

### EPSCoR Track-1

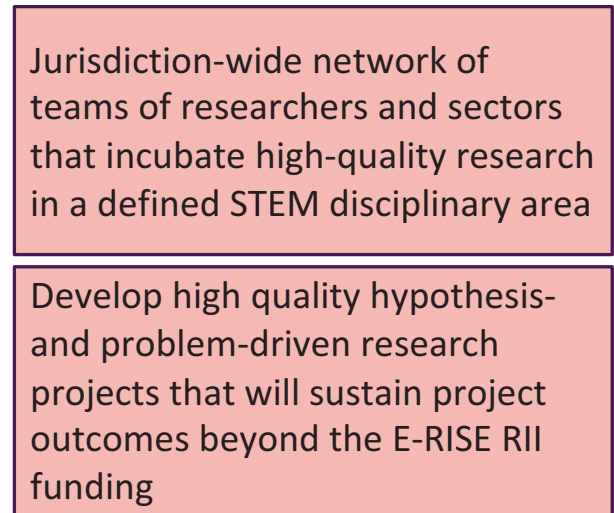
Enhance research and capacity-building in topical areas to improve future R&D competitiveness



5 years (\$20M)

### EPSCoR E-RISE

Supports incubation of research in a scientific field leading to increased research capacity and competitiveness in the topical area and sustainable improvements



4 years (\$8M) + 3 Years (\$4.5M)



## E-CORE / E-RISE Implementation in Idaho

- Eligibility has been expanded [universities, colleges, Tribal Nations, non-profits, private institutions]
- All institutions, except U of I, are eligible to lead and submit now
  - U of I can participate as a non-lead sub-awardee (until 2027)
- Jurisdictional governments are now eligible
- E-CORE: \$10M over 4-years
- E-RISE: \$8M over 4-years
  - No cost match allowed for initial awards, cost match required for renewals
- Intent remains to provide statewide collaboration and coordination [per the current solicitations]



## NSF EPSCoR E-CORE and E-RISE proposals from Idaho

Agency	Title	Years	Institution(s)	Award Amount
NSF 2024 Declined	<b>E-CORE:</b> Undergraduate-Centered Advancement in Research and Education (U-CARE)	2023-28	Col, CWI and NNU	\$10,000,000
NSF 2025 Pending	<b>E-CORE:</b> Idaho Network for Scaling Public Impact Research and Economic Development (INSPIRED)	2026-30	BSU , ITS, ISU, U of I, CWI, Trailhead Boise with WFDC, UW, INL, City of Boise, IDC, Micron ...	\$9,999,979
NSF 2025 Pending	<b>E-RISE:</b> Seasonally snow-covered Landscapes Undergoing Shifting Hydroregimes (SLUSH)	2026-30	ISU with BSU, U of I, and USDA Agricultural Research Service	\$8,000,000
NSF 2025 Pending	<b>E-RISE:</b> Capacity Building for Resilient Microelectronics for Extreme Environments (XTREME) Program.	2026-30	BSU, U of I with CWI, CSI, CEI, BYU-Idaho, Micron, ID WFDC, NASA, AFRL, Penn State, LaTech	\$7,997,728



## E-CORE / E-RISE Implications for Idaho

### Role of EPSCoR Committee is transitioning

- Expanded representation necessary [Chair Tuthill is leading expansion efforts]
- Expected to provide high-level strategic view of research across Idaho
  - greater collaboration with HERC necessary on State Higher Education Research Strategy
- Approval for submissions NOT required
- Notification of submission is required

### Implications

- Statewide coordination, communication, and planning with Idaho institutions remains essential
- Coordination and planning expands to the entire EPSCoR / IDeA program ecosystem



## Building Research Competitiveness through EPSCoR/IDeA



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IDAHO NSF EPSCoR PROJECT ADVISORY BOARD (PAB)  
REPORT ON THE IDAHO EPSCoR RESEARCH INFRASTRUCTURE  
IMPROVEMENT TRACK-1 COOPERATIVE AGREEMENT  
(#OIA-2242769RII)

YEAR TWO  
JULY 2025

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## INTRODUCTION

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The Research Infrastructure Improvement (RII) project “Idaho Community-engaged Resilience for Energy-Water Systems (I-CREWS)” was funded by the National Science Foundation (NSF) Established Program to Stimulate Competitive Research (EPSCoR) and led to the Idaho RII Track-1 Cooperative Agreement. The Idaho EPSCoR Project Advisory Board (PAB) met as part of the I-CREWS annual meeting to hear progress toward the goals set forth in the Strategic Plan, which was finalized in January 2025. The meeting was hosted by the Coeur d'Alene Tribe and took place May 13-15, 2025. The PAB was asked to provide objective feedback on the progress to date as compared to the milestones for year two from the Strategic Plan. A roster of current PAB members is provided in Appendix A.

NSF EPSCoR funded this 60-month award in August 2023 at \$20 million over five years. The State of Idaho has committed to contribute \$4 million in additional funds towards the project over the five-year period. The University of Idaho (UI) is the fiscal agent for the award. Dr. Andrew Kliskey is the Idaho EPSCoR/Institutional Development Award (IDeA) Project Director (PD) and the Principal Investigator (PI) for the RII Track-1 Cooperative Agreement. Co-Principal Investigators are Alistair Smith, Karla Eitel, Kathleen Araujo, and Kitty Griswold.

This report is intended to provide feedback to the I-CREWS project team as they work toward their goals and objectives. This report consists of three parts: notable strengths of the project, challenges and recommendations, and conclusions.

## STRENGTHS

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The main project components—Research and Education & Workforce Development—were strong, as evidenced by the presentations and reports shared with the PAB. Project leadership provides management and support while allowing flexibility in approaches to accomplish key goals. Dr. Kliskey and his team are great facilitators and communicators and are keeping participants moving toward the goals identified in the Strategic Plan. Following are the identified strengths in Research and Education & Workforce Development as documented by the PAB at this I-CREWS annual meeting.

### RESEARCH

This is a well-planned and highly ambitious project. A key strength of the initiative is the robustness of the commitment to authentic transdisciplinary engagement, which entails rigorous multi-disciplinary work along with the meaningful engagement of communities - and in particular Tribal communities. The strength of this commitment is represented both in the research culture and in its structural organization. Of note is the use of the term interweaving (as opposed to, for example, integration or convergence), which is used to denote emerging and organic interconnections across project areas, concepts, and participants. The concept of interweaving was embodied in the design of this year’s annual meeting, which was held on Tribal land and included field trips to locally important natural resources and energy infrastructure. From a structural perspective, the robustness of the transdisciplinary engagement is demonstrated by the current development of explicitly site-centered cross-functional teams as a key part of the organizational structure, which is elaborated below.

## EDUCATION & WORKFORCE DEVELOPMENT

The team continues to make significant progress in its education and workforce development programs. The new E-W systems literacy framework, combined with the VIP and CIP courses, is establishing a solid base for workforce development. With a strong commitment to engaging undergraduates in STEM education, the project is creating impacts that will sustain beyond the life of the award. Undergraduates are an integral piece of the overall research program and are contributing through the SARE program to summer and academic year research progress. The VIPs and CIPs are providing pathways for students to become engaged in the overall project. Human resource development is a critical part of the program that underlies the programmatic successes. The new ASSERT program is supporting the early career faculty as they become engaged in research and mentor students and postdoctoral researchers.

## CHALLENGES & RECOMMENDATIONS

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### RESEARCH

At this point in time, the team is undergoing a conscious inflection. Up until now, the work has been organized according to three interdisciplinary conceptual frameworks: characterize, model, and envision alternative futures. Having made significant progress in the first two of these areas, and realizing that progress in the third will require an evolution in organizational structure and team dynamics, the current shift entails grounding the work in three specific sites: the Coeur d'Alene Tribe reservation in northern Idaho, the Treasure Valley (the area surrounding Boise) in central-western Idaho, and Shoshone-Bannock Tribes' Fort Hall Reservation in southeast Idaho. Along with this shift has been the conscious adoption of the notion of "interweaving" in relation to some of the key objectives as a complement to, and in some cases a replacement for, the notion of "integration." Both interweaving and integrating serve to allow future collaborations and support knowledge co-production. This important work takes a lot of time to establish, and there needs to be a path to agreement on what the successful outcomes of the various types of interactions will be.

Our observation is that a focus on sites and the development of a language and associated practice of interweaving acknowledges the agency of Tribal and other community partners and provides an opening for the formulation of meaningful and relevant framing questions, models, and future visions. We also note that the adoption of a commitment to interweaving may, in some cases, stand in tension with some of the more integration-based language articulated in earlier documents (and still present in the most recent documents). We see value in further discussion regarding what different members of the team, and the group as a whole, *mean* by the concepts of interweaving and integration, as well *how* they will be operationalized in relation to different project objectives. Such discussions have the potential to foster productivity and ensure that the tension embodied by the current shift is a creative one. We also see these types of discussions as having the potential to increase levels of comfort and trust across team members as they approach the challenges of developing framing questions and using them to develop, model, and evaluate alternative futures.

One of the key difficulties is the absence of a shared task that unites all sites in a meaningful way. Without a common focal point, cross-site learning can remain superficial or fragmented. At the same time, forcing uniformity risks erasing the very local knowledge the project seeks to elevate. A community environment has to be created so everyone will trust in what they are doing, which includes an explanation of the success structure as well as a shared understanding of how the team can integrate people and verify that

advancements are being made. The team needs a robust pathway forward to show what they are doing and show how it is leading to success. This includes a clear pathway to quantifying what success might look like, including metrics. There needs to be a broader, more transparent engagement with the technical dimension of the work.

This feedback section is developed in three parts which are intended to offer both conceptual and practical ideas for responding to the opportunities and challenges entailed in the next phase of the project. First, we offer some thoughts on the distinction between interweaving and integrating and the nature of the challenges associated with each. Second, we focus on the development of framing questions as a key boundary object that can link to both integration and interweaving efforts and enable forward traction. Third, we build on these two sections to provide actionable insight into what is arguably the most urgent need for the project—to move forward both appropriately and with expedience on the task of modeling, exploring, and evaluating alternative futures for the energy-water nexus in Idaho.

#### DISTINGUISHING INTEGRATION AND INTERWEAVING

In the early stages of this project, the term integration was used to describe the effort to bring together diverse perspectives, data sources, and disciplinary approaches in modeling the energy-water nexus across Idaho. Integration implies a kind of synthesis: combining parts into a coherent whole, often with the goal of producing a unified model or framework. More recently, the term interweaving has emerged in project documents, including the Year 2 Report. We believe this shift is both meaningful and timely. Interweaving suggests a different kind of relationship—one that values the distinctiveness of each thread (discipline, site, stakeholder perspective) while emphasizing the strength and resilience that comes from their patterned interaction. Unlike integration, which can sometimes imply flattening or subsuming differences, interweaving allows for complexity, tension, and multiplicity to remain visible and productive.

This distinction is not merely academic. It has real implications for how the project team approaches its work:

*- Integration challenges us to build models, scenarios, and representations that incorporate community perspectives into technical frameworks.*

*- Interweaving challenges us to foster meaningful connections across sites, disciplines, and knowledge systems—without necessarily forcing them into a single mold.*

As the project evolves, two distinct but interconnected challenges have emerged that underscore the importance of distinguishing between integration and interweaving. These challenges are not only technical or logistical—they are conceptual and relational, shaping how the project team collaborates, how knowledge is valued, and how progress is defined.

#### **Challenge 1: Bridging the Community–Modeling Gap (The Integration Challenge)**

One of the most persistent and complex challenges facing the project is the difficulty of meaningfully incorporating community knowledge—especially from Tribal nations and other place-based stakeholders—into formal modeling processes. This is not simply a matter of translating local concerns into data points. It is a deeper issue of epistemological alignment: how do we bring together fundamentally different ways of knowing?

Community members often speak from lived experience, cultural memory, and historical observation. These forms of knowledge are rich, nuanced, and deeply grounded—but they do not always conform to

the structures and assumptions of quantitative models. On the other hand, modeling efforts are constrained by what can be measured, simulated, or parameterized. As a result, there is a risk that models may inadvertently exclude or flatten the very perspectives they aim to represent.

Moreover, many modelers are not accustomed to designing models around stakeholder-defined questions. They may lack the tools, training, or institutional support to engage in co-productive processes. This creates a gap—not just in communication, but in purpose and practice.

To address this, we propose a shift in how integration is approached. Rather than attempting to integrate everything, the project should identify focused opportunities where community input can meaningfully shape modeling efforts. This might involve developing narrative-based scenarios that bridge technical and experiential knowledge, or supporting modelers in learning new facilitation and co-design skills. The goal is not to force alignment, but to create bounded spaces where integration is both possible and productive. We will develop more specific recommendations in terms of the development of framing questions and alternative visions for the future below.

**Challenge 2: Weaving Across Sites and Knowledge Systems (The Interweaving Challenge)**

The second challenge is more spatial and relational in nature. It concerns the need to connect insights, practices, and relationships across the three project sites in Idaho. Each site has its own history, its own stakeholders, and its own priorities. What works in one place may not translate directly to another—and that is not a problem to be solved, but a reality to be respected.

This is where the concept of interweaving becomes especially valuable. Unlike integration, which seeks coherence and synthesis, interweaving allows for difference. It values the distinctiveness of each thread while emphasizing the strength that comes from their patterned interaction. But interweaving doesn't happen automatically. It requires intentional design, facilitation, and reflection.

To navigate this, we recommend that, first, the project team take time to reflect on which concept—integration or interweaving—is most appropriate for different project objectives. Doing so can help clarify the following: 1) what kinds of gaps the team is trying to bridge (and how); 2) what kinds of gaps may be better minded (acknowledged and respected); and 3) how different team members can contribute to this work in ways that are both realistic and meaningful.

Second, the team may consider the development of a “meta-site” coordination process—one that supports cross-site dialogue, identifies resonant themes, and surfaces both commonalities and contrasts. Storytelling and narrative tools can play a powerful role here, helping to weave together diverse experiences without demanding uniformity.

Once the team has had a chance to thoughtfully consider their roles in integration vs. interweaving, and created structural spaces for interweaving discussions to happen at the scale of the group as a whole, we anticipate that study areas will have an easier time considering framing questions.

*Developing Framing Questions*

Framing questions are often overlooked, but represent a fundamental step in properly executing a robust scenario planning process, and therefore alternative futures process. Framing questions need to be focused on a key decision or challenge, be open-ended to allow for multiple plausible futures, be relevant to the engaged participants in the region, and have an actionable time horizon.

As we will explain, we see careful attention to framing questions as both essential for the success of modeling efforts and for ensuring that Tribal and other community members continue to have agency in the way the project unfolds. Thus, both integration and interweaving need to be employed to develop the framing question for each project site, and any framing questions that cross all three sites.

During the meeting, the Shoshone-Bannock study site wrestled with the framing question, but arrived at something that could serve the site well, and provides an example for other study sites to consider. The question, “How might energy development and water resource scarcity impact tribal sovereignty?” is focused on a couple of key challenges, is open-ended enough to support multiple futures, and is certainly relevant to most in the region. However, there is no time frame associated with the question, and some specificity could help the different teams envision how they begin answering this question. Additionally, a close variant of this question could be the overall framing question across the three sites, providing clear opportunities for those who wish to interweave.

Even though the Shoshone-Bannock study site went through that exercise during the annual meeting, this should continue to be workshopped to ensure that all members of the study site team and cross-study site team are comfortable with the framing, especially the modelers. If all three study sites agree this is an appropriate overarching framing question, then we encourage each study site team to explore the ways that interweaving might help clarify roles and responsibilities. For example, hydrologists might be interested in interweaving their understanding of current and future hydrographs with tribal knowledge about how fish might respond. This is uniquely different than an integration approach, where numerical estimates of fish numbers might be coupled with a hydrologic model, or water temperature models are developed using climate projections. Interweaving will allow for stronger intercultural engagement, which will ultimately help teams develop better framing questions.

However, as these discussions are pursued, it is of paramount importance that all members of the team co-produce the framing questions. This will allow for deeper conversations between groups like the modeling team and the local representatives, where modelers can better understand why the framing question is of concern to the local representatives, and the non-modelers can understand how models can be used to answer discrete questions. Similarly, we believe this could assist the translation of community needs into factors able to be modeled, leading to better models with clearer variable definitions.

#### MOVING AHEAD WITH ALTERNATIVE FUTURES

Given the core role of alternative futures (AF) to the whole project, we encourage a significant ramp up of efforts supporting the futures work. It was clear from the annual meeting that most modelers knew they were important to the AF work, but were unsure how or when they should interact. Our recommendation is that modelers are engaged early, and often, throughout the process to ensure integration occurs and supports the development of the scenarios that will drive the AF. This should include some training or workshops that allow modelers the opportunity to think not just about the end point, but also all the assumptions going into any given model that supports the AF work.

Building off the two previous recommendations, we believe the AF approach will help solidify the relative role of integrators and interweavers, giving site community members and team members added agency to pursue their ideas and science in a supportive and collaborative environment. We propose that the AF approach could start with interweaving, building off the conversations around the framing questions, allowing common concerns across test cases some “air time.” Identifying the obvious commonalities between the sites and whether there are common uncertainties that challenge each site could be an easy entry point for these conversations. Interweaving should be the focus at that initial step, encouraging

multiple knowledge streams to characterize the region and document key concerns, centered primarily on the people of the place. Of paramount importance is the inclusion of modelers so they can begin to understand why various challenges are being expressed the way they are.

Interweaving can honor not only the individual contributions at this step, but could also encourage and include synthesized opinions from other regional efforts, media, and community documents. There are limited examples of how synthesized issues and decisions can be used to develop scenarios, so this could be a way for the I-CREWS team to contribute meaningfully to the scenario and AF literature, while making up for some lost engagement time.

The role of modelers as integrators will become very critical as straw person scenarios are created. Modelers will be essential for thinking about how to properly characterize and integrate the uncertainties into logical, and plausible, scenario narratives. This should all be done by the end of project year 3 in order to facilitate site-level feedback on those characterizations and scenarios. This will necessitate a cross-functional conversation as the modelers begin to develop these integrated models, in case similar representations can serve across sites.

Early in project year 4, we imagine the need to develop all the physical characterizations of the scenarios, allowing for sufficient time for site engagement and local validation of the models. That feedback could go back to the bigger team (across sites) as another thread to interweave into how Idaho thinks about the energy-water nexus. The localized interpretation of integrated models describing water and energy challenges could serve as an opportunity to create a nested framework for addressing these challenges statewide. Thus, we envision this focus on integration and interweaving can help kick start the AF teams within and across the study sites.

By way of conclusion of this section, we offer a tabular representation of the concepts developed above, and how the concepts of interweaving and integrating may support key project tasks and objectives moving forward. Please note however that our foundational feedback is that the team should take ownership of the distinction between the two concepts and make it work for them, so the table should be treated as a point of departure.

<b>Steps in the Development of Alternative Futures</b>	<b>Interweaving</b>	<b>Integrating</b>
Developing Framing Questions	X	X
Defining or Characterizing Place(s)	X	
Identifying issues and decisions	X	
Defining critical uncertainties	X	
Developing scenario narratives		X

Physical Characterization of Scenarios		X
Impact Models - Exploratory and Normative Engagement with Alternative Futures	X	X

**EDUCATION & WORKFORCE DEVELOPMENT**

The I-CREWS education and workforce programs are well-planned, and in the next year these plans should be implemented fully to create strong outcomes. The team should continue their focus on creating opportunities for undergraduate students to engage in authentic research within the interdisciplinary program. The identified challenge of getting SARE students to share their stories via video could be solved by building into the program a component where students are trained to create short videos for use on social media rather than web-based videos. There is a unique opportunity for students to be involved with the interweaving of the disciplinary areas that is unfolding in this project. The project continues to do an excellent job of including Indigenous perspectives at the core of the effort. With the ever-changing landscape within academia, this project team is a thought leader in how to engage across diverse scientific disciplines and cultural traditions. This success should be celebrated and shared broadly so that other institutions can learn from this rich experience.

**CONCLUSIONS**

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The I-CREWS project is showing significant progress in its first two years. There are many challenges to integrating and interweaving across cultures and disciplines, but the work being accomplished now is a strong foundation to support the site-based modeling and future state-level discussions. It is critical for the partnering Universities to continue their contributions to the project in both research and education. This I-CREWS team is well-positioned to continue their excellent work in helping to train scientists to fill the workforce needs of Idaho and the country more broadly. The PAB would like to thank the Idaho EPSCoR Statewide Committee, all of the faculty, students, post-doctorates, and staff for allowing the PAB to provide its perspective on your excellent work to date. The PAB looks forward to hearing how the team integrates and interweaves the modeling and characterization work over the next year.

Appendix A. Project Advisory Board Members

<b>Name</b>	<b>Affiliation</b>
Paul Hirsch, PAB Chair	Associate Professor and Graduate Program Director of the Department of Environmental Studies, State University of New York College of Environmental Science and Forestry
E. Jamie Trammell	Associate Professor and the chair of the Environmental Science, Policy, and Sustainability department at Southern Oregon University
J. Nathan Kutz	Director for NSF-funded AI Institute in Dynamic Systems at the University of Washington
Anna Waldron	Education and Evaluation Consultant and Principal at Waldron Educational Consulting, LLC

**SUBJECT**

Higher Education Research Council Annual Report for Fiscal Year 2025

**REFERENCE**

February 2017	The Board was provided the annual update of the Higher Education Research Council for FY16 and approved the second reading of amendments to Board Policy III.W.
February 2018	The Board was provided the annual update of the Higher Education Research Council for FY17.
June 2019	The Board was provided the annual update of the Higher Education Research Council for FY18.
June 2020	The Board was provided the annual update of the Higher Education Research Council for FY19.
June 2021	The Board was provided the annual update of the Higher Education Research Council for FY20.
February 2022	The Board was provided the annual update of the Higher Education Research Council for FY21.
February 2023	The Board was provided the annual update of the Higher Education Research Council for FY22.
February 2024	The Board was provided the annual update of the Higher Education Research Council for FY23.
February 2025	The Board was provided the annual update of the Higher Education Research Council for FY24.

**APPLICABLE STATUTE, RULE, OR POLICY**

Idaho State Board of Education Governing Policies and Procedures, Section III.W.  
Higher Education Research

**BACKGROUND/DISCUSSION**

Board Policy III.W. Higher Education Research recognizes the significant role research plays in innovation, economic development, and enhanced quality of educational programs. By developing and leveraging the state's unique research expertise and strengths, Idaho's universities and colleges serve as catalysts to spur the creation of new knowledge, technologies, products, and industries. This in turn leads to new advances and opportunities for economic growth.

The Board's Higher Education Research Council (HERC) provides recommendations to the Board regarding statewide collaborative efforts and initiatives to accomplish these goals and objectives. In addition, HERC provides direction for, and oversees the use of, the limited resources allocated by the Board for higher education research by promoting research activities that will have the greatest beneficial effect on the quality of education and the economy of the state.

HERC also administers the Idaho Global Entrepreneurial Mission (IGEM) Fund programs, disbursement of Infrastructure Funds, and the oversight of matching

funds for our Idaho Established Program to Stimulate Competitive Research (EPSCoR) federal grants on the Board's behalf and in compliance with Board Policy III.W.

HERC-IGEM projects are awarded for competitive state university research in support of the goals of the IGEM initiative. These funds are to be used as seed funding for strengthening Idaho's future by strategically investing in the development of expertise, products, and services which result in state economic growth. While these awards may be for up to three years, the funding is contingent upon successful progress as determined by HERC at an annual review of the project.

### **IMPACT**

Taking a strategic approach to invest in the state's unique research expertise and strengths leads to new advances and opportunities for economic growth and enhances Idaho's reputation as a national and international leader in excellence and innovation. This update will provide the Board with the opportunity to provide ongoing input to the Higher Education Research Council on areas of focus and strategic direction.

### **ATTACHMENTS**

- Attachment 1 – FY25 HERC Report Presentation Deck
- Attachment 2 – FY25 HERC Budget Allocation
- Attachment 3 – FY25 Performance Measure Reports
- Attachment 4 – FY25 Research Activity Reports
- Attachment 5 – FY25 Infrastructure Summary Reports
- Attachment 6 – FY25 Undergraduate Research Report
- Attachment 7 – FY25 Idaho Conference on Undergraduate Research Report
- Attachment 8 – FY25 IGEM Grant Annual Reports

### **BOARD STAFF COMMENTS AND RECOMMENDATIONS**

A full presentation of HERC activities was provided to the Instruction, Research and Student Affairs Committee of the Board on April 2, 2026.

### **BOARD ACTION**

This item is for informational purposes only.

# Higher Education Research Council (HERC)

Report on activities from  
July 1, 2024 - June 30, 2025  
(Fiscal Year 2025)

Dr. Chris Nomura, Chair



# Attachments

- FY25 HERC Budget Allocation
- FY25 Performance Measures Reports
- FY25 Research Activity Reports
- FY25 Infrastructure Summary Reports
- FY25 Undergraduate Research Reports
- FY25 Idaho Conference on Undergraduate Research Report
- FY25 IGEM Active Grants & Final and Annual Reports

# HERC - Mission

Strengthen the research capabilities at Idaho's public four-year institutions and contribute to the economic development of the state of Idaho.

# HERC - Purpose, Vision, and Role

- **Purpose:** To provide vision, leadership, and strategic financial support to the research endeavors at Idaho's higher education institutions.
- **Vision:** Idaho will become a research destination in key discipline areas.
- **Role:** To manage HERC funds, influence the research endeavor in higher education in Idaho, and monitor key factors that might impact the funder and influencer roles HERC plays.

# HERC Membership

## Higher Education Representatives

Dr. Nancy Glenn, *Boise State  
University*

Dr. Martin Blair, *Idaho State  
University*

Dr. Christopher Nomura,  
*University of Idaho (Chair-Elect)*

Dr. Grace Anderson, *Lewis-Clark  
State College (Chair)*

## Industry Representatives

Todd Combs, *Idaho National  
Laboratory*

Eileen Barber, *Keynetics*

Heather Messenger, *Life Sciences  
and Biotech Industry*

Douglas Sayer, *Premier  
Technology Inc.*

# FY25 HERC Budget Allocation

HERC IGEM Grants	\$1,899,263
Research Infrastructure Funds	\$854,000
Matching Grants (EPSCoR match)	\$800,000
Undergraduate Research	\$290,000
AI Tools Research	\$180,737
<b>Total</b>	<b>\$4,019,000</b>

# Research Infrastructure

Funding to support science, engineering, and other research infrastructure

FY25 Infrastructure Budget - \$854,000

Major line items:

- **BSU** – \$55,086 for Biomedical Research Vivarium Equipment and \$50,000 for Atomic Force Microscopy for Laxman Mainali
- **ISU** – \$113,000 for Flow2 (neuroimaging device) equipment and service contract for startup
- **LCSC** – \$43,737 for salary and fringe for LC State Librarian to support undergraduate and faculty research efforts
- **UI** – \$238,215 for High Resolution Chemical Ionization for the EcoTron project

# Undergraduate Research

Funding to support STEM undergraduates in research projects and travel to conferences

FY25 Undergraduate Research Budget - \$290,000

61 student research projects supported in FY25:

- **BSU** – 20 students across 15 disciplines supported at \$3,000 each
- **ISU** – 14 students across 8 STEM disciplines. Funding covered essential laboratory supplies and conference participation support
- **LCSC** – 8 students received fellowships and were able to present posters at either the LC State Research Symposium or ICUR
- **UI** – 4 students supported for Spring 2025 Semester Awards, 13 students supported for SURF projects, and 2 students supports for SURF-INBRE

# Idaho Conference on Undergraduate Research (ICUR)

Funding for a two-day undergraduate conference held each July. Link to ICUR... <https://www.boisestate.edu/icur/icur-2025/>

FY25 ICUR Budget - \$60,000

FY25 ICUR Highlights/Outcomes:

- 590 attendees (2024 = 444 attendees)
- 218 unique project posters, many interdisciplinary (2024 = 181 project posters)
- 623 project collaborators including presenters, co-authors, mentors (2024 = 550 collaborators)
- HERC funding was utilized to pay for transportation and housing for students to attend from across the state and for the space, A/V, and catering for the event

# Idaho Global Entrepreneurial Mission Fund (IGEM)

Competitive grant program used as seed funding for strengthening Idaho's future by strategically investing in the development of expertise, products, and services which result in state economic growth.

- 1- to 3-year grants up to \$700,000 per year
- FY25 IGEM Grant Budget: \$1,899,263
- Active Grants in FY25: 9

# FY25 Active IGEM Grants

- **IGEM 23-001:** Reconfigurable Attack-Defend Instructional Computing Laboratory (**RADICL**)  
University of Idaho  
\$700,000, for last year of a 3-year project
- **IGEM25-001:** Development of Methodologies, Instrumentation, and Assay Kits for Screening of Toxic Organic Pollutants in Environmental Sources  
Boise State University:  
\$187,100 for one-year project
- **IGEM25-002:** A microneedle-based transcutaneous Staphylococcus aureus vaccine  
Boise State University  
\$165,600, for one-year project
- **IGEM25-003:** AI Based Quality Control for Potato Harvesting  
Idaho State University  
\$95,656, for one-year project

# FY25 Active IGEM Grants (Continued)

- **IGEM25-004:** Demonstration of soil thickness and carbon (STC) method  
Idaho State University  
\$200,807 for first year of a two-year project
- **IGEM25-005:** Self-healing Composites for Aggressive Environments  
University of Idaho  
\$197,600 for 18-month project
- **IGEM25-006:** Flexible Data Collection and Analysis Systems for Precision  
Agriculture and Environmental Sensing  
University of Idaho  
\$119,800 for one-year project
- **IGEM25-007:** Recovery of Critical Materials from E-Waste  
University of Idaho  
\$140,000 for one-year project
- **IGEM25-008:** Developing Novel Fungicides for Sustainable Potato Production  
University of Idaho  
\$92,700 for one-year project

# FY25 IGEM Grant Annual and Final Reports

- See attachment 8 for FY25 annual and final reports
- Also, all current and past HERC-IGEM funded projects can be found in at the following link on the Board webpage:  
<https://boardofed.idaho.gov/board-facts/board-committees/higher-education-research-council-herc/current-herc-projects/>

## **2026 Idaho Conference on Undergraduate Research (ICUR)**

Please join students from across the state  
who will present their work

**July 15-16, 2026, at Boise State  
University**

<https://www.boisestate.edu/icur/>

## Example: IGEM26-003: Valorizing Potato Juice and Oat Pulp to Food Ingredients, Boise State

**What:** Recovers surplus and off-grade potatoes for conversion into protein, fiber, and starch for use as ingredients in consumer products.

**Why:** There is a glut of potatoes on the market that generate on the order of 1 to 5 dollars per hundredweight as cattle feed. The value add from this project, over animal feed, is about 30 dollars per hundredweight.

**Who:** Faculty and students along with partners at Genesis Organics, Simplot, and Streamline Precision. Quality testing and industrial scale up occurring in Glenns Ferry.

**Impact:** Waste reduction, job creation, new markets. Create 21 new jobs and generate \$4M in annual revenue by 2030.

## Example: I-GEM 25-003. AI Based Quality Control for Potato Harvesting, ISU

**What:** Proof of Concept: Develop an artificial intelligence (AI) system capable of non-destructive detection and subsequent loss of revenue due to removal of potatoes affected by hollow heart and other abnormalities.

**Why:** Physiological defects such as hollow heart in a potato crop can be devastating to farmers. Defects may result in an entire shipment of potatoes being rejected at points of inspection.

**Who:** Three faculty, 3 undergraduate research students and one graduate student (mechanical engineering program) with interest from two Idaho potato producers, Spudnik Equipment Company and Double L LLC.

**Impact:** For 300+ commercial potato growers in Idaho, reduce the estimated \$86 million annual loss due to poor quality, rejected potato crops.

Thank you.

**FY 2025 Allocation of HERC Funds**

FY2025

	<b>Allocation</b>	<b>\$4,019,000</b>
	<b>HERC IGEM</b>	<b>\$1,899,263</b>
	<b>Infrastructure Funds</b>	<b>\$854,000</b>
	<b>Matching Grants (EPSCoR Match)</b>	<b>\$800,000</b>
	<b>Incubation Fund</b>	<b>\$0</b>
	<b>Undergraduate Research</b>	<b>\$290,000</b>
	<b>Administrative Costs</b>	
<b>TOTAL</b>	<b>Sum</b>	<b>\$3,843,263</b>
<b>BALANCE</b>	<b>Balance</b>	<b>\$175,737</b>

**IGEM Funds**

UI	IGEM 23-001	700,000
BSU	IGEM 25-001	187,100
BSU	IGEM 25-002	165,600
ISU	IGEM 25-003	95,656
ISU	IGEM 25-004	200,807
UI	IGEM 25-005	197,600
UI	IGEM 25-006	119,800
UI	IGEM 25-007	140,000
UI	IGEM 25-008	92,700

**Total IGEM** **Committed IGEM Funds** **\$1,899,263**

**Research Infrastructure Funds**

BSU	\$250,000
ISU	\$250,000
UI	\$250,000
LCSC	\$104,000
<b>Total Infrastructure</b>	<b>\$854,000</b>

**Matching Award Grants**

NSF-EPSCoR	\$800,000
<b>Total Matching Grants</b>	<b>\$800,000</b>

**Targeted Research**

**Total Targeted Research**

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**Undergraduate Research**

BSU	\$65,000
ISU	\$65,000
UI	\$65,000
LCSC	\$30,000
Idaho Conference for Undergraduate Research (ICUR)	\$65,000
One-time money	

**Total Undergraduate Research** **\$290,000**

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**Administrative Costs**

FY25 Administrative Costs

**Total Administrative Costs**

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**Total Budget / Allocation** **\$3,843,263**

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Unused HERC-IGEM funds (\$175,737) plus \$5000 from the ICUR line that didn't get sent (because only \$60,000 was sent with the idea to hold back \$5,000 just in case more was needed).

Then at the HERC meeting held on March 24, 2025 it was decided to send the following amounts to the institutions to use for researching AI tools:

- BSU: \$50,000
- ISU: \$50,000
- LCSC: \$30,737
- UI: \$50,000

Total: 180,737

**BOISE STATE FY2025 PERFORMANCE MEASURES REPORT**

<b>Performance Measure</b>	<b>FY2021</b>	<b>FY2022</b>	<b>FY2023</b>	<b>FY2024</b>	<b>FY2025</b>	<b>Benchmark</b>
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey, 5 Year Average.	\$41,113,857	\$43,638,927	\$45,960,283	\$49,545,213	Not Available	5% average increase across the previous 5 years
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey. % increase over prior 5 yr period.	7.3%	6.1%	5.3%	7.8%	Not Available	5% average increase across the previous 5 years
Number of new sponsored project proposals submitted by an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho institution of higher education (in either direction).	23	26	30	37	27	5% annual increase
Number of new sponsored project awards to an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho public postsecondary institution (in either direction).	12	9	13	12	10	3% annual increase
Number of competitive research project per year supported by the Idaho Higher Education Research Council that directly address research opportunities outlined in Higher Education Research Strategic Plan and that involves at least two Idaho public postsecondary institutions.	2	1	0	0	0	1 per year
Statewide amount of awards with the Idaho National Laboratory by the institutions. 5 year average.	\$2,760,431	\$2,858,774	\$2,654,282	\$2,589,813	\$2,659,488	5% average increase across the previous 5 years
Statewide amount of awards with the Idaho National Laboratory by the institutions. % increase over prior 5 yr period.	5.0%	3.6%	-7.2%	-2.4%	2.7%	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). 5 year average. This funding from private sector only.	10.4	9.2	9.8	9.2	7.4	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). % increase over prior 5 yr period. This funding from private sector only.	-24.6%	-11.5%	6.5%	-6.1%	-19.6%	5% average increase across the previous 5 years

**BOISE STATE FY2025 PERFORMANCE MEASURES REPORT**

Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). 5 year average. This funding federal pass-through only.	4.2	4.6	4.4	4.8	5.4	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). % increase over prior 5 yr period. This funding federal pass-through only.	10.5%	9.5%	-4.3%	9.1%	12.5%	5% average increase across the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions. 5 year average.	24.2	26.0	32.6	36.8	42.4	5% average increase across the combined institutions from the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions. % increase over prior 5 year period.	-5.5%	7.4%	25.4%	12.9%	15.2%	5% average increase across the combined institutions from the previous 5 years
Number of invention disclosures resulting from research at the institutions. 5 year average.	17.0	16.8	16.0	13.4	11.8	5% average increase across the previous 5 years
Number of invention disclosures resulting from research at the institutions. % increase over prior 5 year period	0.00%	-1.18%	-4.76%	-16.25%	-11.94%	5% average increase across the previous 5 years
Number of invention disclosures vetted through entrepreneurial competitions or industry partnerships resulting from research at the institutions.			6	2	4	2 per year per institution
Number of undergraduate and graduate students at the institutions paid from sponsored projects. 5 year average	1118.0	1215.6	1247.2	1291.6	1319.0	3% average increase across the previous 5 years
Number of undergraduate and graduate students at the institutions paid from sponsored projects. % increase over prior 5 year period	7.25%	8.73%	2.60%	3.56%	2.12%	3% average increase across the previous 5 years
Percentage of degree-seeking undergraduate students at the institutions who had a research experience. 5 year average	39.0%	38.8%	38.1%	36.7%	35.3%	10% average increase across the previous 5 years
Percentage of degree-seeking undergraduate students at the institutions who had a research experience. % increase over prior 5 year period	-0.49%	-0.57%	-1.71%	-3.59%	-4.05%	10% average increase across the previous 5 years
Number of faculty and staff at the institutions paid from sponsored projects. 5 year average	993.2	1066.6	1121.2	1137.4	1135.2	3% average increase across the previous 5 years
Number of faculty and staff at the institutions paid from sponsored projects. % increase over prior 5 year period	6.8%	7.4%	5.1%	1.4%	-0.2%	3% average increase across the previous 5 years

**Performance Measure Explanatory Notes:**

**BOISE STATE FY2025 PERFORMANCE MEASURES REPORT**

Note A - Activity with private sector/industry - (a) is funding from private sector, and (b) is funding from private sector, federal flow through.

**IDAHO STATE UNIVERSITY FY2025 PERFORMANCE MEASURES REPORT**

<b>Performance Measure</b>	<b>FY2023</b>	<b>FY2024</b>	<b>FY2025</b>	<b>FY2026</b>	<b>FY2027</b>	<b>Benchmark</b>
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey,	\$7,404,000	\$7,569,000	\$7,747,171	\$0	\$0	5% average increase across the previous 5 years
Number of new sponsored project proposals submitted by an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho public postsecondary institution (in either direction).	37	36	28	0	0	5% annual increase
Number of new sponsored project awards to an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho public postsecondary institution (in either direction).	31	22	20	0	0	3% annual increase
Number of competitive research project per year supported by the Idaho Higher Education Research Council that directly address research opportunities outlined in this strategic plan and that involve at least two Idaho public postsecondary institutions.	0	0	0	0	0	1 per year
Statewide amount of awards with the Idaho National Laboratory by the institutions as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey.	\$2,499,045	\$2,780,447	\$1,252,600	\$0	\$0	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.).	64	48	35	0	0	5% average increase across the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions.	1	0	1	0	0	5% average increase across the combined institutions from the previous 5 years
Number of invention disclosures resulting from research at the institutions.	1	6	4	0	0	5% average increase across the previous 5 years
Number of invention disclosures vetted through entrepreneurial competitions or industry partnerships resulting from research at the institutions.	1	6	4	0	0	2 per year per institution
Number of undergraduate and graduate students at the institutions paid from sponsored projects.	362	382	424	0	0	3% average increase across the previous 5 years
Percentage of degree-seeking undergraduate students at the institutions who had a research experience.	36%	36%	37%	0%	0%	10% average increase across the previous 5 years

IDAHO STATE UNIVERSITY FY2025 PERFORMANCE MEASURES REPORT

Number of faculty and staff (combined metric) at the institutions paid from sponsored projects.	231	211	235	0	0	3% average increase across the previous 5 years
<b>K-20 Statewide Strategic Plan Performance Measures</b>						
Percentage of students participating in undergraduate research.	36%	36%	37%	0%	0%	Note: This measure is being requested independently from your IR offices.

**LEWIS CLARK STATE COLLEGE FY2025 PERFORMANCE MEASURES REPORT**

<b>Performance Measure</b>	<b>FY2024</b>	<b>FY2025</b>	<b>FY2026</b>	<b>FY2027</b>	<b>FY2028</b>	<b>Benchmark</b>
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey, 5 Year Average.*	463000*	470113*				5% average increase across the previous 5 years
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey. % increase over prior 5 yr period.*	N/A	N/A				5% average increase across the previous 5 years
Number of new sponsored project proposals submitted by an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho institution of higher education (in either direction).	0	0				5% annual increase
Number of new sponsored project awards to an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho public postsecondary institution (in either direction).	0	0				3% annual increase
Number of competitive research project per year supported by the Idaho Higher Education Research Council that directly address research opportunities outlined in Higher Education Research Strategic Plan and that involves at least two Idaho public postsecondary institutions.	0	0				1 per year
Statewide amount of awards with the Idaho National Laboratory by the institutions. 5 year average.	0	0				5% average increase across the previous 5 years
Statewide amount of awards with the Idaho National Laboratory by the institutions. % increase over prior 5 yr period.*	N/A	N/A				5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). 5 year average. This funding from private sector only. See Note A*	0	0				5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). % increase over prior 5 yr period. This funding from private sector only. See Note A*	N/A	N/A				5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). 5 year average. This funding is federal pass-through only. See Note A*	0	0				5% average increase across the previous 5 years

**LEWIS CLARK STATE COLLEGE FY2025 PERFORMANCE MEASURES REPORT**

Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). % increase over prior 5 yr period. This funding is federal pass-through only. See Note A*	N/A	N/A				5% average increase across the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions. 5 year average.*	0	0				5% average increase across the combined institutions from the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions. % increase over prior 5 year period.*	N/A	N/A				5% average increase across the combined institutions from the previous 5 years
Number of invention disclosures resulting from research at the institutions. 5 year average.*	0	0				5% average increase across the previous 5 years
Number of invention disclosures resulting from research at the institutions. % increase over prior 5 year period*	N/A	N/A				5% average increase across the previous 5 years
Number of invention disclosures vetted through entrepreneurial competitions or industry partnerships resulting from research at the institutions.	0	0				2 per year per institution
Number of undergraduate and graduate students at the institutions paid from sponsored projects. 5 year average*	28	14				3% average increase across the previous 5 years
Number of undergraduate and graduate students at the institutions paid from sponsored projects. % increase over prior 5 year period*	N/A	N/A				3% average increase across the previous 5 years
Percentage of degree-seeking undergraduate students at the institutions who had a research experience. 5 year average*	11%	8%				10% average increase across the previous 5 years
Percentage of degree-seeking undergraduate students at the institutions who had a research experience. % increase over prior 5 year period*	N/A	N/A				10% average increase across the previous 5 years
Number of faculty and staff at the institutions paid from sponsored projects. 5 year average*	6.00	4.00				3% average increase across the previous 5 years
Number of faculty and staff at the institutions paid from sponsored projects. % increase over prior 5 year period*	N/A	N/A				3% average increase across the previous 5 years

**\*Data not available for 5 year period. FY24 total amount of research expenditures corrected and FY24 & FY25 includes indirect costs.**

**Performance Measure Explanatory Notes:**

Note A - Activity with private sector/industry - (a) is funding from private sector, and (b) is funding from private sector, federal flow through.

**UNIVERSITY OF IDAHO FY2025 PERFORMANCE MEASURES REPORT**

<b>Performance Measure</b>	<b>FY2020</b>	<b>FY2021</b>	<b>FY2022</b>	<b>FY2023</b>	<b>FY2024</b>	<b>Benchmark</b>
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey, 5 Year Average.	\$109,640,230	\$110,327,710	\$111,540,817	\$116,402,928	\$122,132,257	5% average increase across the previous 5 years
Statewide amount of total annual research and development expenditures as reported in the National Science Foundation (NSF) Higher Education Research and Development Survey. % increase over prior 5 yr period.	2.88%	0.63%	1.10%	4.36%	4.92%	5% average increase across the previous 5 years
Number of new sponsored project proposals submitted by an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho institution of higher education (in either direction).	16	18	17	22	26	5% annual increase
Number of new sponsored project awards to an Idaho University that are collaborative, and have a subaward (or are NSF Collaborative) with another Idaho public postsecondary institution (in either direction).	11	6	6	14	16	3% annual increase
Number of competitive research project per year supported by the Idaho Higher Education Research Council that directly address research opportunities outlined in Higher Education Research Strategic Plan and that involves at least two Idaho public postsecondary institutions.	N/A, new metric	N/A, new metric	2	2	1	1 per year
Statewide amount of awards with the Idaho National Laboratory by the institutions. 5 year average.	25.40	28.60	31.20	34.20	35.40	5% average increase across the previous 5 years
Statewide amount of awards with the Idaho National Laboratory by the institutions. % increase over prior 5 yr period.	11.40%	12.60%	9.09%	9.62%	3.51%	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). 5 year average. This funding from private sector only. See Note A	50.80	52.20	50.60	47.80	41.40	5% average increase across the previous 5 years

**UNIVERSITY OF IDAHO FY2025 PERFORMANCE MEASURES REPORT**

Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). % increase over prior 5 yr period. This funding from private sector only. See Note A	4.10%	2.76%	-3.07%	-5.53%	-13.39%	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). 5 year average. This funding is federal pass-through only. See Note A	20.40	21.20	21.60	24.00	24.00	5% average increase across the previous 5 years
Number of new sponsored projects with private sector contributions (funds, in-kind, etc.). % increase over prior 5 yr period. This funding is federal pass-through only. See Note A	10.87%	3.92%	1.89%	11.11%	0.00%	5% average increase across the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions. 5 year average.	6.6	7	8.6	10	10.4	5% average increase across the combined institutions from the previous 5 years
Number of technology transfer agreements, as defined the Association of University Technology Managers, resulting from research at the institutions. % increase over prior 5 year period.	-13.16%	6.06%	22.86%	16.28%	4.00%	5% average increase across the combined institutions from the previous 5 years
Number of invention disclosures resulting from research at the institutions. 5 year average.	24.8	27.2	27	24.6	22.6	5% average increase across the previous 5 years
Number of invention disclosures resulting from research at the institutions. % increase over prior 5 year period	20.39%	9.68%	-0.74%	-8.89%	-8.13%	5% average increase across the previous 5 years
Number of invention disclosures vetted through entrepreneurial competitions or industry partnerships resulting from research at the institutions.	N/A, new metric	N/A, new metric	11	8	6	2 per year per institution
Number of undergraduate and graduate students at the institutions paid from sponsored projects. 5 year average	1180	1151.4	1118.6	1079	1080	3% average increase across the previous 5 years
Number of undergraduate and graduate students at the institutions paid from sponsored projects. % increase over prior 5 year period	-1.24%	-2.42%	-2.85%	-3.54%	0.09%	3% average increase across the previous 5 years
Percentage of degree-seeking undergraduate students at the institutions who had a research experience. 5 year average	60%	60%	57%	56%	55%	10% average increase across the previous 5 years

UNIVERSITY OF IDAHO FY2025 PERFORMANCE MEASURES REPORT

Percentage of degree-seeking undergraduate students at the institutions who had a research experience. % increase over prior 5 year period	-0.51%	-1.08%	-3.98%	-2.09%	-1.59%	10% average increase across the previous 5 years
Number of faculty and staff at the institutions paid from sponsored projects. 5 year average	1264.80	1273.80	1286.20	1289.00	1285.40	3% average increase across the previous 5 years
Number of faculty and staff at the institutions paid from sponsored projects. % increase over prior 5 year period	1.49%	0.71%	0.97%	0.22%	-0.28%	3% average increase across the previous 5 years

**Performance Measure Explanatory Notes:**

Note A - Activity with private sector/industry - (a) is funding from private sector, and (b) is funding from private sector, federal flow through.

**BOISE STATE UNIVRSITY Sponsored Project Activity Report FY2025**

*Awards for the Period July 1, 2024 through June 30, 2025*

Activity Type		Federal	State	Industry	Other	Total	% of Grand Total
<b>Instruction:</b>							
	Sponsored Programs	\$ 1,080,764	\$ 1,834,087	\$ -	\$ 89,036	\$ 3,003,887	
	State Instruction Appropriations	\$ -	\$ 9,900	\$ -	\$ -	\$ 9,900	
	<b>Subtotal Instruction</b>	\$ 1,080,764	\$ 1,843,987	\$ -	\$ 89,036	\$ 3,013,787	4.26%
<b>Research:</b>							
	Sponsored Programs	\$ 42,010,725	\$ 987,324	\$ 284,238	\$ 1,724,413	\$ 45,006,700	
	State Research Appropriations	\$ -	\$ 584,000	\$ -	\$ -	\$ 584,000	
	<b>Subtotal Research</b>	\$ 42,010,725	\$ 1,571,324	\$ 284,238	\$ 1,724,413	\$ 45,590,700	64.40%
<b>Other Sponsored Activities:</b>							
	Sponsored Programs	\$ 15,139,598	\$ 4,356,673	\$ 223,338	\$ 1,718,850	\$ 21,438,459	
	State Other Sponsored Activities Appropriations	\$ -	\$ 744,961	\$ -	\$ -	\$ 744,961	
	<b>Subtotal Other Sponsored Activities</b>	\$ 15,139,598	\$ 5,101,634	\$ 223,338	\$ 1,718,850	\$ 22,183,420	31.34%
<b>More Than One Type</b>							
	Sponsored Programs	\$ -	\$ -	\$ -	\$ -	\$ -	
	State Other Sponsored Activities Appropriations	\$ -	\$ -	\$ -	\$ -	\$ -	
	<b>Subtotal More Than One Type</b>	\$ -	\$ -	\$ -	\$ -	\$ -	0.00%
<b>Grand Totals</b>		\$ 58,231,086	\$ 8,516,945	\$ 507,576	\$ 3,532,299	\$ 70,787,906	
<b>Percent of Grand Total</b>		<b>82.26%</b>	<b>12.03%</b>	<b>0.72%</b>	<b>4.99%</b>	<b>100%</b>	<b>100%</b>

*Expenditures for the Period July 1, 2024 through June 30, 2025*

Activity Type		Federal	State	Industry	Other	Totals	% of Grand Total
<b>Instruction:</b>							
	Sponsored Programs	\$ 1,639,046	\$ 1,487,917	\$ -	\$ 215,921	\$ 3,342,885	
	State Instruction Appropriations	\$ -	\$ -	\$ -	\$ -	\$ -	
	<b>Subtotal Instruction</b>	\$ 1,639,046	\$ 1,487,917	\$ -	\$ 215,921	\$ 3,342,885	4.72%
<b>Research:</b>							
	Sponsored Programs	\$ 40,802,374	\$ 891,839	\$ 166,839	\$ 1,662,980	\$ 43,524,032	
	State Research Appropriations	\$ -	\$ 330,595	\$ -	\$ -	\$ 330,595	
	<b>Subtotal Research</b>	\$ 40,802,374	\$ 1,222,434	\$ 166,839	\$ 1,662,980	\$ 43,854,627	61.88%
<b>Other Sponsored Activities:</b>							
	Sponsored Programs	\$ 18,447,681	\$ 3,488,291	\$ 98,487	\$ 1,540,198	\$ 23,574,657	
	State Other Sponsored Activities Appropriations	\$ -	\$ 92,794	\$ -	\$ -	\$ 92,794	
	<b>Subtotal Other Sponsored Activities</b>	\$ 18,447,681	\$ 3,581,085	\$ 98,487	\$ 1,540,198	\$ 23,667,451	33.40%
<b>Grand Totals</b>		\$ 60,889,101	\$ 6,291,436	\$ 265,326	\$ 3,419,099	\$ 70,864,963	
<b>Percent of Grand Total</b>		<b>85.92%</b>	<b>8.88%</b>	<b>0.37%</b>	<b>4.82%</b>	<b>100%</b>	<b>100%</b>

**Idaho State University**  
**Office for Research**  
**Research Activity Report (FY2025)**  
 Award Breakdown by Funding Agency Type and Project  
 Type July 1, 2024 through June 30, 2025

	Federal	State	Industry	Other/Foundation	Totals	Percent of Total
Research	9,252,775	1,717,273	1,311,498	3,499,078	15,780,624	33%
Training and Instruction	6,786,499	3,362,723	1,411,681	280,885	11,841,788	25%
Other/Public Service	14,499,466	3,742,004	877,610	741,635	19,860,715	42%
Totals	30,538,740	8,822,000	3,600,789	4,521,598	47,483,127	100%
Percent of Total	64%	19%	8%	10%	100%	

State = Awards from state of Idaho agencies, including other state universities and colleges

Other/Foundation = Awards from other funding agencies, such as foundations, universities from outside of Idaho, local municipalities, non-profits, etc.

**Idaho State  
University Office for  
Research  
Research Activity Report  
(FY2025)**

Expenditures Breakdown by Funding Agency Type and Project Type  
July 1, 2024 through June 30, 2025

	Federal	State	Industry	Other/Foundation	Totals	Percent of Total
Research	4,500,420	2,370,151	2,128,260	1,511,248	10,510,079	25%
Training and Instruction	10,111,262	4,426,068	1,503,642	502,760	16,543,732	39%
Other/Public Service	11,946,471	3,236,514	212,765	61,312	15,457,062	36%
Totals	26,558,153	10,032,733	3,844,667	2,075,320	42,510,873	100%
Percent of Total	62%	24%	9%	5%	100%	

**INFORMATIONAL  
APRIL 15-16, 2026**

**ATTACHMENT 4**

**University of Idaho - FY2025 Research Activity Report**

*Awards and Allocations for the Period July 1, 2024 through June 30, 2025*

	Federal	State of Idaho	Industry	Other	Institutional	Total	% of Grand Total	% of Sponsor Total
<b>Instruction:</b>								
Sponsored Programs	\$ 836,724.64	\$ 323,088.24	\$ 51,333.75	\$ 88,026.25	\$ -	\$ 1,299,172.88		1.17%
	\$ 836,724.64	\$ 323,088.24	\$ 51,333.75	\$ 88,026.25	\$ -	\$ 1,299,172.88	0.67%	
<b>Research:</b>								
Sponsored Programs	\$ 57,493,055.70	\$ 1,954,509.66	\$ 913,200.80	\$ 5,595,671.10	\$ -	\$ 65,956,437.26		59.48%
Federal Land Grant Appropriations	2,896,334.00					2,896,334.00		
State Other Appropriations		13,725,532.48				13,725,532.48		
State Restricted Appropriations (CALs,FUR,IGS,EPSCoR,CAES,SHAMP)		26,428,704.27				26,428,704.27		
Other Sources				2,872,338.19	16,187,246.34	19,059,584.53		
<b>Subtotal Research:</b>	\$ 60,389,389.70	\$ 42,108,746.41	\$ 913,200.80	\$ 8,468,009.29	\$ 16,187,246.34	\$ 128,066,592.54	66.39%	
<b>Public Service:</b>								
Sponsored Programs	\$ 37,594,307.45	\$ 3,607,095.44	\$ 382,362.00	\$ 2,048,944.28	\$ -	\$ 43,632,709.17		39.35%
Federal Land Grant Appropriations	3,150,862.00					3,150,862.00		
State ARPA Appropriation		532,100.00				532,100.00		
State Extension Appropriation		16,221,209.00				16,221,209.00		
Other Sources					487,941.89	487,941.89		
<b>Subtotal Public Service:</b>	\$ 40,745,169.45	\$ 20,360,404.44	\$ 382,362.00	\$ 2,048,944.28	\$ 487,941.89	\$ 63,536,880.17	32.94%	
<b>Construction:</b>								
Sponsored Programs	-	-	-	-	\$ -	-	0%	0%
<b>Total Sponsored Programs Awards</b>	<b>\$ 95,924,087.79</b>	<b>\$ 5,884,693.34</b>	<b>\$ 1,346,896.55</b>	<b>\$ 7,732,641.63</b>	<b>\$ -</b>	<b>\$ 110,888,319.31</b>		
<b>Percent of Total Sponsored Programs Awards</b>	<b>88%</b>	<b>5%</b>	<b>1%</b>	<b>6%</b>	<b>0%</b>	<b>100%</b>		<b>100%</b>
<b>Grand Total of All Awards Per Category</b>	<b>\$ 101,971,283.79</b>	<b>\$ 62,792,239.09</b>	<b>\$ 1,346,896.55</b>	<b>\$ 10,604,979.82</b>	<b>\$ 16,675,188.23</b>	<b>\$ 192,902,645.59</b>		
<b>Percent of All Awards</b>	<b>53%</b>	<b>33%</b>	<b>1%</b>	<b>5%</b>	<b>8%</b>	<b>100%</b>	<b>100%</b>	

*Expenditures for the Period July 1, 2024 through June 30, 2025*

	Federal	State of Idaho	Industry	Other	Institutional	Total	% of Grand Total	% of Sponsor Total
<b>Instruction:</b>								
Sponsored Programs	\$ 2,931,785.66	\$ 61,844.75	\$ 54,138.75	\$ 296,404.06	\$ 468,781.36	\$ 3,812,954.58		3.0%
	\$ 2,931,785.66	\$ 61,844.75	\$ 54,138.75	\$ 296,404.06	\$ 468,781.36	\$ 3,812,954.58	1.8%	
<b>Research:</b>								
Sponsored Programs	\$ 69,244,104.49	\$ 1,586,166.22	\$ 1,322,419.62	\$ 4,841,299.52	\$ 9,692,849.77	\$ 86,686,839.62		67.8%
Federal Land Grant Appropriations	2,358,705.97	-	-	-	-	2,358,705.97		
State Research Appropriations (CALs,FUR,IGS,EPSCoR)	-	14,390,859.75	-	-	-	14,390,859.75		
State Other Appropriations	-	27,754,724.47	-	-	-	27,754,724.47		
Other Sources	-	-	-	2,872,338.19	17,447,805.47	20,320,143.66		
<b>Subtotal Research:</b>	\$ 71,602,810.46	\$ 43,731,750.44	\$ 1,322,419.62	\$ 7,713,637.71	\$ 27,140,655.24	\$ 151,511,273.47	71.9%	
<b>Public Service:</b>								
Sponsored Programs	\$ 28,634,581.67	\$ 1,768,966.24	\$ 540,602.96	\$ 1,938,322.50	\$ 4,417,116.93	\$ 37,299,590.30		29.2%
Federal Land Grant Appropriations	3,273,082.67					3,273,082.67		
State ARPA Appropriation		433,977.58				433,977.58		
State Extension Appropriations		13,993,150.71				13,993,150.71		
Other Sources					487,941.89	487,941.89		
<b>Subtotal Public Service:</b>	\$ 31,907,664.34	\$ 16,196,094.53	\$ 540,602.96	\$ 1,938,322.50	\$ 4,905,058.82	\$ 55,487,743.15	26.3%	
<b>Construction:</b>								
Sponsored Programs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	0.0%	0.0%
<b>Total Sponsored Programs Expenditures</b>	<b>\$ 100,810,471.82</b>	<b>\$ 3,416,977.21</b>	<b>\$ 1,917,161.33</b>	<b>\$ 7,076,026.08</b>	<b>\$ 14,578,748.06</b>	<b>\$ 127,799,384.50</b>		
<b>Percent of Total Sponsored Programs Expenditures</b>	<b>79%</b>	<b>3%</b>	<b>2%</b>	<b>6%</b>	<b>10%</b>	<b>100%</b>		<b>100%</b>
<b>Grand Total of All Expenditures Per Category</b>	<b>\$ 106,442,260.46</b>	<b>\$ 59,989,689.72</b>	<b>\$ 1,917,161.33</b>	<b>\$ 9,948,364.27</b>	<b>\$ 32,514,495.42</b>	<b>\$ 210,811,971.20</b>		
<b>Percent of All Expenditures</b>	<b>51%</b>	<b>28%</b>	<b>1%</b>	<b>5%</b>	<b>15%</b>	<b>100%</b>	<b>100%</b>	

## FY 2025 INFRASTRUCTURE REPORT SUMMARY – Boise State

<i>Detailed Allocations</i>	
<i>Library Support</i>	
<i>Graduate Research Assistantships/Research Associates</i>	
<i>Post Doctoral Fellows</i>	
<i>Technician Support</i>	
<i>Maintenance Contracts</i>	
<i>Research Equipment</i>	\$192,520.56
<i>Competitively Awarded Summer Research Support</i>	\$5,924.40
<i>Start-Up Funds for New Hires</i>	\$51,460.67
<i>Incentives to Reward Faculty for Research Achievements</i>	
<i>Other (Generative AI needs)</i>	\$49,711.82 (includes \$2,850.82 in GA support, \$2,000 in faculty incentive stipends, \$3,843,47 in summer salary support, \$40,923.16 in AI equipment and software needs)
<i>Total Allocation</i>	\$299,617.45

## FY 2025 INFRASTRUCTURE REPORT SUMMARY – Boise State

<b><i>Detailed Allocations</i></b>	
<b><i>Publications in refereed journals</i></b>	
<b><i>Presentations at professional meetings and conferences</i></b>	
<b><i>Grants Received as a result</i></b>	2
<b><i>Grants Pending</i></b>	4
<b><i>Student Participation</i></b>	2 (Graduate Assistants – AI and Jared Talley Research Graduate Assistant)
<b><i>Faculty Participation</i></b>	24
<b><i>Other Participation</i></b>	100+ faculty and staff utilizing AI software due to these funds (Gemini, ChatGPT, AmplifyAI)
<b><i>Patents Awarded</i></b>	
<b><i>Patents Pending</i></b>	
<b><i>Manuscripts Submitted</i></b>	

## FY 2025 INFRASTRUCTURE REPORT SUMMARY – Boise State

Notes:

### Start-up funds:

Jared Talley (School of Public Service) Startup Funds– \$14,356.56

- Submission of 1 proposal in FY25

Hwan Kim (School of Allied Health Sciences, Director of new Neuroscience Program) Startup Funds- \$37,104.11

- Submission of 3 federal proposals, awarding of 2 proposals in FY25

= \$51,460.67

### Research Equipment:

Eye Tracking Device Equipment for Daibao Guo, matching SEED grant funds for *Elementary Students' Cognitive Processes and Learning Strategies for Reading Illustrated Science Texts: Eye-Movement Measurements*. - \$16,160 (\$141.95 returned)

- Results informed proposal submission to Spencer Foundation's Research Grants on Education: Large

Evos fluorescence microscope for Department of Biological Sciences use - \$25,000

Atomic Force Microscopy for Laxman Mainali - \$50,000

Office of Information Technology purchase of Google Gemini for Higher Education, Amplify AI - \$46,416.84

Biomedical Research Vivarium Equipment (including anesthesia equipment, somnoflo electronic vaporizer, i-STAT alinity blood machine, laboratory refrigerators for storing samples, and new procedure tables)- \$55,085.67

= \$192,520.56

Summer Research Support for faculty - \$5,924.40

Generative AI Funds - \$49,711.82

- \$38,583.16 used by Office of Information Technology to further support campus AI initiatives and increase access to systems like Google Gemini, ChatGPT, AmplifyAI for 100+ faculty and staff.

TOTAL: \$299,617.45

### Returns

- Return of \$382.55 to SBOE in August 2025 due to difference in fringe costs from awarded amount compared to actuals for a Graduate Student (paid with Generative AI funds) and summer research support.

TOTAL: (\$382.55)

# FY 2025 INFRASTRUCTURE REPORT SUMMARY – Boise State

FY25 Total: \$300,000

IDAHO STATE UNIVERSITY FY 2025 INFRASTRUCTURE REPORT SUMMARY

ISU FY 2025	Total \$	Detailed Allocations
<i>Library Support</i>	\$0	None
<i>Graduate Research Assistantships / Research Associates</i>	\$0	None
<i>Post-Doctoral Fellows</i>	\$0	None
<i>Technician Support</i>	\$0	None
<i>Maintenance Contracts</i>	\$28,387	Service contract for the Sanger Sequencer (SEQSTUDIO 8 FLEX) in the MRCF, \$11,604. Service agreement for ICP-OES spectrometer, \$586. DNA sequencer maintenance contract, \$16,198.
<i>Research Equipment</i>	\$29,571	The ICP-OES instrument is used in both chemistry teaching laboratory classes and for faculty research work. It is used to analyse liquid samples, 18,749. HPGe gamma Spectrometer (partial funded) used in Radiation Safety Department and plays a critical role in federal compliance and is used in training students and departments on radiation measurements techniques. Computers needed in the MRCF for DNA sequencing were purchased due to a Windows 11 upgrade requirement, \$4,922.
<i>Competitively Awarded Summer Research Support</i>	\$0	None
<i>Start-Up Funds for New Hires</i>	\$178,875	Dr Rotman audiology equipment for startup, \$30k. Dr Silva Kernel Flow2 (neuroimaging device) equipment and service contract for startup and he also has a PhD student using this for his dissertation, \$113,700. Dr Jones pharmacy startup equipment (BeNano Series is the latest generation of nanoparticle size and zeta potential analyzers and has DLS, ELS, and SLS integrated into the system to measure particle size, zeta potential, and molecular weight), \$35,175.
<i>Incentives to Reward Faculty for Research Achievements</i>	\$0	None
<i>Other</i>	\$13,167	Cost of administrative recovery assessment fees, \$899. Various (rotary pump which is part of the Isotope Ratio Mass Spectrometry (IRMS), water purification system) repairs/required updates associated with equipment, 12,268.
<b>Total Allocation</b>	<b>\$250,000</b>	

IDAHO STATE UNIVERSITY  
FY 2025 INFRASTRUCTURE REPORT SUMMARY

ISU FY 2025	
<b>Publications in Refereed Journals</b>	One in preparation for Journal of Polymer Chemistry associated with the ICP-OES instrument. In connection with the new BeNano 180Zeta Pro Uni instrument, there is on under preparation by Dr Jesse Jones and another under immediate preparation by Dr Ali Habashi.
<b>Presentations at Professional Meetings and Conferences</b>	Three Professional Presentations (in connection with the ICP-OES instrument): One at the American Chemical Society (ACS) national meeting, polymer chemistry section. Two at the ISU Research Symposium, both in the Biochemistry section. In addition, there were two abstracts submitted for the upcoming American Chemical Society Accreditation meetings. In connection with the new BeNano 180Zeta Pro Uni instrument, there was a Poster presentations at Idaho INBRE Meeting July 28-30 2025 (Taedyn Jacobsen, Jesse Jones, Outstanding Poster Presentation Award--Jones Lab); and ASPET 2025 Annual Meeting being held April 3-6, 2025 at the Hilton Portland Downtown in Portland, Oregon, USA (Ali Habashi--Habashi Lab).
<b>Grants Received as a Result</b>	NIH Modulation of Breast Cancer Met (PI: Dr Ali Habashi) with a total award amount of over \$700k which is in association with the BeNano 180Zeta Pro Uni instrument.
<b>Grants Pending</b>	In connection with the ICP-OES instrument there was one grant application submitted to the Idaho Space Consortium (NASA), \$24,959, and another grant with NSF-EPSCOR in the planning stage. In association with the BeNano 180Zeta Pro Uni instrument there are also the following grants in preparation: R15, R16, and NSF CAREER (Dr Jones).
<b>Student Participation</b>	In connection with the Molecular Research Core Facility (MRCF) DNA sequencers there were at least 81 ISU students and another 177 non-ISU students who were reported to have been served/benefited by these instruments. The new ICP-OES instrument is used in two classes and in several undergraduate research projects and student participation includes: 10+ Student operators, four Student Presentations, two Student funding in grants. The Kernel is being used by a PhD student to design a study looking at the brain network involved in error correction for his dissertation, and also plans to use it to develop a neuroimaging study involving music (by collaborating with the ISU Music dept). There are around 15-20 studnets who use the SIL annually. The DNA sequencer provides data from this instrument impacts many ISU research endeavors with grant funded projects and graduate and undergraduate studies. Students learn nuclear radiation measurement techniques at ISU because we have this. In association with the BeNano 180Zeta Pro Uni instrument there were four graduate students, and six undergraduate students, including one from BYU-I through the INBRE undergrad fellow program. The new High Purity Germanium (HPGe) gamma spectrometer is used as a resource by the Radiation Safety Department for train students in nuclear measurement techniques. Rotary pump which is part of the Isotope Ratio Mass Spectrometry (IRMS) is used by around 15-20 students/year.
<b>Faculty Participation</b>	In connection with the Molecular Research Core Facility (MRCF) DNA sequencers there were 15 ISU faculty PI's who benefited from these instruments. The new ICP-OES instrument has four faculty who are now trained operators, and two faculty and staff are trained maintenance operators. There are around 6-10 faculty who use the SIL annually. Dr Tali Rotman's startup was funded from this award. Dr Silva's startup was funded from this award. Dr Jone's startup support. DNA sequencer provides data for ISU faculty as well as external researchers. In association with the BeNano 180Zeta Pro Uni instrument there were two faculty involved: Dr Jesse Jones and Dr Ali A. Habashi. Rotary pump which is part of the Isotope Ratio Mass Spectrometry (IRMS) is used by around 6-10 faculty/year.
<b>Other Participation</b>	In connection with the Molecular Research Core Facility (MRCF) DNA sequencers there were also 32 non-ISU faculty PI's and 177 non-ISU students from other universities/entities who benefited from these instruments. The List of External Universities includes: BSU, BYU-I, College of Eastern Idaho, Midwestern University, Montana State University, Northwest Nazarene University, Oregon State University, State University of New York, University of Idaho, University of Idaho - Aberdeen, University of Montana, University of Nevada (Las Vegas), University of Nevada (Reno), USDA, Weber State University, Winona State. The SIL is used by 5-10 various federal agencies and other universities annual. The new High Purity Germanium (HPGe) gamma spectrometer is used as a resource by the Radiation Safety Department for train ISU departments in nuclear measurement techniques. Rotary pump which is part of the Isotope Ratio Mass Spectrometry (IRMS) is used by around 5-10 other universities or various federal agencies/year.
<b>Patents Awarded</b>	None
<b>Patents Pending</b>	There is one preliminary patent in the ISU system currently that is associated with work done with the new ICP-OES instrument.

LEWIS CLARK STATE COLLEGE FY 2025 INFRASTRUCTURE REPORT SUMMARY

	Total \$	Detailed Allocations	
<b>Library Support</b>	\$46,694	See Library Support Detail tab.	
<b>Qualtrics License</b>	\$8,691	Annual campus license for survey software for use by students as well as faculty and staff for their survey research.	
<b>Research Symposium</b>	\$4,878	Faculty and Student independent research projects presentations	
<b>Salary for Research Librarian</b>	\$43,737	Salary and fringe for LC State Librarian to support undergraduate and faculty research efforts.	
<b>Total Expenditures</b>	\$104,000		
	Detailed Allocations		
<b>Publications in Refereed Journals</b>			
<b>Presentations at Professional Meetings and Conferences</b>			
<b>Grants Received as a Result</b>			
<b>Grants Pending</b>			
<b>Student Participation</b>	Students utilize the research librarian and the purchased library resources in coursework, undergraduate research activities, and in preparing for the annual LC State Research Symposium. For survey research, Qualtrics survey software was purchased using HERC Infrastructure funds for students' use at no cost.		
<b>Faculty Participation</b>	Faculty utilize the research librarian, Qualtrics software products, the purchased library resources and assist students in preparing for the annual LC State Research Symposium.		
<b>Other Participation</b>	Community members, faculty and staff emeritus, and alumni are invited to attend the research symposium each year.		
<b>Patents Awarded</b>			
<b>Patents Pending</b>			

**FY 2025 - University of Idaho  
 INFRASTRUCTURE REPORT SUMMARY**

	Total \$	Detailed Allocations
<i>Library Support</i>	\$0	
<i>Graduate Research Assistantships / Research Associates</i>	\$0	
<i>Post-Doctoral Fellows</i>	\$0	
<i>Technician Support</i>	\$0	
<i>Maintenance Contracts</i>	\$0	
<i>Equipment</i>	\$288,215	\$50,000 -Exxact TensorEX 4U Rackmount Dual AMD 9004/9005 10x GPU Capable Capable Server for Research and Computing Data Sciences unit work on AI initiatives; \$238,215 - High Resolution Chemical Ionization for the EcoTron project to ensure scope could be fulfilled as expected.
<i>Start-Up Funds for New Hires</i>	\$0	
<i>Incentives to Reward Faculty for Research Achievements</i>	\$4,146	\$1,646 Excellence in Research Awards; \$2,500 Power of Possibility Research Faculty Award;
<i>Other</i>	\$7,639	\$98 for (1) UI Faculty participant to travel to the NIH R01 program in Lincoln, NE; \$7,286 for PostDoc/Faculty Mentor Award; \$255 NASA EPSCoR Conference Room upgrades;
<b>Total Allocation</b>	\$300,000	

**FY 2025 - University of Idaho  
 INFRASTRUCTURE REPORT SUMMARY**

	Detailed Allocations
<i>Publications in Refereed Journals</i>	
<i>Presentations at Professional Meetings and Conferences</i>	1
<i>Grants Received as a Result</i>	
<i>Grants Pending</i>	
<i>Student Participation</i>	58
<i>Faculty Participation</i>	25
<i>Other Participation</i>	1
<i>Patents Awarded</i>	
<i>Patents Pending</i>	

*NOTE: Other participation includes postdocs, research scientists, research specialists, and stakeholders.*

**Higher Education Research Council  
Undergraduate Research Fellows  
Boise State University  
Final Report**

**Academic Year 2024-2025**

Jim Fredricksen, Director, Institute for Inclusive & Transformative Scholarship  
Lavanya Seetamraju, Undergraduate Research Project Manager, Institute for Inclusive & Transformative  
Scholarship  
Nico Diaz, Senior Student Initiatives Coordinator, Institute for Inclusive & Transformative Scholarship

## Introduction

The Institute for Inclusive & Transformative Scholarship oversaw the HERC Undergraduate Research Fellowship at Boise State University Fall 2024 and Spring 2025. HERC funds were used to support Boise State undergraduate students who had minimal research experience with a 12-week mentored research opportunity during the fall and spring semesters. Funds provided by the Higher Education Research Council supported a total of 20 students across 15 different STEM disciplines.

On behalf of the Institute for Inclusive & Transformative Scholarship, we thank the Higher Education Research Council for their generous support in helping build meaningful experiential learning experiences for Idaho students and supporting faculty research.

The Higher Education Research Council provided \$65,000 in funding to support STEM undergraduate research at Boise State University this year. Please see the table below of how stipends and travel awards were dispersed.

## HERC Funding:

Stipends	Amount	Details
Fall Semester Research Stipends	\$24,000	8 fellows, receiving \$3,000 each
Spring Semester Research Stipends	\$36,000	12 fellows, receiving \$3,000 each
Travel grants	\$5,000	See table below
<b>Total</b>	<b>\$65,000</b>	

Conference	Amount	Details
Society for Applied Anthropology	\$843.33	Joseph Nigro attended and presented.
American Chemical Society Spring 25 Conference	\$800	Erykah Foss attended and presented.
TESOL 2025 International Convention and Expo	\$576.35	Grace Nunamaker attended and presented.
American Chemical Society Spring 25 Conference	\$800	Kaden Falkner attended and presented.
International Conference on Language Documentation and Conservation	\$648.80	Remiah Leppert attended and presented.
International Conference on Language Documentation and Conservation	\$666.79	Madison Vosk attended and presented.

Annual Meeting of the Linguistic Society of America	\$664.73	Amy Lemmon
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The titles and abstracts of the student projects are on the following pages.

## Fall 2024 Fellows

### Erykah Foss - Chemistry

Title: Utilizing Ultrafast Time-Resolved Vibrational Sum Frequency Generation Spectrometer to Probe Photoinduced Reactions on Surfaces

Abstract: Organic air pollutants are one of the major contributors to the seasonal pollution in the Arctic, known as the “Arctic Haze”. However, due to long-range transport – aqueous surfaces, soil, and air – organic pollutants travel to regions where the chemicals are banned. Despite the known importance of organic pollutants on the global environment, interactions and atmospheric reaction mechanisms of organic compounds on aqueous interfaces remain poorly understood. Femtosecond time-resolved sum frequency generation (TR-SFG) spectroscopy is a technique used to observe these ultrafast reactions. Here, we have built a TR-SFG spectrometer to investigate the photolysis of naphthalene, a polycyclic aromatic hydrocarbon, on aqueous interfaces. These will allow for the determination of the adsorption of atmospherically relevant organic pollutants on aqueous interfaces and unraveling of their photo-induced reaction mechanisms.

### Karlee Macaw - Mechanical Engineering

Title: Protecting Ligaments from Overuse Injuries with Periodic Rest and Recovery

Abstract: This study investigates the effects of varying rest durations on the recovery of medial collateral ligaments (MCLs) after cyclic fatigue. By examining multiple rest periods on the same sample through repeated measures, this research aims to minimize variability and isolate the impact of rest durations on fatigue recovery. Bovine MCLs were harvested, prepared into uniform dumbbell-shaped specimens, and subjected to cyclic fatigue at 30% ultimate tensile strength using an ElectroForce 5500 system. Each sample underwent 10,000 loading cycles at 3 Hz to mimic daily physical activity, followed by rest periods in three configurations: 1-5-10 hours, 5-10-1 hours, and 10-1-5 hours. Measures of creep and displacement differences were taken across all rest period orders to compare recovery effects using MATLAB. Expected results will highlight how rest order and duration influence recovery, emphasizing the role of rest in preventing accumulated damage. This study aims to provide quantitative insights into recovery protocols for ligaments under repetitive stress. The findings will enhance understanding of fatigue recovery mechanisms and contribute to the development of evidence-based guidelines for preventing overuse injuries in connective tissues.

### Jack Knutson - Biology

Title: Comparing diet composition to lekking sites in Columbian Sharp-Tailed Grouse

Abstract: When it comes to translocating animals, there are a lot of factors that play into the long-term success of that animal's relocation. One of the greatest factors is of course diet, which can be a key factor in

translocation success. I studied the fecal pellets of Columbian Sharp-Tailed Grouse (*Tympanuchus phasianellus columbianus*) to determine the plant species present in their diets across British Columbia. Fecal pellets were subsampled, sequenced for TRNL data, and the data was compiled into the top ten most common plants consumed on various leks. This data will be later used to inform us of possible translocation spots as well as give us some understanding of these animal's lifestyle choices.

## Mackenzie Hutchinson - Biology

Title: What Factors Affect Incubation Behavior in American Kestrels (*Falco sparverius*)?

Abstract: Incubation and parental care are essential behaviors for the healthy development of offspring. Stressors such as migration and disease can affect parental care resulting in altered egg survival and hatch rates. Therefore, varying individual fitness and life history events may lead to changes in reproductive fitness across a population. We examined the relationship between incubation behavior and blood parasite prevalence, migratory strategy (migrant or resident), mass, and first egg date in a population of American Kestrels in southwest Idaho to determine influences on incubation behavior. We observed incubation behavior using nest box camera images taken during preset daylight times. Individual migration status was determined using stable hydrogen isotope analysis on claw samples taken during the time of breeding. We predicted that stressors would negatively affect incubation behavior, leading to an adult that is not displaying appropriate parental care. We discovered that American Kestrels in southwest Idaho showed a common pattern in incubation behavior, with males incubating for an average of 26.3% and females for 59.1% of the total incubation period, and the eggs were uncovered for 14.6% of the time. Incubation was heavily dependent on female incubation, with the only factor significantly affecting male incubation being female incubation ( $p=0.007$ ). However, female incubation was significantly affected by mass ( $p = 0.013$ ), relative parasite load ( $p = 0.003$ ), and male incubation ( $p=0.0005$ ). There was no effect of migration strategy or nesting phenology on incubation behavior. The relationship between parasite load and female incubation showed a positive correlation, suggesting the stressors of a parasite infection possibly inhibit hunting and defensive behaviors, leading to a greater proportion of time inside the nest box. These results will provide further insight into the relationships between incubation behavior and stress in bird populations of southwest Idaho.

## Alicia Johnson - Health Studies

Title: Assessing neural engagement levels when exercising in the virtual-reality and real-world environments

Abstract: A lack of physical inactivity poses significant health risks (e.g., increased risk of chronic disease). Thus, it is crucial to develop effective strategies to promote engagement in physical activity. Commercially available virtual reality (VR) devices offer an accessible, cost-effective, and engaging way to promote physical activity. However, research on the neurophysiological impacts of VR exercise is limited. This study aimed to address two key objectives: (1) to explore the challenges of obtaining reliable neurophysiological data using electroencephalogram (EEG) during VR exercise and (2) to investigate how the brain responds to exercise in virtual reality (VR) versus real world (RW) environments. In counterbalanced order, participants completed two 12-minute exercise sessions on a stationary bike in both environments. EEG was recorded during both conditions and perceived exertion, motion sickness, enjoyment, engagement, and motivation were measured. Regarding aim one, we have been able to collect high-quality EEG during both conditions. We accomplished this goal through careful experiment design which included reminding participants to make minimal movements, placing the VR headset over the EEG cap, and being strategic about which electrodes to use.

Regarding aim two, we have been able to collect data from four participants and the next stage of the study will focus on data processing and analysis. Overall, this study contributes to the limited literature of the neural impacts of exercise in both VR and RW environments. Further, it has the potential to provide insights into engagement differences between both environments. These findings may inform strategies for promoting consistent exercise practice using cost-effective VR technologies.

## Hassan Mohammed - Chemistry

Title: Efficacy of Cold Atmospheric Pressure Plasma in Inactivating Pathogens on Plant Seeds

Abstract: Plant diseases caused by microbial pathogens pose a significant threat to global food security and contribute to an estimated annual economic loss of \$220 billion in agricultural productivity. This study explores the potential of Cold Atmospheric-Pressure Plasma (CAP) as a non-chemical method for seed decontamination of plant pathogens. The research specifically focuses on the inactivation of *E. coli* 0157H7 on mung beans and radish seeds, as well as *Pseudomonas syringae* on sweet corn, popcorn, cucumber, and onion seeds. Our research shows that as low as a 30-second treatment of seeds with the plasma device can lead to > 90% inactivation of the *Pseudomonas syringae* plant pathogen. Additionally, promising results for inactivation of *E. coli* 0157H7 foodborne pathogen are observed with less than 2 minutes of treatment. Furthermore, the study investigates the potential impact of CAP treatment on seed growth and finds that seed germination and early growth are not adversely affected, indicating that CAP treatment does not inhibit plant development. These results demonstrate that CAP effectively reduces seed contamination without negatively impacting seed vitality, suggesting its potential as a sustainable and safe solution for seed decontamination.

## Brynn Elliott - Mechanical Engineering

Title: Biomechanics of Bed Sharing

Abstract: Sudden Unexpected Infant Death (SUID) is a critical public health issue, with half of the 3,500 annual cases in the U.S. involving bedsharing. Despite the frequency of these cases, there is a limited understanding how the adult bed's mechanical environment affects infant movement. This research investigates the mechanical environment and movement patterns of caregiver-infant dyads to better understand the associated risk. Three data collection methods—OpenCap markerless motion capture, Vario thermal camera, and GoPro video camera—were tested for feasibility of recording participants overnight in their homes. OpenCap, despite advanced biomechanical analysis capabilities, was hindered by recording limitations and calibration challenges. The thermal camera effectively captured thermal images and provided a visualization of heat patterns but is expensive and requires significant set-up space which may not be feasible in participants' homes. The GoPro camera emerged as the optimal choice due to its high-resolution video and wide-angle lens, providing clear footage of the entire mattress area. Future steps will include quantifying movement patterns using image analysis. Integrating high-quality video data and advanced computational analysis offers critical insights into bedsharing dynamics, ultimately contributing to the development of safer sleep practices and reducing the incidence of SUID.

## Joseph Nigro - History/Anthropology

Title: Bridging Cultures: How Food Bridges Cultural Gaps

Abstract: This study examines how Latin American restaurants in Canyon County, Idaho, embody the American Dream while acting as cultural bridges. Using infrastructure reviews, interviews, and literature analysis, it highlights how business owners channel hard work and resilience into entrepreneurship, reflecting cultural values and bridging gaps between diverse communities. These restaurants foster cultural integration, serve as community hubs, and showcase personal aspirations, illustrating their critical role in rural economic growth and social cohesion.

## Spring 2025 Fellows

### Tori Abbott - Civil Engineering

Title: The effect of Nailing Patterns on Mechanically Laminated Built-Up Columns

Abstract: This research examines the structural capacity of 2x lumber built-up columns, focusing on the impact of nailing patterns. Current standards allow significant variation in nail spacing and quantity. Additional nails may introduce localized deformations in individual plies, potentially reducing overall column strength. To evaluate this effect, built-up columns will be tested under different nailing patterns to quantify capacity reductions due to additional nails and tighter spacing. The findings aim to improve strength predictions for built-up columns, enhancing building safety, optimizing material use, and refining structural engineering guidelines.

### Haley Betterton - Health Studies

Title: Understanding the Physicochemical Behavior of Microplastics in Lipid Model Membranes

Abstract: Microplastics are ubiquitous in the environment and known to cause health threats to humans and animals. Everyday materials fragment into micro-sized particles which are accumulating in our ecosystems leading to negative affects as they are ingested by humans and wildlife, and are known to be vectors for other pollutants such as persistent organic pollutants and bacteria. With large amounts of microplastics in water it is crucial to determine the fundamental interactions of microplastics with model lipid membranes. Here, we utilize surface specific techniques to determine the molecular level interactions of common microplastics, such as polyethylene, polystyrene, and polypropylene, with lipid monolayers. Our surface tension measurements indicate that polyethylene microplastics have a higher affinity for the membrane surface. Moreover, electrostatic interactions govern how the plastics interact with the lipid monolayers. These fundamental insights of microplastics can provide insights to remove microplastics from the environment and human body systems.

### Dalia DeLaCruz - Biology and Chemistry

Title: Mechanical Loading Regulates Soft Tissue ECM Gene Expression in Fibroblast-Seeded Collagen Scaffolds

Abstract: Mechanical stimuli are crucial for the remodeling and healing of soft tissues like ligaments and tendons. Previous research has examined this mechanobiological response in-vitro by applying stress- or strain-based stimulation on cell-seeded scaffolds. However, the precise physical mechanisms that control fibroblast-mediated extracellular matrix (ECM) remodeling in response to different loading configurations remain unclear. This lack of understanding limits the establishment of optimal treatment strategies for soft

tissue damage, which affects about 12 million U.S. citizens annually. This research aims to bridge this gap by investigating the effects of different loading configurations on the expression of ECM genes in fibroblast-seeded collagen scaffolds. We hypothesize that fibroblast-seeded collagen scaffolds subjected to combined tension-compression loading will improve collagen synthesis and remodeling-associated genes like transforming growth factor beta 1 (TGF- $\beta$ 1), elastin (E1), Collagen type I  $\alpha$ 1 (Col1a1), Collagen type II  $\alpha$ 1 (Col2a1), and Collagen type III  $\alpha$ 1 (Col3a1). This research will enable the development of fundamental theories for the mechanobiology of tendon and ligament healing, which will help medical professionals develop more effective treatments for soft tissue injuries.

## Siena Fox - Biology

Title: Investigating whether big sagebrush (*Artemisia tridentata*) facilitates native plant diversity via soil conditioning

Abstract: Biodiversity shapes ecosystems' functions, including many that humans rely upon [1]. Some species can increase local biodiversity by creating niches that would be otherwise unavailable in their absence, facilitating the presence of other species [2]. In the western, U.S. big sagebrush (*Artemisia tridentata*) is a foundational shrub species in arid desert ecosystems. A survey of sagebrush steppe plant species at several experimental plots in Southwest Idaho found higher diversity of plant species beneath sagebrush canopies compared to adjacent areas without sagebrush plants (interspace areas) [3]. This indicates that sagebrush may facilitate plant species diversity, possibly by altering soil properties. To investigate whether sagebrush facilitates native plant diversity by altering local soil properties, I will conduct a manipulative greenhouse experiment. Seed mixes created utilizing eight native forb species will be planted in soil collected from underneath sagebrush plants and in soil from interspace areas at two different sites in Southwest Idaho. I predict that greater richness of the planted species will be observed when grown in sagebrush soils compared to interspace soils. This result would suggest that sagebrush facilitates plant diversity by conditioning soils, and prompt further questions about the mechanisms underlying this phenomenon.

1. Cardinale, B. J., Duffy, J. E., Gonzalez, A., Hooper, D. U., Perrings, C., Venail, P., Narwani, A., Mace, G. M., Tilman, D., Wardle, D. A., Kinzig, A. P., Daily, G. C., Loreau, M., Grace, J. B., Larigauderie, A., Srivastava, D. S., & Naeem, S. (2012). Biodiversity loss and its impact on humanity. *Nature*, 486(7401), 59–67. <https://doi.org/10.1038/nature11148>
2. McIntire, E. J. B., & Fajardo, A. (2014). Facilitation as a ubiquitous driver of biodiversity. *New Phytologist*, 201(2), 403–416. <https://doi.org/10.1111/nph.12478>
3. Fox, S., Addams, R., Levy, H., deGraff, M., Caughlin, T., Bittleston, L., Simler-Williamson, A. (2024). Interactions between plant community diversity and soil biotic and abiotic properties in sagebrush (*Artemisia tridentata*) steppe ecosystems. Idaho Conference on Undergraduate Research. Poster.

## Teddy Moore - Applied Mathematics and Computer Science

Title: Subsampling Point Clouds Using Poisson Disk Sampling

Abstract: This research focuses on developing efficient algorithms for subsampling point clouds using Poisson disk sampling techniques. Point clouds are unorganized sets of points in 2D or 3D space that represent surfaces of objects, scenes, or areas. These point clouds can consist of hundreds of thousands to millions of points, so reducing their size can make numerically analyzing their properties much more efficient. This reduction, called subsampling, aims to create a smaller set of points that preserves the essential features of the original cloud. An ideal subsampling method would maximize the minimum distance between points,

achieving what is known as the maximal Poisson disk radius. However, this is computationally intractable (NP-hard). Approximate solutions, known as Poisson disk sampling algorithms, can be used to combat this issue. This research specifically focuses on one of these methods, called Weighted Sample Elimination. My project implemented this algorithm and extended it for subsampling point clouds with anisotropic distributions, where point spacing varies depending on the local geometry. This extension could improve efficiency and accuracy in applications with complex spatial data.

## Phaedra Roby - Environmental Studies

Title: The Sound of Conservation: Pets and Wildlife

Abstract: When analyzing an ecosystem and exploring different conservation efforts, there is one element of study that can help us better understand the complex interactions present. Soundscapes, the abiotic and biotic acoustic elements in a given area, offer a unique composition of sounds that are not only essential to the wildlife and organisms living there, but also show a relation to human memories, behavior and well-being. In learning about the essence and importance of sounds to a place, we move towards more holistic and encompassing mitigation and conservation techniques, where it is not only recognized as an effected process, but a natural resource that one fights to protect. Furthermore, these can hep researchers, conservationists and community members improve comprehension in the dynamic processes of our landscapes and what behavior and action should look like in today's relationships between wildlife and human.

## Mason Scott - Communications/Criminal Justice

Title: Beyond the Minimum: How Long Do Idaho Prisoners Serve Beyond Their Determinate Sentences?

Abstract: Under the Idaho Unified Sentencing Act, individuals sentenced to prison receive both a broad indeterminate sentence and a minimum determinate sentence, which they must serve before becoming eligible for parole. This unique sentencing structure raises an important question: How long are individuals in Idaho's prisons actually staying past their determinate sentence? Despite its significance, this question remains largely unanswered due to limited research, restricted public access to sentencing data, and the complexity of criminal justice legislation, which makes it difficult for the general public to understand. Parole boards ultimately have the discretion to release individuals after their mandatory sentence based on various factors, including offense severity, behavior, and risk assessments. To address this gap in information, this study examines all individuals released from Idaho prisons in 2023. In partnership with the Idaho Department of Corrections, I analyzed the proportion of indeterminate sentences served, how long individuals remained incarcerated compared to their full sentence, and how these patterns varied by crime type. The findings provide essential insights into sentencing outcomes in Idaho, along with policy recommendations, study limitations, and directions for future research.

## Emma Stover - Nursing

Title: Navigating Dual Roles: A Qualitative Study of Parental Stress and Perceived Barriers Among Undergraduate Nursing Student-Parents

Abstract: Over the past five years, the proportion of student-parents in undergraduate nursing programs has steadily increased, now comprising 20-25% of the population. Despite this significant representation, there remains a paucity of research examining their unique educational experiences and needs. These individuals navigate complex challenges at the intersection of parental responsibilities and rigorous academic demands. This study aims to identify critical factors influencing both academic achievement and psychological

well-being among nursing students with caregiving responsibilities, addressing a notable gap in the nursing education literature.

## Dinh Tran - Biology and Chemistry

Title: Novel Quorum-Sensing Substrates to Investigate Enzymes behind Bacterial Communication in *B. mallei*

Abstract: At the cellular level, bacteria are constantly engaging in chemical conversations with each other via a complex cellular process called quorum sensing. Using chemical signals called autoinducers, QS enables bacteria to learn about the whereabouts of other bacteria and help all members of a colony collectively transition from a solitary, planktonic lifestyle to a social, biofilm/virulent lifestyle. In the class of gram-negative bacteria, QS is carried out using a unique set of autoinducers called N-acyl-homoserine lactones (AHLs), synthesized by enzymes called AHL synthases. The species-specific BmaI1 AHL synthase uses an 8-carbon chain (C8) acyl-carrier protein (ACP) and a S-adenosylmethionine (SAM) substrate to synthesize their unique autoinducer, an 8-carbon chain AHL signal (C8-HSL). Currently, it is not known how well BmaI1 can utilize substrates other than its own native C8-ACP substrates to synthesize non-native AHL signals, garnering much interest for this investigation. In this project, we aim to purify and prepare an array of non-native, cyclic/aromatic acyl-ACP substrates, providing the groundwork for future investigations into BmaI1 non-native substrate activity. Using protein purification, organic synthesis, and high-performance liquid chromatography (HPLC), we were able to characterize and develop a brand-new, non-native ACP substrate for BmaI1, called cyclohexanoyl-ACP. In the future, we hope to further this investigation by measuring BmaI1 enzyme activity with this new substrate and synthesizing more cyclic/aromatic acyl-ACP substrates.

## Miranda Trester - Biology

Title: Development of Novel Acyl-Homoserine Lactone (AHL)-Based Inhibitors of Bacterial Quorum Sensing

Abstract: The rise of antibiotic-resistant bacteria in humans is one of the largest public health threats of the century. The development of new antibiotics utilizing novel molecular scaffolds has been limited and is unlikely to cure virulent infections due to the ability of bacteria to quickly confer resistance to antibiotics. Therefore, more comprehensive methods of antibiotic drug development are necessary, and one potential strategy my project has explored is the development of new drugs that interfere with quorum sensing. When on its own, a bacterium within the immune system does not have the means to become virulent. However, more often, bacteria become virulent by signaling to their neighbors and behave much like a multicellular organism to reach a quorum, fighting off immune responses within the human body. My project involved the chemical synthesis of a library of molecules called AHL (N-acyl-L-homoserinelactone) analogs that will be used in biological assays to determine IC50 (for inhibitors) and EC50 (for activators) for these compounds to inhibit AHL autoinducer synthase enzymes from bacteria. These enzymes signal to their environment for bacteria to reach a quorum. Their inhibition will hypothetically give the immune system enough time to fight off infectious bacteria before they become virulent. Moving forward, we will examine the effects of changing the characteristics of each type of analog, which includes the headgroup, the acyl chain, and acyl chain linkage (amide vs. ester vs isoamide vs

sulfonamide). I will focus on investigating the specificity of my AHL analogs against AHL synthase enzymes found in numerous species of bacteria, which include *Bradyrhizobium japonicum BjaI*, *Burkholderia mallei BmaI1*, *Pseudomonas aeruginosa RbII*, and *Yersinia pestis YspI*.

## Camden Webster - Electrical Engineering

Title: Development of a Ferromagnetic Resonance Measurement System for Microwave-Magnetic Interaction Analysis

Abstract: Ferromagnetic resonance (FMR) is a powerful technique for studying the interaction between microwaves and magnetic materials. Microscopic magnetic phenomena, such as FMR, enable the control and manipulation of magnetic materials through external fields. In this research, an FMR measurement system is being developed to analyze how external magnetic fields induce resonance in a material's magnetic moments. By measuring the resonance frequency, we can determine the material's ability to absorb specific microwave frequencies and power levels. The system is designed to be highly sensitive to different types of magnetic materials, their thicknesses, magnetic ordering, and chemical composition. These findings are essential for understanding magnetic material behavior in wireless applications, providing insights into their potential for advanced communication technologies.

## Rafael Whyman - Electrical Engineering

Title: Thermo-Optic Modeling For Greater Data Handling Capabilities

Abstract: Phase change materials (PCM) serve an important role in the advancement of computing, as they enable computers to have greater data handling capacity, faster processing times, and decreased energy consumption. PCM's like germanium telluride (GeTe) function in tandem with microheaters to change from an amorphous state to varying levels of crystallinity. Thus, it is through controlled phase changes that one can manipulate the transmittance of light and get different states of memory. Therefore, the objective of this research activity is to model microheaters and photonic devices, and subsequently implement a Mach-Zehnder Interferometer (MZI) to vary the intensity of light. For this project, a well-known PCM, such as GeTe sputtered on a thin film of Indium Tin Oxide (ITO), will be modeled. COMSOL will be used to find the temperature distribution induced by the ITO microheaters in the PCM. Next, Lumerical FDTD will be used to model the MZI and the effects of different phases of the PCM on the device's operation. With the exploratory nature of this research project, expected outcomes are to find suitable power input parameters, specific levels of crystallinity, and varying levels of output intensity.



**Idaho State  
University**

**Office for  
Research**

November 19, 2025

Idaho Higher Education Research Council

Report for year 2025, Projects Funded, Undergraduate Research Report Outcomes, and Student Accomplishments.

### Summary

At Idaho State University (ISU), we are dedicated to fostering undergraduate research excellence by providing robust access to research opportunities, cultivating mentor–mentee relationships, facilitating participation in research conference presentations, and offering travel support for national conference presentations. We recognize that faculty-led research experiences significantly impact student career development by deepening their understanding of academic concepts and honing the professional skills necessary for success in high-demand industries. Moreover, research plays a vital role in driving Idaho's economy by fostering innovation, attracting investment, and creating a skilled workforce that meets the needs of emerging industries. In this context, the importance of research and innovation cannot be overstated; they are critical to Idaho's continued growth and the adaptability of its industries in a rapidly changing economic landscape. Consequently, undergraduate research is integral to ISU's mission. We extend our gratitude to the Higher Education Research Council for their unwavering support, which enables us to empower students and enrich their academic journeys, solidifying ISU's commitment to developing the next generation of innovative leaders.

To ensure students are aware of paid research opportunities, the Office for Research continued to improve student communication to reach all students more effectively. Building on our commitment to accessibility, the Office enhanced the Undergraduate Research website to include links to opportunities at other institutions, industry internships, and an expanded overview of research experiences available specifically through ISU. This site now serves as a centralized resource where students can identify research opportunities during both the academic year and the summer months, connecting them with the information essential to advancing their educational and professional goals.

Building on these communication improvements, this year's award enabled us to support more students with paid internship opportunities across 10 research areas, funding 14 students from eight STEM departments. In addition to student support, the funding covered essential supplies, travel to national conferences, and research travel for the 2024–2025 TRIO McNair cohort. These students also participated in the Undergraduate Research and Creative Works Symposium at Idaho State University, where they had the opportunity to present their work and compete for prize awards. The Symposium continues to serve as an important platform for students to refine their presentation skills, engage with the broader research community, and build professional networks.

In continuation of these hands-on learning opportunities, the student research experience culminated in July at the Idaho Conference on Undergraduate Research (ICUR), hosted by Boise State University—a statewide forum that highlights undergraduate scholarship across disciplines. By mid-summer, awareness of ICUR had grown substantially on the ISU campus, generating strong interest among students and other summer scholars, including students from regional community colleges. To maintain equitable access, particularly for rural students, ISU coordinated transportation to ensure participation was free of barriers. This effort included a scheduled stop in route to Boise to pick up a student from the College of Southern Idaho. Ultimately, forty-two ISU students attended ICUR, representing forty research submissions. As part of our expanding K–12 research pathways initiative, four high school students from southeast Idaho also joined the cohort and presented their summer research projects.

Idaho State University Office for Research, Sonia Martinez, Undergraduate Research and Outreach Director,  
Administration Building, Room 106, Pocatello, ID 83209. [soniamartinez@isu.edu](mailto:soniamartinez@isu.edu), 208-282-1323.

Once at the conference, ISU students engaged in the full breadth of ICUR activities, including poster sessions, lightning talks, and graduate student panels designed to strengthen communication skills and introduce future academic and career pathways. Many students were accompanied by family members who traveled long distances to support their work and expressed deep appreciation to conference organizers for providing such a meaningful platform to showcase undergraduate research from across the state.

**Chart of Projects funded:**

Research Area	Department	Faculty Mentor	Undergraduate Student
AGN-201 Shielding Analysis and Mockups for Educational Purposes.	Nuclear Engineering	Dr. Ali Amir	Several Students
Bacteria in Untreated Waste Water	Biological Science	Dr. Chakraborty	Brinley Smith, Lydia Stevens
Glucose effects on aging	Biological Science	Dr. Lizbeth De LaCruz	Carlos Serna, Brook Wheeler, and Daniel Whisman
Developmental Genetics	Biological Sciences	Dr. Heather Ray	Shaun Stosich
Domestic Terrorism	Political Science	Dr. James Stoutenborough	Ashley Helm
Sustainable Concrete	Civil Engineering	Dr. Mustafa Mashall	Joe Shurtleff
Compounds of interest and biological activity	Chemistry	Dr. Kenneth Olejar	Jillian Keninger, Elizabeth Hodges
Secrets of Aging	Biomedical/chemistry	Dr. Kavita Sharma	Sanaly Nava
Compressed Air Energy Storage	Civil Engineering	Dr. Ebrahimpour	Hannah Baker, Daniel Larkin
Analyzing threats and defense tactics, virtual environments	Chemistry	Dr. John Kalivas	Hyrum Redd
Travel to Field School	TRIO McNair	Dr. James Pascali	Various, Ontaria Ariwite

To complement this summary, a file containing detailed reports of the research activities supported during this grant cycle—and the experiences our students gained throughout the academic year—is attached. If you have any questions, please get in touch with the Office for Research.

Idaho State University Office for Research, Sonia Martinez, Undergraduate Research and Outreach Director, Administration Building, Room 106, Pocatello, ID 83209. [soniamartinez@isu.edu](mailto:soniamartinez@isu.edu), 208-282-1323.



**Idaho State Board of Education  
Higher Education Research Council  
Undergraduate Research Fellows**

**Academic Year 24-25  
Summary**

**Introduction**

The Office of Institutional Research and Effectiveness, in collaboration with the Office of the Provost & Executive Vice President for Academic Affairs, oversaw the Higher Education Research Council (HERC) undergraduate research fellows’ program.

The HERC funds provided undergraduates students with research opportunities in the Science, Technology, Engineering or Math (STEM) fields under the guidance of a faculty mentor. Lewis-Clark State College (LC State) students were selected based on a competitive application process. Eight (8) students received a HERC research fellowship. All participating students presented posters at either the LC State Research Symposium in May 2025 or at the Idaho Conference for Undergraduate Research (ICUR) in Boise, July 2025. Additionally, three students presented at the American Geophysical Union Conference.

Thank you to the Idaho State Board of Education and HERC for their generous allocation of \$30,000 in support of advancing STEM student learning. LC State expended the funds as follows:

EXPENSE CATEGORY	AMOUNT
Stipends	\$22,672.84
Travel	\$9,285.06
Materials and Supplies	\$23,899.49*
Miscellaneous Expenses	\$1,213.46
<b>TOTAL</b>	<b>\$57,070.85</b>

\*Received approval to utilize FY24 carryover to purchase computer equipment for student research.

The following are the student project abstracts:

**Fellowship Recipient:** Stevie Gulman (Fuchs)

**Faculty Mentor:** Dr. Nancy Johnston, LC State, Division of Physical, Division of Physical Life, Movement & Sport Sciences

**Title:** *Health Risks Associated with Formaldehyde and Acetaldehyde in Idaho, USA*

**Abstract:** Air toxics concentrations and corresponding health risks were studied near a paper mill in Lewiston, Idaho at four sampling sites. Hazardous Air Pollutants (HAPs) such as formaldehyde and acetaldehyde can be released via pulp paper processing, in addition to other criteria pollutants like sulfur dioxide (SO<sub>2</sub>). Since 2016, air samples were collected weekly for one-hour long durations using DNPH-coated cartridges, and were analyzed via US EPA methods TO-11a with liquid-chromatography (LC), and were compared to 2006 values collected by the Nez Perce Tribe. SO<sub>2</sub> and Total Reduced Sulfur (TRS) were measured continuously at the LCSC site using a Teledyne T102 analyzer. Aldehyde levels were lower in 2023-24 compared to 2006, while acetaldehyde slightly increased from 2016 to present. The calculated lifetime inhalation exposure cancer risk was calculated via the number of extra cancers per million based on 2023-24 values.

**Fellowship Recipients:** KC Wahl

**Faculty Mentors:** Dr. Nancy Johnston, LC State, Division of Physical, Division of Physical Life, Movement & Sport Sciences

**Title:** *Air Toxics in Communities Near Former Philadelphia Oil Refinery Site*

**Abstract:** In June of 2019 thousands of pounds of hazardous air pollutants, including volatile organic compounds (VOCs), were released into the air in Philadelphia PA. This tremendous release of toxic gases was the result of an explosion at the East Coast's largest oil refinery. Though the refinery was shut down after the explosion, local communities remain concerned about VOC emissions during remediation and redevelopment at the site. In this study, air samples were collected weekly using Tenax sorbent tubes in multiple locations with close proximity to the former oil refinery site. Samples were analyzed using thermal desorption-gas chromatography-mass spectrometry (TD-GC-MS) to measure levels of benzene, toluene, ethylbenzene, xylenes (BTEX), and other VOCs. Benzene was under  $9 \mu\text{g}/\text{m}^3$ , the EPA action level, during the 2023-2024 sampling period. Residential risk exposure based on benzene concentrations and EPA risk methods estimate an extra seven cancers per million people during the study period.

**Fellowship Recipients:** Grace Tiegs

**Faculty Mentor:** Dr. Nancy Johnston, LC State, Division of Physical, Division of Physical Life, Movement & Sport Sciences

**Title:** *Volatile Organic Compounds in Western U.S. Wildfire Smoke and Associated Health Risks*

**Abstract:** Wildfires have become increasingly impactful on the land and people in the western United States, with factors like climate change, prolonged droughts, and land-use practices intensifying these events. Emissions associated with wildfire smoke led to important environmental and public health concerns. To better understand and assess these concerns, passive air sampling was conducted at a number of sites across the US West with the use of Tenax sorbent tubes. Samples were analyzed with thermal desorption-gas chromatography-mass spectrometry instrumentation for about fifty volatile organic compounds (VOCs), including aromatic and aliphatic hydrocarbons. Impact of smoke was assessed and correlated with VOCs such as benzene as well as particulate matter. Health risk due to benzene was calculated using EPA methods.

**Fellowship Recipient:** Connor Alexander, Jayden Youngren and Ava Hasenoehrl

**Contributors:** Abigail Brown and Brayden Graves

**Faculty Mentor:** Dr. Eric Stoffregen, LC State, Division of Physical, Life, Movement and Sport Sciences  
LC State, Physical, Life, Movement & Sport Sciences

**Title:** *Drosophila Y chromosome variation impacts survival in Blm-deficient embryos*

**Abstract:** Blm DNA helicase plays a crucial role in maintaining genome stability during development. Blm females exhibit a significant maternal effect lethality, with most of their embryos failing to survive to the larval stage. Among the few survivors, females (XX) are overrepresented compared to males (XY). This sex-bias correlates with repetitive DNA content, as the XY genotype contains more repetitive DNA content than XX. To test whether Y chromosome variation affects Blm-deficient embryonic survival, we obtained naturally derived lines from global Drosophila populations. We crossed their Y chromosomes into a common genetic background and crossed these males to Blm females. The resulting progeny showed variable female:male ratios. We leveraged the increased meiotic nondisjunction in Blm females to assess Y chromosome-specific lethality by comparing the ratio of sex chromosome aneuploid to euploid survivors (XO:XY males and XXY:XX females). Y chromosomes associated with increased

female:male ratios also showed elevated XO:XY ratios among surviving males, suggesting the exacerbated sex-bias is caused by increased Y-associated lethality. Notably, no XXY females survived, suggesting a repetitive DNA content load that is too high in the absence of Blm. To investigate potential mechanisms for the Y-associated lethality, we used a position effect variegation (PEV) assay to assess relative heterochromatin content of the Y chromosomes, a proxy for chromosome size for the entirely heterochromatic Y chromosome. Surprisingly, we found no correlation between Y chromosome size and Blm-associated male lethality, suggesting that it may be specific types of DNA repeats that require Blm helicase during early development, rather than bulk repetitive content.

**A Fellowship Recipients:** Ava Hasenoehrl, Jayden Youngren, and Conner Alexander

**Contributors:** Brayden Graves and Abigail Brown

**Faculty Mentor:** Dr. Eric Stoffregen, LC State, Division of Physical, Life, Movement & Sport Sciences

**Title:** *A neurodegenerative phenotype in survivors of Blm-deficient development in Drosophila melanogaster*

**Abstract:** DNA damage caused by a lack of maternally loaded Blm protein during early embryonic development in *Drosophila melanogaster* results in significant embryonic lethality. It is unknown, however, how this DNA damage affects normal physiologic processes in the few surviving individuals. We investigated whether this developmental abnormality (Blm-deficiency induced DNA damage) causes neurologic dysfunction in adult survivors. We hypothesized that this DNA damage exposure during early development would cause reduced lifespan, loss of motor function, and disruption of normal sleep patterns and circadian rhythms. To test our hypotheses, we collected adult progeny from Blm<sup>-</sup> mothers crossed to Blm<sup>+</sup> fathers and from the reciprocal cross, Blm<sup>+</sup> mothers crossed to Blm<sup>-</sup> fathers. In both crosses, surviving progeny were heterozygous for Blm, but one set developed with maternally loaded Blm protein (from Blm<sup>+</sup> mothers) and one without (from Blm<sup>-</sup> mothers). We compared lifespan between these sets of progeny, used a climbing assay to measure motor function, and investigated sleep and circadian rhythms using a continuous activity monitor. Progeny that developed without Blm protein exhibit a significant reduction in lifespan, a significant decrease in climbing ability, a significant disruption in sleep condensation, and a significant change in circadian patterns compared to flies that developed with Blm protein. Since these phenotypes are commonly observed in old flies, we are assessing whether there are signs of advanced biological aging in the flies that develop without Blm.

**Fellowship Recipient:** Ava Hasenoehrl, Conner Alexander, and Jayden Youngren

**Contributor:** Abigail Brown

**Faculty Mentor:** Dr. Eric Stoffregen, LC State, Division of Physical, Life, Movement & Sport Sciences

**Title:** *Metabolic dysfunction following Blm-deficient development in Drosophila melanogaster*

**Abstract:** Blm DNA helicase is essential for proper DNA replication during early development in *Drosophila melanogaster*. Blm<sup>-</sup> mothers, who do not provision their eggs with functional Blm protein, exhibit a maternal-effect lethality. Nearly all progeny from Blm<sup>-</sup> mothers die before larval hatching; however, a few survive to adulthood (<10% of embryos). These survivors provide a model to study the effects of DNA damage during early development on healthspan. We hypothesized that survivors of Blm-deficient development would display alterations in metabolic function. We first tested whether development without Blm protein affected body mass and determined that Blm-deficient development results in a statistically significant reduction in body mass. Our data also suggests that Blm-deficient development results in decreased energy storage in adult flies, with clear reductions in triglyceride

levels and a possible reduction in glycogen storage as well. These data suggested that the DNA damage sustained by embryos lacking Blm during early cell cycles either affected metabolic processes related to energy storage or affected the feeding behavior of the flies. To test whether these differences in metabolism could be accounted for by food consumption differences, we performed capillary feeder (CAFE) assays and saw no difference in food consumption by flies that survived Blm-deficient development, suggesting instead that these flies exhibit defects in metabolic processes.

**Fellowship Recipient:** Jayden Youngren, Connor Alexander, Ava Hasenoehrl, Rayana Shah

**Contributor:** Abigail Brown and Brayden Graves

**Faculty Mentor:** Dr. Eric Stoffregen, LC State, Division of Physical, Life, Movement & Sport Sciences

**Title:** *Metabolic dysfunction following Blm-deficient development in Drosophila melanogaster*

**Abstract:** The absence of maternally provided Blm DNA helicase during early embryonic development leads to severe DNA damage in *Drosophila*. This damage is lethal to most embryos, and the small percentage that do survive to adulthood are characterized by an extreme sex bias, where ~70-90% of the population is female. This female sex-bias amongst surviving progeny correlates with repetitive genomic DNA content, as the female genotype (XX) contains less repetitive DNA than the male genotype (XY) due to the highly repetitive nature of the Y chromosome in *Drosophila*. Additionally, embryos from Blm- mothers have a higher probability of aneuploid sex chromosome karyotypes caused by increased meiotic nondisjunction (ndj). These karyotypes include XO, where no second sex chromosome exists and results in a male phenotype. We hypothesized that XO males would exhibit longer lifespans than XY males because of the reduced repetitive DNA content present during Blm-deficient development. To test our hypothesis, we genotyped flies throughout a lifespan assay. In support of our hypothesis, we found that XO males do exhibit longer lifespans than XY males. Additionally, there was a single XO male in our control group (progeny from Blm- males instead of Blm- females) which also exhibited increased survival. This led us to question whether Blm- males also show increased meiotic ndj. We developed a cross scheme to score large numbers of progeny to address this question.

**Fellowship Recipient:** Erica Stryker

**Faculty Mentor:** Dr. Leigh C. Latta, LC State, Division of Physical, Life, Movement & Sport Sciences, Dr. Adam G. Jones, University of Idaho, College of Science

**Title:** *Insights into male pregnancy and its evolution: Patriscin gene family expansion and contraction in Syngnathids.*

**Abstract:** Seahorses, pipefish, and seadragons are all members of the family Syngnathidae. Syngnathids are characterized by male pregnancy wherein the female deposits eggs into a brood pouch located in or on the male. Structures for male pregnancy range from simple external attachment to an enclosed, internal pregnancy similar to a mammalian uterus. This feature is a relatively unique biological phenomenon that raises questions as to how and why the male brood pouch evolved in Syngnathidae. Patriscins are an astacin metalloprotease found in live-bearing teleosts including Syngnathidae and were likely coopted from a digestive role to support nutrient transfer in the brood pouch. This project seeks to use bioinformatic methods to investigate the expansion and contraction of the patriscin gene family in Syngnathidae in order to shed light on the evolutionary process that led to male pregnancy. Twelve Syngnathidae proteomes were acquired from the NCBI Genome database. OrthoFinder2 was used to identify gene families. CAFE5 was used to analyze expansion and contraction events within these gene families. Analysis showed tail brooding Syngnathids had more patriscin genes than trunk

brooders. Furthermore, there were significant changes in patristacin gene family number in the Syngnathini, Stigmatoporini, and Solegnathini clades. Further analysis including more Syngnathidae species is in our control group (progeny from Blm– males instead of Blm– females) which also exhibited increased survival. This led us to question whether Blm– males also show increased meiotic ndj. We developed a cross scheme to score large numbers of progeny to address this question.

**STRATEGIC INITIATIVE**  
***Undergraduate Research Funding for***  
***STEM Majors at the University of Idaho***  
**FINAL PROJECT REPORT**

*FY 2025*

*Submitted to:*  
*Higher Education Research Council*  
*Idaho State Board of Education*  
*P.O. Box 83720*  
*Boise, Idaho 83720-0037*

*Submitted by:*  
*University of Idaho Office of Undergraduate Research*  
*875 Perimeter Drive*  
*Moscow, ID 83844*  
*On October 30, 2025*



**University of Idaho**  
Office of Undergraduate Research

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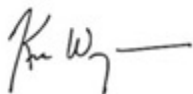
## Executive Summary

Undergraduate research (UGR) is recognized as a high-impact educational practice that increases the rates of student retention and engagement. At the University of Idaho, UGR is practiced throughout all units on campus, and it is centrally placed in the institution's strategic plan through the Experiential Learning Pillar. The Office of Undergraduate Research (OUR) is taking the lead in enabling research opportunities for undergraduates at UI as it manages various competitive student grant programs that directly support student research and ensures that students have access to these opportunities.

During AY 2024-25, generous funding from the State Board of Education (SBoE) permitted UI to continue its Semester Awards and Summer Undergraduate Research Fellowship (SURF) Programs. The Semester awards allow for students to submit a proposal to the OUR and, after review, the OUR selects projects for funding. The OUR allocated \$4000 to fund four of the twenty-one projects in Spring of 2025 with HERC funding. These projects were from the College of Engineering and the College of Science. The OUR then utilized the remaining \$61,000 of SBoE HERC funds to support the Summer 2025 SURF program. This intensive 10-week summer research experience actively engages undergraduates in faculty-mentored, independent research. Over the course of the program, students are mentored toward increased independence on their projects and the OUR provides a series of workshops to help them students prepare for ICUR. Each student was provided with a \$5,500 stipend in the form of a fellowship which allows them to devote full time effort to their projects. Each student was also provided with \$1,000 to help offset materials and supplies and other project-related expenses. **This year there were 39 applications!** Selection of student participants is a competitive process in which students submit 4-page research proposals to the OUR along with budget justifications and a letter of recommendation from their mentor. The Director utilizes faculty affiliates in each college to review the proposals and provide selections of the top proposals. The Director then makes sure that projects are well-represented across colleges. It is important to note that not all projects for this cycle required a supply budget. This allowed for us to fund additional students with partial SBoE funding. For FY25, the SBoE funding supported **11 of the 15 OUR SURF** awards (some were funded completely or in part by OUR funds). All students supported by SBoE funds attended and presented results of their projects at the 2025 Idaho Conference on Undergraduate Research in Boise, ID on July 15-16, 2025. These students will also be required to present their results at the UI Undergraduate Research Symposium on April 20, 2026. In addition to the projects supported by SBoE funds, the OUR was able to fund **4 additional awards** to allow further participation beyond STEM disciplines.

End of project feedback from students and their mentors was overwhelmingly positive. Significantly, none of the undergraduate research projects described here would have been possible without the support provided by the State Board of Education. We sincerely thank the Higher Education Research Council and the Idaho State Board of Education for making these experiences possible for our students.

Sincerely,



Kristopher V. Waynant  
Director, Office of Undergraduate Research  
Associate Professor, Chemistry  
[kwaynant@uidaho.edu](mailto:kwaynant@uidaho.edu)

*Spring 2025 Awards funded by SBoE*

**Student:** Emily Medema

**Project Title:** Evaluation of the shrinking core model of iron sulfide weathering in pyritic waste rock, Red Dog mine

**Mentor:** Jeff Langman, Department of Earth and Spatial Sciences

**Abstract:** Acid rock drainage (ARD) emanates from the Main Waste Stockpile (MWS) of Teck's Red Dog Mine in northwestern Alaska. The ARD is caused by infiltrated precipitation and weathering of pyrite [FeS<sub>2</sub>]. The overall project is evaluating future acid generation through weathering experiments with waste rock collected from the MWS. My portion of the project will involve the use of a scanning electron microscope to evaluate the remaining cores (e.g., unweathered portion) of the pyrite minerals and associated iron-bearing rinds. These two sulfide mineral properties are indicative of the mineral weathered state that we describe as the shrinking core model of sulfide weathering. The remaining pyrite cores represent the weathering progression, and the iron-bearing rinds are an indication of the level of acid generation and mobilization or retention of iron during weathering. Using the scanning electron microscope, I will analyze pyrite samples from twenty sampling intervals in the MWS to compare the level of weathering between the intervals and estimate the penetration of infiltrated precipitation. The results of my work will provide insight into the depth of the weathering front and areas of greatest acid generation that will assist with management of infiltrating water into the MWS.

**Student:** Jasmeen Manshahia

**Project Title:** Inverted Flag

**Mentor:** Vibhav Durgesh, Department of Mechanical Engineering

**Abstract:** This project explores innovative methods for harvesting sustainable and clean energy using an inverted flag design equipped with piezoelectric materials. The study focuses on optimizing the energy production capabilities of piezoelectric flags by varying their thickness-to-length ratios. We plan to conduct experiments in a wind tunnel to investigate the dynamics of the inverted flag and measure the generated electric output. In the second phase, we will perform experiments in a water tunnel using Hydrogen Bubble Flow Visualization to study the flow field around the flag and assess the electricity production. The primary objective is to identify the most efficient configurations for potential commercial applications while gaining deeper insights into the dynamics and performance of the inverted flag system.

**Student:** John Grundy

**Project Title:** Improvements to Experimental Fluids Lab

**Mentor:** Vibhav Durgesh, Mechanical Engineering

**Abstract:** Interest in small aerial vehicles is increasing. The airfoils in these vehicles operate at low Reynolds number flow regimes. The airfoil aerodynamic characteristics under these conditions are complex. Therefore, one research focus in the Experimental Fluids and Aerodynamics Laboratory (EFAL) is to quantify an airfoil's aerodynamics performance at low-Reynolds numbers. Experimentation is performed in the wind tunnel at EFAL using a high-precision load cell which measures lift and drag forces experienced by airfoils. The load cell and the airfoil are mounted on a stepper motor that allows precise change in the angle of attack. Lift and drag data collected from the load cell are analyzed using Python or Matlab, and researchers iteratively process the data to estimate angle of attack misalignment. The misalignment is due to the challenge of accurately determining flow direction of the wind tunnel relative to the airfoil chord. Therefore, the proposed project's focus is to automatically correct the misalignment. The key deliverable will be data-analysis software developed in Matlab that analyzes loadcell data and identifies misalignment using basic principles of airfoil aerodynamics. If successful, this will significantly reduce analysis time and would provide a robust method for identifying the angle of attack misalignment using data analysis techniques.

**Student:** Nishan Thapa

**Project Title:** Improve Head Loss Calculations for Laminar Pipe Flow and its fitting

**Mentor:** Tao Xing, Department of Mechanical Engineering

**Abstract:** Elbows are a common type of fitting in piping systems to transport fluid, but they introduce challenges by causing head loss due to directional changes in flow. Accurate head loss estimation in elbows is crucial for selecting the right pumps for the given pipeline to ensure energy efficiency so that the pump operates close to its best efficiency performance. Current methods largely focus on fully developed, steady flow conditions, neglecting the developing flow regions and effect of Reynolds number on head losses for pipe fittings. This research addresses this gap by analyzing head loss in a laminar pipe system including developing and developed flows and a 90-degree elbow using high-fidelity computational fluid dynamics (CFD) simulations and experimental studies. The project will generate more accurate correlations to estimate head loss for laminar pipe flow system under various Reynolds numbers, which will help select the right pump to achieve the best efficiency point during operation.

**Summer Undergraduate Research Fellowships 2025 funded by SBoE HERC**

**STUDENT:** Brodie Becker

**College:** Engineering

**TITLE:** LoRa Bands for Virtual Fencing

**Mentor:** Dev Shrestha, Department of Biological Engineering

**Abstract:** Virtual fence is an emerging tool for livestock management that can determine an animal’s location on the landscape, compare that location to preset boundaries and implement stimuli to encourage animal movement as needed. An ongoing project at the University of Idaho is working to develop a virtual fence system that leverages radio communication to determine location. This research will evaluate the suitability of two different radios for usage in virtual fencing technology. The radios being compared will operate in the 2400 and 915 MHz bands, both common for LoRa networks. They will be compared based on several factors relevant to their performance in virtual fencing applications. The desired outcome of this project is to provide information to enable informed decision-making for teams selecting radios to be used in rangeland networks.

## Virtual Fence LoRa Band Comparison

A comparison of radio effectiveness in rangeland virtual fencing applications

Presenter: Brodie Becker



**University of Idaho**

**Abstract**

The goal of this research is to evaluate the suitability of two different radio frequencies for usage in Virtual Fencing technology. The radios being compared operate in the 2400 and 915 MHz bands, both common for LoRa networks. They are being compared based on several factors relevant to their performance in Virtual Fencing applications. We are measuring straight line performance as well as obstructions from terrain, foliage, and other obstacles that are likely to be encountered in this application. We aim to measure and quantify the performance advantage of the 915MHz radio in these scenarios. Both radios perform exceptionally well in a line-of-sight scenario with minimal obstructions. However, the 915MHz radio demonstrates a significantly reduced rate of signal integrity decrease with distance.

**Virtual Fence**

Virtual fencing technologies encompass a variety of systems for enforcing livestock locations using a boundary deterrence system to prevent the animal(s) from violating a geographic region defined by the user. These systems operate one or several digital locating systems, such as GPS or ToF(time of flight) ranging. The UI Unfencing Range project uses ToF ranging to evaluate animal positions and sx1280 radios to communicate between devices in the system. This research was inspired by questions that arose in the course of the development of their system.

Virtual fencing technologies offer a promising solution to many problems in the cattle industry, including lower costs than traditional fencing and easier management of grazing animals, rangeland, and the grazing environment as a whole. Radios are a critical part of any Virtual Fence system, and their performance has a direct and drastic impact on the performance of the system as a whole. They are also central to the development process, and once a radio has been selected it is difficult to alter that selection.

**Research & Methodology**

This project aims to compare the performance decrease of two different radios, the sx1280 and sx1260(selected as representative for their respective frequency bands) in rangeland environments and scenarios that will be commonly found in a Virtual Fencing application.

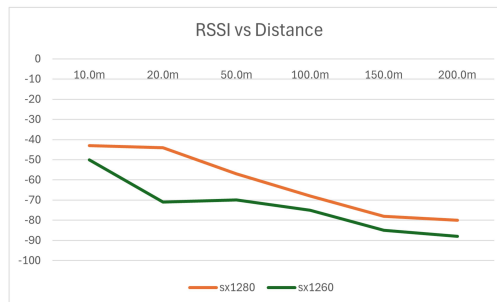
Both radios used are products of Semtech, who produce a variety of LoRa radios. LoRa is a standard intended for long range-low power communication for embedded devices. They are well-suited to Virtual Fencing applications, and very commonly used in many industries.

The sx1280 operates at 2.4GHz, and the sx1260 at 915MHz. 915MHz is broadly known to be better suited to this sort of application, but there are challenges in implementing it for a virtual fencing system. We are evaluating sx1260 performance relative to the sx1280 in 5 key areas that will allow for informed decisions on virtual fencing implementations by quantifying the advantage of the lower frequency radio in pertinent scenarios.

It is important to note that the sx1280, while being very powerful for an unlicensed 2.4GHz radio, is still capable of a significantly lower maximum transmission power. When making implementation decisions and weighing the merits of these two radios, this must be taken into account.



**Results**



In line of sight testing, both radios exhibit a similar rate of decrease for RSSI. This is our key metric for evaluating the relative performance. The testing results indicate that both radios are well suited for this application when deployed in an open field. This data was collected by averaging several minutes of data collected from continuous communication at each distance listed for each radio. This information provides a useful baseline for our comparisons in all future testing. We will be able to evaluate the rate of attenuation of both radios in different scenarios, and use this to make informed decisions about their performance and extrapolate out to consider performance with different antennae and transmission power levels.

**Acknowledgements:**

Funded by the UI Office of Undergraduate Research SURF program  
Support and hardware provided by UI Unfencing Range project

STUDENT: Minigna Lama

COLLEGE: Engineering

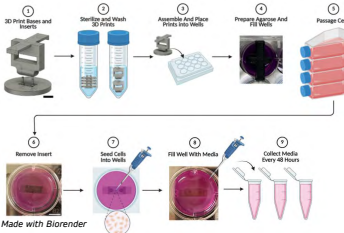
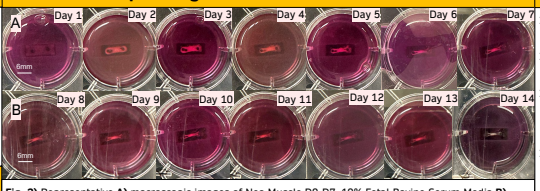
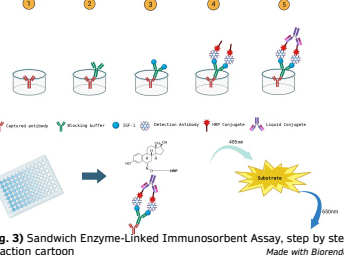
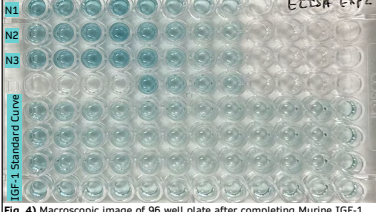
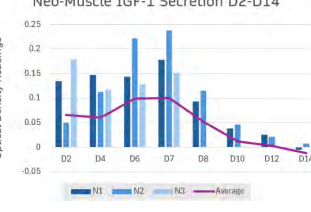
TITLE: Analysis of C2C12 myoblast secretome for enhanced muscle regulation

Mentor: Nathan Schiele, Department of Biological Engineering

**Abstract:** Skeletal muscle repair is a complex process involving cellular proliferation, differentiation, and remodeling of the extracellular matrix, all of which are required for tissue repair as well as tissue engineering. The C2C12 myoblast secretome is involved in the process since proteins secreted into the medium and signaling factors mediate intercellular communication and control muscle differentiation. This study aims to characterize the dynamic modulation of the C2C12 secretome during different stages of myogenic differentiation and with varying serum concentrations and mechanical loads. The significant factors involved in the muscle regeneration process will be quantified by enzyme-linked immunosorbent assay (ELISA) to determine the impact of environmental conditions on the composition of the secretome. Elucidation of such regulatory processes will provide valuable information on muscle tissue communication and adaptation, allowing biomaterial and therapeutic strategy design for muscle tissue engineering and regenerative medicine.

## Analysis of IGF-1 production by C2C12 myoblasts during engineered muscle formation

University of Idaho College of Engineering | Minigna Lama, Alonna G. Clair, and Nathan R. Schiele | Department of Chemical & Biological Engineering, University of Idaho, Moscow, ID | University of Idaho Office of Undergraduate Research

<p><b>Background</b></p> <ul style="list-style-type: none"> <li>C2C12 myoblasts are used to study skeletal muscle repair and regeneration.</li> <li>Secreted proteins act as signaling factors for intercellular communication and regulation of myogenesis.</li> <li>This study analyzes secretome changes during different differentiation stages and serum levels.</li> <li>Enzyme-linked immunosorbent assay (ELISA) used to quantify the secreted proteins (IGF-1) in the culture media.</li> </ul> <p><b>Objective</b></p> <ul style="list-style-type: none"> <li>Evaluation of IGF-1 production during myogenesis of C2C12 cells.</li> </ul> <p><b>Cell Seeding and Secretome Collection</b></p>  <p><b>Fig. 1) C2C12 scaffold free self assembly 3D culture overview</b></p> <p>Neo Muscle seeding protocol steps:</p> <ul style="list-style-type: none"> <li>3D-printed PLA inserts were sterilized in 70% ethanol for 24 hours, rinsed with sterile water, and assembled into standard 12-well plates.</li> <li>2% agarose was poured into each well to create molds; after solidification, inserts were removed to form defined agarose wells.</li> <li>Cells were cultured under standard conditions and passaged when confluency reached 75%.</li> <li>C2C12 line continuation was seeded at 1500cells/cm<sup>2</sup>, and Neo Muscles were seeded with 5 million cells per mold.</li> <li>Neo Muscles treated with 10% FBS till Day 7 and changed to 2% horse serum Day 8 onwards in every 48 hours interval.</li> <li>Macro images were taken of Neo Muscles daily, media was collected for secretome evaluation and stored in -80°C.</li> </ul>	<p><b>Macroscopic Progression of Neo Muscle Constructs</b></p>  <p><b>Fig. 2) Representative A) macroscopic images of Neo Muscle D0-D7, 10% Fetal Bovine Serum Media B) macroscopic images of Neo Muscle D8-D14, 2% Horse Serum Media</b></p> <p><b>ELISA Quantification of IGF-1 Secretion</b></p> <p>The ELISA protocol followed standard steps:</p> <ol style="list-style-type: none"> <li>1-2) Plate coating with capture antibodies and blocked with blocking buffer.</li> <li>3) Sample addition and IGF1 serial dilution, incubate for antigen binding.</li> <li>4-5) Addition of HRP Conjugate antibodies and substrate to generate a colorimetric signal.</li> <li>6) Optical density was measured at 450 nm &amp; 650 nm.</li> <li>7) IGF-1 concentration was determined using a standard curve generated from known IGF-1 concentrations.</li> </ol>  <p><b>Fig. 3) Sandwich Enzyme-Linked Immunosorbent Assay, step by step reaction cartoon</b></p>  <p><b>Fig. 4) Macroscopic image of 96 well plate after completing Murine IGF-1 ELISA test.</b></p> <p><b>ELISA Plate Setup:</b></p> <ul style="list-style-type: none"> <li>The standard curve was prepared by performing serial dilutions of IGF-1, starting from 6000 pg/mL (100 µL per well) diluting down to 0 pg/mL.</li> <li>For experimental samples, Up to Day 7, each 100 µL sample consisted 3 biological replicates.</li> <li>From Day 8 to Day 14, the samples consisted of 2 biological replicates.</li> </ul>	<p><b>IGF-1 concentration peaked on Day 7</b></p> <ul style="list-style-type: none"> <li>IGF-1 concentration peaked between Day 2-7, with the highest recorded IGF-1 quantified approx. on Day 7.</li> <li>Sharp decline post-Day 7 suggests possible reduction in secretion, protein degradation, or cell stress.</li> <li>IGF-1 secretion pattern aligns with published findings, showing peak expression around Day 7 during active myogenic differentiation, followed by a decline as regeneration stabilizes (Charge &amp; Rudnicki, 2004).</li> <li>Day 7 identified as a key window for collecting large quantities of secreted IGF-1, for use as conditioned media in cell differentiation studies.</li> </ul>  <p><b>Fig. 5) IGF-1 curve of OD read for the conditioned media from D2-D14 set to 405nm-650nm.</b></p> <p><b>Future Work</b></p> <ul style="list-style-type: none"> <li>Re-run IGF-1 ELISA with a higher concentration standard curve for accurate quantification.</li> <li>Analyze macroscopic images of Neo Muscles and cell line growth to elucidate possible correlations in IGF-1 secretion.</li> <li>Continue analyzing secretome samples for additional myogenesis biomarkers.</li> <li>Continue collecting secretome samples and testing to identify other secreted factors that may affect other musculoskeletal Neo constructs seeded in the lab, when used as conditioned media.</li> </ul> <p><b>Acknowledgments</b></p> <ul style="list-style-type: none"> <li>This project was funded through Summer Undergraduate Research Fellowship (SURF) by Office of Undergraduate Research (OUR), University of Idaho.</li> </ul>
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STUDENT: Jiaxin Liu

COLLEGE: Engineering

TITLE: The Attack on AI

MENTOR: Min Xian, Department of Computer Science

**Abstract:** Adversarial attacks pose critical challenges to the deployment and adoption of artificial intelligence (AI) and Machine Learning (ML) systems, as they exploit vulnerabilities in AI models to cause incorrect predictions through carefully crafted perturbations. This research explores the mechanisms, implications, and defenses associated with adversarial attacks, with a focus on understanding their impact on deep learning models. Over a 10-week period, foundational concepts in AI and adversarial attacks are studied, followed by hands-on experimentation with state-of-the-art attack methods such as the Fast Gradient Sign Method (FGSM), Projected Gradient Descent (PGD), Carlini & Wagner (C&W), Sign-OPT, and RayS attacks. Defense strategies, including adversarial training, defensive distillation, and input preprocessing, are implemented and evaluated for their effectiveness in mitigating adversarial threats. A small-scale research project is conducted to investigate a specific aspect of adversarial attacks, such as their performance on real-world datasets or the robustness of different model architectures. The findings will highlight the fragility of AI systems to adversarial manipulations and underscore the importance of developing robust models to ensure their reliability and security in critical applications. This research contributes to the growing body of knowledge in adversarial learning and provides insights into the ongoing efforts to build trustworthy AI systems.



**University of Idaho**

**Lance and Shield: Benchmarking Adversarial Attacks and Defenses of AI**

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF IDAHO

Jiaxin Liu, Kyle Lucke, Min Xian



**University of Idaho**

**Abstract**

As deep learning (DL) reshapes the future of image-based applications, from handwritten digit recognition to autonomous driving, one unsettling question persists: just how trustworthy are these celebrated models when faced with real-world adversaries? Our study investigates the mechanisms and consequences of hard-label black-box adversarial attacks that exploit blind spots in state-of-the-art architectures (ResNet-50, DenseNet-121, VGG-16) trained on MNIST, CIFAR-10, and ImageNet. We implement and benchmark three leading methods such as RayS, OPT, and Sign-OPT, and counter them with three advanced defenses: adversarial training, robust self-training, and multi-instance robust self-training. By measuring attack success rates, query efficiency, and perturbation subtlety, our findings expose critical vulnerabilities in vision systems and guide the design of more resilient defenses for practical deployment.

**Background**

- Problem:** DL can now be used for critical applications like cancer classification, but are susceptible to adversarial attacks.
- Goal:** Evaluate three state-of-the-art adversarial attacks against popular DL approaches and defenses.
- Approach:** Benchmark RayS, OPT, and Sign-OPT vs. ResNet50, DenseNet121, and VGG16 using breast-cancer dataset plus CIFAR-10, MNIST, and ImageNet. Then apply three advanced defenses and repeat.
- Outcome:** Reveal which defenses hold up, why others fail, and guide safer AI, whether diagnosing tumors or classifying traffic signs.



**Figure 1:** Study workflow. **Input data** (CIFAR-10/MNIST/ImageNet). **Model** (ResNet50, DenseNet121, and VGG16). **Hard-label black-box attacks** (OPT, Sign-OPT, and RayS). **Defense strategies** (adversarial training, robust self-training, and multi-instance RST). **Evaluation metrics** (success rate, queries, and perturbation)

**Results**

**Table 1. Attack ResNet-50 [12] using the CIFAR-10 [9] dataset ( $\epsilon = 0.031$ ).**

Attack	Success Rate $\uparrow$	Avg Queries $\downarrow$	Med Queries $\downarrow$	Avg $L_2$ $\downarrow$	Avg $L_\infty$ $\downarrow$	Avg PSNR $\uparrow$
OPT [3]	4.39%	376.7	208.0	0.232	0.015	50.266
Sign-OPT [4]	53.20%	2944.8	2040.0	0.446	0.027	42.463
RayS [5]	99.40%	1341.3	719.5	1.593	0.029	31.101

**Table 2. Attack ResNet-50 [12] using the MNIST [10] dataset ( $\epsilon = 0.30$ ).**

Attack	Success Rate $\uparrow$	Avg Queries $\downarrow$	Med Queries $\downarrow$	Avg $L_2$ $\downarrow$	Avg $L_\infty$ $\downarrow$	Avg PSNR $\uparrow$
OPT [3]	78.92%	481.57	433.00	2.234	0.152	28.290
Sign-OPT [4]	89.20%	427.78	287.00	2.972	0.215	25.181
RayS [5]	100.00%	280.24	166.00	8.118	0.232	16.300

**Table 3. Attack ResNet-50 [12] using the ImageNet [11] dataset ( $\epsilon = 0.05$ ).**

Attack	Success Rate $\uparrow$	Avg Queries $\downarrow$	Med Queries $\downarrow$	Avg $L_2$ $\downarrow$	Avg $L_\infty$ $\downarrow$	Avg PSNR $\uparrow$
OPT [3]	3.00%	273.33	167.50	2.099	0.025	48.133
Sign-OPT [4]	31.10%	3569.47	2626.00	3.901	0.044	40.400
RayS [5]	98.40%	1339.02	748.00	17.465	0.046	27.257

Attack success scales directly with perturbation magnitude ( $\epsilon$ ):

- OPT finds adversarial samples with the smallest mean  $L_2$  distances but only a low success rate\* (SR).
- Sign-OPT achieves a higher SR with a larger mean  $L_2$  distances.
- RayS achieves a high SR across all three datasets at the cost of a larger mean  $L_2$  value with roughly 1,300 queries per sample.

**Success rate:** the percentage of examples that have obtained and adversary within a query budget

**Acknowledgements**

I gratefully acknowledge Kyle Lucke for dedicated research assistance and Dr. Min Xian for expert mentorship. This work was supported by a University of Idaho Office of Undergraduate Research (OUR) Semester/SURF Award 2025.



**Figure 2.** Adversarial samples on ImageNet [11] using a ResNet-50 model [12]. Columns show (1) clean image, (2) RayS [5], (3) Sign-OPT [4], (4) OPT [3] examples.

**Conclusions and Future Directions**

Our experiments confirm that ResNet-50, DenseNet-121 and VGG-16 remain highly vulnerable to hard-label black-box attacks, with the SR rising alongside allowed perturbation magnitude. On CIFAR-10, OPT achieves a 4.39 % SR with an average  $L_2$  of 0.2320, whereas RayS achieved a 99.40 % SR with an  $L_2$  of 1.5930. On MNIST, the SR increases from 78.92 % to 100.00 %. On ImageNet, the SR of OPT falls to 3.00 %, Sign-OPT to 31.10 %, while RayS maintains 98.40 % success. Next, we will re-evaluate these models after implementing training-based defense techniques like adversarial training, robust self-training and multi-instance robust self-training, quantifying how they affect SR, query efficiency and perturbation norms. We will also incorporate a distortion threshold for human perceptual evaluation to align the detection results with actual image quality standards.

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STUDENT: Dristanta Silwal

COLLEGE: Engineering

TITLE: Benchmarking Uncertainty Quantification for Deep Learning

MENTOR: Min Xian, Department of Computer Science

**Abstract:** Uncertainty quantification (UQ) plays a pivotal role in ensuring the reliability and robustness of predictive models, particularly in deep learning models where uncertainties arise from many sources, e.g., incomplete data, model approximations, and inherent variability. Ensuring the reliability of predictions is critical to patient safety in medical AI applications. Most work on Uncertainty Quantification (UQ) focuses on out-of-domain (OOD) samples, how it identifies misclassification has yet to be comprehensively explored (1). This research evaluates the existing UQ methods to detect misclassification, and their accuracy based on the publicly available natural image classification dataset. We will then explore how UQ works in different misclassification detections with a detailed comparison of each method evaluated (3, 5). Besides, we will develop a publicly accessible website to report where and how we obtained our datasets and research results with a list of other feasible tasks.

## Benchmarking Uncertainty Quantification for Deep Learning



DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF IDAHO

Dristanta Silwal, Kyle Lucke, Min Xian



### Abstract

One of the most significant developments in the last decade has been the heights Artificial Intelligence (AI) has reached in our daily lives. However, many advanced AI models have proved to be over-confident in their predictions, which makes it a challenge to apply them to critical applications such as healthcare, finance, and nuclear power and creates pressing needs for quantitatively understanding the uncertainties of AI predictions. In this project, we benchmark uncertainty quantification (UQ) methods for state-of-the-art deep learning-based image classification models. The UQ methods focus on identifying misclassification in natural image datasets. We benchmark state-of-the-art UQ methods: Deep Ensembles (DE), Monte Carlo Dropout (MCD), LP-BNN, Dirichlet, and MAPLE. Performance was assessed on publicly available datasets, using DenseNet and WideResNet as backbone architectures. By analyzing epistemic uncertainty across these methods, architectures, and dataset, this research seeks to provide critical insight into UQ's effectiveness for misclassification detection, ultimately enhancing AI reliability and reducing risks associated with confident mistakes.



### Problem

DNNs are increasingly popular due to their state-of-the-art performance on various tasks such as image classification, and natural language processing. Even well-trained models produce confidently incorrect outputs, but cannot detect when this happens

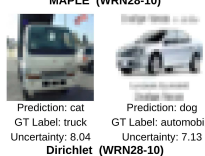
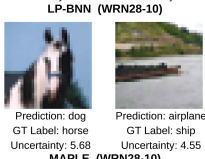
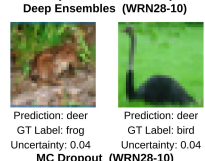
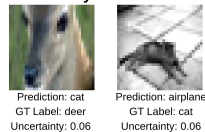
### Solution

UQ is a newly emerging subfield of deep learning that can mitigate this issue. UQ methods provide uncertainty about the model's prediction, allowing the identification of confidently incorrect predictions.

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### High Uncertainty Misclassified Images



### Results Summary

Method	Accuracy (%) ↑	AUGRC (x1000) ↓
Deep Ensembles [3]	91.00	9.90
MC-Dropout [2]	91.60	40.70
LP-BNN [1]	90.95	13.20
MAPLE [7]	90.01	51.10
Dirichlet [6]	91.40	15.80

Table 1: Misclassification detection performance for CIFAR10 [4] dataset using WRN28-10 [8] backbone

Method	Accuracy (%) ↑	AUGRC (x1000) ↓
Deep Ensembles [3]	95.30	4.20
MC-Dropout [2]	93.99	6.60
LP-BNN [1]	93.809	7.10
MAPLE [7]	84.28	94.00
Dirichlet [6]	93.98	35.79

Table 2: Misclassification detection performance for CIFAR10 [4] dataset using DenseNet100 [3] backbone

### Conclusions and Future Directions

We benchmark misclassification detection performance of five UQ methods on the CIFAR10 dataset using WideResNet and DenseNet models. Overall, we find that Deep Ensembles significantly outperforms other methods according to the AUGRC metric. Additionally, we have created a website which discusses the outcome of the research in detail. Our code will be available on github, allowing researchers to evaluate other UQ methods, backbone models and datasets. In the future, we plan to implement more UQ methods and evaluation metrics, and expand the benchmark to more datasets and backbone models.

### Acknowledgements

This research was funded as a Summer Undergraduate Research Fellowship from the Office of Undergraduate Research at the University of Idaho which supports undergraduate student engagement in research and creative activities. Also, I would like to extend my gratitude to Dr. Min Xian and Kyle Lucke for their incredible support and guidance during this research.

Learn more about me and my research project at the following website:



STUDENT: Claire Shelton COLLEGE: Science

TITLE: Investigating the Mechanisms driving regenerative responses in the Zebrafish retina

MENTOR: Diana Mitchell, Department of Biological Sciences

**Abstract:** Humans have limited ability to regenerate damaged tissues in the central nervous system (CNS; brain, spinal cord, and retina). Injury to the CNS can lead to permanent loss of function due to the inability for new neurons to be born or to regrow damaged projections from surviving neurons, which are necessary for neural communication. However, zebrafish show spontaneous regeneration of the CNS in most, but not all, experimental systems of acute damage. By probing the triggers of the regenerative response of this species, we can better understand the distinct characteristics and unique cellular processes that allow CNS regeneration. Understanding these processes will help develop our understanding of tissue regeneration and inflammatory processes. To address this gap, I will examine the regenerative responses of the zebrafish retina at different ages and with different levels of neuron death (Objective 1). I will also investigate if microglia, the innate immune cells of the CNS, are required for this response (Objective 2). By achieving these objectives, I will contribute valuable insights into zebrafish's ability to regenerate the CNS, specifically the retina, paving the way for future research.



University of Idaho  
Department of Biological Sciences

### Investigating the Mechanisms Driving Regenerative Responses in the Zebrafish Retina

DEPARTMENT OF BIOLOGICAL SCIENCES, UNIVERSITY OF IDAHO

Claire Shelton, Jordan Rumford, Ashley Farre PhD, Justin Mai, and Diana Mitchell PhD

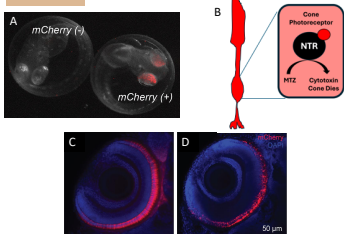


University of Idaho  
Department of Biological Sciences

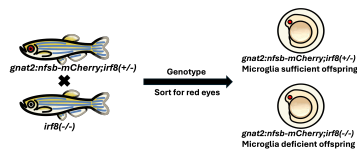
**Abstract**

Humans cannot regenerate damaged retinal tissue, leading to permanent loss of vision. However, zebrafish show spontaneous regeneration of the retina following acute damage. By studying the regenerative response of this species, we can understand the cellular processes that allow retinal regeneration. In this project, we examine the role of microglia, the resident macrophages of the retina, to understand how they may support retinal regeneration. To date, there has been mixed evidence on whether microglia are required for retinal regeneration; this may be related to different experimental models used by different researchers. To trigger regeneration in the zebrafish retina, we used a zebrafish line that allows cone photoreceptor ablation upon drug exposure, which is then followed by regeneration. Cones are a specialized retinal neuron that responds to light in the vertebrate retina. We crossed the "cone ablation" zebrafish with a line that lacks a functional *irf8* gene, leading to microglia deficiency because the *irf8* gene is essential for the development of microglia. Our experiments will compare the regeneration of cones in microglia-deficient *irf8* mutant zebrafish to their microglia-sufficient siblings. This will potentially open new avenues for retinal regeneration research in humans.

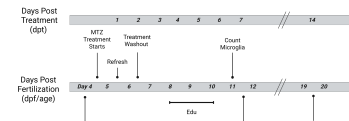
**Methods**



**Figure 1. Transgene expression and MTZ-induced cone ablation in *gnat2:nfsb-mCherry* zebrafish.** (A) Larvae expressing the *gnat2:nfsb-mCherry* transgene. The transgenic larva (+) has red fluorescent cone photoreceptors, while the non-transgenic (-) does not. (B) Diagram showing that Metronidazole (MTZ) selectively ablates cone photoreceptors. Zebrafish at 4.5 days post fertilization (dpf) are given a 48 hour MTZ treatment leading to ablation of cones. (C and D) Whole-mount retina from zebrafish 6.5 dpf. Zebrafish are collected 48 hours into treatment with dimethyl sulfoxide (DMSO) (Vehicle/solvent) (C) and MTZ (D).

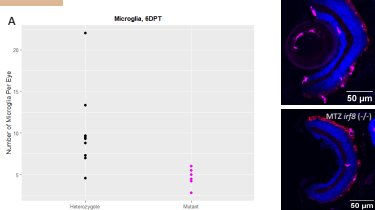


**Figure 2. Breeding Scheme for microglia response.** This diagram illustrates the cross between *gnat2:nfsb-mCherry; irf8 (+/-)* to *irf8 (-/-)*. Offspring were sorted 4 dpf for red mCherry eyes, indicating transgene expression. Genotyping occurred after collection.

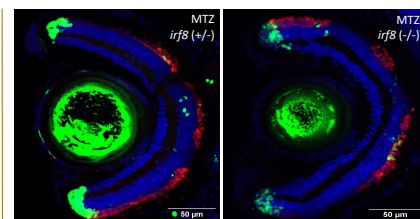


**Figure 3. Age (dpf) and treatment schedule (dpt) for ablation and regeneration of cones.** Edu is a nucleotide analog incorporated into DNA as it is copied and is used to mark cones regenerated from dividing neuronal progenitor cells.

**Results**



**Figure 4. Microglia counts in heterozygote and *irf8* mutant zebrafish retinas at 6 dpt.** (A) Quantification of microglia in heterozygote (black) and *irf8* mutant (magenta) zebrafish using an antibody to stain zebrafish microglia. At 6 dpt, *irf8* mutants show significantly fewer microglia compared to heterozygote, consistent with microglial deficiency. (B) Image of retinal cryosections stained with DAPI (cell nuclei, blue), 4CA (magenta) and mCherry cones (red).



**Figure 5. Detection of Regenerated Cones at 7 dpt.** Image of retinal cryosections stained with DAPI (cell nuclei, blue), Edu (Green) and mCherry cones (red). Edu can be seen colocalized with mCherry + cones, indicating cone regeneration.

**Conclusions and Future Directions**

- Regenerated cones are seen by 7 days post Mtz treatment of *gnat2:nfsb-mCherry* larval zebrafish
- irf8* mutant zebrafish have reduced numbers of microglia but whether regeneration of cones is different remains to be determined
- Ongoing/future work will include quantifying numbers of regenerated cones and microglia at 7 dpt and 14 dpt

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**Acknowledgements**

Funding for this work: Award R01EY030467 from National Institutes of Health granted to Diana Mitchell. We thank the University of Idaho IDAC Optical Imaging Core for their support. Thank you to Dr. Mikko Nagashima (University of Michigan) for gifting us the *gnat2:nfsb-mCherry* fish line made in Rachel Wong's lab (University of Washington; see D'Orazi et al. for more details). Thank you to the University of Idaho Laboratory Animal Research Facility (LARF). Lastly, thank you to the University of Idaho Office of Undergraduate Research for granting me the Summer Undergraduate Research Fellowship (SURF) Award.

STUDENT: Samantha McClure

COLLEGE: Agricultural and Life Sciences

TITLE: Effects of Grafting Standard Tomato Varieties onto Dwarf Tomato Rootstocks

MENTOR: Senay Ugur, Department of Plant Sciences

**Abstract:** Grafting is an important horticultural tool for both ornamental plants and food crops. Grafted plants are the best of both worlds, as producers can select desirable traits in both the rootstock and scion and combine them to create a composite organism. Grafting may be key to producing high yield plants suited to small containers or patio gardens. Tomato (*Solanum lycopersicum*) is one of the most important and valuable vegetable crops in the world. There are hundreds of tomato varieties, each with unique sizes, shapes, colors, taste, texture, growth habits, etc. In recent years, tomato breeding programs have produced dwarf varieties which have a more compact growth habit. These varieties are ideal for home gardeners and small farmers who have limited growing space; however, the options are still limited when compared to the wide diversity of standard tomato varieties. The goal of this project is to explore new rootstock-variety combinations to develop alternative solutions for tomato producers with limited growing spaces.



University of Idaho



## Effects of Grafting Standard Tomato Varieties onto Dwarf Tomato Rootstocks

DEPARTMENT OF PLANT SCIENCES, UNIVERSITY OF IDAHO

Samantha McClure, Anne Knerr, and Senay Ugur




University of Idaho

**Abstract**

Grafting may be key to producing high-yield, compact tomato plants suited for small containers or patio gardens, offering an alternative for home gardeners and small farmers who have limited space but want more options beyond the relatively few dwarf tomato varieties currently available. The goal of this project is to explore new rootstock-scion combinations that may exhibit a dwarf or compact growth habit. Seeds from 3 rootstocks (Dwarf Sandy Stripes, Dwarf Harmonic Convergence, and Fortamino F1 Rootstock) and 2 scions (Super Sweet 100 and Delicious) were initially sown in cell trays, with germination rates ranging from 83% to 100%. After approximately five weeks, the seedlings were transplanted into 2-inch pots and were ready for grafting. Using the splice grafting technique, eight rootstock-scion combinations were created, and each tomato variety was also grown as a non-grafted control, for a total of 13 treatments. The graft unions were allowed to heal for approximately two weeks under humid, shaded conditions, resulting in a grafting success rate of 86%. The plants will be transferred to 1-gallon containers for the remainder of the growth period to evaluate growth parameters across all treatments and identify which rootstock-scion combinations perform best under compact growing conditions.

**Introduction**

- Container gardening allows people with limited space to grow their own fruits and vegetables.
- Fruit and vegetable cultivars with a dwarf or compact growth habit perform best in container production.
- The expected outcome is that grafting standard tomato varieties onto dwarf rootstocks will enhance plant space utilization while maintaining or improving fruit yield.

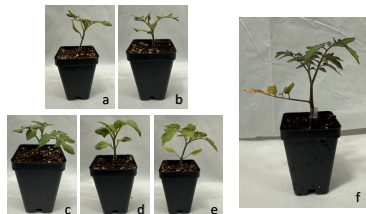


Figure 1: Super Sweet 100 (a), Delicious (b), Dwarf Sandy Stripes (c), Dwarf Harmonic Convergence (d), Fortamino F1 (e), and grafted example (f).

**Methods**

1. Seeds were sown in 72-cell trays.
2. Plants were transplanted into 2-inch pots about five weeks after germination.
3. Both rootstock and scion were cut at a 45-degree angle (rootstock cut below cotyledons and scion cut above cotyledons).
4. The scion was tightly aligned with the rootstock and held in place by a 2.0 mm silicon grafting clip.
5. Grafted plants were placed in a humidity dome under shade cloth for about two weeks.
6. Fully healed grafted plants were transplanted into 1-gallon pots.



Figure 2: Cutting scion at a 45-degree using miter-cut grafting knife.

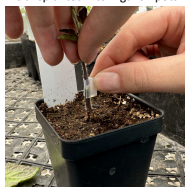


Figure 3: Aligning a scion and rootstock using a 2.0 mm silicon grafting clip.



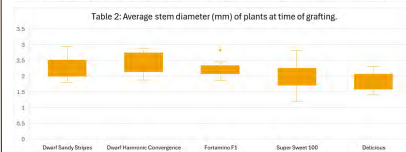
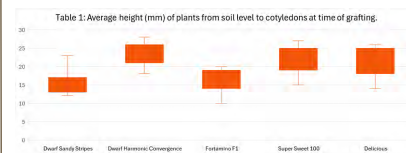
Figure 4: Healed graft union.



Figure 5: Complete randomized block design contains three blocks and 13 total treatments with 5 plants per treatment per block.

**Results**

- The grafting success rate is about 86%.
- The tomato plants had between 2 and 3 true leaves at time of grafting.
- Once healed, the grafted tomato functions as a single plant.



**Conclusions and Future Work**

- Matching up the scion and rootstock based on stem diameter was important for the vascular tissues of both plants to form a successful union.
- The grafted and non-grafted tomato plants will continue to grow in the greenhouse for the next few weeks.
- Shoot height, flower number and fruit number, and ripe fruit fresh weight will be assessed weekly.
- At harvest time, the tomato plants will be cut at the soil surface then dried and measured for shoot biomass.



Figure 6: Healed grafted tomato plant in 1-gallon container.

**Acknowledgements**

This project was funded by the Office of Undergraduate Research SURF 2025. Seeds were sourced from Victory Seed Company and High Mowing Seeds.

**STUDENT:** Mary Schwartz      **COLLEGE:** Agricultural and Life Sciences

**TITLE:** The Relationship of the Mediterranean Diet Adherence and Pregnancy/Postpartum

**MENTOR:** Yimin Chen

**Abstract:** This study's goal is to analyze the relationship between Mediterranean Diet adherence and perinatal maternal health. Weight management during the perinatal period is a critical life stage that may influence later risks for chronic diseases. The Mediterranean Diet is associated with reduced risk of many weight-associated chronic diseases in various populations. This will be a sub-analysis of an ongoing study to investigate associations between perinatal weight during baseline (2-3 weeks before the due date) as well as 4-week and 8-week postnatal appointments to monitor for gestational diabetes and postnatal glucose homeostasis.

## Adherence to Mediterranean Diet & Perinatal Health

Mary Schwartz, College of Agricultural and Life Sciences, Professor Yimin Chen, PhD, RD

Project funded in part by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health (NIH), the NIH Office of Women's Health and the NIH Office of Nutrition Research under grant #P20GM152304, and an Undergraduate Research Grant from the Office of Undergraduate Research at the University of Idaho.

### Introduction

- The Mediterranean Diet is associated with reducing the risk of many chronic diseases. And its adherence is also associated with lower odds of excessive gestational weight gain and postpartum weight retention.<sup>1</sup>
- After giving birth, many women struggle to lose weight due to low thyroid function, sleeplessness, and stress hormones.<sup>2</sup>
- Data from randomized clinical trials suggest the Mediterranean Diet has a beneficial effect on the primary and secondary prevention of cardiovascular disease, type 2 diabetes, atrial fibrillation, and breast cancer.<sup>3</sup>



Shaker, L. (n.d.). Greek salad or horiatiki with large pieces of tomatoes, cucumbers, olives, feta cheese and olives in white bowl behind top view - whole salad with dill, cucumber, onion, parsley and olive oil. Freepress. Retrieved July 8, 2023.

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### Hypothesis

- Higher adherence to the Mediterranean Diet will be associated with a lower Body Mass Index and Hemoglobin A1C level in perinatal women.
- Higher adherence to the Mediterranean Diet will be associated with lower maternal stress via Perceived Stress Scale scores in perinatal women.

### Methods

- Data is currently being collected from pregnant and postpartum (<3 months postpartum) women who are being recruited in Moscow, ID and the surrounding areas of the Palouse.
- Mothers will complete a 72-hour diet recall using the ASA24® dietary assessment tool at 4-week and 8-week time points. Raw data collected from the ASA24 will be directly inputted into the versatile R package dietary index, and the output will be used to determine a score (aMed) based on adherence to the Mediterranean diet.
- Mothers will be weighed on the same stand-on scales at baseline, 4-week and 8-week postnatal appointments.
- Maternal perceived stress will be measured at baseline, 4-week and 8-week time points using the validated Perceived Stress Scale.
- Maternal glycemic control will be assessed by quantifying HgbA1C concentrations using blood samples collected at baseline and 8-week postnatal appointments.
- Data will first be assessed for normality. If the data is normally distributed, Pearson correlation will be conducted. If the data is not normally distributed, Spearman's rank correlation coefficient will be used.

### Project Design

- The parent study is a double-blind randomized control study.
  - The control group will receive a prenatal vitamin and 2,000 IU/day of Vitamin D gummies.
  - The placebo group will receive a prenatal vitamin and placebo gummies.
- A secondary analysis of the parent study will be conducted looking at the following relationships:
  - Adherence to the Mediterranean Diet and BMI
  - Adherence to the Mediterranean Diet and HbA1c levels
  - Adherence to the Mediterranean Diet and the Perceived Stress Scale
- Blood will be collected at baseline and 8-week and stored in -80°C and then analyzed at the same time.



Unkown, U. (2020). Pregnancy. Baby belly. Woman image. Pixabay. Retrieved July 8, 2023.



STUDENT: Callie Schmidt

COLLEGE: Agricultural and Life Sciences

TITLE: Exploring Innovative Approaches to micropropagate North American Cloudberry

MENTOR: Senay Ugur

**Abstract:** The Cloudberry (*Rubus chamaemorus*) is a hidden northern gem, one of nature's remarkable gifts, yet is largely unknown to many people. Commercial cloudberry products (fresh fruit, jelly and wines) fetch a premium price, while cloudberry products cultivated in Norway and Sweden are considered a national delicacy. However, demand greatly exceeds the supply available from wild plants. Traditional propagation methods, such as using seeds or rhizomes, have proven to be inefficient, labor intensive, and time consuming. Micropropagation, an asexual method wherein plants are multiplied using controlled levels of nutrients and light on an artificial media, has potential for cloudberry propagation. Four cloudberry cultivars have been developed using micropropagation in Norway but are unavailable to interested US buyers. The goal of my proposed research is to develop a micropropagation procedure for North American cloudberry. I will compare the effects of different growth media on the development and overall health of cloudberry plants. Media to be compared will include Murashige and Skoog, which has been used previously, against the effects of two new media, woody plant and Driver Kuniyuki Walnut. I hope my research will serve as the first step to introduce and produce this unique fruit in North America.



**University of Idaho**

## Exploring Innovative Approaches to Micropropagate North American Cloudberry (*Rubus chamaemorus*)

DEPARTMENT OF PLANT SCIENCES, UNIVERSITY OF IDAHO

Callie Schmidt, Anne Knerr, and Senay Ugur



**University of Idaho**

**Abstract**

Cloudberry (*Rubus chamaemorus* L.) is a nutritionally rich and uniquely flavored berry with high commercial potential. However, declining wild populations and limited success of conventional propagation methods hinder conservation and commercial cultivation. The species' complex physical and chemical seed dormancy further complicates propagation, highlighting the need for efficient in vitro techniques. This project aims to develop a standardized micropropagation protocol to ensure a reliable and uniform supply of cloudberry plant material. Two genotypes (PI 672676 and PI 672677) were obtained from the USDA National Clonal Germplasm Repository. The seeds were soaked overnight on a shaker to remove the endocarp, surface-sterilized, treated with gibberellic acid (GA<sub>3</sub>) for an hour, and cultured on half-strength Murashige and Skoog (½ MS) medium supplemented with 4 μM or 8.9 μM 6-benzylaminopurine (BAP). The GA<sub>3</sub> treatment enhanced germination, with seeds germinating approximately two weeks earlier. So far, 19 plantlets have been regenerated from PI672677 and 5 from PI672676 using MS, ½ MS, and PH media enhanced with varying amount of BAP. However, post-germination shoot development was most vigorous on PH medium supplemented with 4 μM BAP. Future efforts will focus on optimizing growth media to accelerate development and increase propagation efficiency.

**Methods**

- Researchers used seeds provided USDA National Clonal Germplasm Repository to establish cloudberry in vitro.
- GA<sub>3</sub> treated germination trial: (PI672677)
  - 10 seeds soaked in water over night
  - Following day endocarp was removed
  - Surface sterilized seeds
  - Treated with GA<sub>3</sub> solution for 1 hour
  - Placed on ½ MS, MS, and pH media with two different concentrations of BAP (8.9 μM BAP and 4 μM BAP)

**Multiplication**

After germination trials:

- Healthy plantlet selected from germination trial
- Plantlets appeared to have yellow tint while on ½ MS media.
- Moved to pH media
- 2 ½ weeks later color had darkened, and plantlet size increased.
- Plantlet removed from the media and divided into five new plantlets, placed back on pH media.
- After 27 days the five plantlets were divided three more times, resulting in nineteen plantlets.

**Introduction**

Cloudberry (*Rubus chamaemorus* L.) is a highly prized arctic berry with significant commercial potential. However, its widespread cultivation is hindered by Declining wild populations, Complex seed dormancy, and Ineffective traditional propagation methods. This research addresses these issues by developing a standardized micropropagation protocol for optimal shoot growth, allowing for propagation via division at a more frequent rate.

**Results of Germination Trial**

GA<sub>3</sub> treated seeds:

- Germination after 2 days
- Radicle emergence after 7 days
- True leaf emergence after 11 days
- Germination was not observed if endocarp was left intact

**Conclusion**

- GA<sub>3</sub> treatment enhanced germination by 2 weeks.
- PH media containing 4 μM BAP proved more effective for shoot growth.
- Removal of endocarp facilitates germination

**Future Direction**

- Plantlets will continue to be divided until researchers have obtained enough plantlets from a single seed source to conduct experiments on media content.
- Upcoming research will evaluate different tissue culture media
  - Driver and Kuniyuki Walnut (DKW)
  - Woody Plant Medium (WPM)
  - PH Medium
  - Murashige and Skoog (MS) at full strength and half strength

**Acknowledgements**

This research was supported by the Office of Undergraduate Research SURF 2025.



Figure 3: Intact seed with endocarp



Figure 4: Embryo and seed coat



Figure 5: Removal of endocarp



Figure 1: Cloudberry before being placed on pH media



Figure 2: Cloudberry after being placed on pH media



Figure 6: Radicle root emergence



Figure 7: True leaves emerging



Figure 8: 11 days after seed sowing



Figure 9: Cloudberry multiplication in vitro



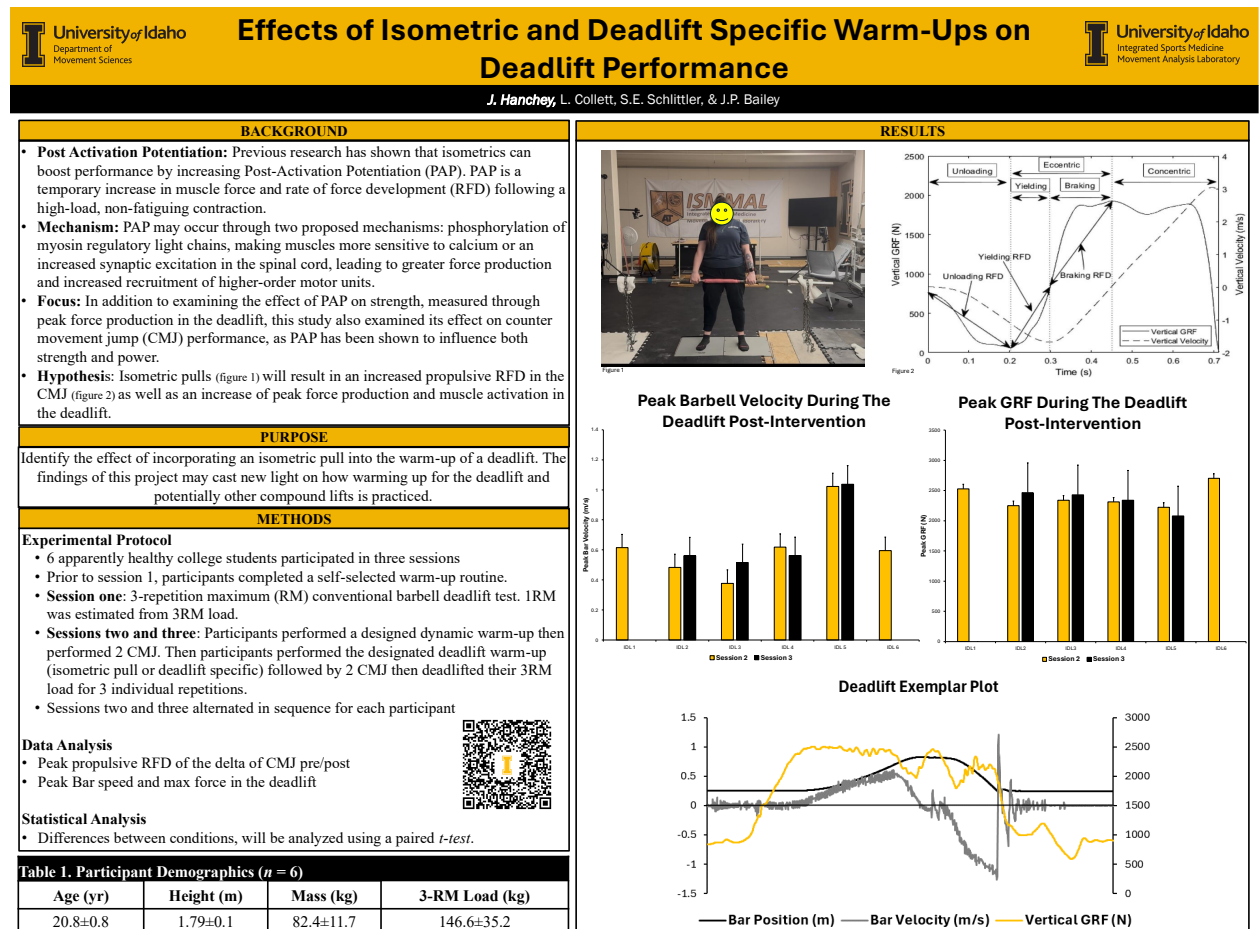
Figure 10: Plantlet size before multiplication

**STUDENT:** Jared Hanchey **COLLEGE:** Education and Human Health Sciences

**TITLE:** Effects of Isometric and Generalized Warm-Ups on Deadlift performance

**MENTOR:** Joshua Baliey, Department of Movement Sciences

**Abstract:** Isometric pulls before testing/performance have been associated with an increased athletic performance, such as countermovement jump (CMJ) testing (1). However, there is no research about the effect of isometric pulls, used during a warm-up, on deadlift performance. The purpose of this project is to help determine the best type of warm-up to maximize deadlift performance. It is hypothesized that the isometric pull will improve performance in deadlifting and jump performance. Methods to observe differences between generalized warmups and a warmup utilizing isometric pulls will be as follows. Participants will participate in 3 sessions: session 1 will be consent and intake, followed by a 3RM test; sessions 2 and 3 will be either a deadlift specific warm-up or an isometric mid-thigh high-pull warm-up followed by CMJ and 90% 1RM deadlifts. Young healthy adults (18-30) with resistance training experience, specifically deadlifting, will perform the CMJ and deadlifts on dual force platforms with motion capture and electromyography (EMG). Specific warm-ups will be counterbalanced, to remove order effect of condition. Dependent variables [peak force and power, rate of force development (RFD), and muscle activation (EMG RMSE)] will be analyzed using paired *t*-test.




STUDENT: Ash Moghadam COLLEGE: Art and Architecture

TITLE: Enhancing Architectural History Education with AI-generated imagery

MENTOR: Lori Smithey


**Abstract:** This research project aims to revolutionize the teaching of architectural history by integrating Heinrich Wölfflin’s comparative method with the innovative capabilities of AI-generated imagery. As an architecture student passionate about teaching, I propose to enhance traditional educational methods by leveraging AI to create visually stimulating and thought-provoking images. The methodology involves gathering a comprehensive data set from architectural history and training three AI programs (Midjourney, DALL-E 3, and Stable Diffusion) on selected structures. Various prompts will be tested to combine images of architectural examples often used for comparing and contrasting discussions. By training AI software on specific historical data sets and generating hybrid images that merge architectural precedents, the project seeks to develop a powerful pedagogical tool. These AI-generated images will not only aid in teaching visual literacy but also serve as compelling design constructs. This early study aims to inspire future explorations and advancements.



## Enhancing Architectural History Education with AI-Generated Imagery

College of Art & Architecture, UNIVERSITY OF IDAHO, Moscow, Idaho, 83844

Ash Alizadeh Moghadam, Prof. Lori Smithey



**Abstract**

Leveraging generative AI to enrich established pedagogy, this project reimagines architectural-history instruction through purpose-built, visually provocative imagery. Guided by Wölfflin’s comparative binaries, Venturi’s dialectic of complexity, and Davis’s visual-culture analytics, we curate supervised, citation-rich datasets of canonical buildings and fine-tune Midjourney, DALL-E 3, and Stable Diffusion to produce hybrid renderings that fuse—yet never obscure—their source precedents. Targeted prompt engineering and model-specific control nets enable deliberate manipulation of massing, proportion, and ornament, foregrounding formal parallels and cultural divergences to sharpen comparative discussion. Pilot studio workshops show marked gains in students’ visual-literacy scores and catalyze livelier debate, while faculty report the images’ utility as springboards for speculative design.

Ongoing analysis is cataloguing prompt–image–learning correlations to establish replicable best practices and to build an open-access repository of annotated AI visuals. By uniting historiographic theory with supervised machine creativity, the study delivers a scalable toolset for architecture educators and a transferable model for humanities-centered AI scholarship.

**Introduction**

Architectural-history courses still rely on a narrow corpus of photographs and plans, leaving students with few opportunities to practice deep visual reading across time, style, and context. This project asks: How can generative AI enrich architectural-history pedagogy and sharpen students’ visual literacy? Leveraging Wölfflin’s comparative method, Venturi’s dialectic of complexity and contradiction, and Davis’s focus on the physical and metaphysical resonances of images, we curate a supervised dataset drawn from seminal texts (i.e. Kostof, Ching, Ingersoll, et al.). Fine-tuned Midjourney and DZINE AI models then synthesize “Multi-structure” renderings: mash-ups that fuse signature elements of paired precedents and re-illuminate canonical buildings from fresh vantage points. This supervised workflow—unique in architecture education—serves as both research probe and classroom assignment, inviting students to generate, analyze, and debate their own AI-aided visuals.



Figure 1.1: Bivisibility Diagram - Whitney Davis

Conclusively the future implementation of this method hopes to see measurable gains in comparative accuracy and descriptive precision, underscoring AI’s potential to transform even the most tradition-bound corners of the curriculum.

**Results**



Figure 1.2: Hybrid-structure generation (Midjourney)

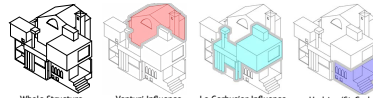
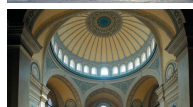


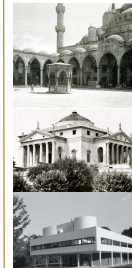
Figure 1.3: Isometric breakdown diagram

The outcomes of our image-generation experiments have clarified how the software responds to both the initial training dataset and to the incremental introduction of additional architectural structures. Continuous, rigorously documented testing—combined with an explicit engagement with the theoretical underpinnings of our visual-production strategy—has enabled us to iteratively calibrate the model’s parameters. As a result, we have achieved demonstrable improvements in the fidelity, stylistic nuance, and pedagogical value of the generated imagery, thereby bringing the outputs into closer alignment with the project’s overarching objectives.



(Top) Figure 1.4: Generation of Suleymaniye Mosque (Midjourney)  
(Bottom) Figure 1.5: Generation of Hybrid Sinan-Palladio

**Data Sets**



By synthesizing Kostof’s panoramic chronology, Fazio’s typological matrix, Venturi’s dialectic of complexity, Davis’s scalar “bivisibility,” Wölfflin’s comparative binaries, and Ching-Ingersoll graphic manuals, the training corpus combined breadth and analytical precision. These sources diversified visual inputs, framed theoretically rigorous prompts, and supplied nuanced evaluation rubrics, enabling iterative fine-tuning. The resulting AI outputs—pedagogically annotated architectural mash-ups—balance historical authenticity with inventive recombination, offering a visually coherent, theoretically grounded tool that augments visual literacy instruction and stimulates contemporary design inquiry within studios and history classrooms.

Figures 1.6-1.8: Example images from datasets

**Conclusions and Future Directions**

Moving forward, the project will concentrate on three practical goals. First, we will broaden the supervised image set by systematically adding peer-reviewed exemplars from core architectural-history texts. Second, we will convert the AI workflow into repeatable studio and lecture assignments that ask students to generate, annotate, and debate hybrid-structural images. Finally, we will compile the best outputs—along with accompanying prompts and discussion guides—into a modular teaching pack for use across our history sequence. By steadily enlarging the dataset and embedding AI-mediated visual inquiry into everyday coursework, we aim to create a richer material for instructors and a more active, image-literate learning experience for students.

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**Acknowledgements**

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 Thank you to Prof. Lori Smithey for the opportunity and boundless support

**STUDENT:** Kaitlyn Vilgos **COLLEGE:** Letters, Arts, and Social Sciences

**TITLE:** Missing and Murdered Indigenous Women and Two-Spirit Individuals

**MENTOR:** Omi Hodwitz, Criminal Justice

**Abstract:** North America's history of systemic oppression against Indigenous people has contributed to a tragic epidemic of Missing and Murdered Indigenous Women, Girls, and Two-Spirit people (MMIWG2). These individuals suffer disproportionately high rates of violence, this disturbing imbalance is emphasized by Hodwitz and King, stating that, "when compared to the national average, Indigenous women are two and a half times more likely to experience violent crime, twice as likely to be victims of sexual assault, and ten times more likely to be murdered than non-Indigenous women" (2021, p. 319). This statistic highlights the severity of the violence that Indigenous women and Two-Spirit's face, but official estimates still do not show the full scope of the problem. Data collection of MMIWG2 cases remains inconsistent and inaccurate, leaving many cases undetected and unacknowledged. This lack of data affects the development of preventative measures and effective government responses to this issue. This research project, conducted at the University of Idaho, aims to improve our understanding of the MMIWG2 crisis by verifying existing case information (through public media sources) and compiling all known data into one database. This will help address discrepancies in current data and provide a more complete picture of the issue, supporting efforts to bring justice and healing to affected communities.

## The MMIWG2 Database: Addressing Canada's Missing and Murdered Indigenous Women, Girls, & Two Spirit People Crisis

**DEPARTMENT OF CULTURE, SOCIETY, AND JUSTICE, UNIVERSITY OF IDAHO**  
Kaitlyn Vilgos, Omi Hodwitz, Ph.D, Steff King, M.S., Olivia Michelson

**Abstract**

North America has a history of systemic oppression against Indigenous people that has contributed to a tragic epidemic of Missing and Murdered Indigenous Women, Girls, and Two Spirit people. While Canada has recently begun to keep track of reported cases, there is a sufficient lack in research and attention to this crisis. Indigenous people suffer disproportionately high rates of violence and mistreatment, and official estimates cannot show the full scope of this issue. The data being inaccurate leaves many cases undetected and unacknowledged. To address this problem, the MMIWG2 project actively collects and compiles all known information about Indigenous cases into a comprehensive database. This process clears up data discrepancies to improve government responses and prevent future violence for MMIWG2 individuals and their families. This research is ongoing and the MMIWG2 database needs continuous collaboration. These efforts will provide a more complete picture of this crisis and support bringing justice and closure to affected communities.

**Research Questions**

- To what extent do Indigenous youths, under the age of 18, make up the majority of direct victims of the MMIWG2 crisis compared to Indigenous adults in Canada?
- What are the primary geographic locations with the highest numbers of recorded cases of Indigenous youths across Canada?

**Acknowledgements**  
Thank you to University of Idaho's Office of Undergraduate Research (OUR) and the College of Letters, Arts, and Social Sciences for funding this research. Thank you to research advisors Omi Hodwitz and Steff King.

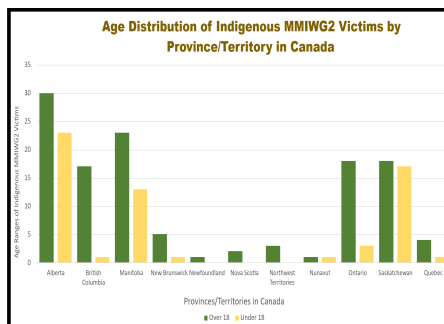
**INTRODUCTION**

The Missing and Murdered Indigenous Women, Girls, and Two-Spirit (MMIWG2) individuals crisis puts tremendous heartbreak and frustration upon affected families. Beyond the immediate concerns for health and wellness, Indigenous families also endure the stress of wondering whether a family member will vanish without proper justice or attention. This tragic reality is worsened by the lack of research and depth of knowledge given to it, creating a limited understanding of these cases. Amplifying this issue, media coverage alienates Indigenous communities through insufficient reporting and inadequate representation of these events. In direct response to the urgent need for improved data collection and research, the MMIWG2 project, conducted at the University of Idaho, was established in 1980. This ongoing project requires continuous collaboration to ensure the database remains current with the unceasing volume of reported cases. While the full scope of the crisis remains vast and obscured, the MMIWG2 database serves as a vital source of consolidated and clear information. Analysis of the data allows for identification of the key descriptors associated with MMIWG2 cases, offering crucial insights into the demographics of those affected. While the complexity of the crisis means that definitive conclusions cannot be drawn, the data within the MMIWG2 database provides visible trends regarding age ranges and geographic locations.

**Methodology**

The MMIWG2 database requires three phases:  
1) Gathering details and reading reports of MMIWG2 cases.  
2) Coding the collected case information and conducting quality control.  
3) Preliminary data analysis.

In this specific research study, a total of 200 cases were fully coded for analysis.



**Results**

- Out of the 200 cases, there were **63 total** reported MMIWG2 cases where the victim was **under the age of 18**.
- Out of the 200 cases, there were **119 total** reported MMIWG2 cases where the victim was **over the age of 18**.
- **Alberta, Canada** had the highest number of recorded cases of Indigenous youths: **23**.
- **Saskatchewan, Canada**, had the second highest number: **17**, and **Manitoba, Canada**, had the third highest number: **13**.

**Conclusion**

These findings suggest that Indigenous adults (those over 18) made up the majority of direct MMIWG2 victims, significantly outnumbering Indigenous youth. However, there were three concerning provinces within this specific dataset that had alarming numbers of Indigenous youth being direct victims; Alberta, Saskatchewan, and Manitoba, which is crucial to acknowledge for this research. These research questions represent only a fraction of the MMIWG2 project. There has been significant work accomplished, but there remains much more to be done. This adapting database has been a tool to provide clear, sufficient statistics. The ongoing efforts are vital for a complete understanding of the MMIWG2 crisis, which is important for informing effective policies + strategies to achieve justice and prevent further violence for all Indigenous peoples.

**STUDENT:** Maximillian Wood

**COLLEGE:** Letters, Arts, and Social Sciences

**TITLE:** Sharing Idaho's History - Visually

**MENTOR:** Mark Warner, Anthropology

**Abstract:** For 12 years anthropologists at the University of Idaho have actively engaged the citizens of the state through a series of public archaeology projects in locations such as Coeur d'Alene, Moscow, and Boise. The projects have generally been successful from a research perspective and somewhat successful from an outreach perspective, reaching thousands of the state's citizens during the excavation. The shortcoming with the projects has been the ability to continue to engage communities after excavations are completed (a typical project is two to four weeks). The proposed project is intended to address this issue by producing at least three documentary videos on two recent excavations and one upcoming excavation. The excavations were conducted in Moscow, near Riggins and the upcoming excavation will be in Boise. The resulting videos provide opportunities to continue to share archaeological work for years after excavations are complete as well as the ability to reach audiences who may not otherwise be able to visit archaeological sites. Furthermore, it provides a significant opportunity for professional development for the student researcher enabling them to create multiple videos that will be shared throughout the state.

<https://www.youtube.com/watch?v=nZzBiUeo-r4>



*Boise Assay Office – Field School Documentary.*


Max also created a video for an Archeology project at Moscow High School and presented his work at a regional archeology conference.

**STUDENT:** Rahman Ratul **COLLEGE:** Art and Architecture

**TITLE:** Exploring Mississippi River Models as Hybrid objects

**MENTOR:** Lori Smithey

**Abstract:** This research project explores the two models of the Mississippi River, the Mississippi River Basin Model and the Mud Island Park River Model, as hybrid objects that bridge the gap between nature and society. Built by the US Army Corps of Engineers between 1943 and 1965, the Mississippi River Basin Model was designed to visualize the Lower Mississippi and predict flooding, reflecting early 20th-century technological optimism. In contrast, the Mud Island Park River Model, designed by architect Roy Harrover in 1976, emerged during a period of growing environmental awareness and serves as a cultural and educational attraction. This study examines these models through the lens of Bruno Latour’s concept of the “Parliament of Things,” which advocates for giving non-human entities a voice in decision-making processes. By employing site visits, documentation, archival research, and literature analysis, this project aims to highlight the limitations of modernist approaches to environmental management and suggest alternative frameworks for understanding human-environment interactions. This research contributes to broader discussions on environmental stewardship and the role of physical models in fostering public engagement and understanding.




**University of Idaho**

## Reimagining Mississippi River Model As Hybrid Objects

COLLEGE OF ART AND ARCHITECTURE, UNIVERSITY OF IDAHO

ASHIKUR RAHMAN RATUL, DR. LORI SMITHEY



**University of Idaho**

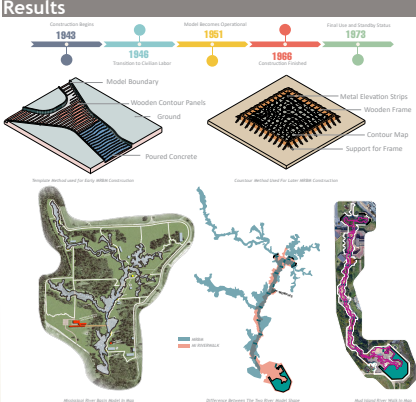
### Abstract

This research compares two large-scale representations of the Mississippi River—the Mississippi River Basin Model (MRBM) and the Mud Island River Park Model—as hybrid objects at the intersection of architecture, infrastructure, and environmental imagination. Built by the U.S. Army Corps of Engineers between 1943 and 1966, the MRBM was a massive hydraulic model for flood simulation and water policy. In contrast, the Mud Island model, designed by Roy Harrover in 1976, served as a symbolic public artwork and educational experience. Through site visits, archival research, and construction analysis, this study explores how each model merges engineering precision, spatial design, and cultural narrative. Drawing on Bruno Latour’s “Parliament of Things,” it considers how these models grant representational agency to the river. Ultimately, the project reveals how physical modeling has shifted—from predictive infrastructure to immersive artifact—highlighting its evolving role in environmental modeling, architectural meaning-making, and human-nature mediation.

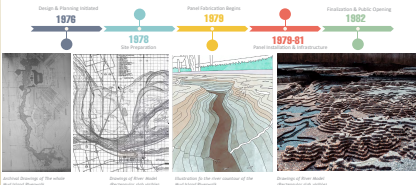
### Introduction

The Mississippi River has been modeled at two vastly different scales and for two distinct purposes. The Mississippi River Basin Model (MRBM), constructed by the U.S. Army Corps of Engineers between 1943 and 1966, functioned as a massive hydraulic tool used to simulate flooding and inform federal water management strategies. In contrast, the Mud Island River Park Model, designed in 1976 by architect Roy Harrover, was created as a symbolic and educational public space offering visitors a walkable, artistic experience of the river. This project investigates how each model expresses different values: scientific control versus cultural interpretation, and functional infrastructure versus architectural storytelling.

### Results



To begin the research process, we conducted an on-site documentation of both the Mississippi River Basin Model (MRBM) in Clinton, Mississippi, and the Mud Island River Park Model in Memphis, Tennessee. At each location, we recorded photographs, sketches, and spatial measurements while observing construction details and visitor experience. Upon returning, we expanded our investigation through historical archives, gathering documents from the U.S. Army Corps of Engineers regarding the MRBM’s construction and engineering methods, and consulting Roy Harrover’s architectural papers at the University of Memphis for the Mud Island model. We also reviewed published books, government reports, and internal documents to better understand the technical and conceptual foundations behind both models.



The MRBM, built over 30 years, used elevation strip and contour line methods to construct a 200-acre concrete terrain at 1:2000 horizontal and 1:100 vertical scale. It featured a complex system of pumps, valves, and rainfall simulators to model flood scenarios and inform federal water policy. By contrast, the Mud Island River Park Model, built from 1977–1981, spans 2,000 feet and was cast in modular concrete at a scale of 1 inch = 1 mile horizontally and 1 inch = 100 feet vertically. While it includes a flowing water channel, its intent was not technical precision but geographic storytelling translating the river’s course into an immersive public experience.

Both models translate the Mississippi River into tangible form, but their roles diverge. The MRBM, a closed research site, reflects mid-century ideals of prediction and control. Mud Island, open to the public, emphasizes interpretation, memory, and engagement. Framed by Bruno Latour’s “Parliament of Things,” these models grant representational agency to the river one through engineering data, the other through cultural narrative. Together, they reveal how modeling evolves not just with technology, but with shifting values in how we relate to nature and infrastructure.

### Conclusions and Future Directions

This study shows how two river models originally built for opposite purposes have converged in meaning. The MRBM, once a scientific tool for flood simulation, and the Mud Island model, designed for public storytelling, now both function as sites of memory and engagement. Though one emphasized control and the other experience, each now invites reflection on the river’s cultural and environmental significance.

Future research may explore how such models evolve as cultural artifacts through preservation, reinterpretation, or new forms of engagement. Comparative studies could examine similar models globally or investigate how communities find meaning in obsolete infrastructure. This work also opens paths into questions of memory, narrative, and environmental representation asking not just how rivers were modeled, but how our relationship with them continues to be shaped.

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I am deeply grateful to my mentor, Dr. Lori Smithey, for her constant guidance, encouragement, and for accompanying me to the site—her support was instrumental in shaping the direction and depth of this research.

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TAB 2

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STUDENT: Lily Givens

COLLEGE: Science

TITLE: Exploring the potential of the novel killer K21L in *Saccharomyces kudriavzevii*

MENTOR: Paul Rowley, Department of Biological Sciences

**Abstract:** Fungal infections, particularly those caused by *Candida* species, pose a significant threat to global health. A potential alternative to traditional antifungal drugs lies in the application of “killer toxins” produced by certain yeast strains. Yeast exhibiting the “killer” phenotype are capable of secreting toxins that are harmful to neighboring susceptible yeasts while maintaining immunity themselves. A survey of killer toxin-producing yeasts has discovered a novel killer toxin found in *Saccharomyces kudriavzevii*. This killer toxin is a homolog of the K21 toxin found in *Saccharomyces paradoxus* and has been named K21-like (K21L). K21L is strikingly similar to K21, with 88% similarity and 81% identity at the amino acid level. In addition, secondary and tertiary structure predictions of both toxins show many conserved features, indicating K21 and K21L may share similar mechanisms of antifungal activity. This project aims to confirm the presence of the K21L gene and killer toxin expression by *S. kudriavzevii* and to characterize the function of these killer toxins.

## Exploring the Potential of the Novel Killer Toxin K21L in *Saccharomyces kudriavzevii*

Lily L. Givens<sup>1</sup>, Sarah A. Coss<sup>1</sup>, Jack W.G. Creagh<sup>1</sup>, F. Marty Ytreberg<sup>2,3</sup>, Paul A. Rowley<sup>1</sup>

<sup>1</sup>Department of Biological Sciences, University of Idaho, Moscow, ID. <sup>2</sup>Department of Physics, University of Idaho, Moscow, ID. <sup>3</sup>Institute for Modeling Collaboration and Innovation, University of Idaho, Moscow, ID.

### Abstract

Fungal infections, particularly those caused by *Candida* species, pose a significant threat to global health. A potential alternative to traditional antifungal drugs lies in the application of “killer toxins” produced by certain yeast strains. Yeast exhibiting the “killer” phenotype are capable of secreting toxins that are harmful to neighboring susceptible yeasts while maintaining immunity themselves. A survey of killer toxin-producing yeasts has discovered a novel killer toxin found in *Saccharomyces kudriavzevii*. This killer toxin is a homolog of the K21 toxin found in *Saccharomyces paradoxus* and has been named K21-like (K21L). K21L is strikingly similar to K21, with 88% similarity and 81% identity at the amino acid level. In addition, secondary and tertiary structure predictions of both toxins show many conserved features, indicating K21 and K21L may share similar mechanisms of antifungal activity. This project aims to confirm the presence of the K21L gene and killer toxin expression by *S. kudriavzevii* and to characterize the function of these killer toxins.

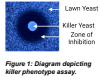


Figure 1: Diagram depicting killer phenotype assay.

### Killer toxin mechanisms

Killer toxin mechanisms are not well understood. Diverse sequences. Receptors are not well studied or identified. No solved structures of any *Saccharomyces* killer toxin. What do we know about how yeast killer toxins function? Figure 2A Yeast killer toxins go through complex proteolytic processing where the mature toxin is an alpha beta heterodimer resulting from cleavage at dibasic residue motifs [1].

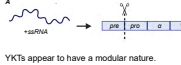
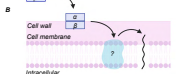


Figure 2B The mature alpha-beta toxin acts on target cells in three steps. YKTs appear to have a modular nature. Figure 2C Some of the most well studied of the YKTs are believed to be ionophores [2, 3].



### Structure prediction of killer toxins

*Saccharomyces* killer toxins of the share significant structural homology despite low sequence conservation, suggesting a conserved structure to function relationship.

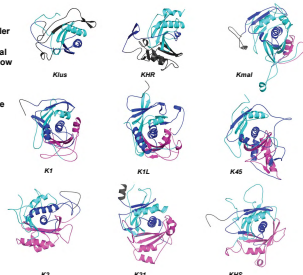


Figure 3: Tertiary structure predictions of various killer toxins.

Legend: alpha (blue), gamma (green), delta (red).

### Results

#### The novel toxin K21L is a homolog of the known toxin K21

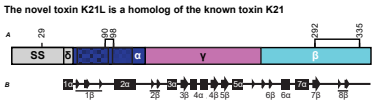


Figure 4: A) Domain diagram of K21 and K21L. B) Secondary structure is represented by arrows and rectangles. C) Tertiary structure model of killer toxin protein captured by domains as depicted in panel A.

#### K21 and K21L are similar but exhibit key differences in killing specificity

Small differences between K21 and K21L encode the ability to target the human pathogen *C. glabrata*

Aim: Identify mutations and differences in higher order structure that dictate differences in killing specificity between K21 and K21L.

#### Development of novel toxins with swapped beta domains

Figure 6: Novel chimera toxins are created through homologous recombining in yeast.

#### Expected Results

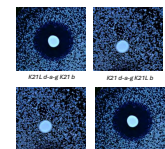


Figure 7: Killer Assays. Chimeras with swapped beta domains are expected to show swapped killing specificity against *C. glabrata*.

Figure 8: Spot Assays. Chimeras with swapped beta domains are expected to show a suicidal phenotype when spotted on inducing media.

#### The novel toxin K21L shows killing specificity towards the drug resistant human pathogen *Candida glabrata*

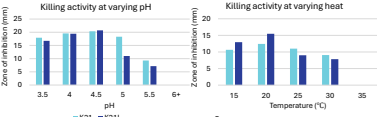


Figure 5: A) Graph of optimal pH for killing activity of K21 and K21L. B) Graph of optimal heat for killing activity of K21 and K21L. C) Grid depicting spectrum of activity of K21 and K21L. Strains of *C. glabrata* are in bold text.

### Conclusions

Characterization of domain function will further the understanding of the mechanism of action of yeast killer toxins and what determines killer toxin specificity, which is essential for clinical or industrial applications.

Further analysis into what determines altered specificity between K21 and K21L will be conducted using site directed mutagenesis.

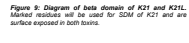


Figure 9: Diagram of beta domain of K21 and K21L. Mutated residue will be used for SCAM of K21 and the surface exposed in both toxins.

### Acknowledgments

The project described was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under Grant #202040404 and the Institute for Modeling Collaboration and Innovation of the University of Idaho. We thank the National Institutes of Health, National Science Foundation, and the National Institutes of Health under Grant #R01NS044043. Additional support was provided by the National Science Foundation CAREER Award Grant #1346463. This research was supported in part by a Summer Undergraduate Research Fellowship from the Office of Undergraduate Research at the University of Idaho and a Career for Undergraduate Research, Scholarship, and Creative Activities from the University of Idaho Human Program.

### References

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- Morales B, Zhu H, Adams A, Chen S, Calderone RL, Berman H, King C. Novel killer toxins from an emerging yeast pathogen and an antifungal bioterrorism. *Proc Natl Acad Sci U S A*. 2002 Aug 13;99(16):10208-12. doi: 10.1073/pnas.011622899. PMID: 1206715. PMCID: PMC136506
- Chenaki J, Frenkel MM, Chikara MK, Chaganti SR, Saper RB. K21 killer toxin: molecular phylogenetic divergence in the yeast *Saccharomyces cerevisiae*. *FEMS Microbiol Rev*. 2016 Mar;162(1-2):103-12. doi: 10.1007/s11241-015-9261-0. Epub 2015 Jan 26. PMID: 2619855.

STUDENT: Sebastian Herrera-Allegre

COLLEGE: Science

TITLE: Development of a modular thumb support with multi-directional locking to improve post-stroke thumb opening and positioning

MENTOR: Joel Perry, Mechanical Engineering

**Abstract:** Stroke is a leading cause of long-term adult disability and frequently impairs voluntary control of the hand. Disruption to the brain’s motor pathways weakens the muscles responsible for finger extension while also increasing involuntary tone in the finger flexors. This imbalance makes it difficult to extend or release the hand, hindering daily activities and slowing rehabilitation. Although dysfunction affects the entire upper limb, effective thumb positioning—particularly in abduction, extension, and opposition—is essential for functional hand use. Most orthotic devices focus on supporting grasp but offer little assistance for controlled hand opening or repeatable thumb positioning. To address this gap, a modular thumb support attachment was developed for a lab-designed hand orthosis. The design includes a multi-layered spherical joint with a position-locking cam handle, allowing for manual locking and multi-directional adjustment. The attachment was designed to align with natural thumb movement and provide support for abduction and extension without interfering with grasp. It remains low-profile and lightweight for user comfort and integrates directly into the existing hand orthosis framework. Preliminary self-testing demonstrated improved comfort, positioning, and ease of use during repeated motions. This early-stage prototype presents a promising direction for adaptable, user-centered orthotic tools that support functional hand rehabilitation.

**Development of a Modular Thumb Support With Multi-Directional Locking to Improve Post-Stroke Thumb Opening and Positioning**  
Sebastian Herrera Alegre<sup>1</sup>; Joel Perry<sup>2</sup>  
<sup>1</sup>Department of Chemical and Biological Engineering and <sup>2</sup>Department of Mechanical Engineering, University of Idaho, Moscow ID

**Abstract**

➤ **Background:**

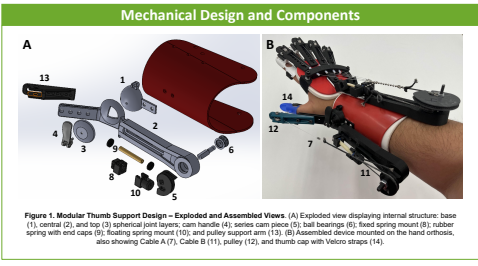
- Stroke often impairs voluntary hand control by weakening extensors and increasing involuntary flexor tone.
- This limits hand opening, delaying recovery and complicating tasks where thumb positioning—especially in abduction, extension, and opposition—is critical.

➤ **Problem Statement:**

- Few orthotic devices provide targeted, adjustable support for the thumb that enables functional hand opening after stroke.

➤ **Solution Design:**

- A modular thumb support was developed for a modified hand orthosis, featuring a low-profile, lightweight structure that integrates directly into the device and uses a multi-layered spherical joint with a position-locking cam handle to support thumb abduction and extension without interfering with grasp.



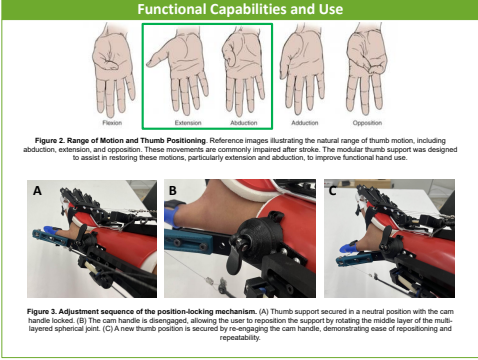
**Comparison to Existing Orthotic Solutions**

Feature	Proposed Thumb Support	SaeboFlex	SoftPro Orthosis
Thumb Adjustability	Multi-directional, manual locking	Limited (via Allen wrench)	Minimal (pre-shaped splints)
Locking Mechanism	Cam handle for secure positioning	Screws	None
Extension Assistance	Nonlinear force via cam + spring	Linear spring assistance	Passive/stretch-based support
Grasp Compatibility	Maintains open grasp	Designed for flexion tasks	Supports resting or grip
Integration	Modular	Full splint	Pre-molded resting orthosis
Adjustability	High (mechanical + length tunable)	Medium (adjust w/ tools)	Low (fixed shape, bend-to-fit)
User Setup	Designed for single-user operation	May need assistance	Simple; straps or Velcro

Table 1. Comparative features of the proposed thumb support and two commonly used orthotic systems in post-stroke hand rehabilitation.

**Objectives**

- Design a modular thumb support attachment that approximates the natural range of motion in a non-stroke-affected thumb.
- Develop a mechanical system that provides assistive force for thumb extension to support controlled hand opening.
- Incorporate a position-locking mechanism that enables repeatable, user-defined thumb orientation for functional tasks or therapy.
- Ensure compatibility with both daily use and clinical settings, prioritizing ease of adjustment, comfort, and integration with existing orthoses.



**Discussion**

- Designed to support thumb extension and positioning often impaired post-stroke.
- Multi-layered spherical joint and locking cam allow flexible, repeatable adjustment.
- Nonlinear spring and dual-cable system offer graded assistance but require tuning.
- Manual locking supports consistent use, though may be difficult to adjust unassisted.
- Future refinement will target compactness, ease of use, and clinical evaluation.

**Methods**

- **Design Requirements:**
  - Replicate the functional range of motion of the thumb, with emphasis on abduction, extension, and opposition with manual locking.
  - Ensure integration with a lab orthosis and maintain a lightweight, low-profile design.
- **Design Implementation:**
  - A multi-layered spherical joint was selected for secure, multi-directional adjustment and manual position locking.
  - Components were modeled in CAD and 3D printed using a combination of rigid and flexible materials to balance support and comfort.
- **Testing:**
  - Self-testing assessed comfort, anatomical alignment, and grasp compatibility across repeated-motion trials.
  - Assisted extension and locking stability were evaluated, with qualitative observations informing refinement and future user testing.

**Conclusions**

- Preliminary self-testing showed improved thumb comfort, positioning, and ease of use during repeated motions.
- This early-stage prototype presents a promising direction for adaptable, user-centered orthotic tools that support functional hand rehabilitation.

**Acknowledgments**

- Supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under Grant #P20GM103408.
- For further questions please contact Dr. Perry by email at jperry@uidaho.edu.

**BUDGET:**

\$65,000 – spent \$64,869

**Budget Justification:**

- A. Spring Semester Awards **\$4,000** but \$3,369 spent  
In December of 2024 it was determined that SBoE earmarked STEM funding could apply to four of the Spring 2025 semester awards. Each of these projects requested \$1,000 and the students and faculty mentors utilized internal departmental budget codes (that we monitored) to purchase supplies for the projects. Attached to this document is a itemized list of materials purchased (\$3,369)
  
- B. Summer Undergraduate Research Fellowship (SURF) awards **\$50,500**  
For Summer of 2025 the OUR was able to award 8 full scholarships at \$5,500 to STEM students using SBoE HERC funding and one partial scholarship of \$1,500 and another partial scholarship of \$5,000. The rest of the funding – specifically for their projects – was supported from the OUR.
  
- C. SURF-INBRE Stipends **\$11,000**  
The OUR has partnered with the Idaho INBRE program to help students that were meritorious enough to earn INBRE in their Sophomore year summer and reapplied for INBRE for their Junior year summer. In this partnership – the OUR is secured a high-quality STEM related research project and motivated student and INBRE can offer a second summer for students with limited other options. This year – the two students in the SURF-INBRE program were Lily Givens and Sebastian Herrera Allegre. Each was paid a \$5500 stipend and the remaining stipend and supplies budget was furnished by INBRE.
  
- D. **Total: \$64,869**

**University of Idaho**  
**Itemized Expenditures**  
From 7/1/2024 through 6/30/2025

**Grant: SC8081 - ISBOE HERC OUR FY25**

Index: -

Fund: 228081 - ISBOE HERC OUR FY25

Operating Expenses

E5025 Printing & Binding

4/28/2025	J1376225	Tckt#1640778591 Iron Weathering tg	\$59.40
4/30/2025	J1376510	Tckt#1642813919 J Manshahia Pstr tg	\$67.20
4/30/2025	J1376520	Tckt#1643474785 John Grundy Pstr tg	\$43.20
4/30/2025	J1376764	Tckt#1644130351 Thapa Symp Pstr tg	\$43.20
6/11/2025	J1379362	jlr/To 917998 SURF Medema Doc Ref: J1376225	(\$56.45)
6/11/2025	J1379364	jlr/To 917998 SURF Manshashia Doc Ref: J1376510	(\$42.58)

E5080 Licensing/Certificates

4/21/2025	Z1094191	Renewal of Tecplot research softwar Doc Ref:	\$608.00
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E5307 Analytical Services

4/11/2025	J1375504	March 2025 EM Center Langman; jdj	\$590.00
4/15/2025	J1375614	RJH / CT 804776 to 887854 / ESS Doc Ref:	\$60.00

E5671 Refreshments & Meals - Internal

6/20/2025	Z1098189	This was for lunch for the ME Exter Doc Ref:	\$92.39
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E5710 Tools

5/5/2025	Z1094957	This was ordered for Jasmeen Mansha Doc Ref:	\$496.58
5/5/2025	Z1094957	This was ordered for Jasmeen Mansha Doc Ref:	\$35.44

E5724 Research Supplies

3/11/2025	Q0103445	Amazon Capital WEST SYSTEM 105A Epoxy Resin	\$104.98
3/14/2025	Q0104016	Amazon Capital 13 Pieces Set of 5 gram Diamond	\$49.00
3/14/2025	Q0104016	Amazon Capital shipping	\$11.28
3/18/2025	Z1091947	Seeding fluid for Vibhav Durgesh's Doc Ref:	\$310.00
3/31/2025	!0577344	Amazon Capital Services Inc	\$0.00
4/2/2025	Z1093029	Research supplies: thin section mat Doc Ref:	\$181.79
4/3/2025	!0577760	Amazon Capital Services Inc	\$0.00
5/8/2025	Z1095331	Differential pressure transducer fo Doc Ref:	\$133.36
5/8/2025	Z1095331	Differential pressure transducer fo Doc Ref:	\$210.00
6/20/2025	Z1098189	Reimbursement from PayPal correspon Doc Ref:	(\$133.36)
6/20/2025	Z1098189	Reimbursement from PayPal correspon Doc Ref:	(\$210.00)
6/20/2025	Z1098189	This is for Dr. Durgesh and John Gr Doc Ref:	\$715.45

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\$3,368.88

Trustee/Benefits

E7060 Prizes & Awards

5/12/2025	J1377283	SPAP for V00809589	\$2,750.00
5/12/2025	J1377283	SPAP for V00877197	\$2,750.00
5/12/2025	J1377283	SPAP for V00938253	\$2,750.00
5/12/2025	J1377283	SPAP for V00959435	\$2,750.00
5/12/2025	J1377287	SPAP for V00910800	\$2,750.00
5/12/2025	J1377292	SPAP for V00924845	\$5,000.00

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5/13/2025	J1377285	SPAP for V00888970		\$2,750.00
5/13/2025	J1377290	SPAP for V00898620		\$1,500.00
5/13/2025	J1377289	SPAP for V00927644		\$2,750.00
5/13/2025	J1377288	SPAP for V00975945		\$2,750.00
6/11/2025	J1379337	SPAP for V00809589		\$2,750.00
6/11/2025	J1379337	SPAP for V00877197		\$2,750.00
6/11/2025	J1379339	SPAP for V00888970		\$2,750.00
6/11/2025	J1379341	SPAP for V00910800		\$2,750.00
6/11/2025	J1379343	SPAP for V00927644		\$2,750.00
6/11/2025	J1379337	SPAP for V00938253		\$2,750.00
6/11/2025	J1379337	SPAP for V00959435		\$2,750.00
6/11/2025	J1379342	SPAP for V00975945		\$2,750.00
6/18/2025	J1379957	jlr/FR 917999 SURF Stipends	Doc Ref: J1379345	\$11,000.00
				<hr/>
				\$61,500.00
				<hr/>
Totals for 228081				\$64,868.88
				<hr/>
Totals for SC8081				\$64,868.88

## 2025 Final Report: HERC Funding for the Idaho Conference on Undergraduate Research (ICUR)

Submitted by Jim Fredricksen, Director of the Boise State Institute for Inclusive and Transformative Scholarship

### Executive Summary

Thanks to HERC’s foundational support and other contributions from partners, ICUR 2025 (July 16 and 17, 2025) successfully convened a broad statewide and cross-institutional representation with 590 attendees. The conference’s core purpose – provide Idaho undergraduates a supportive, accessible forum to present research and to connect across campuses, disciplines, and backgrounds – was realized through a state-wide planning team and engaged programming. This year over 600 collaborators contributed to 218 research projects spanning more than 30 institutions. Find the link to ICUR 2025 agenda, speaker and session information, and videos of lightning talks at this link: <https://www.boisestate.edu/icur/icur-2025/>

### Core Purpose and Goals

ICUR 2025 advanced these major goals:

- Offering a meaningful and supportive space for students to present to non-expert audiences and to network across the state institutions
- Reducing barriers to participation – geographically, financially, and by discipline
- Inviting contributions from STEM and non-STEM researchers
- Fostering statewide community and professionalization among Idaho’s undergraduates

### Participation Overview

Metric	Value	Notes
Attendees	590	(2024 = 444 attendees)
Projects (posters)	218	From 218 unique projects, many interdisciplinary (2024 = 181 posters/projects)
Collaborators	623	Includes presenters, co-authors, mentors (2024 = 550 collaborators)
Survey Respondents	161	33% response rate (2024 = 32.9% response rate)

### Institutional Representation

- Boise State University: 52.3%, 114 projects
- University of Idaho: 22.9%, 50 projects
- Idaho State University: 19.3%, 42 projects
- College of Idaho: 2.3%, 5 projects

- Lewis-Clark State College: 1.8%, 4 projects
- College of Southern Idaho: .5%, 1 project
- College of Western Idaho: .5%, 1 project
- BYU-Idaho: .5%, 1 project

Note: Other and out-of-state institutions = several single-project contributors

### Disciplinary Breadth (218 projects)

- Biological Sciences: 39.4%, 86 projects
- Physical Sciences: 25.2%, 55 projects
- Engineering: 15.6%, 34 projects
- Health Sciences: 14.7%, 32 projects
- Social Sciences: 13.8%, 30 projects
- Computer Science: 10.1%, 22 projects
- Humanities: 3.7%, 8 projects
- Arts and Design: 3.2%, 7 projects
- Business/Economics: 1.8%, 4 projects
- Mathematics: .9%, 2 projects
- Education: .5%, 1 project
- Public Service: .5%, 1 project

*Note: Because projects could be interdisciplinary, the sum of percentages exceeds 100%*

### Special Programs and Innovations

1. **Keynote:** Dr. Eric Jankowski (Professor, Director of Micron School of Materials Science and Engineering, Boise State) led the conference through a Story Collider workshop. This advanced the integration of storytelling into scientific communication, professional development, and community building among all conference attendees. Story Collider is a nationally recognized science communication leader that aims to boost student confidence, audience engagement, and campus-community connections.
2. **MakerLab Experiences:** A new hands on experience, students were able to engage directly with innovation and technology at the MakerLab on campus. The MakerLab provides the space for participants to collaborate, build, hack, invent, share, make, and do, reflecting many of the goals of the conference.
3. **Expanded Networking and Storytelling:** Provided opportunities for participants to share their highlights and lessons learned through quick video interviews and montage shared at the conference. As in past conferences, ICUR 2025 included Meet-a-Professor roundtable conversations and Graduate Student Panel sessions.

4. **Poster Sessions and Lightning Talks:** Scheduled for accessible and varied participation, presenters showcased their work in different formats, engaging a varied audience. Participants had the opportunity to communicate their accomplishments in a more informal setting through poster presentations and in rehearsed speeches in Lightning Talks.

Financial Overview

Category	Amount	Details
Meals / Refreshments	\$24,269.18	Student Union Building (SUB) catering (breakfasts, snacks, lunches, day 0 dinner) plus Albertsons purchases
Facilities (AV, space)	\$2,652.50	SUB space (inc AV), Games Center, stadium tour
Transportation / Travel	\$14,268.00	Charter buses, campus parking
Housing	\$18,443.94	Student and faculty lodging
Salary / staffing	\$13,272.45	Event coordination, logistics, project management
Supplies / Materials	\$326.24	Conference materials, signage
<b>TOTAL EXPENSES</b>	<b>\$73,252.31</b>	

Partner Contributions:

- Idaho EPSCoR Summer Authentic Research Experience program: \$7,252.31 (travel, food, lodging)
- National Institutes of Health Southwest Idaho Bridge to Baccalaureate program at Boise State: \$5,000 (facility/space rental)
- IDeA Network for Biomedical Research Excellence (INBRE) program: \$1,000 (Day 2 lunch)
- In-Kind: 10 cases of soft drinks (Swire Coca Cola)

**Total Partner Support: \$13,252.31**

**Net HERC Grant Utilized: \$60,000.00** (all grant funds spent as planned)

Impact and Feedback

- Overall satisfaction: 94% of respondents reported being “satisfied” or “very satisfied”
- Poster sessions and networking: 91.9% and 80.6% satisfaction rates, respectively
- Gains in skills and confidence: 77.7% “satisfied” or better
- Qualitative feedback showed excitement about interdisciplinary learning, supportive environment for new presenters, and networking with peers and faculty across Idaho institutions. Selected quotes include the following:

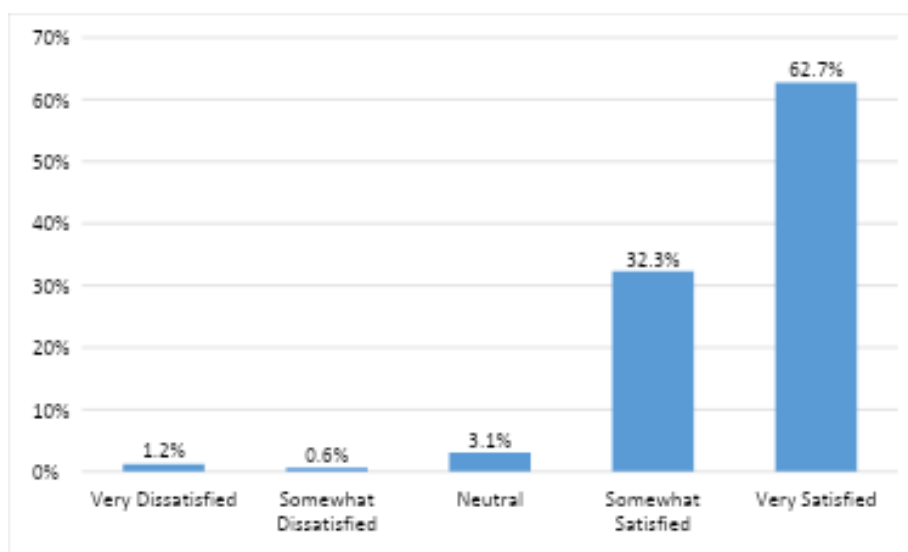
- STUDENT: *“The entire process of creating a poster in general; it was impactful to display and encourage me to think about not only what I am doing but why it matters. Not only this, but communicating it in a professional manner.”*
- STUDENT: *“The lightning talks in particular were fascinating and it was inspiring to see students presenting research that matters especially in a more digestible way”*
- STUDENT: *“The most impactful part of attending ICUR was being able to discuss my research/expertise with others at the event. It was genuinely an enjoyable experience to introduce others to the project that my team and I have spent several months working on, and getting to share a slice of my expertise in the field with others.”*
- STUDENT: *Walking around the poster sessions during Day 1 was the most impactful time for me because I felt like I really got to connect with student researchers like myself and learn about new topics. I approached some posters that didn't necessarily draw me in with their titles or topics, but I always left glad that I walked up.”*
- STUDENT: *“Being able to speak with so many different kinds of researchers put the scope of college research into scale for me, which was really impactful”*
- EDUCATOR: *“ICUR was extremely approachable for students' first conference. They all had a wonderful time and felt that it was a valuable experience. As a mentor and educator, that was incredible to see.”*
- EDUCATOR: *“My student was able to build confidence and presenting skills. It was a joy to see her shine. I also was really impressed with the various other poster presentations! Thank you for organizing this! It's such a great opportunity for undergrads across the state.”*
- OTHER: *“I thought this year there were lots of students from universities other than BSU, which was cool to see. I think encouraging that is important to give undergraduates a feel for how to present and interact at a conference in other states or areas, even if they are from the area”*

**Idaho Conference on Undergraduate Research 2025  
Survey Results**

**RESPONSE RATE: 32.9%**

- 531 survey recipients (excludes 6 IFITS staff who did not receive the survey)
  - o 354 (66.7%) students
  - o 177 (33.3%) faculty/staff/other
  
- 161 recorded responses; 2 of these are an incomplete response
  - o Answers for the incomplete response is included where available.

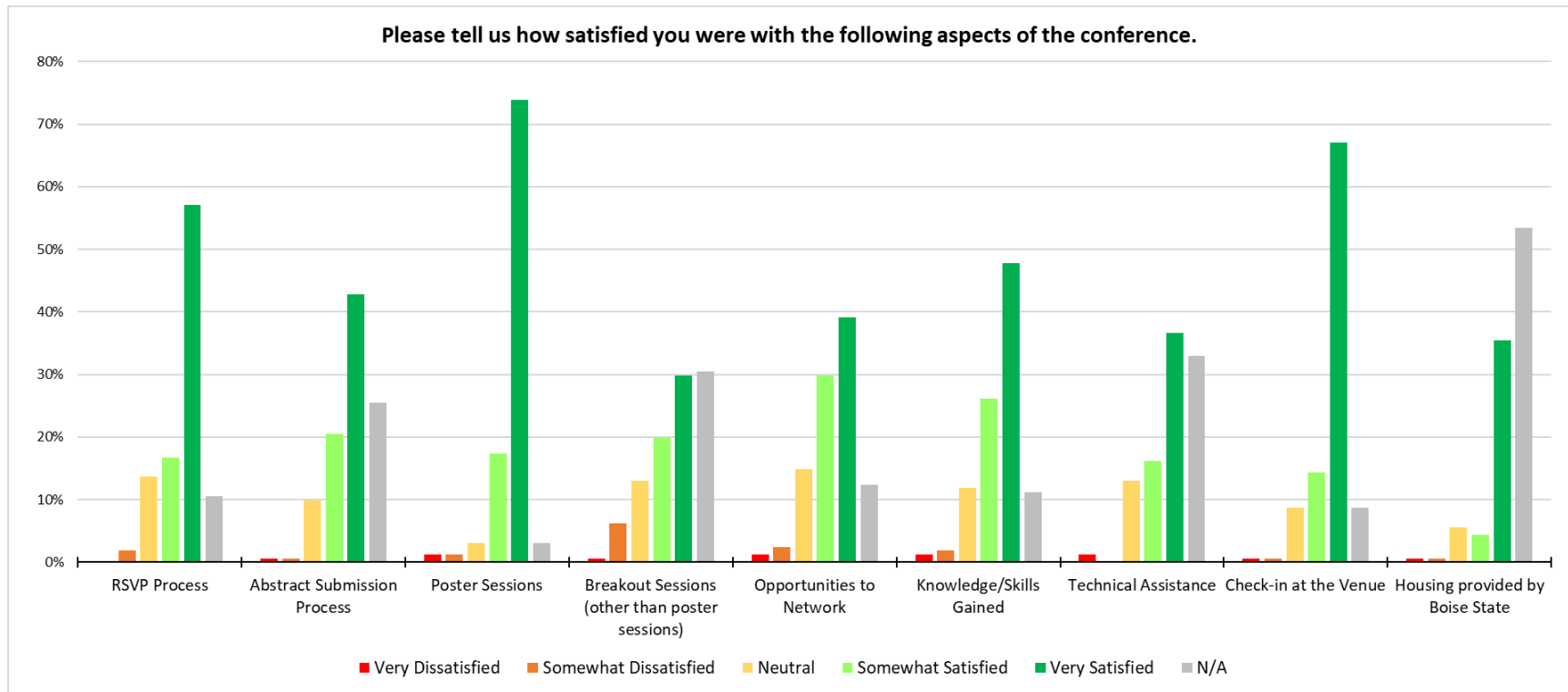
**Please indicate your overall satisfaction with the 2025 Idaho Conference on Undergraduate Research.**



Answer	%	Count
Very Dissatisfied	1.2%	2
Somewhat Dissatisfied	0.6%	1
Neutral	3.1%	5
Somewhat Satisfied	32.3%	52
Very Satisfied	62.7%	101
Grand Total	100.0%	161

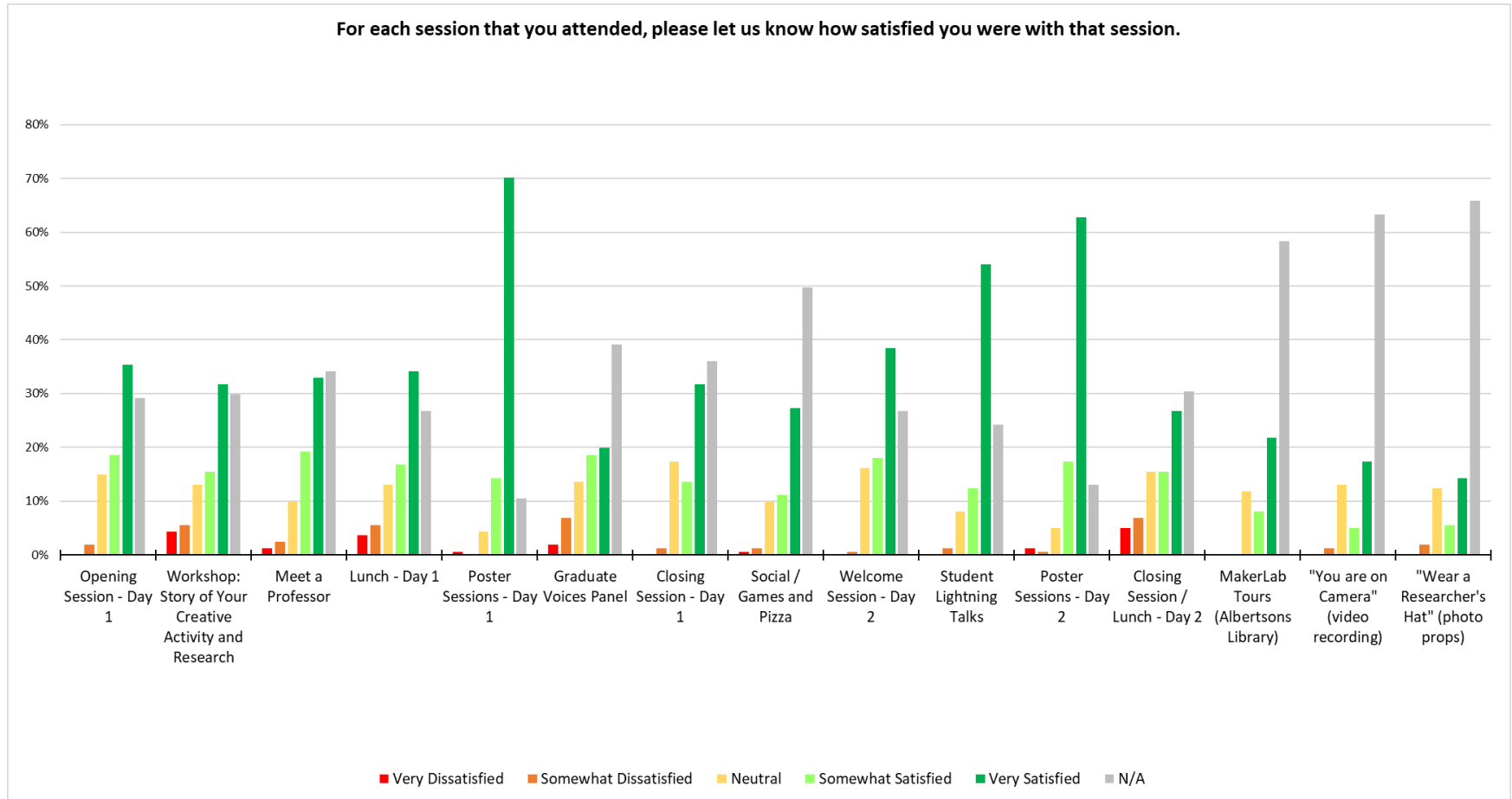
Please tell us how satisfied you were with the following aspects of the conference.

Aspect	Very Dissatisfied		Somewhat Dissatisfied		Neutral		Somewhat Satisfied		Very Satisfied		N/A		Total	
	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count
RSVP Process	0%	0	2%	3	14%	22	17%	27	57%	92	11%	17	100%	161
Abstract Submission Process	1%	1	1%	1	10%	16	20%	33	43%	69	25%	41	100%	161
Poster Sessions	1%	2	1%	2	3%	5	17%	28	74%	119	3%	5	100%	161
Breakout Sessions (other than poster sessions)	1%	1	6%	10	13%	21	20%	32	30%	48	30%	49	100%	161
Opportunities to Network	1%	2	2%	4	15%	24	30%	48	39%	63	12%	20	100%	161
Knowledge/Skills Gained	1%	2	2%	3	12%	19	26%	42	48%	77	11%	18	100%	161
Technical Assistance	1%	2	0%	0	13%	21	16%	26	37%	59	33%	53	100%	161
Check-in at the Venue	1%	1	1%	1	9%	14	14%	23	67%	108	9%	14	100%	161
Housing provided by Boise State	1%	1	1%	1	6%	9	4%	7	35%	57	53%	86	100%	161

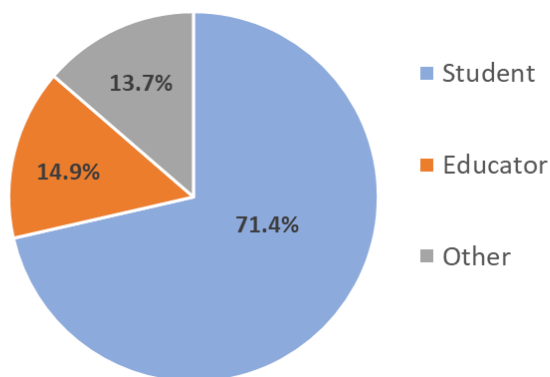


For each session that you attended, please let us know how satisfied you were with that session.

Session	Very Dissatisfied		Somewhat Dissatisfied		Neutral		Somewhat Satisfied		Very Satisfied		N/A		Total	
	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count
Opening Session - Day 1	0%	0	2%	3	15%	24	19%	30	35%	57	29%	47	100%	161
Workshop: Story of Your Creative Activity and Research	4%	7	6%	9	13%	21	16%	25	32%	51	30%	48	100%	161
Meet a Professor	1%	2	2%	4	10%	16	19%	31	33%	53	34%	55	100%	161
Lunch - Day 1	4%	6	6%	9	13%	21	17%	27	34%	55	27%	43	100%	161
Poster Sessions - Day 1	1%	1	0%	0	4%	7	14%	23	70%	113	11%	17	100%	161
Graduate Voices Panel	2%	3	7%	11	14%	22	19%	30	20%	32	39%	63	100%	161
Closing Session - Day 1	0%	0	1%	2	17%	28	14%	22	32%	51	36%	58	100%	161
Social / Games and Pizza	1%	1	1%	2	10%	16	11%	18	27%	44	50%	80	100%	161
Welcome Session - Day 2	0%	0	1%	1	16%	26	18%	29	39%	62	27%	43	100%	161
Student Lightning Talks	0%	0	1%	2	8%	13	12%	20	54%	87	24%	39	100%	161
Poster Sessions - Day 2	1%	2	1%	1	5%	8	17%	28	63%	101	13%	21	100%	161
Closing Session / Lunch - Day 2	5%	8	7%	11	16%	25	16%	25	27%	43	30%	49	100%	161
MakerLab Tours (Albertsons Library)	0%	0	0%	0	12%	19	8%	13	22%	35	58%	94	100%	161
"You are on Camera" (video recording)	0%	0	1%	2	13%	21	5%	8	17%	28	63%	102	100%	161
"Wear a Researcher's Hat" (photo props)	0%	0	2%	3	12%	20	6%	9	14%	23	66%	106	100%	161
Faculty Lounge	0%	0	0%	0	11%	17	1%	1	9%	15	80%	128	100%	161

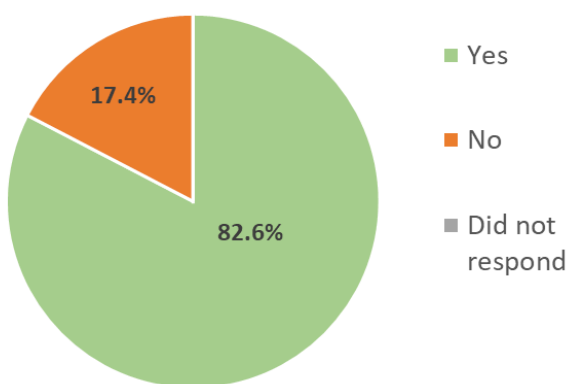


Please select your role.



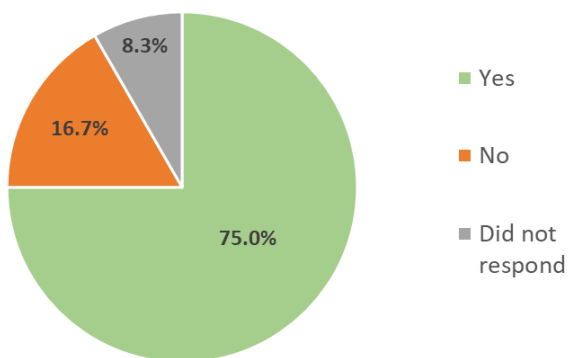
Answer	%	Count
Student	71.4%	115
Educator	14.9%	24
Other	13.7%	22
Total	100.0%	161

Did you present a poster? (This question presented only to the respondents who selected "Student" as their Role.)



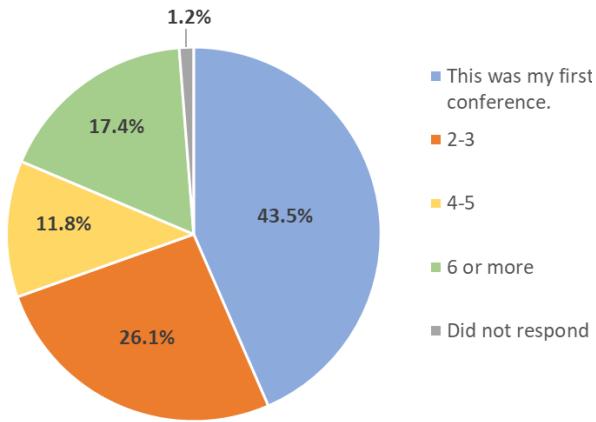
Answer	%	Count
Yes	82.6%	95
No	17.4%	20
Did not respond	0.0%	0
Total	100.0%	115

Were you a mentor of a student researcher who presented a poster? (This question presented only to the respondents who selected "Educator" as their Role.)



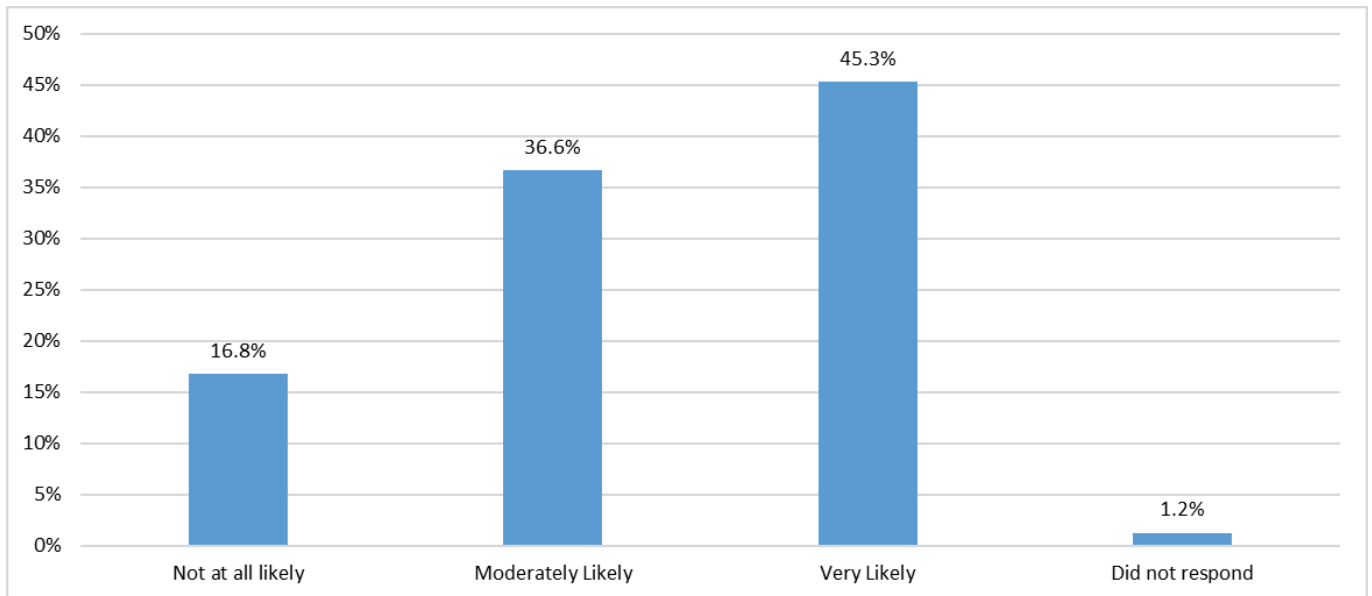
Answer	%	Count
Yes	75.0%	18
No	16.7%	4
Did not respond	8.3%	2
Total	100.0%	24

How many conferences (technical and professional conferences) have you attended including this one?



Answer	%	Count
This was my first conference.	43.5%	70
2-3	26.1%	42
4-5	11.8%	19
6 or more	17.4%	28
Did not respond	1.2%	2
<b>Total</b>	<b>100.0%</b>	<b>161</b>

How likely are you to attend ICUR next year?



Answer	%	Count
Not at all likely	16.8%	27
Moderately Likely	36.6%	59
Very Likely	45.3%	73
Did not respond	1.2%	2
<b>Total</b>	<b>100.0%</b>	<b>161</b>

### How did you find out about ICUR?

The following table summarizes categories mentioned in the open-ended responses to this question and the count of respondents who mentioned them. The summary is sorted by the greatest number of mentions to the lowest. 140 respondents answered to this question.

CATEGORIES OF COMMENTS	COUNT
Specific faculty or staff member	24
Research supervisor/mentor	18
Program requirement - not specified	14
I have previously attended	9
Email	8
SARE	8
Student	8
Friend/family	7
Office of Undergraduate Research (not necessarily BSU)	7
Not specified	5
INBRE	4
McNair Scholars	4
Project SEED	4
Student research participation (not specified)	4
Advisor	3
I-CREWS	3
LSAMP	3
REU program	3
Work	3
EPSCoR	2
From the university/school (no specifics given)	2
Internship	2
SURF	2
TRIO	2
Website	2
B2B	1
Course requirement	1
From a previous ICUR attendee	1
ICUR committee	1
Lab - not specified	1
Other research event at my school	1
No response	21

### What were your greatest lessons or take-aways from the conference?

The following table summarizes categories mentioned in the open-ended responses to this question and the count of respondents who mentioned them. The summary is sorted by the greatest number of mentions to the lowest. 128 respondents answered to this question; 58 mentioned more than one take-away.

<b>CATEGORIES OF COMMENTS</b>	<b>COUNT</b>
Learn about students'/others' research	26
Diversity of research	16
Interacting with/meeting students	15
Opportunity to present/practice presenting research/poster	13
Networking opportunities	12
Poster sessions	10
Exposure to research conference experience	9
Lightning talks	9
Students' enthusiasm	8
Value of research	6
Gained confidence to present/conduct research	5
Story of Your Creative Activity and Research	5
How to be a better researcher/succeed with research	4
How to present research/posters	4
Improving communication skills	4
Interacting with/meeting faculty/professionals	4
Meet the Prof session	4
Attendance/participation level	3
Different paths to research/careers	3
How to conduct research	3
Learn about fields and types of research	3
Ability/potential/growth/empowerment of students	2
How to better assist undergraduates with research	2
How to create a poster	2
Learn to communicate to a large audience/people outside my field	2
Research opportunities	2
Ability to support students	1
Criticism: Insufficient publicizing/marketing/communication about the event	1
Diversity of students doing research	1
Feedback on my research	1
Food	1
Graduate school info	1
Housing	1
Networking	1
New ways to get involved in UG research	1
Praise: ICUR in general	1
Praise: ICUR organization	1
Skills transferable to careers	1
Working/researching with grad students	1
n/a or no answer	33

Strong responses:

- STUDENT: *“The entire process of creating a poster in general; it was impactful to display and encourage me to think about not only what I am doing but why it matters. Not only this, but communicating it in a professional manner.”*
- STUDENT: *“The lightning talks in particular were fascinating and it was inspiring to see students presenting research that matters especially in a more digestible way”*
- STUDENT: *“The most impactful part of attending ICUR was being able to discuss my research/expertise with others at the event. It was genuinely an enjoyable experience to introduce others to the project that my team and I have spent several months working on, and getting to share a slice of my expertise in the field with others.”*
- STUDENT: *Walking around the poster sessions during Day 1 was the most impactful time for me because I felt like I really got to connect with student researchers like myself and learn about new topics. I approached some posters that didn't necessarily draw me in with their titles or topics, but I always left glad that I walked up.”*
- STUDENT: *“Being able to speak with so many different kinds of researchers put the scope of college research into scale for me, which was really impactful”*
- EDUCATOR: *“ICUR was extremely approachable for students' first conference. They all had a wonderful time and felt that it was a valuable experience. As a mentor and educator, that was incredible to see.”*
- EDUCATOR: *“My student was able to build confidence and presenting skills. It was a joy to see her shine. I also was really impressed with the various other poster presentations! Thank you for organizing this! It's such a great opportunity for undergrads across the state.”*
- OTHER: *“I thought this year there were lots of students from universities other than BSU, which was cool to see. I think encouraging that is important to give undergraduates a feel for how to present and interact at a conference in other states or areas, even if they are from the area”*

The complete list of comments grouped by role follows, excluding “n/a” responses.

STUDENTS	
Student	All the different fields of research
Student	Being able to explore all the posters that were there
Student	Being able to present my research focus to people outside my topic.
Student	Being able to see just how many opportunities there are for student research, all across the board, and not just at larger universities like Boise State.
Student	Being able to speak with so many different kinds of researchers put the scope of college research into scale for me, which was really impactful
Student	Condensing research into an easy to read poster
Student	Confidence
Student	connecting with other students.
Student	Getting experience of presenting and networking with other students.
Student	Getting to present research I've spent most of my time working on
Student	Getting to see my classmates' and peers' research and learn about the myriad topics of Idaho research.
Student	Giving a lightning talk. Being prepared to give talks in a short amount of time
Student	Hearing others people poster and talking to professors.
Student	How large of a research community idaho has
Student	How to conduct myself at a conference

Student	I absolutely loved the research posters and I learned that so many young people are inspired to learn and innovate even in the state of Idaho.
Student	I believe getting to meet new people and realize how passionate they are about their research. How hard they worked to get to this point.
Student	I believe the greatest takeaway from this conference was learning how others present their posters and figuring out how to make mine better next time.
Student	I enjoyed getting to work with a graduate student's research.
Student	I enjoyed learning about the story collider and how much of an impact a good narrative can make.
Student	I enjoyed looking around at the different posters. I also enjoyed the lightning talks.
Student	I enjoyed the poster session the most.
Student	I got to be more comfortable with the idea of presenting a poster at a conference.
Student	I got to learn a lot about research and I thought it was very cool
Student	I learned a lot about poster presentations and conferences
Student	I learned more about getting research ready for presentation.
Student	I like hearing other people's stories and what they plan to do after ICUR.
Student	I liked being able to see the research going on in undergraduate labs nationwide
Student	I really appreciated the different food options and the chance to socialize with others in my discipline and learn about others disciplines work.
Student	I really enjoyed getting to learn about all of the different types of insights from a variety of fields
Student	I really liked talking with other researchers
Student	I really liked the workshop and the words of the speaker were very impactful.
Student	I think the most impactful part to me was presenting my poster.
Student	I want to note that I only attended the poster session on the second day within the last 30 minutes of closing, so that is why I put many NA. My greatest takeaway was that, for the poster session, students have been gaining specialized knowledge that will prepare them for graduate education.
Student	I worked a lot on my presentation and communication skills.
Student	Improving my communication skills.
Student	Improving my presentation and communication skills was the highlight of my ICUR experience.
Student	It was eye opening how diverse research is.
Student	It was great to talk to other researchers and to know of all the amazing science taking place around me.
Student	It was interesting to visualize how broad research can be.
Student	It was so cool to hear about everyone's research and learn about their passions while they present their posters.
Student	Learning about different fields.
Student	Learning about other peoples research, and seeing what college, undergraduate, and graduate research looks like.
Student	Learning from other presenters and their research, gained valuable insights into other fields. Advice from professors and current grad students.
Student	Learning how to present and network at a conference.
Student	Lightning Talks: This was my favorite aspect of the conference. The range of topics was fascinating, and I wish some of the presenters at the posters could summarize their research so clearly and quickly.  Grad School Panel: I enjoyed the varied experience of the members of the panel, but waiting for them to go first to answer the questions became kind of awkward. Overall, incredibly valuable session.
Student	Meaningful, important research is on a smaller, more focused scale than media shows. Important work can (and usually is) done in a small niche of a subject most people (even in the field) haven't really heard of.
Student	Meeting other students

Student	Meeting people and being able to network
Student	Meeting people outside of my field of study
Student	My greatest take-away attending ICUR was the poster session which I was able to get an idea of what I need to be doing when I do a research project and be better prepared for a conference.
Student	My greatest takeaway was that this conferences is a great resource for Boise State students that unfortunately does not seem to be very well publicized to undergraduate students. (I've been a student here for three years and had never heard of it before until I happened to find it in a google search)
Student	Networking
Student	Networking and student researchers
Student	Networking oppurtunities were great.
Student	Networking was great!
Student	Never afraid to present your ideas and listen what others has to say
Student	Presenting my poster and the story telling session.
Student	Presenting poster and learning through other people work.
Student	Seeing all the different fields of interest being talked about.
Student	Seeing all the posters and other research being done around the state.
Student	Seeing how impactful history research can be to some people. The research I did was very focused on a small community in northern Idaho, but seeing how people related to it was very special.
Student	Seeing how important it is to give undergrads a space to talk about science.
Student	Seeing students around the state and their research
Student	Seeing the breadth of research that was being done and seeing how different disciplines went about their research.
Student	Seeing the wide range of topics covered by labs outside of Boise State and talking to all my fellow undergraduates.
Student	Talking to my fellow students about their research.
Student	That BSU has FANTASTIC dorms---that AC was a dream come true. Also, that presenting posters is more about fostering an intellectually stimulating conversation with others about your research rather than rambling an over-practiced speech at them for five minutes straight. The poster presentation session was excellent for guiding new researchers through the process of having one-on-one discussions about the merits and pitfalls of their work, without any of the scary rejection involved that often goes hand in hand with research.
Student	That there is more than one way to be involved in a meaningful area of work while remaining financially stable
Student	That there's so much about this world that we will always try to better understand.
Student	That you can present about your research at any point throughout the process.
Student	The community!
Student	The entire process of creating a poster in general; it was impactful to display and encourage me to think about not only what I am doing but why it matters. Not only this, but communicating it in a professional manner.
Student	The experience of presenting and networking
Student	The lightning talks in particular were fascinating and it was inspiring to see students presenting research that matters especially in a more digestible way
Student	The Lightning Talks were my favorite because it made me want to know more about each researcher's work throughout the summer or their previous years! It was so knowledgeable!
Student	The lightning talks were the best part, easily.

Student	The most impactful part of attending ICUR was being able to discuss my research/expertise with others at the event. It was genuinely an enjoyable experience to introduce others to the project that my team and I have spent several months working on, and getting to share a slice of my expertise in the field with others.
Student	The most impactful part of attending ICUR was seeing the other student researchers and being able to hear about their research.
Student	The most impactful part of ICUR was meeting many different people.
Student	The most impactful part was just being in a room of people who all value science and research, providing a hopeful light during an insecure time for research funding
Student	The networking and connections between disciplines :)
Student	The poster session I participated in provided me with many avenues to pursue my own improvement.
Student	The poster sessions, finding out what other students are doing research on was very interesting.
Student	The posters were the best part, i loved learning about all the cool research going on
Student	The storytelling workshop was the most impactful part.
Student	The time investment and gravity of significant research.
Student	The variety of undergraduate research in Idaho.
Student	The vast amount of topics being explored was interesting
Student	There is power in engaging with a wide variety of research topics in various fields
Student	There weren't any experiences or workshops at the conference that were relevant to me or my research, the only workshop that I found enjoyable what the student lightning talks.
Student	Walking around the poster sessions during Day 1 was the most impactful time for me because I felt like I really got to connect with student researchers like myself and learn about new topics. I approached some posters that didn't necessarily draw me in with their titles or topics, but I always left glad that I walked up.
Student	When people are really interested in what they are talking about, it makes the presentation a lot better.
<b>EDUCATORS</b>	
Educator	Depth and breadth of undergraduate research involvement.
Educator	Getting a chance to speak with students during the Meet a Professor session was quite enjoyable
Educator	Good experience for my undergraduate mentee
Educator	ICUR was extremely approachable for students' first conference. They all had a wonderful time and felt that it was a valuable experience. As a mentor and educator, that was incredible to see.
Educator	Loved the lightning talks and meet-a-professor. The student I know really appreciated these events.
Educator	Meeting students
Educator	My student was able to build confidence and presenting skills. It was a joy to see her shine. I also was really impressed with the various other poster presentations! Thank you for organizing this! It's such a great opportunity for undergrads across the state.
Educator	narrativizing research journeys
Educator	Networking
Educator	Providing my students an experience of presenting their research and networking with others
Educator	Seeing how excited and engaged the undergraduate students were at the presentations. I will try and encourage my students to do these posters and work on them.
Educator	Seeing my student get professional experience
Educator	Seeing my students presenting and building confidence/network
Educator	Seeing the undergrads presenting their research in high level
Educator	The breadth of student research across the state, and the excitement the students have for the work they are doing.
Educator	The greatest takeaway was the high level of student participation. BSU's outstanding organization set a strong example for others hosting regional conferences.
Educator	The poster sessions were great work by the students and also really enjoyed the story workshop!

Educator	The quality of the presentations.
Educator	The students had the opportunities for research presentations.
Educator	Undergraduates really enjoyed their first conference that is only for undergraduates. Meeting professor sessions were good for my students.
<b>OTHER ROLES</b>	
Other	How smart the students were.
Other	I loved the lightning talks. A whole bunch of research topics packed into a short amount of time. It expands one's knowledge of what others are doing in a efficient way.
Other	I observed the students networking from the various universities. They looked really happy with a sense of belonging.
Other	I thought this year there were lots of students from universities other than BSU, which was cool to see. I think encouraging that is important to give undergraduates a feel for how to present and interact at a conference in other states or areas, even if they are from the area
Other	Integrating undergraduate students into the research environment
Other	It was astounding at the diversity and volume of presenters. Such an amazing opportunity for students.
Other	It's good to get public speaking experience as well as knowing your stuff to answer audience questions.
Other	Learning and realizing how specific a group/individual can be about they're research, and seeing how significant it is for students to be able to put out what they have been researching to the world so that they can grow a greater understanding of how to branch out their studies to others.
Other	Meeting the students and two of the professors
Other	Research being done by students is very varied and impactful
Other	Seeing all the research across many fields being conducted in Idaho!
Other	Students very passionate, confident and optimistic about their research experience and future options.
Other	The variety and depth of student work.
Other	Undergraduate student research work
Other	What amazing thing Undergraduate Researchers are doing

**What changes in the ICUR would significantly improve the conference experience for you?**

The following table summarizes categories mentioned in the open-ended responses to this question and the count of respondents who mentioned them. The summary is sorted by the greatest number of mentions to the lowest. 83 respondents suggested at least one change; 24 made more than one suggestion. 78 respondents either did not answer this question or indicated they had no suggestions for improvement.

CATEGORIES OF COMMENTS	COUNT
Other logistics	37
Plenary/breakout/other talk sessions	32
Poster sessions	22
Conference - general	18
Discipline focus	3
Interpersonal	1
Networking	1
No changes suggested	78

Highlights:

- Other logistics
  - 18 people suggested better/wider food selection.
  - 4 people mentioned housing issues.
- Plenary/breakout/other talk sessions
  - 10 people felt one or more sessions had presenters that did not generate interest or understanding of the audience.
  - 4 people desire more plenary/breakout/panel sessions.\*
  - 3 people felt the sessions were not long enough.
- Poster sessions
  - 4 people felt the sessions were not long enough.
  - 3 people would like the posters grouped by discipline.
  - 3 people said the room was too loud.
- Conference - general
  - 4 people made scheduling suggestions.
  - 3 people said the conference was not long enough.

*\*Repeat highlight from last year*

Strong criticisms:

- STUDENT: *“The conference was very STEM heavy. There was some attempts to open the conference up to other fields, but it felt very minimal and last minute. I would have liked to see a more deliberate inclusion of the liberal arts.”*
- STUDENT: *“Housing: My room key deactivated on its own twice. I know four people who also had this issue. I had to go to the front desk twice to have it reactivated, and it was stressful for me during the whole conference to think that my key might randomly not work when I returned. Aside from that, and the room being an unnecessarily long walk from the elevators, housing was great.”*

- STUDENT: *"I'm sure you've heard this, but the lunch!!! I don't have any dietary restrictions, but both days I ended up eating a gluten free lunch because things weren't labeled properly and enough things weren't ordered. If the lunch was more clear about who should go to what tables, that would be great! Also, I wish there were more options for turkey/ham lunches on the second day as I ended up getting a vegetarian lunch, which was a bunch of soggy veggies between bread slices.*

*The graduate students panel also was not super helpful, as it seemed like many of the graduates didn't want to be there and I even asked a question that I got a half-response to (why did you chose graduate school over industry?). They didn't seem super engaged, except the one student that hadn't been to graduate school yet.*

*Also, I understood why we did the opening packet session, but I'm not sure if it had the intended effect. If anything, I would've preferred an icebreaker type event where I could meet students from other universities.*

*I also was a little annoyed by the speaker repeating the schedule over and over, it just did not feel necessary to state the plan that many times.*

*Even with these complaints, I still had an amazing time at the conference, and hopefully I have the priviledge to attend next year!"*

- STUDENT: *Make the important information (i.e., dates, deadlines, times, places, etc.) much easier to find on the website—it's really buried in the conference website. I found more and better information on a third-party website than I did on the BoiseState.edu website"*
- STUDENT: *"I suggest being more aware/handling food allergies better on the catering side. The lady in charge was very kind and helpful, but the catering service did not do a great job at making safe food."*
- STUDENT: *"While the overall experience was wonderful, I believe the housing facilities could be improved. I was also a bit taken aback by a staff member's unexpectedly rude response to a simple question I asked during the closing lunch."*
- EDUCATOR: *"The registration process was very confusing. I completed at least three different forms and apparently I still missed to complete one more"*
- EDUCATOR: *"Having more professors for the ""Meet a Professor"" session. There were often 20 or more students per professor and that diminishes the value for students. If they could meet in smaller, more personable groups, that would have helped. Also, the use of generative AI in the opening speech and in the visuals was extremely disheartening and lessened my impression of BSU's values and work ethic."*

Changes/Comments by Category (sorted by the greatest number of mentions to the lowest):

CATEGORY > SPECIFICS	COUNT
<b>Other logistics</b>	<b>37</b>
Better food/wider selection	18
Housing issues	4
Food safety	2
ICUR merch	2
Registration/RSVP process was confusing	2
Transportation	2
Better communication of submission/registration process	1
Better signage	1
Better/more communication of sessions and details before conference begins	1
More seats/different arrangement in sessions	1
Too loud	1
Video recordings	1

Website is confusing/difficult to navigate	1
<b>Plenary/breakout/other talk sessions</b>	<b>32</b>
Some presenters did not generate interest or understanding of audience	10
More plenary/breakout/other talk sessions	4
Not long enough	3
More lightning talks	2
Session structure redesign suggestion	2
AI use	1
Better talks/speakers - not specified	1
More diversity of speakers	1
More enthusiastic speakers	1
More interactive sessions	1
More interesting sessions	1
More options	1
More sessions for faculty/mentors	1
More speakers from industry	1
More STEM focus	1
Too tight on space	1
<b>Poster sessions</b>	<b>22</b>
Not long enough	4
Group by discipline	3
Too loud	3
Scheduling suggestion	2
Session structure redesign suggestion	2
Too tight on space	2
Have a judged competition/dedicated feedback	1
Improve poster design	1
Longer/more breaks between sessions	1
More interactive sessions	1
More social science/less STEM	1
Online posters	1
<b>Conference - general</b>	<b>18</b>
Scheduling suggestion	4
Not long enough	3
More focus on disciplines other than STEM	2
More variety of fields	2
Change dates of conference	1
Faculty recruitment	1
Longer/more breaks between sessions	1
More info about specific grad school opportunities	1
More student involvement	1
Student recruitment	1
Too long	1
<b>Discipline focus</b>	<b>3</b>
More STEM focus	2

More science content	1
<b>Interpersonal</b>	<b>1</b>
Rude/inappropriate interaction	1
<b>Networking</b>	<b>1</b>
Better/more networking opportunities	1
<b>No changes suggested</b>	<b>78</b>

The complete list of comments grouped by role follows, excluding “n/a” and “none” responses that do not elaborate further.

STUDENTS	
Student	(I wish I could return to the previous page of questions on this survey, because then I could bring up the specific issues I had.) Trying to recall, I think my biggest issue was the writing-your-own-story panel. I think that as researchers, no matter the field, it should have had more of a focus on how to tell the story of YOUR research, rather than some miscellaneous story that comes to mind at the drop of a hat. I was writing about a scary experience during my first job, for goodness' sake, instead of refining the details about my research and the story I wanted to tell with it. Also, I think the summary panels at the beginning and end of every day was a bit excessive. I did like the thought-provoking questions, but after those six hours of research panel after research panel, I think we were all a bit too worn out to truly give those an effort. Maybe just doing them the next morning after we've had a full night of sleep?
Student	A better variety of food choices to tailor to more diets. Having guest speakers from different careers show up and talk about their daily work life. More, shorter lightning talks.
Student	A bigger room for posters and/or longer time. I felt like I was both yelling and rushing most of the time to see the posters and be heard.
Student	Besides the poster and the presentation on the first day, there was not a whole lot of student involvement.
Student	Better catering, lots of cross contamination worries and other food safety from temperatures
Student	Better food
Student	Better food for dietary restrictions (vegetarian), graduate student panel should be people who actually are in graduate school and want to be talking about it
Student	Better food, better panelists of the graduate talk.
Student	better lunch. Too many vegetarian options left not enough real food for the rest of us. All the good stuff was gone before the lunch even began.
Student	Bigger venue would make it feel less loud. I had crazy autism sensory overload and could barely hear anything.
Student	Choosing Graduate Students that actually wanted to answer questions to be on the pannel, for the Graduate Students part of ICUR.
Student	Definitely increase the amount of non vegan option for dinner
Student	Definitely more social sciences, I was the only presenter on day 2 that had a creative work.
Student	Everything at ICUR went very smoothly for me. The staff were very helpful and accommodating.
Student	Forethought planning for housing trans/gender non-conforming students
Student	Getting rid of the story collider workshop, boring, not super applicable to overall STEM activities.
Student	Having hot chocolate available
Student	Honestly I thought though last year was busy it was much better in many aspects more panels, better food, and just seemed a bit more put together.

Student	Housing: My room key deactivated on its own twice. I know four people who also had this issue. I had to go to the front desk twice to have it reactivated, and it was stressful for me during the whole conference to think that my key might randomly not work when I returned. Aside from that, and the room being an unnecessarily long walk from the elevators, housing was great.
Student	I can't think of anything at the moment.
Student	I couldn't begin to suggest anything
Student	I don't know how easily improved upon it can be but the later sessions on the first day were harder to make and fully enjoy because of how tiring it is to present the session before.
Student	I dont know.
Student	I don't think there are any changes that I can think of that would significantly improve the experience.
Student	I found that the graduate speaker panel was somewhat of a letdown from what I was expecting. I wish that some of the speakers were more motivated to actually speak and there was more advice given.
Student	I only attended the poster session in the last 30 minutes because of time, but I enjoyed it. I would add that the poster session could be improved by interactive activities or scenarios to understand the research.
Student	I suggest being more aware/handling food allergies better on the catering side. The lady in charge was very kind and helpful, but the catering service did not do a great job at making safe food.
Student	I think it was well executed, but clearer travel signs could have helped, having more explanation of where things were located
Student	I think it would be wonderful if there could be more time allotted to viewing the posters. I was looking forward to seeing them all, but I ran out of time.
Student	I think you should add synopses. Like I feel like you should give people to attend different events at the same time. Maybe have two different events at same time, so people don't feel forced to attend. As well as I think the graduate students were disappointing when they went on stage , just make them all answer each question , so they don't look at each other
Student	I thought it was great and really well run!
Student	I would have loved to see more humanities people there.
Student	I wouldn't know, I didn't attend most of the spaces.
Student	ICUR seems perfect as it was. There was plenty of time for the students to do what they wanted, and the talks and presentations were really great without being overly long.
Student	If possible, maybe conference for more days
Student	I'm sure you've heard this, but the lunch!!! I don't have any dietary restrictions, but both days I ended up eating a gluten free lunch because things weren't labeled properly and enough things weren't ordered. If the lunch was more clear about who should go to what tables, that would be great! Also, I wish there were more options for turkey/ham lunches on the second day as I ended up getting a vegetarian lunch, which was a bunch of soggy veggies between bread slices. The graduate students panel also was not super helpful, as it seemed like many of the graduates didn't want to be there and I even asked a question that I got a half-response to (why did you chose graduate school over industry?). They didn't seem super engaged, except the one student that hadn't been to graduate school yet. Also, I understood why we did the opening packet session, but I'm not sure if it had the intended effect. If anything, I would've preferred an icebreaker type event where I could meet students from other universities. I also was a little annoyed by the speaker repeating the schedule over and over, it just did not feel necessary to state the plan that many times. Even with these complaints, I still had an amazing time at the conference, and hopefully I have the priviledge to attend next year!
Student	Include more social science, professor, posters, ect.
Student	It was fantastic
Student	It was my first conference. I was satisfied with the arrangements. Only thing that I would suggest is there should also be a onetime use toothbrush and paste with soap like in motels.
Student	It's perfect.

Student	Longer Poster Sessions, or maybe more poster sessions with less posters in each session so that I can spend ample time getting to know each poster
Student	Make the important information (i.e., dates, deadlines, times, places, etc.) much easier to find on the website—it's really buried in the conference website. I found more and better information on a third-party website than I did on the BoiseState.edu website
Student	Maybe lunch. Chicken would be a nice addition.
Student	<p>Maybe make the 2nd day longer, since I saw a few people come by after all presentations had finished, since they thought presentations continued until 5pm both days.</p> <p>Also, maybe more seating in a quieter area for overstimulated people to calm down, or just for people to casually chat amongst friends. (I saw most people tried to hang out right in front of the poster session entrance, which meant seating was limited, and noise was an issue).</p> <p>Finally, instead of just setting up a video camera for people to approach on their own and answer a question, it would have been more fun and interactive if you had had one of us (or 2) walk around with the microphone and camera, asking people for impromptu interviews about the event. That way, it's less awkward to get video, and the interactive part makes it more fun and engaging. In my experience, people are more willing to be interviewed than they are to just approach an abandoned camera on a tripod next to a sign. Plus, it allows the videographer to get more real-time video of the event itself, so people watching can feel like they are actually walking the event themselves.</p> <p>We could even have this interviewer interview a few people standing at their own posters to talk about their research work and how they think the event is going so far. (Comic cons film videos in this way for a reason. A video shot in first-person POV with someone walking the whole convention floor and interviewing various attendees and vendors gets much more attention and online viewership than a random camera left filming in the corner of the room).</p>
Student	Maybe more time with poster presentations?
Student	More breaks in between sessions.
Student	More chances to network or meet others.
Student	More data
Student	More diversity within the professors who spoke.
Student	More faculty and graduate students that are in STEM, Public Health, and Arts & History for the panel. I would love more versatility!!
Student	More hot lunch options.
Student	More info about grad school
Student	More lunch on the second day, had run out by the time I got there.
Student	More non-vegan lunch options on day 2! Opportunities to hear the poster presentations that were done the same time mine was.
Student	More small group stuff
Student	More STEM research projects
Student	More time to discuss research.
Student	More time to do breakout
Student	more workshops to connect with students.
Student	No change, things were great!
Student	No notes, great experience overall
Student	none come to mind, though I was only present for a poster session.
Student	Not doing the story time and having a longer meet the professor session. I wish I could've talked to more than two of them.
Student	Pacing could be a bit quicker but overall it was great

Student	Please dont do the memory excercises again, that was the worst part I was so bored and i didnt feel it was important
Student	Poster sessions should have had a greater break in between. Maybe session one, lunch, then session two... Also, the location wasn't ideal. I think it might have been better in the halls where the echo of conversation would be more muffled, and questions could be heard.
Student	Prolonging time for posters or having them be in two different rooms (one STEM and other Arts)
Student	The changes:  <ul style="list-style-type: none"> <li>*Have more time on the "meeting with the professors"</li> <li>*Also have more time on the students 3-minute presentation of their research</li> <li>*Have an extra day for bowling and games with students especially when we're moving into the dorms.</li> <li>*Create work sessions for students based on their interests</li> <li>*Have a graduate panel of students with their professors to talk about their relationships along with the research.</li> <li>*Have merchandise of ICUR which probably have more engagement.</li> <li>*Have multiple microphones where it would be easier for the people not having to run back and forth to students that seated at different table areas.</li> </ul>
Student	The conference was very STEM heavy. There was some attempts to open the conference up to other fields, but it felt very minimal and last minute. I would have liked to see a more deliberate inclusion of the liberal arts.
Student	The first day was very long. I personally felt wiped by the end.
Student	The food at ICUR 2024 was much better. The food at the lunches were awful this year. The lunch day one was the worst.
Student	The food. It was not good. Everything else was great. Some of the speakers were boring but most were great.
Student	The graduate panel felt like a waste, I don't feel like i gained anything from it.
Student	The housing upgrades and check in was already a fantastic upgrade. The only thing i ask would be for the Greyhound buses to have a functional toilet and Wi-Fi
Student	The opening session of telling your story. He was not a good facilitator. Then I would love if there was a space where posters could stay up the whole weekend so you can read them on your own time!
Student	There's nothing that I can think of!
Student	This would be more of a marketing thing, but making sure that there is a strong diversity of research present. I was one of very few students representing wildlife field work, and was surrounded by people in medical/engineering/chemistry sciences who I couldn't relate with and couldn't relate with me.
Student	While the overall experience was wonderful, I believe the housing facilities could be improved. I was also a bit taken aback by a staff member's unexpectedly rude response to a simple question I asked during the closing lunch.
<b>EDUCATORS</b>	
Educator	A little bit later in July... I needed to hurry up to finalize the presentations in a timely manner!
Educator	Give more "how to get involved" emails 365 days prior to the conference.
Educator	Having more professors for the "Meet a Professor" session. There were often 20 or more students per professor and that diminishes the value for students. If they could meet in smaller, more personable groups, that would have helped. Also, the use of generative AI in the opening speech and in the visuals was extremely disheartening and lessened my impression of BSU's values and work ethic.
Educator	I can't think of anything specific
Educator	I need to attend more :)
Educator	I thought the whole experience was wonderful, but the meals could be better.
Educator	I was only able to attend one poster session therefore I don't feel qualified to make any recommendations. Everything I saw was great. It was organized and well-attended.

Educator	I wasn't sure how the posters were arranged; I think it would be good if they were grouped by the subjects/areas of research (e.g. physics next to chemistry and materials science)
Educator	I would like more opportunities for faculty to mix apart from their students.
Educator	It is pretty good as it is!
Educator	It was great as it was
Educator	It would be wonderful to introduce Best Poster and Best Talk awards specifically for undergraduate students, as it would help them feel more recognized—just like at other conferences. It might also be beneficial to organize poster sessions by discipline (e.g., separate sessions for different sciences and fields). Providing students with ICUR-themed T-shirts further enhance their experience. Offering certificates for the three-minute presentations was also an excellent choice. Just thought. Overall it was great experience for students and faculties.
Educator	Lunches could be a bit better
Educator	None, well done
Educator	Second day could be a bit longer with similar programs like meeting with professors.
Educator	The registration process being less complicated
Educator	The registration process was very confusing. I completed at least three different forms and apparently I still missed to complete one more
Educator	They ran out of non -veggie lunches day 2- but surprisingly the veggie sandwich was delicious! The bus did not have a functional bathroom, which would have been nice. The conference itself was well organized and fun!
<b>OTHER ROLES</b>	
Other	1) I would like lightning talks on both days. 2) the posters are so close together which causes a lot of conversational noise. It is hard at times to hear the presenters. A bigger room or a room with more sound absorption would help.
Other	A few things - Meet a professor was a bit crowded, so I would create a better set-up. Some had a large crowd, and it appeared they had a difficult time hearing. Also, some not all my participants failed to get back to "do you confirm" e-mails, maybe sending me or sampus coordinator a copy of the email for participants would allow for additional coordination/confirmation of participation.
Other	A standardized framework for the poster presentations could be useful, something that the students could use as a basis for what and how they present, while still encouraging their creativity.
Other	I don't have enough knowledge/experience to answer this.
Other	I think it would've been nice to have the individuals who spoke at the lightening talks to have presented their posters the same day so people could go to them if they had anymore questions
Other	I wish there was a requirement for undergraduates to submit their posters a week early so collaborators could look at it/leave comments before submission.
Other	Nothing, the experience was amazing.
Other	Opportunities to bring other, currently not involved, faculty, students, admins, and advisors...I think the positiveness was palpable and would be very contagious for those not having exposure to these students/researchers and the great BSU network of support!!!!
Other	The distribution of program for 2 whole days

### IGEM Grant Report

Progress (due January 1)       Annual (due July 31)       Final (due August 31)

IGEM Grant #: IGM25-001      Principal Investigator: Daniel Fologea, PhD

Submission Date: 08/29/2025      Primary Institution: Boise State University

*Instructions: Complete each section of this report directly on this template. Completed reports must be limited to **1 page for Progress Reports and 2 pages for Annual or Final Reports in 12 pt Arial or similar font**, excluding the expenditure report. Simple and concise answers will be appreciated, and even bullet lists of information will be sufficient. Reports that do not follow these requirements will be returned for revision. Submit reports by the appropriate due date to [HERC@edu.idaho.gov](mailto:HERC@edu.idaho.gov).*

**Section 1:** Summary of project accomplishments for the reporting period and plans for the upcoming reporting period.

- We demonstrated the successful use of KinExA technology in conjunction with aptamers for direct determination of Polychlorinated Biphenyls (PCB) in water samples. The estimated sensitivity of the developed method for PCB72 is less than 1 ppt, which surpasses by 2 orders the EPA's maximum contaminant level in water (i.e., 0.5 ppb).
- We identified functional anti-PFAS antibodies in eggs, extracted and purified the mRNA pool, and selected the most potent antibodies by employing the phage display method.
- The Boise State University team developed a novel method for rapid concentration of small, organic pollutants in water samples. A single, 15-minute concentration step provides a ~20-fold increase in the concentration of organic pollutants; therefore, a thousand-fold concentration increase may be attained in less than one hour.
- Two polyclonal antibodies for polycyclic aromatic hydrocarbons (PAHs) have been produced and purified from eggs; both have been successfully tested with the KinExA technology for PAH measurements in water.
- We developed a procedure for covalent binding of PCB aptamers to glass beads and used them as capture elements for KinExA; the beads maintained full functionality for over 8 months at room temperature.
- We finalized and tested the portable KinExA instrument for PCB quantification in water in a bench setup; in the same line, we determined the temperature-correction factors for using the portable instrument to determine PCB in water in a temperature interval ranging from 5 °C to 45 °C.
- We collected water samples from wells, rivers, lakes, and household sources in the region. From those, over 50 have been already tested for PCB 72 and further spiked for PCB quantification in true environmental conditions. The determined confidence interval of the measurements was greater than 96% for all samples.

**Section 2:** High-level summary of budget expenditures for the period just completed. The total budgeted cost of the project was \$187,100; we spent \$186,060, which led to an unspent amount of \$1,040. The expenditures include salaries (\$109,362.97), fringe benefits (\$10,868), OE (\$64,682), and travel (\$1,146). A detailed expenditure report is provided in section 6, presented in a separate document included with this submission. The 0.6% underspending occurred because of the billing cycles; the remaining funds may be used for additional sample measurements or may be returned to the sponsor.

**Section 3:** Demonstration of economic development/impact, including the following as applicable: patents, copyrights, plant variety protection certificates received or pending; technology licenses signed, start-up businesses created, and industry involvement; private sector engagement; jobs created; external funding; any other pertinent information.

- The project benefited from a significant involvement of the commercial partner, Sapidyne Instruments. Their engagement in this project led to 12 new jobs. Up to date, Sapidyne hired 1 PhD student, 1 MSc student, 5 undergraduate students, 3 high school students, and provided 2 internships.
- The PI Fologea also created 8 research technician/research assistant positions for undergraduate and graduate students during the academic year, and 11 internship positions for high school students during the summers. The PI Fologea initiated the preparation of documents required for IP on the newly developed method of concentrating organic pollutants in water and works closely with Sapidyne for licensing.
- An external solicitation for funding was prepared and sent to the Department of Defense in 2025; this proposal was not selected for funding but the new experimental data are anticipated to lead to a new application in the spring of 2026.
- The PI and two students successfully completed the NSF ICorps program.
- The results were disseminated at two national conferences, and one of the presentations was selected for press release.

**Section 4:** Number of faculty and student participants as a result of funding, and brief description of student efforts.

Besides the 12 new hires at Sapidyne, this project involved three faculty members, 8 high school students, 10 undergraduate students, and 4 graduate students for the entire project duration. The student efforts consisted of sample preparation, experimental setup, sample running, and data analysis with the KinExA instrument, environmental sample collection in standardized conditions, sample concentration and purification, and pollutant quantification in pristine and spiked environmental samples. One of the graduate students included all these efforts in their PhD thesis. Three undergraduate students participated in this project as volunteers, and 4 of the hires made by Sapidyne were for students trained in the PI's lab at Boise State University. Six of the trained undergraduate students that worked with the PI were selected to continue working at Boise State University on distinct research projects that require using the KinExA technology.

**Section 5:** Updated details and/or progress on the long-term sustainability plan for the project and description of future plans for project continuation or expansion.

The project ran for one year and this is the final report. The efforts for the next year will be led by the industrial/commercial partner, Sapidyne Instruments in collaboration with Boise State University. It is anticipated that the PCB and PFAS kits will be fully validated and become commercially available within 16 months. Sapidyne Instruments started the commercialization of functionalized glass beads to be used with the KinExA technology. We also plan on requesting federal funds from DOE and NSF for further technology development together with Sapidyne and other commercial partners.

**Section 6:** Expenditure report – is attached as a separate document in the submission.

### IGEM Grant Report

Progress (due January 1)       Annual (due July 31)       Final (due August 31)

IGEM Grant #: IGEM25-001      Principal Investigator: Daniel Fologea, PhD

Submission Date: 08/29/2025      Primary Institution: Boise State University

**Section 6:** Expenditure Report – Attach an expenditure report as a separate document showing expenses toward the original budget submitted for this project. The expenditure report does not count toward the page limit. A written summary of budget expenditures should be provided in section 2 of this report.

The original budget of the project totaled \$187,100 and included salaries, fringes, and OE (Materials and Supplies). However, we requested and received approval from the Board to reallocate ~\$18k from OE to a subcontract to Creative Biolabs. The budget adjustment did not impact the scope of the project and did not exceed 10% of the annual award amount. The adjustment was needed due to problems with the availability of materials and supplies needed to construct and characterize the mRNA library. This not only expedited the process, but also eliminated the need for additional time-consuming and costly tasks initially intended to be carried out locally. This facilitated an early sample collection and characterization, and provided more opportunities for students to participate at the research tasks presented by this proposal, and present the findings at national conferences.

The expenditures toward the original budget are detailed next.

**PI salary:** we budgeted \$27,300 to partially cover the PI's summer salaries for a total period of 10 weeks spread over the summers of 2024 and 2025 (the PI is on a 9-month contract). We spent \$26,910 for this category.

**Fringe PI salary:** we budgeted \$9,300 for fringe benefits, and we spent \$5,036.

**OE:** we budgeted \$92,200 and spent \$64,682. This underspending occurred because of task subcontracting to Creative Biolabs. Besides subcontracting, the funds were spent on materials and supplies (analytical standards, lipids, airfuge supplies for sample concentration, consumables for KinExA experiments, chemicals of analytical purity, pristine capture beads, extruders, filters, microcontrollers, accessories for rotary evaporation, environmental vials, and personal protective equipment). The phage display analysis, which we developed and carried out within this project, comprised of materials and supplies that were not included as a distinct sub-category in the initial OE budget. However, the surplus funds have been used for student salaries and travel.

**Other salaries and fringes:** The initial budget included \$55,100 for other salaries (including students and Research Technicians), and we spent \$82,453. We also included \$3,200 for other fringes in the original budget and spent \$5,833. As we

explained, the contracting of mRNA library led to a significant cost reduction, and the surplus funds have been used for student support, which also added to the fringe benefits category.

**Travel:** The original budget did not include travel funds; however, we utilized the available funds to support the dissemination of the results at two national conferences. The travel funds provided from this grant amounted for \$1,147; this represents only ~30% of the total funding needed for travel. The additional funding was provided by the institution from other available sources.

**Budget balance:** The total budget of \$187,100 was spent at a 99.4% rate (\$186,040), with a remaining balance of \$1,040. This occurred because of the billing cycles, some expenses contracted during the project were billed beyond project's duration. These remaining funds may be used to support a student to expand the measurements on environmental samples, or they may be returned to the sponsor.

### IGEM Grant Report

Progress (due January 1)       Annual (due July 31)       Final (due August 31)

IGEM Grant # IGEM25-002      Principal Investigator Tinker

Submission Date 8-28-25      Primary Institution Boise State University

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#### Section 1: Summary of project accomplishments for the reporting period

Objective 1: Determine the stability and antigen-delivery capacity of *S. aureus* *IsdA+CifA-CTA2/B* dissolvable microneedles.

- Silk and sugar microneedles (MN) containing vaccine were successfully constructed and assessed for structure using electron and digital microscopy
- Silk and sugar MN were tested for mechanical stability including force-displacement and puncture testing, and found to be resistant to relevant forces and consistently puncture to 260nm.
- A fluorescent CTA2/B fusion was produced to assess delivery using sugar MN. MN patches were found to successfully deliver this protein into pig skin as determined by confocal microscopy.
- Vaccine deposition into pig skin of was determined using immunohistochemistry. Sugar MN were found to successfully deposit antigen into pig dermal layer. Quantification of deposition was performed using analytical microscopy.

Objective 2: Assess MN *IsdA+CifA-CTA2/B* immunogenicity in mice.

- A 28 day mouse vaccine immunogenicity study was completed using sugar MN. Analysis of antigen-specific responses in the blood on Day 28 showed no difference between CTA2/B adjuvant control and vaccine-loaded MN. T-cell stimulation assays also indicated no difference between vaccine-loaded and adjuvant only control MN responses in mice.
- Analysis of removed patches from mice using microscopy indicated that only partial insertion and dissolution of sugar microneedles occurred.
- The challenge study (Objective 2A) was not performed as a result of immunogenicity outcomes.
- A modified immunogenicity study was performed. Outcomes using fluorescent dye indicated improved placement with good MN dissolution after 20 min. Skin cells were isolated and assessed for type recruited to MN site after 48 hrs. Results showed no significant increase in infiltration of immune cells in MN patch, however sample size was small ( $n=2$ ).

**Section 2: High-level summary of budget expenditures for the period.** A re-budget was performed on 9/30/24 due to the loss of hired Research Technician to another position, and a need to hire multiple students to complete objectives. This resulted in a decrease in salary costs including a substantial decrease in Fringe that was directed instead to student costs (OE). Animal studies (Objective 2) were performed in the spring

of 2025 and occurred with the help of multiple students and the Co-PI, resulting in expenditure of all but 8.87% of original budget.

**Section 3: Demonstration of economic development/impact.**

Industry involvement/private sector engagement. Dr. Tinker is a co-founder of Pentamer Biologics, LLC. (CEO, B. Allinson), a start-up company that has a cooperative agreement with Boise State for use of a family of related patents (*Cholera toxin and its use as a staph vaccine, U.S. #8,834,898 Tinker*). This start-up has been successful obtaining a Phase I USDA STTR for development of a bovine vaccine. Pilot IGEM-HERC funding supported Pentamer Biologics through the acquisition of essential preliminary data for a human vaccine to pursue NIH and DoD small business funding.

Economic development via jobs created. In addition to jobs for undergraduate students created directly, funding supported two temporary research technicians and indirectly supported a post-doctoral fellow (E. Overgaard) employed by Pentamer Biologics.

Grants: This funding was synergistic with an NSF TRANSFORM seed grant (current), and provided preliminary data for a Rocky Mountain REACH application (submitted June 2025). A USDA STTR Phase II and NIH STTR Phase I will be submitted in collaboration with Pentamer Biologics (Sept 23, 2025, and planned Jan 5, 2026).

Technology transfer: An invention disclosure for methods related to dissolvable silk/sugar microneedles, and a related disclosure for a third antigen (NSF TRANSFORM) are planned for the fall 2025.

**Section 4: Number of faculty and student participants as a result of funding, and brief description of student efforts.**

Faculty/staff participation: Funding supported the salaries of the PI (J. Tinker, 0.75 mth) and Co-PI (S. Theodossiou, 0.75 mth), as well as a Research Technician (D. Pica, 1 mth).

Student participation: Two PhD students, one MS student and three undergraduate students were directly supported. Major accomplishments included a successful Ph.D. dissertation defense (H. Bridgewater, Dec'24), a successful MS thesis defense (H. Hedelius, June'25), and submission of manuscript during this project period (*Dissolvable microneedles to deliver cholera toxin B-adjuvanted protein subunits to the skin, Science Advances, submitted Dec 7, 2024, rejected Dec 24, 2024, to be resubmitted, Oct 2025*). A student in the Co-PIs laboratory was also indirectly supported on this project as a major component of an ME thesis (B. Penney, expected graduation Dec'25).

**Section 5 : Updated details and/or progress on the long-term sustainability plan for the project and description of future plans for project continuation or expansion.**

Sugar and silk microneedles containing *Staphylococcus* vaccine antigens were found to be stable, reproducible and effective to deliver vaccine to pig skin, as determined by microscopy. Despite these outcomes, sugar microneedles did not successfully stimulate antigen-specific responses in mice. Reasons for this may include: incomplete insertion into skin and antigen instability in the skin. Funding was pivotal however as key methods were developed and areas for improvement identified, including: vaccine incorporation into microneedles, animal vaccination protocols and skin cell isolation. Data obtained will support the resubmission of a well-scored NIH STTR Phase I proposal and technology transfer to Pentamer Biologics.

**Section 6: Expenditure Report – Attach an expenditure report as a separate document showing expenses toward the original budget submitted for this project.**

(see attached)

*Reporting period: 7/1/24-6/30/25*

Category	Original budget	Budgeted (re-budget)	Spent	+/-	%remaining
Salary	\$97,700.00	\$113,675.60	\$100,297.54	\$13,378.06	11.77
Fringe	\$37,300.00	\$8075.00	\$8632.34	(\$557.34)	-6.90
Travel	\$3500.00	\$0.0	\$0.0	\$0.0	-
OE (including student costs, capital)	\$27,100.00	\$43,849.40	\$41,980.04	\$1869.36	4.26
<b>Totals</b>		<b>\$165,600.00</b>	<b>\$150,909.92</b>	<b>\$14,690.08</b>	<b>8.87</b>

**Title:** A Microneedle-based Transcutaneous Staphylococcus Aureus  
**Award #** 3941021  
**Fund**  
**Dept**  
**Cost Center**  
**Project**

**Start Date:** 7/1/2024  
**End Date:** 6/30/2025  
**Budget Period:** 6/30/2025  
**OSP #** 11613  
**Sponsor #**

**Projection as of:** 7/25/2025  
**Updated by:** Brittany Archuleta  
**PI:** Juliette Tinker  
**Sponsor:** Idaho State Board of Education (HERC)  
**F&A Type and Rate:** No F&A 0.00%

	Original Budget	PPM Budget	Pending Rebudgets	Life to Date Expenses	Balance	Encumbrance	Available Budget	% Remaining	Burn Rate
Salary	\$ 97,700.00	\$ 113,675.60		\$ -	\$ 113,675.60	\$ -	\$ 113,675.60	100.00%	0.00%
Fringe	\$ 37,300.00	\$ 8,075.00		\$ -	\$ 8,075.00	\$ -	\$ 8,075.00	100.00%	0.00%
OE	\$ 27,100.00	\$ 42,849.40		\$ (40,980.04)	\$ 1,869.36	\$ -	\$ 1,869.36	4.36%	95.64%
Travel	\$ 3,500.00	\$ -		\$ -	\$ -	\$ -	\$ -	-	#DIV/0!
Capital	\$ -	\$ 1,000.00		\$ (1,000.00)	\$ -	\$ -	\$ -	-	100.00%
Subcontracts >25k	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	-	#DIV/0!
Subcontracts <25k	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	-	#DIV/0!
Student Costs (OE)	\$ -	\$ -		\$ -	\$ -	\$ -	\$ -	-	#DIV/0!
Total Direct	\$ 165,600.00	\$ 165,600.00	\$ -	\$ (41,980.04)	\$ 123,619.96	\$ -	\$ 123,619.96		
F&A	\$ -	\$ -	\$ -		\$ -	\$ -	\$ -		
Totals	\$ 165,600.00	\$ 165,600.00		\$ (41,980.04)	\$ 123,619.96		\$ 123,619.96		

**AAR Amount** \$ 150,909.92  
**Variance** \$ 108,929.88

Timeline Burn Rate: 116.21%  
 Current Burn Rate: 25.35%

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## IGEM Grant Report

Progress (due January 1)     Annual (due July 31)     Final (due September 30)

IGEM Grant # \_IGEM25-03\_    Principal Investigators: Marco Schoen & Mary Hofle

Submission Date \_\_September 30, 2025\_\_ Primary Institution: Idaho State University

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**Section 1:** Summary of project accomplishments for the reporting period and plans for the upcoming reporting period.

- Established potato processing procedure, data collection process, and equipment acquisition.
- Successfully recorded sound and potato visuals for analysis.
- Successfully developed computer program to extract potato features to identify differences between potatoes with hollow heart and non-hollow heart.
- Statistical analysis shows, with accuracy in the mid-80%, hollow heart can be detected in potatoes using non-destructive methods.
- Datasets have been posted to public open-source platform – figshare.com
- Paper submitted to MDPI Data journal: “Comparative Data Analysis of Non-Destructive Testing for Hollow Heart in Potatoes.”
- Poster presentation at Idaho State University Research Symposium entitled “Non-Destructive Detection of Hollow Heart in Potatoes Using Artificial Intelligence.”
- Engaged three undergraduate students and one PhD student in the project.
- Established relationship with Double L - an Idaho potato equipment manufacturer for future work related to this project.
- Continued collaboration with Spudnik Equipment Company on Hollow Heart detection project.

**Section 2:** High-level summary of budget expenditures for the period just completed. If budget is underspent at time of report, explain why and plans for expending funds.

The requested funds of \$95,655.59 were utilized in support of the proposed activities. They included personnel cost such as partial summer support for the two PI’s and student support (three undergraduate students and one PhD student): \$66,833.47 (budget was \$61,923.59), equipment: \$ 13,646.42 (budgeted for \$15,700), travel: \$384.64 (budget \$600), participant support: \$11,832 (budgeted \$11522) and materials and supplies: \$3,269.06 (budget \$5,600).

**Section 3:** Demonstration of economic development/impact, including the following as applicable: patents, copyrights, plant variety protection certificates received or pending; technology licenses signed, start-up businesses created, and industry involvement;

private sector engagement; jobs created; external funding; any other pertinent information.

Ongoing discussion of the project with Spudnik Equipment Company and Double L (both Idaho based potato equipment manufacturers). There is mutual interest in a) developing derivative technology based on the results of the project (Double L), b) further developing a prototype system (Spudnik Equipment Company). This includes applications on equipment for automated visual inspection such as AI based detection of potatoes during the harvesting process, online discernment of non-potato items in the harvest, extraction of foreign objects (dirt masquerading as potatoes) during the process, and seed potatoes delivery system improvement utilizing a developed vision system.

**Section 4:** Number of faculty and student participants as a result of funding, and brief description of student efforts.

A total of three (3) faculty members were involved in this project. Two were partially supported by the requested budget, and one volunteered his services. In addition, three undergraduate Mechanical Engineering students were part of this project for the entire duration of the project, while two additional students were temporarily helping. The primary three undergraduate students developed testing procedures that allowed for accurate feature extraction from potatoes. This included the development of computer programs that interfaced with various measurement devices and partially automated the data collection process. For the project, a large data set was required. The undergraduate students were tasked with making artificial hollow heart samples resulting in a data set of 1048 potatoes (hollow heart and non-hollow heart). Instrumentation specification, calibration, and networking was also accomplished by the three undergraduate students. At times, an additional undergraduate, as well as an additional graduate student, helped with the experiments. These tasks were very time consuming. The primary graduate student (PhD) developed the artificial intelligence-based algorithms to detect hollow heart in the data collected. This included feature engineering, data pipeline development, automated data cleaning algorithm, programming machine learning algorithms, and testing of the algorithms.

**Section 5:** Updated details and/or progress on the long-term sustainability plan for the project and description of future plans for project continuation or expansion. The team is currently in contact with two Idaho based potato equipment companies (Spudnik Equipment Company and Double L LLC). Both companies have specific and diverse interests in the developed technology. We plan to continue our work with these two companies.

**Section 6:** Expenditure Report – Attach an expenditure report as a separate document showing expenses toward the original budget submitted for this project. The expenditure report does not count toward the page limit. A written summary of budget expenditures should be provided in section 2 of this report.

FORM D: IGEM-HERC Full Proposal Budget Sheet

Track (select one): *Innovation*  
 PI First & Last Name: Marco Schoen, Mary Hofle  
 Project Title: AI Based Quality Control for Potato Harvesting  
 Milestone description (if applicable): *Completed project*

*Insert more rows in each section, as needed.*  
*Do not remove or hide rows.*  
*Copy/paste cell formulas, as needed.*  
*Shaded areas have preset formulas.*  
*See cell notes for additional information.*

Personnel										
Name	FTE (opt)	Months	Base Salary	Salary Request	Fringe Rate	Other Ben Rat	Fringe Request	Total	ACTUALS	Comments
Marco Schoen	9	0.5279	\$113,661.00	\$5,000.14	0.097		\$485.01	\$5,485.15	\$ 7,871.16	
Mary Hofle	9	0.6945	\$86,404.00	\$5,000.63	0.097		\$485.06	\$5,485.69	\$ 6,901.41	
Graduate Student	1		\$22,800.00	\$22,800.00	0.025		\$570.00	\$23,370.00	\$ 28,705.94	Farheen; Gupta.
Undergraduate Student	1		\$8,970.00	\$8,970.00	0.025		\$224.25	\$9,194.25	\$ 7,195.50	Hone
Undergraduate Student	1		\$8,970.00	\$8,970.00	0.025		\$224.25	\$9,194.25	\$ 8,779.29	Mosher
Undergraduate Student	1		\$8,970.00	\$8,970.00	0.025		\$224.25	\$9,194.25	\$ 7,180.29	Shumway
Undergraduate Student	1		\$8,970.00	\$0.00	0.025		\$0.00	\$0.00	\$ 199.88	Rone
								\$61,923.59	\$ 66,833.47	
Equipment										
Item Description	Units	Unit Cost	Total							
Workstation	1	\$3,700.00	\$3,700.00							
Laptop	1	\$1,800.00	\$1,800.00							
Ultrasonic testing system	1	\$10,200.00	\$10,200.00							
Ultrasonic 16 BIT	1		\$0.00							
Ultrasonic 3D printer, Engraver	1		\$15,700.00							
			\$13,646.42							
Travel										
Tentative Date(s)	# persons	Total days	Transit cost/ person	Lodging/ day	Meal per diem	Total				
Field trips - local	6	3	\$100.00			\$600.00				
						\$ 384.64				
						\$ 384.64				
Participant Support										
Description	# persons	Cost/ Stipend	Total							
Tuition and Fees for Grad.St.	1	\$11,832.00	\$11,832.00							
			\$11,832.00							
Other Direct Costs										
Item	Units	Cost	Total							
Materials/ Supplies	1	\$5,600.00	\$5,600.00							
Other	1	\$0.00	\$0.00							
Other	1	\$0.00	\$0.00							
Other	1	\$0.00	\$0.00							
			\$5,600.00							
			\$3,262.47							
			\$6.59							
			\$0.00							
			\$0.00							
			\$3,269.06							
			\$95,655.59							
<b>TOTAL DIRECT COST REQUEST</b>								<b>\$95,655.59</b>		

**IGEM Grant Report**

Progress (due January 1)     Annual (due July 31)     Final (due August 31)

**IGEM Grant #:** IGEM25-004

**Principal Investigator:** Kathleen Lohse

**Submission Date:** 7/3/25

**Primary Institution:** Idaho State University

*Submit reports by the appropriate due date to HERC@edu.idaho.gov.*

**Section 1:** We exceeded expectations based on metrics (Table 1). We completed 13 out of 12-16 sites planned for sampling. We completed registering sample to SESAR database ([https://app.geosamples.org/sample\\_group.php?group\\_id=422](https://app.geosamples.org/sample_group.php?group_id=422)). Patton has accepted a Visiting Assistant Professor position at ISU so that we ramped up sampling in FY24; the hired full-time research specialist will be key to processing and analyzing these data in the lab in FY25. Patton will produce reports and technical products in FY25. Patton developed a demonstration visualization model as a Google Earth layer/flight path and will improve this in FY25.

Obj.	Task	Metric	Milestones			
			FY24	FY24 Actual	FY25	Total
1	A)	Submit IGEN-HERC proposal	Yes	Yes	NA	Yes
	B)	Hire specialist/technicians (#)	3	1 full-time / 5 students	2	5
	C)	Obtain agreements (#)	5-6	13	7-9	12-15
		Elevation datasets (#)	5-6	13	7-9	12-15
		Sites for excavation (#)	55-66	205	77-99	132-165
2	D)	Field areas (#)	5-6	11	7-9	12-15
		Soil pits (#)	73-84	153	103-125	176-209
		Soil samples (#)	580-661	1064	812-992	1392-1653
	E)	Register samples SESAR (#)	580-661	1064	812-992	1392-1653
		Process samples (#)	580-661	588	812-992	1392-1653
		Analyze for carbon (#)	580-661	588	812-992	1392-1653
		Produce online datasets (#)	NA	12	12-15	12-15
	F)	Generate STC outputs (#)	5-6	2	7-9	12-15
		Evaluate STC uncertainty (#)	5-6	0	7-9	12-15

**Section 2:** We were underspent by \$10,819 as of June 26, 2025 (Table 2). However, we were unable to run approximately 500 samples so that remaining funds will be used for sample fees and travel in July.

Acct	Title	Approved Budget	Jun-2025 YTD Actual	Encumbrances	Budget Available
<b>Labor Expenses</b>					
610	Salaries	38,921.25	78,603	6,627	-39,682
620	Irregular Help	88,055	36,001	4,263	47,791
630	Fringe Benefits	27,856	25,829	2,998	-971
	Subtotal	54,832.53	140,433	13,888	-0.511
<b>Operating Expenses</b>					
700	Travel	20,000	15,592	0	4,408
720	Services	5,026	4,199	0	827
730	Supplies	12974	8,102	0	4,872
800	Capital Expense	7,974	7,974	0	0
	Subtotal	45,974	35,867	-	10,107
<b>Total All Expenses</b>		<b>200,807</b>	<b>176,300</b>	<b>13,888</b>	<b>10,619</b>

\*Approved changes to budget added \$15025.25 from service/supplies to salary and 7974 to capital expenses

**Section 3:** Lohse and Patton entered into an agreement with ISU for use of copyrighted material associated with IGEM project (data, demonstration project) in return for 5% on gross revenue from a business using these materials. Lohse worked with ISU to develop a financial conflict of interest management plan given that she owns the patent (ISU has no interest), and business plans were eliminated as part of this project. Her team met 2 times with an independent review committee to ensure transparency in collection of data and made data publicly available to them. During her sabbatical (70% FTE including IGEM academic salary), Lohse attended I-CORP and a 7-week Start-Up Success course through Silicon Couloir on her own time and dime and conducted market research (20+ interviews) developed a pitch, formed a preliminary marketing strategy “Visualizing the soil underfoot”, proforma, and slide deck.

**Section 4:** One faculty (Lohse), one postdoctoral associate (Patton), one full-time research specialist, one 6-month full-time technician working 25% of the project (Kerner), and five seasonal technicians (undergraduate researchers) were engaged in the IGEM project. Student researchers were engaged in field campaigns and soil processing in the laboratory and learned how to describe soils, color, texture and quantify soil carbon.

**Section 5:** Lohse and Patton plan to apply for the next round of IGEM funds to develop an application programming interface (API) for being able to scale the business as well as apply for the NSF SBIR/STTR proposal Phase I proposal. Lohse registered a domain

name for her startup, groundedtechnology.tech, and will register the business as a LLC in the next year.

**Section 6:** Expenditure Report, see Table 3 below.

<b>Index</b>	<b>Acct</b>	<b>Acct Title</b>	<b>Transaction Date</b>	<b>Activity Date</b>	<b>Amount</b>
AHRC51	7226	Testing/Sampling/Inspecting Service	24-Jun-2025	24-Jun-2025	1,050.50
AHRC51	7022	Airfare-Out of State	24-Jun-2025	24-Jun-2025	887.37
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	86.00
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	86.00
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	24-Jun-2025	24-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	86.00
AHRC51	7022	Airfare-Out of State	23-Jun-2025	23-Jun-2025	486.36
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	68.00
AHRC51	7022	Airfare-Out of State	23-Jun-2025	23-Jun-2025	70.00
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	23-Jun-2025	23-Jun-2025	86.00
AHRC51	6310	Fringe Allocation	20-Jun-2025	12-Jun-2025	2,866.40
AHRC51	6102	Professional Salaries	20-Jun-2025	12-Jun-2025	4,494.11
AHRC51	6208	Faculty Summer Salaries	20-Jun-2025	12-Jun-2025	11,367.80
AHRC51	6204	Student Non-Work Study	20-Jun-2025	12-Jun-2025	440.00
AHRC51	7022	Airfare-Out of State	17-Jun-2025	17-Jun-2025	486.36
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	86.00
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	68.00
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	86.00
AHRC51	7036	Subsistence-Out of State Travel	17-Jun-2025	17-Jun-2025	68.00
AHRC51	7372	Field Supply/Equip for Research<\$300	16-Jun-2025	16-Jun-2025	5.54
AHRC51	7372	Field Supply/Equip for Research<\$300	16-Jun-2025	16-Jun-2025	3.70
AHRC51	7372	Field Supply/Equip for Research<\$300	16-Jun-2025	16-Jun-2025	14.29
AHRC51	7230	Parking Permits-not Travel Status	11-Jun-2025	25-Jun-2025	16.00
AHRC51	7230	Parking Permits-not Travel Status	11-Jun-2025	25-Jun-2025	17.07
AHRC51	7230	Parking Permits-not Travel Status	11-Jun-2025	25-Jun-2025	17.07
AHRC51	7230	Parking Permits-not Travel Status	11-Jun-2025	25-Jun-2025	17.07
AHRC51	7271	Freight/Shipping	10-Jun-2025	10-Jun-2025	89.30
AHRC51	6310	Fringe Allocation	06-Jun-2025	02-Jun-2025	1,767.70
AHRC51	6204	Student Non-Work Study	06-Jun-2025	02-Jun-2025	600.00
AHRC51	6102	Professional Salaries	06-Jun-2025	02-Jun-2025	4,494.11
AHRC51	7034	Subsistence-In State Travel	05-Jun-2025	05-Jun-2025	58.00
AHRC51	7034	Subsistence-In State Travel	05-Jun-2025	05-Jun-2025	58.00

AHRC51	7034	Subsistence-In State Travel	05-Jun-2025	05-Jun-2025	58.00
AHRC51	7034	Subsistence-In State Travel	05-Jun-2025	05-Jun-2025	58.00
AHRC51	7034	Subsistence-In State Travel	04-Jun-2025	04-Jun-2025	58.00
AHRC51	7034	Subsistence-In State Travel	04-Jun-2025	04-Jun-2025	58.00
AHRC51	7034	Subsistence-In State Travel	04-Jun-2025	04-Jun-2025	58.00
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	03-Jun-2025	03-Jun-2025	-19.18
AHRC51	7034	Subsistence-In State Travel	30-May-2025	30-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	30-May-2025	30-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	30-May-2025	30-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	28-May-2025	28-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	28-May-2025	28-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	28-May-2025	28-May-2025	58.00
AHRC51	6310	Fringe Allocation	23-May-2025	15-May-2025	1,752.70
AHRC51	6102	Professional Salaries	23-May-2025	15-May-2025	4,494.11
AHRC51	7311	Office Supplies-Consumable Only	21-May-2025	21-May-2025	12.17
AHRC51	7345	R-M Machinery/Equip-Supplies Only	21-May-2025	27-May-2025	330.00
AHRC51	7034	Subsistence-In State Travel	15-May-2025	15-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	15-May-2025	15-May-2025	58.00
AHRC51	7016	Motor Pool Vehicle - In State	15-May-2025	27-May-2025	100.00
AHRC51	7271	Freight/Shipping	13-May-2025	13-May-2025	35.22
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	13-May-2025	13-May-2025	337.05
AHRC51	7034	Subsistence-In State Travel	13-May-2025	13-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	13-May-2025	13-May-2025	384.67
AHRC51	7034	Subsistence-In State Travel	13-May-2025	13-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	13-May-2025	13-May-2025	58.00
AHRC51	7034	Subsistence-In State Travel	13-May-2025	13-May-2025	58.00
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	12-May-2025	12-May-2025	257.19
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	12-May-2025	12-May-2025	927.12
AHRC51	6310	Fringe Allocation	09-May-2025	01-May-2025	1,874.69
AHRC51	6108	Faculty Overload	09-May-2025	01-May-2025	1,257.68
AHRC51	6102	Professional Salaries	09-May-2025	01-May-2025	4,494.11
AHRC51	7011	Refreshment/Meal Travel Status Only	05-May-2025	05-May-2025	2.86
AHRC51	7034	Subsistence-In State Travel	05-May-2025	05-May-2025	448.17
AHRC51	7011	Refreshment/Meal Travel Status Only	05-May-2025	05-May-2025	38.57
AHRC51	7011	Refreshment/Meal Travel Status Only	05-May-2025	05-May-2025	49.88
AHRC51	7011	Refreshment/Meal Travel Status Only	05-May-2025	05-May-2025	65.35
AHRC51	7372	Field Supply/Equip for Research<\$300	05-May-2025	05-May-2025	133.89
AHRC51	7011	Refreshment/Meal Travel Status Only	05-May-2025	05-May-2025	129.84
AHRC51	7271	Freight/Shipping	25-Apr-2025	25-Apr-2025	274.96
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	25-Apr-2025	25-Apr-2025	692.16
AHRC51	6310	Fringe Allocation	25-Apr-2025	17-Apr-2025	1,856.23
AHRC51	6108	Faculty Overload	25-Apr-2025	17-Apr-2025	1,257.68
AHRC51	6102	Professional Salaries	25-Apr-2025	17-Apr-2025	4,446.78
AHRC51	6310	Fringe Allocation	11-Apr-2025	03-Apr-2025	1,654.22
AHRC51	6204	Student Non-Work Study	11-Apr-2025	03-Apr-2025	303.00
AHRC51	6108	Faculty Overload	11-Apr-2025	03-Apr-2025	1,257.68
AHRC51	6102	Professional Salaries	11-Apr-2025	03-Apr-2025	3,936.66
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	07-Apr-2025	07-Apr-2025	366.97
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	07-Apr-2025	07-Apr-2025	588.72

AHRC51	6310	Fringe Allocation	28-Mar-2025	21-Mar-2025	1,690.11
AHRC51	6102	Professional Salaries	28-Mar-2025	21-Mar-2025	4,020.84
AHRC51	6108	Faculty Overload	28-Mar-2025	21-Mar-2025	1,257.68
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	25-Mar-2025	25-Mar-2025	12.49
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	17-Mar-2025	17-Mar-2025	301.88
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	14-Mar-2025	14-Mar-2025	27.51
AHRC51	6310	Fringe Allocation	14-Mar-2025	06-Mar-2025	1,693.32
AHRC51	6204	Student Non-Work Study	14-Mar-2025	06-Mar-2025	127.50
AHRC51	6102	Professional Salaries	14-Mar-2025	06-Mar-2025	4,020.84
AHRC51	6108	Faculty Overload	14-Mar-2025	06-Mar-2025	1,257.68
AHRC51	7226	Testing/Sampling/Inspecting Service	07-Mar-2025	07-Mar-2025	2,204.00
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	06-Mar-2025	06-Mar-2025	92.95
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	06-Mar-2025	06-Mar-2025	1,726.42
AHRC51	6310	Fringe Allocation	28-Feb-2025	21-Feb-2025	1,690.11
AHRC51	6102	Professional Salaries	28-Feb-2025	21-Feb-2025	4,020.84
AHRC51	6108	Faculty Overload	28-Feb-2025	21-Feb-2025	1,257.68
AHRC51	6310	Fringe Allocation	23-Feb-2025	24-Feb-2025	46.00
AHRC51	6204	Student Non-Work Study	23-Feb-2025	24-Feb-2025	1,840.00
AHRC51	6310	Fringe Allocation	14-Feb-2025	07-Feb-2025	982.43
AHRC51	6204	Student Non-Work Study	14-Feb-2025	07-Feb-2025	87.00
AHRC51	6108	Faculty Overload	14-Feb-2025	07-Feb-2025	1,257.68
AHRC51	6102	Professional Salaries	14-Feb-2025	07-Feb-2025	2,200.65
AHRC51	7311	Office Supplies-Consumable Only	13-Feb-2025	13-Feb-2025	24.37
AHRC51	8505C	>5K Medical/Surgery/Lab Equipment	31-Jan-2025	06-Feb-2025	7,974.47
AHRC51	6310	Fringe Allocation	31-Jan-2025	26-Jan-2025	982.87
AHRC51	6204	Student Non-Work Study	31-Jan-2025	26-Jan-2025	105.00
AHRC51	6102	Professional Salaries	31-Jan-2025	26-Jan-2025	2,200.65
AHRC51	6108	Faculty Overload	31-Jan-2025	26-Jan-2025	1,257.68
AHRC51	6108	Faculty Overload	25-Jan-2025	27-Jan-2025	1,257.68
AHRC51	6310	Fringe Allocation	25-Jan-2025	27-Jan-2025	121.99
AHRC51	6310	Fringe Allocation	17-Jan-2025	13-Jan-2025	465.28
AHRC51	6102	Professional Salaries	17-Jan-2025	13-Jan-2025	880.25
AHRC51	6108	Faculty Overload	17-Jan-2025	13-Jan-2025	1,257.68
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	14-Jan-2025	14-Jan-2025	37.33
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	11-Jan-2025	15-Jan-2025	745.92
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	11-Jan-2025	15-Jan-2025	31.36
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	11-Jan-2025	15-Jan-2025	11.01
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	08-Jan-2025	08-Jan-2025	168.54
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	08-Jan-2025	08-Jan-2025	76.79
AHRC51	6310	Fringe Allocation	03-Jan-2025	27-Dec-2024	467.99
AHRC51	6108	Faculty Overload	03-Jan-2025	27-Dec-2024	1,257.68
AHRC51	6204	Student Non-Work Study	03-Jan-2025	27-Dec-2024	107.90
AHRC51	6102	Professional Salaries	03-Jan-2025	27-Dec-2024	880.26
AHRC51	6310	Fringe Allocation	20-Dec-2024	13-Dec-2024	471.14
AHRC51	6102	Professional Salaries	20-Dec-2024	13-Dec-2024	880.26
AHRC51	6108	Faculty Overload	20-Dec-2024	13-Dec-2024	1,257.68
AHRC51	6204	Student Non-Work Study	20-Dec-2024	13-Dec-2024	234.00
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	121.99
AHRC51	6108	Faculty Overload	08-Dec-2024	09-Dec-2024	1,257.68

AHRC51	6204	Student Non-Work Study	08-Dec-2024	09-Dec-2024	920.00
AHRC51	6108	Faculty Overload	08-Dec-2024	09-Dec-2024	1,257.68
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	144.99
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	144.99
AHRC51	6108	Faculty Overload	08-Dec-2024	09-Dec-2024	1,257.68
AHRC51	6204	Student Non-Work Study	08-Dec-2024	09-Dec-2024	920.00
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	121.99
AHRC51	6108	Faculty Overload	08-Dec-2024	09-Dec-2024	1,257.68
AHRC51	6108	Faculty Overload	08-Dec-2024	09-Dec-2024	1,257.68
AHRC51	6208	Faculty Summer Salaries	08-Dec-2024	09-Dec-2024	-966.65
AHRC51	6208	Faculty Summer Salaries	08-Dec-2024	09-Dec-2024	966.65
AHRC51	6204	Student Non-Work Study	08-Dec-2024	09-Dec-2024	6,808.00
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	607.27
AHRC51	6208	Faculty Summer Salaries	08-Dec-2024	09-Dec-2024	966.65
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	-93.77
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	215.76
AHRC51	6102	Professional Salaries	08-Dec-2024	09-Dec-2024	880.26
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	666.40
AHRC51	6204	Student Non-Work Study	08-Dec-2024	09-Dec-2024	2,208.00
AHRC51	6102	Professional Salaries	08-Dec-2024	09-Dec-2024	880.26
AHRC51	6208	Faculty Summer Salaries	08-Dec-2024	09-Dec-2024	2,761.86
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	666.40
AHRC51	6208	Faculty Summer Salaries	08-Dec-2024	09-Dec-2024	2,761.86
AHRC51	6204	Student Non-Work Study	08-Dec-2024	09-Dec-2024	2,208.00
AHRC51	6102	Professional Salaries	08-Dec-2024	09-Dec-2024	880.26
AHRC51	6310	Fringe Allocation	08-Dec-2024	09-Dec-2024	176.25
AHRC51	6102	Professional Salaries	08-Dec-2024	09-Dec-2024	440.13
AHRC51	6204	Student Non-Work Study	08-Dec-2024	09-Dec-2024	184.00
AHRC51	6310	Fringe Allocation	06-Dec-2024	01-Dec-2024	466.92
AHRC51	6204	Student Non-Work Study	06-Dec-2024	01-Dec-2024	65.00
AHRC51	6102	Professional Salaries	06-Dec-2024	01-Dec-2024	880.26
AHRC51	6108	Faculty Overload	06-Dec-2024	01-Dec-2024	1,257.68
AHRC51	6310	Fringe Allocation	22-Nov-2024	14-Nov-2024	466.92
AHRC51	6108	Faculty Overload	22-Nov-2024	14-Nov-2024	1,257.68
AHRC51	6204	Student Non-Work Study	22-Nov-2024	14-Nov-2024	65.00
AHRC51	6102	Professional Salaries	22-Nov-2024	14-Nov-2024	880.26
AHRC51	7235	Contractor/Recruit/Non-Employee Exp	21-Nov-2024	21-Nov-2024	477.95
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	08-Nov-2024	08-Nov-2024	478.72
AHRC51	6310	Fringe Allocation	08-Nov-2024	04-Nov-2024	343.30
AHRC51	6102	Professional Salaries	08-Nov-2024	04-Nov-2024	880.26
AHRC51	6310	Fringe Allocation	25-Oct-2024	17-Oct-2024	343.30
AHRC51	6102	Professional Salaries	25-Oct-2024	17-Oct-2024	880.26
AHRC51	6310	Fringe Allocation	11-Oct-2024	07-Oct-2024	343.30
AHRC51	6102	Professional Salaries	11-Oct-2024	07-Oct-2024	880.26
AHRC51	6310	Fringe Allocation	27-Sep-2024	20-Sep-2024	343.30
AHRC51	6102	Professional Salaries	27-Sep-2024	20-Sep-2024	880.26
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	61.31
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	57.46
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	24.75

AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	70.40
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AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	11.10
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	60.21
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	9.27
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	13.93
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	20.00
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	732.73
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	1,295.55
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	171.61
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	257.67
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	947.63
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	69.94
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	57.03
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	39.14
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	33.80
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	45.65
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	46.00
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	38.63
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	48.06
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	28.00
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	46.65
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	20.50
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	37.04
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	47.77
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	39.30
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	80.66
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	256.28
AHRC51	7830	Group/Team/ASISU Travel	26-Sep-2024	26-Sep-2024	32.40
AHRC51	6310	Fringe Allocation	13-Sep-2024	06-Sep-2024	366.30
AHRC51	6204	Student Non-Work Study	13-Sep-2024	06-Sep-2024	920.00
AHRC51	6102	Professional Salaries	13-Sep-2024	06-Sep-2024	880.26
AHRC51	7372	Field Supply/Equip for Research<\$300	30-Aug-2024	30-Aug-2024	229.69
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	1,154.61
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	42.69
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	19.03
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	64.23
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	21.23
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	111.66
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	48.76
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	61.41
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	58.13
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	20.07
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	91.96

AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	16.80
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	389.00
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	26.96
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	283.21
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	25.00
AHRC51	7830	Group/Team/ASISU Travel	29-Aug-2024	29-Aug-2024	28.46
AHRC51	7830	Group/Team/ASISU Travel	27-Aug-2024	27-Aug-2024	1,067.79
AHRC51	7830	Group/Team/ASISU Travel	27-Aug-2024	27-Aug-2024	175.64
AHRC51	7830	Group/Team/ASISU Travel	27-Aug-2024	27-Aug-2024	648.68
AHRC51	7830	Group/Team/ASISU Travel	27-Aug-2024	27-Aug-2024	366.98
AHRC51	7371	Lab Supplies/Lab Equip LT \$300/item	27-Aug-2024	27-Aug-2024	487.52
<b>Total All Expenses</b>					<b>176,300.75</b>

IGEM Grant Report

Progress (due January 1)    X **Annual (due July 31)**     Final (due August 31)

IGEM Grant # IGEM25-005

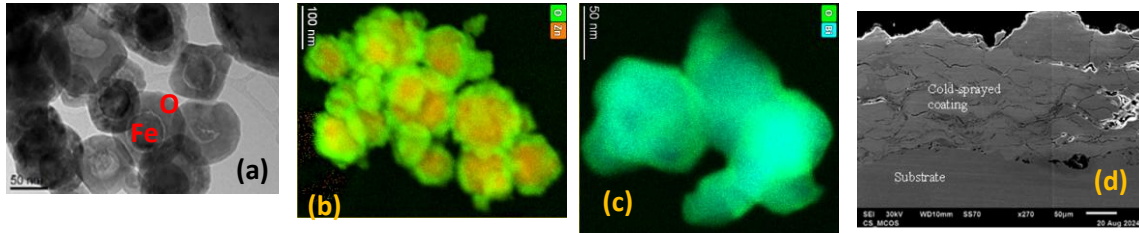
Principal Investigator: Krishnan S Raja

Submission Date: 07/28/2025

Primary Institution: University of Idaho

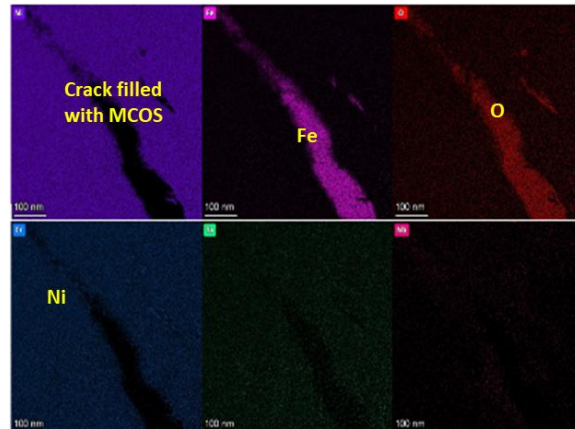
**Section 1: Summary of Project Accomplishments:**

Prepared different types of metal core-oxide shell nanocapsules that render self-healing of matrix. Figures 1 (a) - (c) illustrate the MCOS structures.



*Fig. 1(a) – (c). Transmission electron microscopic (TEM) images of metal core oxide shell (MCOS) nanocapsules. (a) Iron core – iron oxide shell, (b) zinc core – zinc oxide shell, and (c) bismuth core and bismuth oxide shell structures. (d) Cold sprayed coating of nickel base alloy 625 + 10 wt% iron core-iron oxide shell nanocapsules on to 316 stainless steel substrate.*

Self-healing composites were prepared by three different methods, such as (a) cold spray, (b) laser powder bed fusion (LPBF), and (c) compaction and sintering. Fig. 1 (d) illustrates the cross-section of a cold-sprayed coating comprising 10 wt% iron core-iron oxide shell nanocapsules distributed in the Inconel 625 matrix. The cracks of the cold-sprayed coating were partially healed by filling the MCOS as illustrated in Fig. 2.



*Fig. 2 Self-healing of the crack in the cold sprayed coating (10 wt% iron core-iron oxide shell nanocapsules distributed in the IN 625 matrix).*

About twenty LPBF trials were performed to 3D print Alloy 625 + 10 wt% MCOS composite samples by varying laser power, and scanning speed. Microstructural characterization studies are being performed.

Different MCOS + ceramic matrix samples were prepared by the conventional compaction + sintering route. The process parameters were optimized and 3-point bend samples were prepared. Currently, the self-healing behaviors of ceramic-MCOS composite samples are being investigated through 3-point bend tests performed at elevated temperatures under various stress conditions.

Plan for the upcoming report period: LPBF process parameters will be optimized to achieve defect-free 3D prints and test samples will be prepared for further characterization. High-temperature 3-point bend tests will be performed on the ceramic-MCOS composite samples and self-healing behavior will be demonstrated. Microstructural characterization will be performed on all the pertinent samples using SEM, TEM, and XRD techniques.

**Section 2:** High-level summary of budget expenditures

We have spent 66.23% of the total budget, and the remaining 33.77% of the funds will be spent by December 31, 2025. The budget is being spent on time as planned, with 66.6% of the proposed work completed. Two graduate students were financially supported, and two faculty members received support for one month during the summer. Two graduate students will be supported in the fall of 2025. Several mechanical tests and microstructural characterization studies will be completed using the remaining funds.

**Section 3:** Demonstration of economic development/impact:

The investigators collaborated with GenNext Materials & Technologies LLC, a private industry partner in Reno, and won an STTR proposal. A patent will be applied for at the end of this year if more encouraging results are obtained. The investigators will submit a research grant proposal seeking significant funding from federal agencies.

**Section 4:** Number of faculty and student participants as a result of funding, and brief description of student efforts.

Two faculty members, two graduate students, and one undergraduate student participated in this project. The faculty members attended the regional NSF-iCorps program and learnt customer discovery and the commercialization process. The students' efforts include the large-scale synthesis of MCOS nanomaterials, the preparation of composite materials through compaction and sintering, and hands-on operation of sophisticated instruments such as Raman confocal microscopy, SEM, TEM, and XRD. The students made two presentations at the American Nuclear Society conference. Two manuscripts are being prepared for submission to peer-reviewed journals.

**Section 5 :** Updated details and/or progress on the long-term sustainability plan for the project and description of future plans for project continuation or expansion.

The investigators attended the regional NSF-iCorps program on customer discovery and commercialization. This program helped connect with several industrial personnel working in nuclear, aerospace, additive manufacturing, and coating industries. Several companies showed interest in collaborating. More positive results are expected at the end of the project, which will help carve out a concrete plan for project expansion. A patent application will be filed, which will allow the investigators to apply for the national-level NSF-iCorps program. The investigators will develop a 15-page proposal that expands on the current work and seek funding from the NSF and DOE.

**Section 6:** Expenditure Report – Attach an expenditure report as a separate document showing expenses toward the original budget submitted for this project. The expenditure report does not count toward the page limit. A written summary of budget expenditures should be provided in section 2 of this report.

	Budgeted, \$	Spent, \$	Balance, \$	% Remaining
Salary	115410.40	73021.31	42389.09	36.7
Fringe	8,875.00	8,379.08	495.92	5.59
Materials & Supplies	35,190.60	24,704.77	10,485.83	29.80
Tuition	38,124.00	24,761.00	13,363.00	35.05
<b>Total</b>	<b>197,600.00</b>	<b>130,866.16</b>	<b>66,733.84</b>	<b>33.77</b>

## IGEM Grant Report

**Final (due August 31)**

IGEM Grant # IGEM25-006

Principal Investigator Mary Everett

Submission Date: 8/18/25 Primary Institution University of Idaho

### Section 1:

#### Project Accomplishments

- LoRaWAN gateway and sensors were developed for the system. 11 sensors (leaf wetness, CO<sub>2</sub>, and more) could report every 5 minutes up to 0.6 miles away. The longest range on one sensor was 3.5 miles.
- Additionally, a LoRaWAN gateway was developed to forward information to main SCARECRO gateway. Dendrometer sensors were added to the system.
- The Data Gator is now dynamically configurable via a web-based user interface. The Data Gator sensor documentation was maintained and the build has stayed under \$120 per unit.
- Tempest weather stations were added to Laurel Grove Wine Farm (LGWF). TreeTag point dendrometers were added to 20 trees (apple, pear, and cherry) at Sandpoint Organic Agriculture Center (SOAC).
- A Microclimate comparison study was conducted using AI (k-means clustering and dynamic time warping) at LGWF to determine possible varietal plantings in growing area. (Presented on at European Conference on Precision Agriculture).
- Quantitative Association Rule Mining (QARM) via Genetic Algorithms (another AI-based tool) was conducted to determine driving factors of downy mildew and frost events at LGWF.
- Climate comparison research was conducted (using dynamic time warping) for drivers of climate similarity between LGWF and 4 other wine producing regions.
- A custom Degree Day Modeling App was developed and documented for SOAC.
- Downy mildew forecasting graphs (using Syngenta prediction model) were developed for LGWF.
- Climate prediction to outcome research conducted via the program was published in an ACM journal during the project period.

#### Upcoming Plans

- There is planning deployment of LoRaWAN sensors in the UI Experimental Forest (ideal environment for long-range sensing), and long-term sensor collection and monitoring for SOAC, LGWF.
- There is a planned changeover to Grafana as the integration framework for variety of farm tasks, including degree day model visualization and farm mapping

### Section 2:

A total of \$119,800 was budgeted (\$106,360.54 spent, \$13,439.46 left). \$5,049.55 was budgeted and spent on agricultural sensors, \$1,500 was budgeted and spent on an AI journal publication, and \$13,166 was budgeted and spent on tuition for the graduate student. \$13,439.46 was left of the \$100,134.54 budgeted for personnel costs due to a flu season impacting the number of hours worked by several of the student participants. It was our impression that this cannot be expended outside the project period. If this is

not the case, this money would be put toward student work on farmer-directed analytics.

### **Section 3:**

#### **Industry Involvement**

- The NSF I-Corps training program was one of the main industry engagement projects undertaken (16 zoom and phone interviews with farmers, precision agriculture researchers, and environmental managers).
- The microclimate comparison research was presented at the 2025 European Conference on Precision Agriculture. There was significant interest in the SCARECRO system and contacts were made with companies (WeLASER and SAF Water Sampling) and members of WSU's precision agriculture group.

#### **Private Sector Involvement**

- LGWF has continued to be our industry, research, and technology development partner throughout the endeavor. They provided the data collected through the system and feedback about use, and served as the test bed for AI modeling.
- At the ECPA, a contact was made with an Idaho company interested in a potential collaboration on the SCARECRO system for farming in Southern Idaho.

#### **External Funding**

- NASA Idaho Space Grant Consortium (ISGC) funded a student for Summer 2025 to develop an optimal gateway build for lakeshore monitoring.
- Idaho INBRE (Idea Network of Biomedical Research Excellence) funded a student for Summer 2025 to assist in developing the climate comparison AI.

### **Section 4:**

- 1 faculty member (plus 1 research scientist) participated in the program by developing software and providing environmental/farming feedback
- 5 undergraduate students and 4 graduate students participated in the project. The undergraduate students primarily worked on the dashboard, some sensor integrations, and the AI components to a lesser extent. The graduate students worked on the Data Gator improvements as well as the AI integrations.

### **Section 5 :**

#### **Long-Term Sustainability**

- We aim to conduct a long-term sustainability test in the coming year.
- Some of the biggest takeaways from this project year were (1) the system needs to be easier to setup, and (2) farmers have existing metrics that the data needs implement before AI projects are developed.

#### **Future Plans**

- The follow-on grant will stress test and commercialize the SCARECRO system.
- We plan to write 2 USDA NIFA grants for using SCARECRO system data. We plan to put in for an NSF VINES and an NSF Cyber-Physical Systems grant on the entire network in the upcoming year. We will continue seeking NASA ISGC, Idaho INBRE, and UI Office of Undergraduate Research funding for individual students on the project.

**Section 6: Please see attached report.**

## IGEM Expenditure Report

IGEM Grant # IGEM25-006 Principal Investigator Mary Everett

Submission Date: 8/18/25 Primary Institution University of Idaho

### Expenditure Report

#### Personnel:

Budgeted: 84,1480.90

Rebudgeted: 100,134.45

Spent: 86,694.99

Remaining: 13,439.46

**Description:** The personnel category was spent on 5 undergraduate students and 4 graduate students over the project course (part time during the school year and full-time over the summer). These students conducted the bulk of the Data Gator software improvements, dashboard development, and artificial intelligence model development. This category also included time for the research scientist (PI) who worked on the gateway software and documentation, as well as the I-Corps participant and industry partner coordinator. Finally, this category included time from one faculty member who assisted with project directing, student and industry connections, and technological expertise on all parts of system development. This category was underspent, even after the rebudget. This was in part due to a particularly difficult illness season this year which prevented many of the students from working full allotted hours.

#### Equipment:

Budgeted: 5,049.55

Spent: 5,049.55

Remaining: 0

**Description:** The money for equipment was spent primarily on agricultural sensors, including Tempest Weather Stations and S6 temperature/humidity sensors. Funding from another source also provided a variety of LoRa and dendrometer sensors to use in project sensing. This category also bought some basic materials and supplies for gateway and Data Gator maintenance, installs, and continued operations.

#### Travel:

Budgeted: 0

Spent: 0

#### Participant Support:

Budgeted: 0

Spent: 0

#### Other Direct Costs:

Publication Charges Budget: 1,500

Publication Charges Spent: 1,500

Tuition Budgeted: 29,069.55

Tuition Rebudgeted: 13,116

Spent: 13,116

Remaining: 0

**Description:** The publication charges went toward publishing results on the climate prediction AI research (applied in this case to Valley Fever data, which impacts agricultural workers) in the Journal of Biomedical Informatics with a study titled: “*Valley-Forecast: Forecasting Coccidioidomycosis incidence via enhanced LSTM models trained on comprehensive meteorological data*” (DOI: 10.1016/j.jbi.2025.104774). The Tuition category was spent on the yearlong tuition charges for the graduate student working on the Data Gator improvements.

**Total Budget:** 119,800

**Total Spent Budget:** 106,360.54

**Total Underspent Budget: 13,439.46**

A total of 13,439.46 was underspent during the budget part. This is in part because we rebudgeted in order to fit the project into a year-long grant cycle, which aligned better with the follow-on grant and was more in line with the current grant year’s progress. We did conduct a rebudget midway through the project which allowed better expenditures for the year cycle. However, some unexpected illnesses from student workers resulted in less than full hours worked from those allotted on the project, resulting in a surplus budget.

**Plans for Expenditure:**

**It is our understanding that the surplus is not permitted to be spent outside of the project period.** However, if that is not the case, we would put the surplus towards graduate and undergraduate student work on the project for the next grant cycle, especially in industry-focused technology integration aspects (creating more farmer-based visualizations and analytics packages).

**IGEM Grant Report**

Progress (due January 1)       Annual (due July 31)       Final (due August 31)

IGEM Grant # IGM 25-007      Principal Investigator Vivek Utgikar

Submission Date July 29, 2025      Primary Institution University of Idaho

Recovery of Critical Materials from E-Waste

**Section 1:** Summary of project accomplishments and future plans

The pyrometallurgical process based on solid state chlorination and electrowinning of Nd from the neodymium magnet e-waste is shown below in Figure 1.

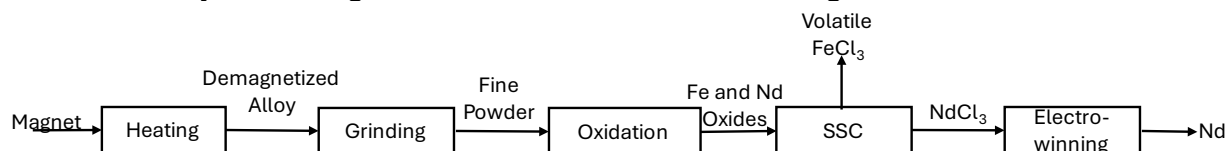


Figure 1. Process schematic for pyrometallurgical recovery of Nd

The work conducted in the reporting period focused on solid state chlorination and Fe/Nd separation with the significant accomplishments being:

1. Optimum conditions for demagnetization of the magnets have been determined.
2. Protocol for grinding of the demagnetized solid alloy in a ball mill has been finalized to obtain fine particles for processing in subsequent reaction steps.
3. Conditions necessary for complete oxidation of particles (<500 mesh or 25 μm) in a muffle furnace have been determined.
4. Processing conditions for quantitative chlorination of oxidized powder using solid NH<sub>4</sub>Cl have been determined. Gravimetric measurements indicate that the volatile FeCl<sub>3</sub> (and other volatiles) can be selectively removed from the system yielding a solid NdCl<sub>3</sub> product that can be subjected to electrochemical reduction to obtain pure Nd.

Work planned for future includes:

1. Determination of kinetics and oxidation reactions through experimentation with uniform sized particles.
2. Electrochemical NdCl<sub>3</sub> reduction experimentation in molten LiCl-KCl eutectic electrolyte for recovery of Nd.
3. Development of comprehensive flow sheet and preliminary techno-economic analysis

**Section 2:** Summary of budget expenditures

The budgeted amount for personnel costs (salary and fringe) was 62.7% of the total budget. Currently ~51% of the funds allocated have been utilized for graduate and undergraduate stipends. The expenditure is on track with the balance of funds to be used for stipends for the graduate and undergraduate students, and faculty summer salary.

The amount allocated for operating expenses was 19.2% of the total budget and currently 27% of the funds allocated in this category have been utilized for acquisition of chemicals and reagents, miscellaneous fittings, reactors and parts for experimental setup, and analysis charges. (Inclusion of the charges incurred that are in process for payment will increase this percentage slightly). The expenditures in this category are anticipated

to rise significantly, with increases in analytical charges (compositional and structural characterizations), and initiation of the electrochemical experimentation. Overall, the expenditure in this category is in alignment with the anticipated amounts needed.

The amount allocated for tuition/health insurance was 18.1% of the total budget, and currently 43.2% of the funds allocated in this category have been expended for the academic year 2024-2025. The balance of the funds will be expended over the remaining project period for the payment of tuition/insurance of the graduate student for the academic year 2025-2026 and summer semester. (The tuition/insurance charges for the academic year 2025-2026 are higher than those for 2024-2025).

Overall, the project expenditure is consistent with the anticipated spending.

**Section 3: Demonstration of economic development/impact**

Planned dissemination of scientific and technical advances and intellectual property development

1. Refereed journal articles on 1) review of pyrometallurgical rare earth recycle, 2) kinetics of oxidation and chlorination reactions, 3) electrowinning of Nd
2. Invention disclosure on the proposed process shown in Figure 1.

Companies identified for collaboration: U.S. Critical Materials Corporation, Idaho Strategic Resources, Inc., Megado Minerals Limited. Contacts will be initiated in late 2025/early 2026.

**Section 4: Number of faculty and student participants**

1. Vivek Utgikar, PI, faculty: Project management and supervision of research effort; Approval of experimental design, and guidance on data interpretation and analysis; Budget and expenditure management.
2. Krishnan Raja, co-PI, faculty: Supervision of research effort; Assisting PI in directing experimental effort and data interpretation/analysis.
3. Dijina Asarinte Valappil, graduate student: Execution of project tasks including experimentation, theoretical modeling, sample analysis and data interpretation.
4. Diba Zadehgol, undergraduate student: Assisting graduate student in conducting experiments and laboratory tasks.
5. Mahir Adib, undergraduate student: Assisting graduate student in conducting experiments and laboratory tasks.

**Section 5: Long term sustainability and future plans**

Follow up research will focus on optimization studies on the process steps investigated in this research as well as incorporating processing steps for the management of secondary stream generated in each step. Process flow sheet will also be modified to include head-end e-waste processing schemes. Finally, theoretical models will be developed to increase fundamental understanding of the transformations in the process.

Potential funding agencies: 1) ARPA-E 2) NSF (CBET Division and cross-cutting programs), 3) DOE – Critical Materials and Minerals Programs, SBIR/STTR

**Section 6: Expenditure Report**

IGEM Grant # IGEM 25-007  
 Submission Date July 29, 2025

Principal Investigator Vivek Utgikar  
 Primary Institution University of Idaho

Recovery of Critical Materials from E-Waste

**Expenditures**

<i>Category</i>	<i>Budgeted</i>	<i>Spent</i>	<i>Balance</i>
<b>Personnel (Salary + Fringe) PI, co-PI, Students</b>	87,752	45,048.07	42,703.93
<b>Operating Expenses (Materials/Supplies, Publication)</b>	26,832	7,246.70	19585.30
<b>Graduate Tuition and Health Insurance</b>	25,416	10,991	14,425.00
<i>Total</i>	140,000	63,285.77	76,714.23

## IGEM Grant Report

Progress (due January 1)       Annual (due July 31)       Final (due August 31)

IGEM Grant # IGEM25-008      Principal Investigator Marty Ytreberg

Submission Date 10/31/2025      Primary Institution University of Idaho

*Instructions: Complete each section of this report directly on this template. Completed reports must be limited to **1 page for Progress Reports and 2 pages for Annual or Final Reports in 12 pt Arial or similar font**, excluding the expenditure report. Simple and concise answers will be appreciated, and even bullet lists of information will be sufficient. Reports that do not follow these requirements will be returned for revision. Submit reports by the appropriate due date to [HERC@edu.idaho.gov](mailto:HERC@edu.idaho.gov).*

**Section 1:** Summary of project accomplishments for the reporting period and plans for the upcoming reporting period.

Our primary outcome is we have identified 15 compounds that have efficacy against fungal infection in the lab and 6 of these are not toxic to potatoes and hence have the potential to be developed into fungicide products. To accomplish this, we used bioinformatics to identify fungal proteins that could serve as potential targets for fungicides. We then used molecular modeling to screen over 20 million chemical compounds for binding to 4 different fungal protein targets. We purchased 154 compounds based on our simulations and have tested over half of these for their ability to inhibit fungal infection.

**Section 2:** High-level summary of budget expenditures for the period just completed. If budget is underspent at time of report, explain why and plans for expending funds.

Funds were 100% expended by the end of the funding period. Funds were used to purchase compounds for testing as potential fungicides (\$12,572.80) and to support personnel salary (\$61,285.96) and fringe (\$21,566.86). David Condon performed bioinformatics to identify fungal protein targets, Hannah Biehn performed experiments in the Schroeder lab, and Marty Ytreberg performed molecular modeling and supervised the overall project.

**Section 3:** Demonstration of economic development/impact, including the following as applicable: patents, copyrights, plant variety protection certificates received or pending; technology licenses signed, start-up businesses created, and industry involvement; private sector engagement; jobs created; external funding; any other pertinent information.

Our team has been awarded an Idaho State Department of Agriculture Specialty Crop Block grant (starting winter 2025) to continue this work by testing against a broader range of fungal pathogens for potatoes. We also have two pending proposals to continue fungicide development efforts: (1) IGEN-HERC Initial Startup preproposal, and (2) University of Idaho Strategic Plan grant.

**Section 4:** Number of faculty and student participants as a result of funding, and brief description of student efforts.

A total of 7 faculty and 5 students were engaged in the project; 2 students performed experiments (2 in Schroeder lab, 1 in Rowley lab), and 2 performed molecular modeling in the Ytreberg lab.

**Section 5:** Updated details and/or progress on the long-term sustainability plan for the project and description of future plans for project continuation or expansion.

We will continue to seek funding to continue our work with a focus on ensuring that the fungicidal compounds are targeting the desired fungal proteins to optimize potency and commercial properties. Long-term, we envision obtaining provisional patents for promising compounds and seeking licensing opportunities with Gowan Company or other industrial partners.

**Section 6:** Expenditure Report – Attach an expenditure report as a separate document showing expenses toward the original budget submitted for this project. The expenditure report does not count toward the page limit. A written summary of budget expenditures should be provided in section 2 of this report.

See attached PDF.

## IGEM Grant Report

Progress (due Jan. 1)                       Annual (due Jul. 31)                       (due Aug. 31)

IGEM Grant #23-001

Principal Investigator – Prof. R. A. Borrelli

Submission Date – 2025.11.28

Primary Institution – University of Idaho

### **Library of Reconfigurable Immersive Attack and Defend Scenarios for Cybersecurity Research and Workforce Development**

#### **Section 1:** Summary of project and goals

Our project was designed to enhance capacity in the cybersecurity space at the Idaho Falls Center for Higher Education (UIIF) for both the University of Idaho and Idaho State University for multi-disciplined research and workforce training. The Adversary-As-A-Service concept, developed under this IGEM funding is an immersive environment that can integrate real physical processes, full-scale enterprise systems, and Internet-scale cyberattacks on-demand to offer researchers, students, and trainees a controlled live-fire environment like no other currently available. IGEM funding has also supported development of a hybrid virtual and physical environment of enterprise-scale information technology systems and bench-top physical process systems under digital control. Additionally, the cybersecurity degree program at the University of Idaho has seen increased enrollment with several graduate students funded to build these capacities.

Several papers and proposals have been generated as a result of this funding initiative. Of note, follow-on funding was acquired from NIST to generally continue capacity building. The University of Idaho was then able to hire a postdoctorate researcher for the power systems laboratory at the Idaho Falls Center for Higher Education.

#### **Section 2:** Summary of project accomplishments and upcoming plans.

- Student activity
  1. Increased enrollment at the Idaho Falls Center for Higher Education through IGEM funding.
  2. Increased student participation to Cybersecurity courses.
- RADICL
  1. Extended RADICL with additional power to support containerized network elements; e.g., routers, switches, vulnerable servers, and malicious hosts.
  2. Purchased equipment and extended RADICL with Hardware Security capabilities.
  3. Purchased mechatronics trainer station and deployed into laboratory environment.
- Education
  1. University of Idaho developed a Hardware Security course for the first time by an Idaho University.
  2. Idaho State University student researchers began design of a hands-on industrial networking security proficiency evaluation. The researchers developed a scenario, network diagram, software list, task list, and scoring rubric. This exam will be used as an assessment instrument for students in the ISU industrial cybersecurity program.

3. ISU is working with secondary teachers to deploy curricular materials into high schools. Additionally, the industrial cybersecurity courseware will be moved to an online delivery format. Other plans include proposing a graduate certificate in industrial cybersecurity to the Idaho State Board of Education, deploying motor control trainers in the laboratory, deploying the industrial networking security proficiency assessment, and designing hands-on control systems fundamentals proficiency exam.
- Developed the Agile Emulated Educational Environment for Guided Industrial Security (AE<sup>3</sup>GIS) platform.
    1. Falcon can now run multi-headed Hydra nodes to operate the AE<sup>3</sup>GIS platform.
    2. The platform is fully open source (no external licenses).
    3. It is comprised of virtual components that correspond to nodes often seen IT/OT networks (including PLCs and servers) and it is focused on realism.
    4. It is designed to be lightweight; it can be downloaded and hosted on servers of colleges or industries.
    5. If not downloaded, it can be accessed remotely by other educational institutions of Idaho. Demos to ISU, BSU, BYU, CEI and NIC have already been arranged starting September 2025.
    6. Implemented three scenarios but enables instructors to implement custom scenarios.
    7. Will submit paper by end of 2025 describing the capabilities and advantages of the platform.
  - Adversary-As-A-Service (AAS) methodology
    - (a) Ransomware attack (Wannacry) – Students learn to detect ransomware activity and analyze encryption behavior and propagation patterns.
    - (b) Distributed Denial of Service attack (Mirai) – Students learn to analyze network traffic for DDoS patterns and implement defensive measures such as firewalls and load balancers.
    - (c) Data Exfiltration via Covert Channels (Heartbleed) – Students recognize covert data exfiltration techniques and implement monitoring and alerting for anomalous traffic.
  - New University of Idaho Level-II research center
    1. Supported by 20 faculty across Idaho universities.
    2. Aimed to create formal partnership in eastern Idaho to encourage research and workforce development.
    3. Motivated to form larger collaborations with Universities and industry towards securing larger funding.
  - Idaho Falls Center for Higher Education Power systems laboratory
    1. Expanded relationship with Schweitzer Engineering Laboratories, Westinghouse (now WESCO), Datacast Technologies, and Edge Velocity to integrate their technologies into the laboratory.
    2. Obtained matching funds provided by the university to procure the real-time digital grid simulator.
    3. Further developing a \$330K grant with Schweitzer Engineering Laboratories in collaboration with the University of Idaho Moscow campus focused on power systems communication and control systems.

- Accepted pre-proposal DOE EPSCoR with ISU, and BSU. The project capitalizes on the infrastructure to support industrial metaverse educational scenarios.

### Publications

- (1) McBride, S. (2024). "Curricular Guidance: Industrial Cybersecurity Knowledge." 125 pp. Joint publication of: United States Department of Energy, International Society of Automation Global Cybersecurity Alliance, Idaho State University, Idaho National Laboratory. [isagca.org/hubfs/2023 ISA Website Redesigns/ISAGCA/PDFs/Industrial Cybersecurity Knowledge FINAL.pdf](https://isagca.org/hubfs/2023_ISA_Website_Redesigns/ISAGCA/PDFs/Industrial_Cybersecurity_Knowledge_FINAL.pdf)
- (2) S. McBride (2024). "What does an OT Security Professional Need to Know?" Colloquium for Information Systems Security Education (CISSE). [Best Paper Award](#).
- (3) Vedros K., Vakanski A., Koliass C., Forte D. "From Capture-Recapture to No Recapture: Efficient SCAD Even After Software Updates", Annual Computer Security Applications Conference (ACSAC) 2025.
- (4) Tollan B., Koliass, C., Borrelli R.A. "AE<sup>3</sup>GIS – Agile Emulated Educational Environment for Guided Industrial Security", Future Internet, To Be Submitted.
- (5) Tollan B., Centofante C., Koliass, C., Borrelli R.A. "Adversary in the Loop: Breach and Attack Simulation for Assessing the Defensibility of ICS Networks", Energies, To Be Submitted.

### Proposals

- (1) Sean McBride (PI) - Idaho State University, Dakota Roberson (co-PI), R. A. Borrelli (co-PI), Constantinos Koliass (co-PI) - University of Idaho. Industrial Cyber Security Research and Training Laboratory. National Institute of Standards and Technology. \$2,875,000. 2024.08.01 - 2026.07.31. [*noncompetitive*]
- (2) Dakota Roberson (PI) - University of Idaho. Foundational Theories for Inherently Secure Digital Systems. Schweitzer Engineering Laboratories. \$334,157. *Pending new PI. Workslope is approved.*
- (3) Sean McBride (PI) - Idaho State University. Threat Hunting Operational Technology Lab (THROTL) Laboratory Directed Research and Development (LDRD) Collaboration. Idaho National Laboratory. \$72,528.

### Section 3: High-level summary of budget expenditures for the period just completed.

- Funding of \$700,000 for FY25 is split between UI and ISU co-PIs to manage (\$300,000 subaward to ISU, \$400,000 allocated to UI.)

Expenditures were in accordance with the HERC IGEM requirements and the University of Idaho Office of Sponsored Programs.

### Section 4: Demonstration of economic development/impact.

The new Level-II Center at the University of Idaho will act as an academic catalyst, facilitating collaboration across disciplines in order to pursue larger interdisciplinary awards. The Center will be a hub for the Idaho Falls Center for Higher Education for research, education, and workforce development to cultivate a security-conscious workforce by incorporating research-driven methodologies into educational pathways and offering experiential learning embedded in practical, real world contexts. Idaho Falls will be a regional nexus for innovation and excellence in the protection of critical infrastructure, in alignment with national imperatives and regional economic advancement.

Dr. Sean McBride participates in the Regional Economic Development Initiative (REDI) cybersecurity alliance. The alliance encourages development of the cybersecurity industry in Southeast Idaho by hosting monthly meetings and an annual symposium.

**Section 5:** Number of faculty and student participants as a result of funding, with a brief description efforts.

- Henok Tadelle (M.S.) - (Graduated, first position at Dell). Helped with the deployment of servers, and HPCs.
- Tollan Berhanu (M.S.) - Helped with the development of the AE<sup>3</sup>IS platform.
- Chad Centofante (M.S.) - Led efforts related to offering developed resources that mimic adversarial activity, as a service including Breach and Attack Tools.
- Heidi Codling (M.Eng) - College of Eastern Idaho
- 4 Faculty, including 1 Extension Faculty
- 17 total undergraduate and graduate students directly involved in supporting project efforts
- 7 Principal Investigators supported by this grant over the full period.

Over 20 faculty and students from both institutions have been working together on multiple facets of this grant effort: from selection of components and shopping for available new or refurbished equipment, to designing network architecture and cyber-physical systems platforms, working with vendors and contractors, university procurement, and facilities personnel, installing and configuring software, running wiring and connecting gadgets, building up, tearing down, and building up again the various platforms and elements to support our vision.

**Section 6:** Updated progress on long-term sustainability and description of future expansion.

- The NIST award allows both institutions to continue research and support more students.
- Continuing submission of grant proposals as opportunities arise.
- ISU's College of Technology determined to put the Introduction to Cyber-Physical Systems course on track to be offered remotely, as dual-credit/dual-enrollment, and to become a General Education class.
- ISU intends to offer industrial cybersecurity workforce development training at the Idaho Falls campus in Fall 2026.

We are engaging local industries, such as Kiewit Corporation, to demonstrate capabilities at the Idaho Falls Center for Higher Education and form new collaborations. We intend to generate a sustainable revenue stream to sustain our staff, equipment, software licensing, and other operating expenses with commercialization paths on the horizon. The model for our Idaho Falls facilities and capabilities centers on our engagement with community and industry partners here and across the region.

**Section 7:** Expenditure Report

**University of Idaho**  
**Itemized Expenditures**  
 From 7/1/2022 through 11/20/2025

**Grant: UA6244 - ISBOE IGEM HERC: Secure Cyberspace**

Index: 855911 - ISBOE IGEM HERC Secure Cyberspace

Fund: 226244 - ISBOE IGEM HERC Secure Cyberspace

Salaries

E4108 Summer Salary

Borrelli, Robert	110 Hours	\$7,747.30
Haney, Michael	168 Hours	\$14,544.35
Kolias, Konstantinos	120 Hours	\$8,049.60
Roberson, Dakota	80 Hours	\$5,175.20

E4109 IA/GA Salary

Makrakis, Georgios	320 Hours	\$7,680.00
Makrakis, Georgios	24 Hours	\$576.00
Williams, Taegan	340 Hours	\$6,939.40

\$50,711.85

Temporary Help

E4135 Temporary Student

Tacke, Jonathan	414 Hours	\$8,565.48
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\$8,565.48

Fringe Benefits

E4280 Faculty CFR Benefit Expense	\$10,769.66
E4282 Student CFR Fringe Expense	\$745.67
E4282 Student CFR Fringe Expense	\$20.74

\$11,536.07

Operating Expenses

E5020 Postage & Mailing

6/21/2023	Z1057581	UPS Shipping and Insurance for SEL	Doc Ref:	\$160.28
8/25/2023	Z1060932	UPS Shipping and Insurance for SEL	Doc Ref:	\$219.95

E5240 R&M Svcs - Technology Infrastructure

1/17/2023	I2272149	Wheeler Electric, Inc.		\$450.00
1/17/2023	I2272121	Wheeler Electric, Inc.		\$1,960.00

E5320 Software/Applications - Individual

12/27/2022	Z1047551	D2L, Ltd. Payment for VMware Academ	Doc Ref:	\$330.00
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E5560 Technology - Supplies

11/9/2022	TC110922	TDX263871 4-Samsung 27" Mntr		\$963.82
2/16/2023	TC021623	TDX278215 Dell dock+34" mntr+ship		\$788.39

E5720 Educational Supplies

4/26/2023	Z1053854	Amazon. Purchase of (3) Refillable	Doc Ref:	\$47.97
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E5724 Research Supplies

**INFORMATIONAL  
APRIL 15-16, 2026**

**ATTACHMENT 8**

11/21/2025 10:19:25 AM

Page: 2

8/29/2022	Z1040672	Amazon. Purchase of (1) 6 Pack P To	Doc Ref:	\$19.79
8/29/2022	Z1040672	Amazon. Purchase of (1) Brother P-T	Doc Ref:	\$59.49
8/29/2022	Z1040672	Amazon. Purchase of (12) Wall Contr	Doc Ref:	\$1,101.63
8/29/2022	Z1040672	Amazon. Purchase of (16) SAMSUNG FT	Doc Ref:	\$3,422.72
8/29/2022	Z1040672	Amazon. Purchase of (2) Dell GM069	Doc Ref:	\$119.90
8/29/2022	Z1040672	Amazon. Purchase of (8) Tripp Lite	Doc Ref:	\$338.79
9/28/2022	Z1042127	Amazon. Purchase of (1) 100-000-00	Doc Ref:	\$154.99
9/28/2022	Z1042127	Amazon. Purchase of (1) Belkin Comp	Doc Ref:	\$1,639.64
9/28/2022	Z1042127	Amazon. Purchase of (1) Logitech K4	Doc Ref:	\$26.99
9/28/2022	Z1042127	Amazon. Purchase of (1) Tripp Lite	Doc Ref:	\$63.99
9/28/2022	Z1042127	Newegg. Purchase of (36) DELL 342-3	Doc Ref:	\$1,990.00
9/28/2022	Z1042127	Newegg. Purchase of (4) Dell G803n	Doc Ref:	\$126.12
9/28/2022	Z1042127	Newegg. Purchase of (4) SAMSUNG 870	Doc Ref:	\$386.60
9/28/2022	Z1042127	Newegg. Refund of (36) DELL 342-349	Doc Ref:	(\$1,990.00)
9/28/2022	Z1042127	xByte Technologies. Purchase of (33	Doc Ref:	\$4,656.00
10/4/2022	Z1042503	Amazon. Purchase of (1) HELIFOUNER	Doc Ref:	\$147.89
10/4/2022	Z1042503	Amazon. Purchase of (1) PLC Control	Doc Ref:	\$254.61
10/4/2022	Z1042503	Home Depot. Purchase of (1) MCH SCR	Doc Ref:	\$39.08
10/4/2022	Z1042525	Amazon. Purchase of (2) Tripp Lite	Doc Ref:	\$128.00
10/4/2022	Z1042525	Amazon. Purchase of (3) VIVO Black	Doc Ref:	\$746.05
10/4/2022	Z1042525	Amazon. Purchase of (6) SAMSUNG 32G	Doc Ref:	\$258.18
11/11/2022	Z1045125	Amazon. Purchase of (1) 4 Pack 1.25	Doc Ref:	\$412.53
11/11/2022	Z1045125	Amazon. Purchase of (1) Fiber Patch	Doc Ref:	\$25.99
11/11/2022	Z1045125	Amazon. Purchase of (19) Pipishell	Doc Ref:	\$297.81
11/11/2022	Z1045125	Amazon. Purchase of (3) Tripp Lite	Doc Ref:	\$115.14
12/7/2022	Z1046419	Amazon. Purchase of (1) 8-in-1 Univ	Doc Ref:	\$7.40
12/7/2022	Z1046419	Amazon. Purchase of (1) Arduino UNO	Doc Ref:	\$1,381.37
12/7/2022	Z1046419	Amazon. Purchase of (1) MEAN WELL U	Doc Ref:	\$18.16
12/7/2022	Z1046419	Amazon. Purchase of (1) ODROID XU4	Doc Ref:	\$89.50
12/7/2022	Z1046419	Amazon. Purchase of (1) Orange Pi 3	Doc Ref:	\$58.98
12/7/2022	Z1046419	Amazon. Purchase of (1) Raspberry P	Doc Ref:	\$9.99
12/7/2022	Z1046419	Newegg.com. Purchase of (2) 0DF-007	Doc Ref:	\$134.45
12/7/2022	Z1046419	The Home Depot. Purchase of (3) Hus	Doc Ref:	\$163.14
12/7/2022	Z1046419	The Home Depot. Purchase of The Hom	Doc Ref:	\$153.90
12/7/2022	Z1046419	The Home Depot. Refund for The Home	Doc Ref:	(\$163.14)
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12/27/2022	Z1047551	Amazon. Purchase of (2) GearIT Cat	Doc Ref:	\$102.54
12/27/2022	Z1047551	Amazon. Purchase of (2) MEAN WELL U	Doc Ref:	\$36.76
12/27/2022	Z1047551	Amazon. Purchase of (2) Mounting Dr	Doc Ref:	\$149.92
12/27/2022	Z1047551	Amazon. Purchase of (3) SAMSUNG 65-	Doc Ref:	\$1,643.97
12/27/2022	Z1047551	Amazon. Purchase of (4) Intel Ether	Doc Ref:	\$508.00
12/27/2022	Z1047551	Amazon. Purchase of (6) DIN Rail Mo	Doc Ref:	\$1,109.70
1/25/2023	Z1048638	Amazon. Purchase of (1) 12V 2A Powe	Doc Ref:	\$23.36
1/25/2023	Z1048638	Amazon. Purchase of (1) 2.5" to 3.5	Doc Ref:	\$6.99
1/25/2023	Z1048638	Amazon. Purchase of (1) Gikfun MTS1	Doc Ref:	\$8.98
1/25/2023	Z1048638	Amazon. Purchase of (2) 5 X 32GB US	Doc Ref:	\$78.94
1/25/2023	Z1048638	Newegg.com. Purchase of 3 Samsung 8	Doc Ref:	\$254.97
2/27/2023	Z1050052	Cisco 2960X Switch Rack kit for IGE	Doc Ref:	\$135.20
2/27/2023	Z1050052	Cisco 3750G Switch Rack kit for IGE	Doc Ref:	\$37.96
2/27/2023	Z1050052	Dual Radio with a router for IGEM P	Doc Ref:	\$725.71
2/27/2023	Z1050052	HDMI Cables and extension cord for	Doc Ref:	\$488.35
2/27/2023	Z1050052	Research Supplies for FY23 HERC-IGE	Doc Ref:	\$551.07
2/27/2023	Z1050052	Supplies for FY HERC-IGEM -- **T	Doc Ref:	\$382.22
2/27/2023	Z1050052	Supplies for the FY23 HERC IGEM Cyb	Doc Ref:	\$39.78
3/7/2023	Z1050805	McMaster-Carr. Purchase of (4) 4706	Doc Ref:	\$600.19
3/16/2023	Z1051394	Research Supplies for Dr. Michael H	Doc Ref:	\$29.37

3/16/2023	Z1051394	Research Supplies for Dr. Michael H	Doc Ref:	\$67.32
3/16/2023	Z1051394	Research Supplies for IGEM-HERC Pro	Doc Ref:	\$20.54
3/20/2023	Q0001346	Amazon Capital Intel EXP19404PTL PRO/1000 PT		\$228.00
3/21/2023	Q0001355	Amazon Capital ELEGOO Upgraded 37 in 1 Sensor		\$73.96
3/21/2023	Q0001360	Amazon Capital ELEGOO UNO Project Super Starter		\$71.98
3/21/2023	Q0001360	Amazon Capital HCDC RPi GPIO Status LED &		\$18.99
3/21/2023	Q0001360	Amazon Capital Kingston DataTraveler Max Type-A		\$105.49
3/21/2023	Q0001364	Amazon Capital 5V 3A 2.5A 2A 1.5A 1A AC Adapter		\$12.89
3/22/2023	Q0001410	Amazon Capital 90Wh VV09XL Laptop Battery for HP		\$40.74
3/22/2023	Q0001413	Amazon Capital DIN Rail Mount 8 SPDT IoT Power		\$65.00
3/22/2023	Q0001410	Amazon Capital Freenove Ultimate Starter Kit for		\$119.80
3/22/2023	Q0001366	Amazon Capital Libre Computer AML-S905X-CC Le		\$139.00
3/22/2023	Q0001403	Amazon Capital Screw Terminal Block Breakout Board		\$32.00
3/23/2023	Q0001426	Amazon Capital Beagleboard (BeagleBone Rev C)		\$62.99
3/23/2023	Q0001448	Amazon Capital Kingston DataTraveler Max 1TB USB-		\$98.29
3/23/2023	Q0001426	Amazon Capital Libre Computer Board ROC-RK3328-		\$200.00
3/27/2023	Z1052155	Amazon. Purchase of (1) 5pcs Ultras	Doc Ref:	\$9.99
3/27/2023	Z1052155	Amazon. Purchase of (1) 9V 2A Power	Doc Ref:	\$29.97
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3/27/2023	Z1052155	Amazon. Purchase of (1) RasTech Ras	Doc Ref:	\$11.79
3/27/2023	Z1052155	Amazon. Purchase of (1) Screw Mount	Doc Ref:	\$31.80
3/27/2023	Z1052155	Amazon. Purchase of (1) Songhe Dual	Doc Ref:	\$6.88
3/27/2023	Z1052155	Amazon. Purchase of (2) Arducam 160	Doc Ref:	\$11.18
3/27/2023	Z1052155	Home Depot. Purchase of (4) HEFTY 4	Doc Ref:	\$146.54
3/27/2023	Z1052155	Home Depot. Purchase of Purchase of	Doc Ref:	\$155.33
3/27/2023	Z1052155	Home Depot. Refund for purchase of	Doc Ref:	(\$155.33)
3/30/2023	Q0001737	Amazon Capital DIN Rail Mount Bracket for Raspberry		\$94.95
3/31/2023	Q0001816	Amazon Capital Raspberry Pi Pico RP2040		\$23.90
3/31/2023	Q0001748	Amazon Capital Treedix 2PCS Compatible with		\$31.98
4/1/2023	Q0001865	Amazon Capital ANMBEST 2PCS 4 Channel 5V Relay		\$51.16
4/1/2023	Q0001864	Amazon Capital Arduino UNO REV3 [A000066]		\$139.65
4/1/2023	Q0001858	Amazon Capital Belkin Components USB A/B Device		\$24.75
4/1/2023	Q0001857	Amazon Capital ICI T&G 2 Pieces DIN Rail Slotted		\$189.80
4/1/2023	Q0001864	Amazon Capital SunFounder 7 Inch HD TFT LCD		\$274.95
4/1/2023	Q0001858	Amazon Capital UCTRONICS Active PoE Splitter 12V -		\$29.97
4/1/2023	Q0001866	Amazon Capital UCTRONICS Active PoE Splitter 12V -		\$9.99
4/2/2023	Q0001879	Amazon Capital Amcrest 5MP Turret POE Camera,		\$163.86
4/2/2023	Q0001888	Amazon Capital Amcrest 5MP Turret POE Camera,		\$163.86
4/2/2023	Q0001880	Amazon Capital Amcrest 5MP Turret POE Camera,		\$163.86
4/2/2023	Q0001878	Amazon Capital Amcrest 5MP Turret POE Camera,		\$54.62
4/2/2023	Q0001879	Amazon Capital Bergen Industries Inc PS313163 3-		\$19.35
4/2/2023	Q0001873	Amazon Capital Cable Matters 4K Mini DisplayPort to		\$9.97
4/2/2023	Q0001880	Amazon Capital Cable Matters Mini DisplayPort to VGA		\$16.33
4/2/2023	Q0001889	Amazon Capital Crucial RAM 32GB Kit (2x16GB) DDR4		\$68.99
4/2/2023	Q0001875	Amazon Capital DSLRKIT Gigabit USB Type C Active		\$62.45
4/2/2023	Q0001873	Amazon Capital LOVIMAG Strong Neodymium Disc		\$99.95
4/2/2023	Q0001897	Amazon Capital MazerPi 15 Pcs Pin Header, Pin		\$5.99
4/2/2023	Q0001875	Amazon Capital NETGEAR 5 Port PoE Gigabit		\$274.95
4/2/2023	Q0001875	Amazon Capital Orange Pi 5 16GB LPDDR4 RK3588S		\$299.98
4/2/2023	Q0001880	Amazon Capital UCTRONICS Active PoE Splitter 12V -		\$9.99
4/5/2023	Q0002104	Amazon Capital MEAN WELL Ultra Slim Step-Shape		\$73.36
4/8/2023	Q0002325	Amazon Capital Tripp Lite Heavy-Duty Computer		\$75.80
4/8/2023	Q0002318	Amazon Capital Tripp Lite Heavy-Duty Computer		\$75.80
4/9/2023	Q0002331	Amazon Capital NETGEAR 24-Port Gigabit Ethernet		\$179.99
4/9/2023	Q0002353	Amazon Capital Crucial RAM 32GB Kit (2x16GB) DDR4		\$68.99
4/11/2023	Q0002487	Amazon Capital 100G QSFP28 DAC Cable -		\$43.99
4/18/2023	Q0003101	Amazon Capital Aluminum Spacer 5/8" OD x 1/4" ID		\$67.04

4/18/2023	Q0003053	Amazon Capital	Panda 300Mbps Wireless N USB	\$65.99
4/18/2023	Q0003053	Amazon Capital	Panda Wireless PAU06 300Mbps	\$71.99
4/19/2023	B1904579	Amazon Capital	Services Inc	\$0.00
4/19/2023	Q0003142	Amazon Capital	#6 Stainless Steel Flat Washer (0.16"	\$6.78
4/19/2023	Q0003142	Amazon Capital	1/4-20 x 1-1/2" (3/8" to 4"	\$9.65
4/19/2023	Q0003142	Amazon Capital	24PCS Sand Paper Variety Pack	\$5.99
4/19/2023	Q0003164	Amazon Capital	4Pcs 6mm Flange Coupling	\$8.98
4/19/2023	Q0003142	Amazon Capital	6#32 x 1/2" Flat Countersunk Head	\$8.69
4/19/2023	Q0003142	Amazon Capital	Automatic Center Punch, 5 inch	\$8.99
4/19/2023	Q0003123	Amazon Capital	DSLKIT Gigabit USB Type C Active	\$12.49
4/19/2023	Q0003132	Amazon Capital	EHOMEAZZ Ramekin Stainless Steel	\$11.98
4/19/2023	Q0003164	Amazon Capital	Gluerious Mini Hot Glue Gun with 30	\$13.99
4/19/2023	Q0003164	Amazon Capital	Greartisan DC 12V 25RPM Turbo	\$14.99
4/19/2023	Q0003142	Amazon Capital	Gya Labs Coffee Essential Oil (10ml) -	\$9.98
4/19/2023	Q0003164	Amazon Capital	HELIFOUNER 1280 Pieces Socket	\$29.99
4/19/2023	Q0003123	Amazon Capital	HiLetgo 2pcs A3967 Stepper Motor	\$13.49
4/19/2023	Q0003123	Amazon Capital	Hilitchi 460 Pcs M2 M3 M4 M5 Female	\$18.99
4/19/2023	Q0003143	Amazon Capital	J-B Weld 50112 ClearWeld 5 Minute	\$6.54
4/19/2023	Q0003132	Amazon Capital	TIMESETL 20 Pack 608-2RS Ball	\$8.99
4/19/2023	Q0003150	Amazon Capital	The Hillman Group 180237 Type A	\$15.06
4/19/2023	Q0003123	Amazon Capital	Washers, 304 Stainless Steel Large	\$17.85
4/19/2023	Q0003123	Amazon Capital	Wathai DC Brushless Cooling Fan	\$8.89
4/19/2023	Q0003133	W.W. Grainger I	TK83016289T Cable Tie Mounting	\$14.02
4/19/2023	Q0003133	W.W. Grainger I	TK83016290T Grounding Lug Kit	\$15.68
4/20/2023	B1904735	Amazon Capital	Services Inc	\$0.00
4/20/2023	B1904735	Amazon Capital	Services Inc	\$0.00
4/20/2023	B1904735	Amazon Capital	Services Inc	\$0.00
4/20/2023	B1904735	Amazon Capital	Services Inc	\$0.00
4/20/2023	Q0003295	Amazon Capital	10Pcs Needle File Set Hardened Alloy	\$7.89
4/20/2023	Q0003295	Amazon Capital	7 Pieces Center Drill Bits Kit,	\$12.99
4/20/2023	Q0003295	Amazon Capital	Adafruit (PID 324 Stepper Motor -	\$18.72
4/20/2023	Q0003295	Amazon Capital	Alfa Long-Range Dual-Band AC1200	\$62.99
4/20/2023	Q0003295	Amazon Capital	Bringsmart CCM6N DC PWM Motor	\$13.39
4/20/2023	Q0003295	Amazon Capital	DSLKIT Gigabit USB Type C Active	\$24.98
4/20/2023	Q0003295	Amazon Capital	EPBOWPT DC 12V 24V to DC 5V 3A	\$35.96
4/20/2023	Q0003295	Amazon Capital	Essential Oil Diffuser for Home, 150ml	\$11.99
4/20/2023	Q0003314	Amazon Capital	LUBAN Led Signal Tower Stack	\$38.56
4/21/2023	Q0003373	Amazon Capital	LTC1871 DC-DC Boost Step-up	\$35.97
4/21/2023	Q0003350	Amazon Capital	LUBAN Led Signal Tower Stack	\$77.12
4/22/2023	Q0003426	Amazon Capital	1/4-20 Hex Nuts 100Pcs 304	\$8.57
4/22/2023	Q0003439	Amazon Capital	SHNITPWR 12V 10A Power Supply	\$48.15
4/23/2023	Q0003486	Amazon Capital	LUBAN Led Signal Tower Stack	\$38.56
4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
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4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
4/24/2023	B1904859	Amazon Capital	Services Inc	\$0.00
4/26/2023	Z1053854	Amazon.	Purchase of (1) Automation Doc Ref:	\$399.99
4/26/2023	Z1053854	Amazon.	Purchase of (1) KEYESTUDIO Doc Ref:	\$130.75
4/26/2023	Z1053854	Amazon.	Purchase of (1) KEYESTUDIO Doc Ref:	\$38.99
4/26/2023	Z1053854	Amazon.	Purchase of (4) Controllino Doc Ref:	\$1,260.27
4/26/2023	Z1053854	Amazon.	Purchase of (4) Monoprice 1 Doc Ref:	\$1,766.33
4/26/2023	Z1053854	QNAPdirect.	Purchase of (1) Mellano Doc Ref:	\$518.64



5/22/2023	B1906487	Amazon Capital Services Inc	\$0.00
5/22/2023	B1906487	Amazon Capital Services Inc	\$0.00
5/22/2023	B1906487	Amazon Capital Services Inc	\$0.00
5/22/2023	B1906487	Amazon Capital Services Inc	\$0.00
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5/22/2023	B1906487	Amazon Capital Services Inc	\$0.00
5/22/2023	B1906487	Amazon Capital Services Inc	\$0.00
5/24/2023	B1906712	Amazon Capital Services Inc	\$0.00
5/30/2023	Q0006871	Amazon Capital Tripp Lite Home Office Surge	(\$202.53)
6/6/2023	Z1056217	Stainless Steel Machine Kit, Black Doc Ref:	\$160.02
6/8/2023	Q0007887	McMaster-Carr S Din Rail, Din 3, 35mm x 2m	\$31.82
6/8/2023	Q0007887	McMaster-Carr S Grounding Bock with 12 holes, 6-	\$77.80
6/8/2023	Q0007887	McMaster-Carr S Non-insulated Jumper for 8mm wide	\$167.25
6/8/2023	Q0007887	McMaster-Carr S Shipping	\$52.24
6/8/2023	Q0007887	McMaster-Carr S Slotted Wire Duct with Snap-on	\$51.54
6/8/2023	Q0007887	McMaster-Carr S Spade Terminals, Vinyl Insulated,	\$31.12
6/8/2023	Q0007887	McMaster-Carr S Spiral Sleeving, Polyethylene Plastic,	\$4.93
6/8/2023	Q0007887	McMaster-Carr S Terminal Block, Din-Rail, 6 mm wide,	\$7.10
6/8/2023	Q0007887	McMaster-Carr S Terminal Block, Din-Rail, 6 mm wide,	\$357.00
6/8/2023	Q0007887	McMaster-Carr S Terminal Block, Din-Rail, 6 mm wide,	\$7.10
6/14/2023	Q0008478	Idaho State Uni CHE Building Instruction Costs for	\$53.41
6/14/2023	Q0008479	Idaho State Uni Research Supplies for the IGEM HERC	\$35.10
6/19/2023	B1909018	Amazon Capital Services Inc	\$0.00
6/20/2023	Z1057340	McMaster-Carr. Purchase of (3) 9581 Doc Ref:	\$90.65
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/22/2023	B1909302	McMaster-Carr Supply Co.	\$0.00
6/29/2023	B1909840	Amazon Capital Services Inc	\$0.00
7/7/2023	Z1058862	Supplies for the FY23 HERC IGEM Cyb Doc Ref:	\$20.03
10/19/2023	Q0023008	Amazon Capital DVOZVO Orange Pi 5/5B Case with	\$17.29
10/19/2023	Q0023082	Amazon Capital KIOXIA (Toshiba 128GB M.2 2230	\$14.98
10/19/2023	Q0023082	Amazon Capital SanDisk 64GB X2 (128GB) MicroSDXC	\$13.49
11/8/2023	B1917496	Amazon Capital Services Inc	\$0.00
11/8/2023	B1917496	Amazon Capital Services Inc	\$0.00
11/8/2023	B1917496	Amazon Capital Services Inc	\$0.00
11/16/2023	Q0026594	Pi Shop Inc FedEx Ground	\$16.38
11/16/2023	Q0026594	Pi Shop Inc Raspberry Pi 4 Model B/4GB	\$1,100.00
11/21/2023	Z1065795	Adafruit. Purchase of (1) Raspberry Doc Ref:	\$60.98
12/2/2023	Q0028337	Amazon Capital 4 in. Octagon Box, Drawn, 1-1/2 in.	\$9.18
12/2/2023	Q0028337	Amazon Capital 400 Pack Rainbow Balloons 12	\$17.99
12/2/2023	Q0028337	Amazon Capital ANMBEST 10PCS 5V Relay Module	\$14.89
12/2/2023	Q0028337	Amazon Capital ANMBEST 2PCS 4 Channel 5V Relay	\$60.40

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12/2/2023	Q0028337	Amazon Capital	ANMBEST 5PCS 2 Channel 5V Relay	\$29.78
12/2/2023	Q0028337	Amazon Capital	ARDUINO MEGA 2560 REV3	\$479.16
12/2/2023	Q0028337	Amazon Capital	Automation Direct PLC Trainer - Click	\$499.99
12/2/2023	Q0028337	Amazon Capital	Belkin Components USB A/B Device	\$74.85
12/2/2023	Q0028337	Amazon Capital	Bergen Industries Inc PS313163 3-	\$104.25
12/2/2023	Q0028337	Amazon Capital	Brother P-Touch Monochrome Label	\$38.94
12/2/2023	Q0028337	Amazon Capital	Coolwell RGB Full-Color LED Matrix	\$38.50
12/2/2023	Q0028337	Amazon Capital	Digital Complete do it Yourself PLC	\$149.95
12/2/2023	Q0028337	Amazon Capital	ESP-WROOM-32 ESP32 ESP-32S	\$15.59
12/2/2023	Q0028337	Amazon Capital	Legrand - Pass & Seymour - Keyless	\$12.00
12/2/2023	Q0028337	Amazon Capital	MEAN WELL HDR-15-5 Ultra Slim	\$137.50
12/2/2023	Q0028337	Amazon Capital	NETGEAR 5 Port PoE Gigabit	\$699.90
12/2/2023	Q0028337	Amazon Capital	PCFING Electric Air Balloon Pump and	\$19.99
12/2/2023	Q0028337	Amazon Capital	Panda Wireless PAU09 N600 Dual	\$73.99
12/2/2023	Q0028337	Amazon Capital	Pegitz Pegboard Peg Locks 50PCS	\$9.89
12/2/2023	Q0028337	Amazon Capital	REVODATA Gigabit Type C PoE	\$297.80
12/2/2023	Q0028337	Amazon Capital	Tripp Lite Home Office Surge	\$400.40
12/2/2023	Q0028337	Amazon Capital	YUNLAIGOTOP Electric Air Balloon	\$95.00
12/2/2023	Q0028337	Amazon Capital	novelinks Transparent 4" x 6" Photo	\$68.97
12/2/2023	Q0028337	Amazon Capital	shipping	\$30.00
12/6/2023	!0526118	Pi Shop Inc		\$0.00
12/6/2023	!0526118	Pi Shop Inc		\$0.00
12/25/2023	B1920089	Amazon Capital Services Inc		\$0.00
12/25/2023	B1920089	Amazon Capital Services Inc		\$0.00
12/25/2023	B1920089	Amazon Capital Services Inc		\$0.00
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12/25/2023	B1920089	Amazon Capital Services Inc		\$0.00
12/25/2023	B1920089	Amazon Capital Services Inc		\$0.00
1/29/2024	Z1068888	Newegg.com.	Purchase of (1) 9SIB7VE Doc Ref:	\$789.00

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\$45,049.22

\$5K or > Capital Outlay

E6411 >5K Technology Equip - Enterprise

2/23/2023	J1327506	MKL to E6411 from E7815	Doc Ref: I2265885	\$99,294.23
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E6520 >5K Educational Equipment

1/25/2023	Z1048638	Home Depot.	Purchase of (1) MCH SCR Doc Ref:	\$54.91
3/7/2023	Z1050805	Home Depot.	Purchase of (1) 1 in. M Doc Ref:	\$110.98
3/7/2023	Z1050805	Home Depot.	Purchase of (1) Multi-A Doc Ref:	\$144.55

6/20/2023	Z1057340	Home Depot in-store purchase. Purch	Doc Ref:	\$272.26
12/19/2023	J1346123	mrb-CT Home Depot	Doc Ref: Z1052302	\$317.63
E6620 >5K Constr & Engr Equipment				
4/12/2023	Z1053140	Capital research equipment for the	Doc Ref:	\$3,757.14
E6850 >5K Medical/Surgery/Lab Equipment				
4/20/2023	I2286936	Absopulse Electronics Ltd		\$3,570.00
4/30/2023	Q0004211	Amazon Capital Tripp Lite Duplex Multimode		\$75.66
4/30/2023	Q0004211	Amazon Capital Tripp Lite Duplex Multimode		\$47.88
5/1/2023	Q0004290	McMaster-Carr S Building Wire, Stranded with Nylon		\$80.45
5/1/2023	Q0004280	McMaster-Carr S Cable, SJEOOW, Black Outer		\$138.18
5/1/2023	Q0004280	McMaster-Carr S Cable, SJEOOW, Black Outer		\$167.58
5/1/2023	Q0004280	McMaster-Carr S Cord Grip, Aluminum, for 0.5"-0.63"		\$26.26
5/1/2023	Q0004280	McMaster-Carr S Cord Grip, Aluminum, for 0.63"-0.72"		\$49.39
5/1/2023	Q0004280	McMaster-Carr S Din-Rail Mount Fuse Block for 2 UL		\$63.99
5/1/2023	Q0004280	McMaster-Carr S End Stop for One Circuit Modular DIN-		\$17.64
5/1/2023	Q0004280	McMaster-Carr S Gray End Cover for Modular Din-Rail		\$4.70
5/1/2023	Q0004280	McMaster-Carr S Locknut and O-ring for 3/4 knockout		\$40.72
5/1/2023	Q0004280	McMaster-Carr S Modular DIN-Rail Mount Terminal		\$13.92
5/1/2023	Q0004280	McMaster-Carr S Modular DIN-Rail Mount Terminal		\$13.92
5/1/2023	Q0004280	McMaster-Carr S Modular DIN-Rail Mount Terminal		\$13.92
5/1/2023	Q0004280	McMaster-Carr S Noninsulated Jumper for 6mm Wide		\$39.15
5/1/2023	Q0004290	McMaster-Carr S Slotted Wire Duct with Snap-On		\$434.99
5/1/2023	Q0004280	McMaster-Carr S Thin-Wall (EMT) Steel Conduit, Zinc		\$15.15
5/1/2023	Q0004280	McMaster-Carr S Thin-Wall (EMT) Steel Conduit, Zinc		\$12.35
5/1/2023	Q0004280	McMaster-Carr S Turn-Lock Connector, Grounded		\$43.96
5/1/2023	Q0004290	McMaster-Carr S UL Class CC Time-Delay Midget Fuse		\$0.01
5/1/2023	Q0004280	McMaster-Carr S UL Class CC Time-Delay Midget Fuse		\$149.16
5/1/2023	Q0004290	McMaster-Carr S shipping		\$55.54
5/1/2023	Q0004280	McMaster-Carr S shipping		\$29.35
5/2/2023	Q0004431	Amazon Capital Tripp Lite Duplex Multimode		\$109.98
5/2/2023	Q0004431	Amazon Capital shipping		\$5.99
5/2/2023	Q0004364	W.W. Grainger I TK83560301T Sheet Stock Acrylic		\$70.68
5/2/2023	Q0004364	W.W. Grainger I shipping		\$139.00
5/3/2023	Q0004535	Amazon Capital PowerBear 4K HDMI Cable 20 ft		\$37.62
5/3/2023	Q0004473	Amazon Capital SAMSUNG 870 EVO SATA SSD		\$79.98
5/3/2023	Q0004558	Amazon Capital Tripp Lite Duplex Multimode		\$78.48
5/3/2023	Q0004558	Amazon Capital Tripp Lite Duplex Multimode		\$43.34
5/4/2023	Q0004581	Amazon Capital PowerBear 4K HDMI Cable 10 ft		\$8.95
5/5/2023	Q0004267	Amazon Capital Tripp Lite Duplex Multimode		\$76.20
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
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5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00
5/8/2023	B1905760	McMaster-Carr Supply Co.		\$0.00

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5/8/2023	B1905760	McMaster-Carr Supply Co.	\$0.00
5/10/2023	Q0005143	McMaster-Carr S Thin-Wall (EMT) Steel Conduit, Zinc	(\$8.19)
5/10/2023	Q0005105	McMaster-Carr S UL Class CC Time-Delay Midget Fuse	\$802.41
5/10/2023	Q0005105	McMaster-Carr S shipping	\$29.35
5/11/2023	Q0004173	Amazon Capital Tripp Lite Duplex Multimode	\$39.92
5/12/2023	Q0005360	Amazon Capital Tripp Lite Duplex Multimode	\$23.93
5/12/2023	Q0005391	Amazon Capital Tripp Lite Duplex Multimode	\$23.93
5/16/2023	Q0005669	Amazon Capital Tripp Lite Duplex Multimode	\$106.68
5/17/2023	B1906256	Amazon Capital Services Inc	\$0.00
5/17/2023	B1906358	W.W. Grainger Inc.	\$0.00
5/25/2023	B1906917	McMaster-Carr Supply Co.	\$0.00
5/25/2023	B1906917	McMaster-Carr Supply Co.	\$0.00
5/26/2023	Q0006645	Amazon Capital Tripp Lite Duplex Multimode	\$60.96
5/28/2023	Q0006757	Amazon Capital Tripp Lite Duplex Multimode	\$15.24
5/29/2023	B1906969	Amazon Capital Services Inc	\$0.00
5/31/2023	B1907031	Amazon Capital Services Inc	\$0.00
5/31/2023	B1907031	Amazon Capital Services Inc	\$0.00
6/2/2023	Q0007216	Amazon Capital Tripp Lite Duplex Multimode	\$15.24
6/2/2023	Q0004395	McMaster-Carr S UL Class CC Time-Delay Midget Fuse	\$8.03
6/5/2023	B1907304	Amazon Capital Services Inc	\$0.00
6/5/2023	B1907304	Amazon Capital Services Inc	\$0.00
6/5/2023	B1907304	Amazon Capital Services Inc	\$0.00
6/5/2023	B1907304	Amazon Capital Services Inc	\$0.00
6/5/2023	B1907304	Amazon Capital Services Inc	\$0.00
6/5/2023	B1907304	Amazon Capital Services Inc	\$0.00
6/12/2023	B1908209	Amazon Capital Services Inc	\$0.00
6/12/2023	B1908209	Amazon Capital Services Inc	\$0.00
6/12/2023	B1908296	McMaster-Carr Supply Co.	\$0.00
6/12/2023	Z1056782	Shipping and handling for the deliv Doc Ref:	\$41.66
6/15/2023	B1908524	Amazon Capital Services Inc	\$0.00
6/26/2023	B1909343	Amazon Capital Services Inc	\$0.00
6/28/2023	B1909665	Amazon Capital Services Inc	\$0.00
7/3/2023	B1909989	Amazon Capital Services Inc	\$0.00
7/31/2023	Q0013268	Real-Time Digit 1 x 12 Channel Analogue Input Card	\$3,493.75
7/31/2023	Q0013268	Real-Time Digit 1 x 16 Channel Analogue Output Card	\$3,493.75
7/31/2023	Q0013268	Real-Time Digit 1 x 64 Channel Digital Input Card	\$3,493.75
7/31/2023	Q0013268	Real-Time Digit 1 x 64 Channel Digital Output Cards	\$3,493.75
7/31/2023	Q0013268	Real-Time Digit 1 x GTNET Chassis (can house up to	\$2,012.40
7/31/2023	Q0013268	Real-Time Digit 1 x GTNETx2 Card including available	\$10,062.00
7/31/2023	Q0013268	Real-Time Digit 1 x GTSYNC Card	\$3,493.75
7/31/2023	Q0013268	Real-Time Digit 1 x NovaCor Chassis with 1 Enabled	\$38,962.30
7/31/2023	Q0013268	Real-Time Digit 1 x NovaCor Cubicle including power	\$6,708.00
7/31/2023	Q0013268	Real-Time Digit Shipping and insurance costs (CIP)	\$838.50
8/3/2023	Q0013268	Real-Time Digit 1 x 12 Channel Analogue Input Card	(\$3,493.75)
8/3/2023	Q0013268	Real-Time Digit 1 x 16 Channel Analogue Output Card	(\$3,493.75)
8/3/2023	Q0013268	Real-Time Digit 1 x 64 Channel Digital Input Card	(\$3,493.75)
8/3/2023	Q0013268	Real-Time Digit 1 x 64 Channel Digital Output Cards	(\$3,493.75)
8/3/2023	Q0013268	Real-Time Digit 1 x GTNET Chassis (can house up to	(\$2,012.40)
8/3/2023	Q0013268	Real-Time Digit 1 x GTNETx2 Card including available	(\$10,062.00)
8/3/2023	Q0013268	Real-Time Digit 1 x GTSYNC Card	(\$3,493.75)
8/3/2023	Q0013268	Real-Time Digit 1 x NovaCor Chassis with 1 Enabled	(\$38,962.30)
8/3/2023	Q0013268	Real-Time Digit 1 x NovaCor Cubicle including power	(\$6,708.00)
8/3/2023	Q0013268	Real-Time Digit Shipping and insurance costs (CIP)	(\$838.50)
8/3/2023	I2301621	Real-Time Digital Simulator Technol	\$76,051.95
9/27/2023	Z1062477	Livingston International. Payment f Doc Ref:	\$250.69
11/3/2023	Q0025096	McMaster-Carr S Credit memo for P0066353. See	(\$848.74)
1/3/2024	B1920258	McMaster-Carr Supply Co.	\$0.00

\$186,318.85

< \$5K Non-Capital Outlay

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E7810 <5K Technology Equip - Office/Deptl

9/20/2022	I2254047	Dell, Inc.	\$32,216.40
10/10/2022	B1893944	Dell, Inc.	\$0.00

E7815 <5K Technology Equip - Enterprise

7/28/2022	I2246129	xByte Technologies Inc	\$21,330.00
8/11/2022	B1889427	xByte Technologies Inc	\$0.00
8/15/2022	I2248790	SimplyGroup II LLC	\$9,219.55
8/17/2022	B1889605	SimplyGroup II LLC	\$0.00
12/14/2022	I2268073	Dell, Inc.	\$4,814.76
12/21/2022	B1897863	Dell, Inc.	\$0.00
1/26/2023	I2265885	CDW Computer Centers, Inc.	\$99,294.23
1/30/2023	B1900432	CDW Computer Centers, Inc.	\$0.00
2/23/2023	J1327506	MKL from E7815 to E6411 Doc Ref: I2265885	(\$99,294.23)

E7860 <5K Educational Equipment

1/29/2024	Z1068888	WLKATA. Purchase of (1) Wlkata Miro Doc Ref:	\$1,800.00
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\$69,380.71

Trustee/Benefits

E7140 Tuition and Fees - Grad Assistants

8/15/2022	J1316076	FFD1 for 142-28584	\$35.00
8/15/2022	J1316076	G1GC for 142-28584	\$786.00
8/15/2022	J1316076	T1GC for 142-28584	\$4,198.00
1/13/2023	J1325011	G2GD for V00707178	\$786.00
1/13/2023	J1325011	SHI2 for V00707178	\$1,041.00
1/13/2023	J1325011	T2GD for V00707178	\$4,198.00
1/13/2023	J1325011	VVSF for V00707178	\$100.00

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\$11,144.00

Totals for 226244

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\$382,706.18

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Index: 855910 - ISBOE IGEM HERC Secure Cyber. SUB1

Fund: 226245 - ISBOE IGEM HERC Secure Cyber. SUB1

Subcontracts

ES001 Subaward 1 Expenses

12/20/2022	I2269160	Idaho State University	\$33,172.30
1/6/2023	I2270868	Idaho State University	\$28,134.02
3/28/2023	I2283183	Idaho State University	\$367.84
4/5/2023	I2284411	Idaho State University	\$12,676.00
5/10/2023	I2289818	Idaho State University	\$3,381.00
6/23/2023	I2296833	Idaho State University	\$78,086.16
10/2/2023	I2307238	Idaho State University	\$120,617.94
5/16/2024	Q0054226	Idaho State Uni Award UA6244-855911: Period	\$9,392.49

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\$285,827.75

Totals for 226245

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\$285,827.75

Totals for UA6244

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\$668,533.93

**University of Idaho**  
**Itemized Expenditures**  
From 7/1/2023 through 11/20/2025

**Grant: UA7231 - ISBOE IGEM HERC: Secure Cyberspace**

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Index: 855888 - ISBOE IGEM HERC Secure Cyberspace  
Fund: 227231 - ISBOE IGEM HERC Secure Cyberspace

Salaries

E4108 Summer Salary

Borrelli, Robert	80 Hours	\$5,665.60
Haney, Michael	240 Hours	\$22,411.20
Kolias, Konstantinos	62.63 Hours	\$4,857.77

E4109 IA/GA Salary

Codling, Heidi	1420 Hours	\$31,708.20
Vera, Sebastian	376 Hours	\$8,238.16

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\$72,880.93

Fringe Benefits

E4280 Faculty CFR Benefit Expense	\$10,322.17
E4282 Student CFR Fringe Expense	\$932.14

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\$11,254.31

Travel

E5399 Other Employee Travel

1/13/2025	Z1088736	cables and signal processor for HE	Doc Ref:	\$2,338.75
1/13/2025	Z1088736	electronic components for research	Doc Ref:	\$519.65
1/30/2025	Z1089397	materials needed for research	Doc Ref: 41571562	\$766.15
4/14/2025	J1375552	TGT from E5399 to E5724	Doc Ref: Z1088736	(\$2,858.40)
4/14/2025	J1375558	TGT from E5399 to E5724	Doc Ref: Z1089397	(\$766.15)

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\$0.00

Operating Expenses

E5199 Other Professional Service

5/31/2024	Q0057313	System Tech., I Install fiber, and interconnect		\$3,812.85
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E5310 Technology - Services

11/28/2023	Q0027658	xByte Technolog WAR-SARNWL-3YMFHD-XB		\$2,499.00
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E5420 Non-Capital Office Equipment

2/20/2025	Z1090581	3D printers, filaments, and set up	Doc Ref:	\$2,452.01
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E5724 Research Supplies

9/8/2023	Z1061527	Lab Supplies for IGEM HERC Shooting	Doc Ref:	\$412.50
12/9/2023	Q0029482	Amazon Capital LEGO MINDSTORMS Robot Inventor		\$619.95
12/9/2023	Q0029482	Amazon Capital shipping		\$7.49
1/4/2024	B1920337	Amazon Capital Services Inc		\$0.00
1/8/2024	Q0032607	Amazon Capital 1 in x 30 ft Hook and Loop Roll		\$7.98
1/8/2024	Q0032607	Amazon Capital Gearmo USB to RS-422/485		\$23.69

1/8/2024	Q0032607	Amazon Capital	Scissors Set of 6-Pack, 8" Scissors All	\$9.77
1/8/2024	Q0032607	Amazon Capital	USB 3.0 HDMI KVM Switch, 4 Ports	\$60.99
1/8/2024	Q0032607	Amazon Capital	USB to Serial RS-232 Adapter with	\$21.94
1/9/2024	Q0032632	Amazon Capital	Cable Matters USB to RJ45 Serial	\$67.40
1/9/2024	Q0032632	Amazon Capital	Gearmo Pro 5ft. USB to RS-485/422	\$24.24
1/18/2024	Q0034068	Amazon Capital	ECSiNG 15 Sets PCB DIN C45 Rail	\$14.89
1/18/2024	Q0033962	Amazon Capital	Prime-Line 9076244 Wing Nuts, Cold-	\$29.37
1/19/2024	Q0034154	Amazon Capital	VIVO Black Universal TV Stand for 32	\$75.60
1/20/2024	Q0034450	Amazon Capital	DIN Rail Mount Bracket for Raspberry	\$410.16
1/20/2024	Q0034454	Amazon Capital	ECSiNG 15 Sets PCB DIN C45 Rail	\$44.67
1/20/2024	Q0034450	Amazon Capital	VIVO Black Universal TV Stand for 32	\$75.60
1/22/2024	Q0034794	Amazon Capital	VIVO Black Universal TV Stand for 32	\$50.40
1/23/2024	Q0034872	Amazon Capital	VIVO Black Universal TV Stand for 32	\$50.40
1/29/2024	B1922384	Amazon Capital Services Inc		\$0.00
1/29/2024	B1922384	Amazon Capital Services Inc		\$0.00
1/29/2024	B1922384	Amazon Capital Services Inc		\$0.00
1/29/2024	B1922384	Amazon Capital Services Inc		\$0.00
1/29/2024	B1922384	Amazon Capital Services Inc		\$0.00
1/29/2024	B1922384	Amazon Capital Services Inc		\$0.00
2/2/2024	Q0036529	Amazon Capital	Tripp Lite ISOBAR8ULTRA Isobar 8	\$476.16
2/3/2024	Q0036560	Amazon Capital	ASUS ZenScreen Touch Screen	\$1,030.02
2/3/2024	Q0036585	Amazon Capital	Brother Genuine P-Touch TZE-131	\$22.00
2/3/2024	Q0036585	Amazon Capital	Cables Direct Online Grey 20ft Cat6	\$7.50
2/3/2024	Q0036585	Amazon Capital	Coolwell RGB Full-Color LED Matrix	\$38.50
2/3/2024	Q0036585	Amazon Capital	Logitech K400 Plus Wireless Touch	\$72.00
2/3/2024	Q0036585	Amazon Capital	NETGEAR 5 Port PoE Gigabit	\$699.90
2/3/2024	Q0036585	Amazon Capital	PowerBear 4K HDMI Cable 10 ft	\$7.19
2/3/2024	Q0036585	Amazon Capital	Seadream High Speed Micro HDMI	\$32.36
2/3/2024	Q0036585	Amazon Capital	TEKTON Everybit Ratchet	\$35.00
2/3/2024	Q0036585	Amazon Capital	TEKTON Everybit Tech Rescue Kit	\$24.00
2/3/2024	Q0036556	Amazon Capital	Tripp Lite ISOBAR8ULTRA Isobar 8	\$317.44
2/3/2024	Q0036585	Amazon Capital	Tripp Lite Isobar 8 Outlet Surge	\$102.99
2/7/2024	B1922939	Amazon Capital Services Inc		\$0.00
2/7/2024	B1922939	Amazon Capital Services Inc		\$0.00
2/8/2024	B1923125	Amazon Capital Services Inc		\$0.00
2/9/2024	Q0036091	Amazon Capital	ASUS ZenScreen Touch Screen	\$1,030.02
2/9/2024	Q0036090	Amazon Capital	ASUS ZenScreen Touch Screen	\$1,030.02
2/9/2024	Q0036089	Amazon Capital	ASUS ZenScreen Touch Screen	\$1,030.02
2/9/2024	Q0036088	Amazon Capital	ASUS ZenScreen Touch Screen	\$1,030.02
2/9/2024	Q0036087	Amazon Capital	ASUS ZenScreen Touch Screen	\$686.68
2/9/2024	Q0036086	Amazon Capital	ASUS ZenScreen Touch Screen	\$1,030.02
2/10/2024	Q0037899	Amazon Capital	DIYables LED Traffic Light Module for	\$9.99
2/10/2024	Q0037908	Amazon Capital	Rapid Care First Aid 80095 4 Shelf	\$139.98
2/10/2024	Q0037896	Amazon Capital	StarTech.com Anti-Static Mat - 25" x	\$277.80
2/11/2024	Q0037911	Amazon Capital	Amazon Basics 48-Pack AA Alkaline	\$13.43
2/11/2024	Q0037914	Amazon Capital	Arduino Uno REV3 [A000066]	\$297.55
2/11/2024	Q0037914	Amazon Capital	Assurance Designed Black Grounding	\$83.94
2/11/2024	Q0037910	Amazon Capital	Chanzon 40pcs 30cm Long Female to	\$6.99
2/11/2024	Q0037911	Amazon Capital	Klein Tools 32717 Precision	\$332.64
2/11/2024	Q0037914	Amazon Capital	Raspberry Pi 3 Model B+ Board (3B+)	\$49.91
2/12/2024	B1923222	Amazon Capital Services Inc		\$0.00
2/12/2024	B1923222	Amazon Capital Services Inc		\$0.00
2/12/2024	B1923222	Amazon Capital Services Inc		\$0.00
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2/12/2024	B1923222	Amazon Capital Services Inc		\$0.00
2/21/2024	B1923639	Amazon Capital Services Inc		\$0.00

2/21/2024	B1923639	Amazon Capital Services Inc	\$0.00
2/21/2024	B1923639	Amazon Capital Services Inc	\$0.00
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2/21/2024	B1923639	Amazon Capital Services Inc	\$0.00
2/21/2024	B1923639	Amazon Capital Services Inc	\$0.00
2/21/2024	Z1070178	CaseCruzer INV #148348 for Dr. Micha Doc Ref:	\$2,459.40
2/21/2024	Z1070178	CaseCruzer INV #148349 for Dr. Micha Doc Ref:	\$2,398.66
2/21/2024	Q0039406	Pi Shop Inc Full sized breadboard – 830 points	\$119.00
2/21/2024	Q0039406	Pi Shop Inc Micro-HDMI to HDMI cable for Pi 4, 3ft,	\$99.00
2/21/2024	Q0039406	Pi Shop Inc Raspberry Pi 27W USB-C Power Supply	\$326.40
2/21/2024	Q0039406	Pi Shop Inc Raspberry Pi 3 T-Cobbler Breakout Kit	\$179.00
2/21/2024	Q0039406	Pi Shop Inc Raspberry Pi 5/8GB	\$1,920.00
2/21/2024	Q0039406	Pi Shop Inc Raspberry Pi Case for Pi 5 Black/Grey	\$400.00
2/21/2024	Q0039406	Pi Shop Inc Shipping	\$39.44
2/21/2024	Q0039406	Pi Shop Inc Type-C Power Switch for Raspberry Pi 4	\$99.00
2/21/2024	Q0039406	Pi Shop Inc USB Micro SD Card Reader - Black	\$59.00
2/21/2024	Q0039406	Pi Shop Inc microSD Card With Raspberry Pi	\$299.00
2/22/2024	B1923825	Amazon Capital Services Inc	\$0.00
2/26/2024	B1923880	Amazon Capital Services Inc	\$0.00
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2/29/2024	!0536108	Pi Shop Inc	\$0.00
2/29/2024	!0536108	Pi Shop Inc	\$0.00
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2/29/2024	!0536108	Pi Shop Inc	\$0.00
3/4/2024	B1924268	Amazon Capital Services Inc	\$0.00
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3/4/2024	B1924268	Amazon Capital Services Inc	\$0.00
3/4/2024	B1924268	Amazon Capital Services Inc	\$0.00
3/15/2024	Q0040872	Amazon Capital Klein Tools MM325 Multimeter, Digital	\$419.64
3/15/2024	Q0040872	Amazon Capital OneLeaf 120PCS Cord Organizer 6 x	\$9.53
3/15/2024	Q0040732	Amazon Capital Antrader Breadboard Jumper Wires	\$5.49
3/15/2024	Q0040732	Amazon Capital Elastic Band for Sewing, 2 Inch x 12	\$7.09
3/15/2024	Q0040732	Amazon Capital GearIT Cat 6 Ethernet Cable 1 ft (24-	\$36.61
3/15/2024	Q0040732	Amazon Capital GearIT Cat 6 Ethernet Cable 2 ft (24-	\$43.54
3/15/2024	Q0040732	Amazon Capital GearIT Cat 6 Ethernet Cable 3 ft (24-	\$46.51
3/15/2024	Q0040732	Amazon Capital Lichamp 10-Pack Colored Electrical	\$19.79

3/15/2024	Q0040732	Amazon Capital	Screen Cleaner Spray - TV Screen	\$9.99
3/15/2024	Q0040732	Amazon Capital	Tripp Lite ISOBAR8ULTRA Isobar 8	\$83.74
3/15/2024	Q0040579	Amazon Capital	MEAN WELL Ultra Slim Step-Shape	\$120.70
3/15/2024	Q0040579	Amazon Capital	shipping	\$3.53
3/18/2024	B1925045	Amazon Capital Services Inc		\$0.00
3/20/2024	!0537692	Amazon Capital Services Inc		\$0.00
3/20/2024	!0537692	Amazon Capital Services Inc		\$0.00
3/20/2024	!0537692	Amazon Capital Services Inc		\$0.00
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3/26/2024	Q0045250	Amazon Capital	Cherry Stream Keyboard TKL Wired	\$79.96
3/26/2024	Q0045282	Amazon Capital	Cherry Stream Keyboard TKL Wired	\$319.84
3/26/2024	Q0045271	Amazon Capital	Gloreen Clear Storage Bin, 16 Quart	\$92.97
3/26/2024	Q0045250	Amazon Capital	Gloreen Clear Storage Bin, 16 Quart	\$30.99
3/26/2024	Q0045265	Amazon Capital	Gloreen Clear Storage Bin, 16 Quart	\$92.97
3/26/2024	Q0045269	Amazon Capital	Gloreen Clear Storage Bin, 16 Quart	\$92.97
3/27/2024	Q0045306	Amazon Capital	LUBAN Led Signal Tower Stack	\$19.28
3/28/2024	Q0045650	Amazon Capital	LUBAN Led Signal Tower Stack	\$38.56
3/28/2024	Q0045649	Amazon Capital	LUBAN Led Signal Tower Stack	\$38.56
3/30/2024	Q0045987	Amazon Capital	LUBAN Led Signal Tower Stack	\$38.56
4/4/2024	Z1072456		Bought for research purposes. Inclu Doc Ref:	\$128.19
4/4/2024	Z1072456		Sales tax returned. Sales tax had b Doc Ref:	(\$7.80)
4/4/2024	Z1072456		Supplies for research purposes. Inc Doc Ref:	\$9.53
4/15/2024	!0539997	Amazon Capital Services Inc		\$0.00
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4/17/2024	!0540186	Amazon Capital Services Inc		\$0.00
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4/17/2024	!0540186	Amazon Capital Services Inc		\$0.00
4/17/2024	!0540186	Amazon Capital Services Inc		\$0.00
4/22/2024	!0540576	Amazon Capital Services Inc		\$0.00
5/12/2024	Q0053568	Amazon Capital	Seadream High Speed Micro HDMI	\$97.08
6/3/2024	!0544922	Amazon Capital Services Inc		\$0.00
6/5/2024	Q0050713	Amazon Capital	Seadream High Speed Micro HDMI	\$64.72
6/5/2024	Q0050327	Amazon Capital	Cuberspeed Moyu rs3m Maglev 2021	\$109.80
6/5/2024	Q0050338	Amazon Capital	ELOGGAA 120Pcs 20cm(7.9inch)	\$20.94
6/5/2024	Q0050231	Amazon Capital	CanaKit 3.5A Raspberry Pi 4 Power	\$79.92
6/5/2024	Q0050231	Amazon Capital	DARKROCK 3-Pack 120mm Black	\$8.99
6/5/2024	!0545406	Amazon Capital Services Inc		\$0.00
6/5/2024	!0545406	Amazon Capital Services Inc		\$0.00
6/5/2024	!0545406	Amazon Capital Services Inc		\$0.00
6/5/2024	!0545406	Amazon Capital Services Inc		\$0.00
6/5/2024	!0545406	Amazon Capital Services Inc		\$0.00
11/14/2024	Q0085591	Amazon Capital	150PCS Reusable Fastener Straps - 6	\$10.78
11/14/2024	Q0085589	Amazon Capital	Anker Cable Management, Magnetic	\$61.25
11/14/2024	Q0085722	Amazon Capital	HUASAI 4/5" 100 Pack Zip Tie Mount	\$17.98
11/14/2024	Q0085722	Amazon Capital	LX IntMfr. Hook and Loop Cable Ties,	\$75.60
11/14/2024	Q0085648	Amazon Capital	Secure 1 Inch Black Polyethylene	\$52.39
11/14/2024	Q0085589	Amazon Capital	Spiral Cable Wrap -20 Ft 1/2" Cable	\$6.99
11/14/2024	Q0085589	Amazon Capital	VELCRO Brand Mountable Cable	\$33.88

11/25/2024	Q0087672	Amazon Capital	4 AWG Gauge Wire (25ft) Black	\$64.87
11/25/2024	Q0087672	Amazon Capital	Unslotted Hex Washer Head Sheet	\$125.67
11/26/2024	Q0087692	Amazon Capital	Blue Sea Systems 5129 Fuse ANL	\$24.41
11/26/2024	Q0087693	Amazon Capital	Blue Sea Systems 5125 ANL Fuse -	\$39.50
11/26/2024	Q0087693	Amazon Capital	Fiberglass Roller Tools Kit, 3pcs	\$11.19
11/26/2024	Q0087693	Amazon Capital	SAMSUNG 990 PRO SSD NVMe M.2	\$159.99
11/26/2024	Q0087699	Amazon Capital	Metoro Steel 18 gauge Metal Plate.	\$221.88
11/26/2024	Q0087682	Amazon Capital	Blue Sea Systems 5131 Fuse ANL	\$46.34
11/26/2024	Q0087682	Amazon Capital	OFC Black 1/0 AWG Gauge Wire	\$142.87
11/26/2024	Q0087690	Amazon Capital	8 Gauge Wire - 25ft Black   8 Gauge	\$28.87
11/26/2024	Q0087690	Amazon Capital	Grade 5 Hex Cap Bolts Screws, Nuts,	\$89.72
11/26/2024	Q0087694	Amazon Capital	1/0 AWG Gauge Wire (25ft) Red	\$142.87
11/26/2024	Q0087694	Amazon Capital	Corsair TM30 Performance Thermal	\$7.99
11/26/2024	Q0087935	Amazon Capital	#6#8#10 Phillips Pan Head Machine	\$262.42
11/26/2024	Q0087935	Amazon Capital	Blue Sea Systems 5122 Fuse ANL 50-	\$20.82
11/26/2024	Q0087935	Amazon Capital	SIMPLYHARDWARE 1708 Fiberglass	\$41.95
11/26/2024	Q0087917	Amazon Capital	Durham 305B-95 Cold Rolled Steel	\$159.99
11/26/2024	Q0087920	Amazon Capital	Durham 102-95-IND Gray Cold Rolled	\$178.65
11/26/2024	Q0087923	Amazon Capital	Astro Pneumatic Tool 1442 13" Hand	\$83.42
11/26/2024	Q0087947	Amazon Capital	Blue Sea Systems 5122 Fuse ANL 50-	\$20.82
11/26/2024	Q0087941	Amazon Capital	Elgato Stream Deck +, Audio Mixer,	\$167.20
11/26/2024	Q0087941	Amazon Capital	Official Creality PETG 3D Printer	\$12.99
11/26/2024	Q0087942	Amazon Capital	Official Creality PETG 3D Printer	\$27.53
11/26/2024	Q0087942	Amazon Capital	Official Creality PETG 3D Printer	\$12.99
11/26/2024	Q0087941	Amazon Capital	Polymaker ABS Filament 1.75mm	\$37.38
11/26/2024	Q0087941	Amazon Capital	Polymaker ABS Filament 1.75mm	\$19.54
11/26/2024	Q0087942	Amazon Capital	Polymaker ABS Filament 1.75mm	\$37.38
11/26/2024	Q0087947	Amazon Capital	SVAAR 34pcs Battery Cable Lugs kit	\$26.99
11/26/2024	Q0087939	Amazon Capital	SVAAR 4 6 8 AWG Battery Lug	\$26.99
11/27/2024	Q0087970	Amazon Capital	8 Gauge Wire - 25ft Red   8 Gauge	\$28.87
11/27/2024	Q0087970	Amazon Capital	ALEKOR 10 Sizes 505 Pieces Large	\$29.99
11/27/2024	Q0087972	Amazon Capital	Blue Sea Systems 5122 Fuse ANL 50-	\$20.82
11/27/2024	Q0087972	Amazon Capital	Cooler Master MWE Gold 1050 V2	\$159.99
11/27/2024	Q0088129	Amazon Capital	Antec C8 Curve Wood, Fans not	\$149.99
11/28/2024	Q0088151	Amazon Capital	ASUS ROG Ryujin III 360 ARGB All-in-	\$349.99
11/28/2024	Q0088153	Amazon Capital	The Original Rhino Strong Commercial	\$19.95
11/29/2024	Q0088197	Amazon Capital	1" (0.944") Clear Acrylic 24"x12"	\$71.53
11/29/2024	Q0088160	Amazon Capital	TotalBoat 5:1 Epoxy Resin Kit	\$154.99
11/29/2024	Q0088191	Amazon Capital	ASUS TUF Gaming GeForce RTX™	\$2,204.57
11/30/2024	Q0088209	Amazon Capital	Inch 18-8 Stainless Steel Allen	\$143.06
11/30/2024	Q0088204	Amazon Capital	Inch 18-8 Stainless Steel Allen	\$158.09
11/30/2024	Q0088209	Amazon Capital	Screw Bolt Nut Thread Measure	\$10.28
11/30/2024	Q0088204	Amazon Capital	Trivd Frol Rivet Nut Tool Kit, 520pcs	\$64.77
12/1/2024	Q0088224	Amazon Capital	1" (0.944") Clear Acrylic 12"x12"	\$84.26
12/1/2024	Q0088406	Amazon Capital	AMD Ryzen 9 7950X 16-Core, 32-	\$466.99
12/1/2024	Q0088413	Amazon Capital	Blue Sea Systems 5005 ANL Fuse	\$52.70
12/1/2024	Q0088408	Amazon Capital	Blue Sea Systems 5164 ANL 35 AMP	\$62.73
12/1/2024	Q0088307	Amazon Capital	Blue Sea Systems 5164 ANL 35 AMP	\$41.82
12/1/2024	Q0088412	Amazon Capital	FLASHFORGE PLA Filament 1.75mm,	\$15.83
12/1/2024	Q0088406	Amazon Capital	G.SKILL Trident Z5 Neo RGB Series	\$435.96
12/1/2024	Q0088406	Amazon Capital	Metric Class 10.9 Hex Cap Screws	\$122.50
12/1/2024	Q0088409	Amazon Capital	OFC 4 AWG Gauge Wire (25ft) Red	\$64.87
12/1/2024	Q0088223	Amazon Capital	Official Creality PETG 3D Printer	\$25.98
12/1/2024	Q0088405	Amazon Capital	SELTERM Large Size Marine Grade	\$15.99
12/3/2024	Q0088623	Amazon Capital	XINGYHENG 20 Pairs Male Female	\$38.97
12/3/2024	Q0088653	Amazon Capital	CrocSee 25ft - 1/2 inch Braided	\$12.79
12/3/2024	Q0088653	Amazon Capital	uxcell Silicone RCA Port Anti-Dust	\$9.39





12/26/2024	!0566079	Amazon Capital Services Inc	\$0.00
12/26/2024	!0566079	Amazon Capital Services Inc	\$0.00
12/26/2024	!0566079	Amazon Capital Services Inc	\$0.00
12/26/2024	!0566079	Amazon Capital Services Inc	\$0.00
12/26/2024	!0566079	Amazon Capital Services Inc	\$0.00
12/26/2024	Q0092201	Amazon Capital EMK 90 Degree Toslink Optical Cable	\$23.98
12/26/2024	Q0092201	Amazon Capital EMK 90 Degree Toslink Optical Cable	\$75.54
12/27/2024	!0566146	Amazon Capital Services Inc	\$0.00
12/27/2024	Q0092218	Amazon Capital EMK 90 Degree Toslink Optical Cable	\$23.98
12/28/2024	Q0092294	Amazon Capital CESS-075-1f Heavy Duty Waterproof	\$47.96
12/28/2024	Q0092294	Amazon Capital miniDSP, UMIK-2 USB Reference	\$239.95
12/28/2024	Q0092297	Amazon Capital Bangun 0.2m (7 inch) Short Optical	\$53.94
12/28/2024	Q0092300	Amazon Capital Fosi Audio BT20A Pro Bluetooth 5.0	\$99.99
12/28/2024	Q0092302	Amazon Capital S.M.S.L A100 Bluetooth 5.0 Stereo	\$92.99
12/28/2024	Q0092304	Amazon Capital CESS-075-6i Heavy Duty Waterproof	\$42.76
12/30/2024	!0566186	Amazon Capital Services Inc	\$0.00
12/30/2024	!0566186	Amazon Capital Services Inc	\$0.00
12/30/2024	Q0092325	Amazon Capital CESS-075-3f Heavy Duty Waterproof	\$59.96
1/15/2025	!0570069	Amazon Capital Services Inc	\$0.00
1/15/2025	!0570069	Amazon Capital Services Inc	\$0.00
1/16/2025	!0570148	Amazon Capital Services Inc	\$0.00
1/17/2025	!0570496	Amazon Capital Services Inc	\$0.00
1/17/2025	!0570496	Amazon Capital Services Inc	\$0.00
1/17/2025	!0570496	Amazon Capital Services Inc	\$0.00
1/17/2025	!0570496	Amazon Capital Services Inc	\$0.00
1/17/2025	!0570496	Amazon Capital Services Inc	\$0.00
1/17/2025	!0570496	Amazon Capital Services Inc	\$0.00
1/20/2025	!0570548	Amazon Capital Services Inc	\$0.00
1/20/2025	!0570548	Amazon Capital Services Inc	\$0.00
1/27/2025	Z1089276	Research supplies Doc Ref: 42216641	\$145.90
1/27/2025	Z1089276	Research supplies Doc Ref: 42216641	\$375.46
3/24/2025	Q0100801	Amazon Capital EMK 90 Degree Toslink Optical Cable	(\$11.99)
3/24/2025	Q0100794	Amazon Capital EMK 90 Degree Toslink Optical Cable	(\$23.98)
3/24/2025	Q0100800	Amazon Capital EMK 90 Degree Toslink Optical Cable	(\$11.99)
3/24/2025	Q0100798	Amazon Capital EMK 90 Degree Toslink Optical Cable	(\$50.36)
3/24/2025	Q0100795	Amazon Capital EMK 90 Degree Toslink Optical Cable	(\$25.18)
3/24/2025	!0576596	Amazon Capital Services Inc	\$0.00
3/24/2025	!0576596	Amazon Capital Services Inc	\$0.00
3/24/2025	!0576596	Amazon Capital Services Inc	\$0.00
3/24/2025	!0576596	Amazon Capital Services Inc	\$0.00
3/24/2025	!0576596	Amazon Capital Services Inc	\$0.00
4/2/2025	Q0100784	Amazon Capital CESS-075-1f Heavy Duty Waterproof	(\$47.96)
4/2/2025	Q0100784	Amazon Capital miniDSP, UMIK-2 USB Reference	(\$239.95)
4/2/2025	!0577713	Amazon Capital Services Inc	\$0.00
4/2/2025	!0577713	Amazon Capital Services Inc	\$0.00
4/14/2025	J1375552	TGT from E5399 to E5724 Doc Ref: Z1088736	\$2,858.40
4/14/2025	J1375558	TGT from E5399 to E5724 Doc Ref: Z1089397	\$766.15

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\$52,479.91

\$5K or > Capital Outlay

E6499 >5K Computer Equipment Other

11/21/2023	Q0027202	xByte Technolog Dell PowerEdge T630 Server	\$10,602.00
11/21/2023	Q0027202	xByte Technolog Shipping	\$235.00
11/27/2023	Q0027604	CDW Computer Ce DELL CTO PE MX750C 2X6334	\$12,998.26
11/30/2023	Q0028033	xByte Technolog Dell PowerEdge M640 Blade Server	\$20,890.00
11/30/2023	Q0028033	xByte Technolog Shipping	\$350.00
12/6/2023	B1919190	xByte Technologies Inc	\$0.00



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10/30/2023	!0522620	Workspace Development LLC	\$0.00
			<hr/>
			\$65,392.04

Trustee/Benefits

E7140 Tuition and Fees - Grad Assistants

8/22/2023	J1339578	AWA3 for V01263740	\$35.00
8/22/2023	J1339578	G1GC for V01263740	\$866.00
8/22/2023	J1339578	SHI1 for V01263740	\$1,080.00
8/22/2023	J1339578	T1GC for V01263740	\$4,408.00
1/24/2024	J1348081	FFD2 for V01263740	\$35.00
1/24/2024	J1348081	G2GC for V01263740	\$866.00
1/24/2024	J1348240	G2GD for V00950449	\$866.00
1/24/2024	J1348081	MG2T for V01263740	\$105.00
1/24/2024	J1348240	SHI2 for V00950449	\$1,080.00
1/24/2024	J1348081	SHI2 for V01263740	\$1,080.00
1/24/2024	J1348081	T2GC for V01263740	\$4,408.00
1/24/2024	J1348240	T2GD for V00950449	\$4,408.00
2/27/2024	J1350098	FFD2 for V00950449	\$35.00
5/24/2024	J1354661	G3HC for V01263740	\$288.00
5/24/2024	J1354661	KCP3 for V01263740	\$105.00
5/24/2024	J1354661	T3HC for V01263740	\$1,470.00
9/3/2024	J1362395	FFD1 for V01263740	\$140.00
			<hr/>
			\$21,275.00

Totals for 227231

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 \$400,448.29

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Index: 855887 - ISBOE IGEM HERC Secure Cyber. SUB1  
Fund: 227287 - ISBOE IGEM HERC Cyberspace-ISU Sub

Subcontracts

ES001 Subaward 1 Expenses

5/9/2024	Q0053233	Idaho State Uni Award UA7231-855887: Period	\$1,000.52
5/9/2024	Q0053234	Idaho State Uni Award UA7231-855887: Period	\$12,165.44
5/9/2024	Q0053232	Idaho State Uni Award UA7231-855887: Period	\$745.45
5/23/2024	Q0055838	Idaho State Uni Award UA7231-855887: Period	\$4,384.40
6/30/2024	Q0064609	Idaho State Uni Award UA7231-855887: Period	\$178,090.00
7/31/2024	Q0067495	Idaho State Uni Award UA7231-855887: Period	\$4,732.46
3/4/2025	Q0102163	Idaho State Uni Salary and fringe for Award UA7231-	\$2,721.25
3/18/2025	Q0104454	Idaho State Uni Award UA7231-855887 payment for	\$12,929.82
3/19/2025	Q0104713	Idaho State Uni Award UA7231-855887 salary and	\$383.53
3/19/2025	Q0104716	Idaho State Uni Award UA7231-855887, period from	\$51,168.51
5/1/2025	Q0112519	Idaho State Uni salary, fringe and materials for Award	\$12,251.32
6/17/2025	Q0120973	Idaho State Uni salary, fringe and materials for Award	\$7,996.00
6/30/2025	Q0122944	Idaho State Uni salary, fringe, and other expenses for	\$135,180.06
			\$423,748.76
Totals for 227287			\$423,748.76
Totals for UA7231			\$824,197.05

**University of Idaho**  
**Itemized Expenditures**  
From 7/1/2024 through 11/20/2025

**Grant: UA8090 - ISBOE IGEM HERC: Secu Cybersp FY25**

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Index: 855871 - ISBOE IGEM HERC: Secu Cybersp FY25  
Fund: 228090 - ISBOE IGEM HERC: Secu Cybersp FY25

Salaries

E4108 Summer Salary

Borrelli, Robert	160 Hours	\$11,584.00
Kolias, Konstantinos	200 Hours	\$14,400.00

E4109 IA/GA Salary

Berhanu, Tollan	352 Hours	\$8,800.00
Tadele, Henok	736 Hours	\$17,222.40

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\$52,006.40

Temporary Help

E4135 Temporary Student

Berhanu, Tollan	210 Hours	\$5,250.00
Li, Longze	160 Hours	\$3,840.00

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\$9,090.00

Fringe Benefits

E4280 Faculty CFR Benefit Expense	\$7,920.12
E4282 Student CFR Fringe Expense	\$805.93

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\$8,726.05

Travel

E5365 Personal Vehicle - Out-of-State

6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$27.71
6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$27.87

E5368 Rental Vehicles - Out-of-State

6/27/2025	Z1099154	Car Rental Fuel 06052025 Doc Ref: 45155981	\$26.82
6/27/2025	Z1099154	JacobT 155981 Enterprise. car renta Doc Ref:	\$336.79

E5381 Airfare - Out-of-State

6/5/2025	Z1097049	TJacobsen 605873 American Air trave Doc Ref:	\$373.37
8/18/2025	Z1101249	JacobT 189606 Enterprise. Toll whil Doc Ref:	\$5.80
8/18/2025	Z1101249	TJacobsen 189606 Enterprise Rent a Doc Ref:	\$25.87
10/16/2025	Z1103875	TJacobsen 728740 American Airlines. Doc Ref:	\$660.36

E5397 Lodging & Per Diem – Out of State

6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$60.00
6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$80.00
6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$80.00
6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$80.00
6/27/2025	I2339826	Jacobsen, Thomas Arley.	\$47.00

6/27/2025	I2339826	Jacobsen, Thomas Arley.		\$80.00
6/27/2025	Z1099154	JacobT 155981 Aloft. Hotel accommod	Doc Ref:	\$122.00
6/27/2025	Z1099154	JacobT 155981 Courtyard. Hotel stay	Doc Ref:	\$144.00
6/27/2025	Z1099154	JacobT 155981 Fairfield. City tax f	Doc Ref:	\$1.26
6/27/2025	Z1099154	JacobT 155981 Fairfield. Hotel acco	Doc Ref:	\$126.00
6/27/2025	Z1099154	JacobT 155981 Fairfield. Hotel acco	Doc Ref:	\$122.00
6/27/2025	Z1099154	JacobT 155981 Fairfield. Room tax f	Doc Ref:	\$8.82
6/27/2025	Z1099154	JacobT 155981 Fairfield. Room tax f	Doc Ref:	\$1.26
6/27/2025	Z1099154	JacobT 155981 Fairfield. Room tax f	Doc Ref:	\$8.82
6/27/2025	Z1099154	JacobT 155981 Fairfield. Room tax f	Doc Ref:	\$126.00
				<hr/>
				\$2,571.75

Operating Expenses

E5020 Postage & Mailing

7/30/2025	TC073025	TDX455028 Ship to CDA		\$53.17
8/14/2025	TC081425	TDX455031 Ship to CDA		\$29.49

E5560 Technology - Supplies

5/27/2025	Q0117097	Amazon Capital FLASHFORGE 3D Printer Filament,		\$119.94
5/27/2025	Q0117097	Amazon Capital FLASHFORGE 3D Printer Filament,		\$41.70
6/16/2025	!0584779	Amazon Capital Services Inc		\$0.00
6/16/2025	!0584779	Amazon Capital Services Inc		\$0.00

E5710 Tools

5/28/2025	Q0117256	Amazon Capital Ball End Hex Bit Set - Railer 2 Inch		\$19.99
5/28/2025	Q0117256	Amazon Capital M12 Fuel 12V 1/4" Lithium-ion		\$162.50
5/29/2025	Q0117491	Amazon Capital 3D Printer Tool Kit Essential 3D		\$41.99
5/29/2025	Q0117491	Amazon Capital Gonex 3600 Tackle Trays 4 Packs,		\$23.74
6/17/2025	!0584854	Amazon Capital Services Inc		\$0.00
6/17/2025	!0584854	Amazon Capital Services Inc		\$0.00
6/18/2025	!0585139	Amazon Capital Services Inc		\$0.00
6/18/2025	!0585139	Amazon Capital Services Inc		\$0.00

E5720 Educational Supplies

6/23/2025	Z1098349	JacobT 308552 Alphagraphics. Educat	Doc Ref:	\$15.85
6/27/2025	Z1099155	JacobT 260568 Bambulab. 3D printer	Doc Ref:	\$987.94
6/27/2025	Z1099155	JacobT 260568 SparkFun. Robotic com	Doc Ref:	\$541.50
6/27/2025	Z1099155	JacobT 260568 SparkFun. Robotic com	Doc Ref:	\$551.00
8/5/2025	Z1100742	JacobT 747607 HighCountryGlass. Ple	Doc Ref:	\$140.00
9/2/2025	Q0133246	Amazon Capital 3D Printing GT2 Timing Belt, Zeelo		\$90.93
9/2/2025	Q0133346	Amazon Capital [2025 Special Bundle]SUNLU Official		\$134.99
9/2/2025	Q0133380	Amazon Capital 1000 Pcs White Zip Ties, 6 Inch		\$16.96
9/2/2025	Q0133380	Amazon Capital 3D Printing GT2 Timing Belt, Zeelo		\$77.94
9/2/2025	Q0133390	Amazon Capital 3D Printing GT2 Timing Belt, Zeelo		\$90.93
9/2/2025	Q0133380	Amazon Capital BNUOK 180pcs M3 x 25mm Hex		\$9.49
9/2/2025	Q0133390	Amazon Capital BNUOK 180pcs M3 x 25mm Hex		\$37.96
9/2/2025	Q0133386	Amazon Capital GBA-SZC GT2 Idler Pulley 16 Teeth		\$23.96
9/2/2025	Q0133378	Amazon Capital GBA-SZC GT2 Idler Pulley 16 Teeth		\$11.98
9/2/2025	Q0133380	Amazon Capital Gonex 3600 Tackle Trays 4 Packs,		\$25.64
9/2/2025	Q0133390	Amazon Capital LeTaoXing 9V 5A Power Adapter		\$158.40
9/2/2025	Q0133380	Amazon Capital LeTaoXing 9V 5A Power Adapter		\$17.60
9/2/2025	Q0133380	Amazon Capital SUNLU Official Filament Connector,		\$38.24
9/2/2025	Q0133380	Amazon Capital WWZMDiB 5 Pcs DS18B20		\$9.99
9/2/2025	Q0133378	Amazon Capital XIKE 10 Pcs 6701-2RS Bearings		\$17.98
9/4/2025	Q0133769	Amazon Capital 180Pcs M3x8mm Hex Socket Head		\$11.98
9/4/2025	Q0133776	Amazon Capital 180Pcs M3x8mm Hex Socket Head		\$23.96
9/4/2025	Q0133777	Amazon Capital 180Pcs M3x8mm Hex Socket Head		\$17.97
9/4/2025	Q0133778	Amazon Capital 180Pcs M3x8mm Hex Socket Head		\$23.96





5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/26/2025	!0582890	Amazon Capital Services Inc	\$0.00
5/27/2025	!0582941	Amazon Capital Services Inc	\$0.00
5/27/2025	!0582941	Amazon Capital Services Inc	\$0.00
5/30/2025	B1951216	Home Depot Pro	\$0.00
6/10/2025	B1951705	Home Depot Pro	\$0.00
6/11/2025	Q0119924	Amazon Capital XOOOL 62 in 1 Precision Screwdriver	\$12.58
6/12/2025	Q0120256	Amazon Capital Gonex 3600 Tackle Trays 4 Packs,	\$25.64
6/12/2025	Q0120256	Amazon Capital Stemedu 5PCS Capacitive Analog Soil	\$8.46
6/16/2025	Q0120945	Amazon Capital 9V 5A Power Supply, COOLM 9V 5A	\$159.00
6/16/2025	Q0120941	Amazon Capital BZ 3D GT2 Idler Pulley 16 Teeth	\$43.92
6/16/2025	Q0120946	Amazon Capital Railer 20pc Screwdriver Bit Set -	\$18.50
6/16/2025	Q0120946	Amazon Capital Stemedu 5PCS Capacitive Analog Soil	\$33.84
6/18/2025	Q0121414	Amazon Capital Railer Allen Wrench Hex Bit Set 2	\$18.50
6/18/2025	Q0121414	Amazon Capital Stemedu 5PCS Capacitive Analog Soil	\$42.30
7/1/2025	!0586250	Amazon Capital Services Inc	\$0.00
7/2/2025	!0586493	Amazon Capital Services Inc	\$0.00
7/2/2025	!0586493	Amazon Capital Services Inc	\$0.00
7/7/2025	!0586646	Amazon Capital Services Inc	\$0.00
7/7/2025	!0586646	Amazon Capital Services Inc	\$0.00
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7/7/2025	!0586646	Amazon Capital Services Inc	\$0.00
7/7/2025	!0586646	Amazon Capital Services Inc	\$0.00
7/8/2025	!0586704	Amazon Capital Services Inc	\$0.00
7/8/2025	!0586704	Amazon Capital Services Inc	\$0.00
E5747 Safety Supplies			
10/8/2025	Z1103230	Robot safety supplies. Doc Ref: 47071478	\$2,345.00
E5799 Other Insurance			
8/14/2025	TC081425	TDX455031 3-4yr wrnty	\$327.00
			<hr/>
			\$8,723.53
\$5K or > Capital Outlay			
E6410 >5K Technology Equip - Office/Deptl			
9/19/2025	J1386388	TDX467700 8-M3 Ultra+16-M4 Max kjw	\$160,536.00
E6520 >5K Educational Equipment			
10/17/2025	Q0141275	Mouser Electron Diligent Programmable Logic IC	\$2,990.00
10/17/2025	Q0141275	Mouser Electron NewAE Technology Development	\$400.00
10/17/2025	Q0141276	Mouser Electron NewAE Technology Development	\$1,400.00
10/17/2025	Q0141275	Mouser Electron NewAE Technology Development	\$12,600.00
10/17/2025	Q0141275	Mouser Electron NewAE Technology Programmable	\$6,437.50
10/17/2025	Q0141275	Mouser Electron NewAE Technology Programmable	\$650.00
10/17/2025	Q0141276	Mouser Electron freight	\$1.99
10/17/2025	Q0141275	Mouser Electron freight	\$247.60
10/27/2025	!0599446	Mouser Electronics, Inc.	\$0.00
10/28/2025	!0599663	Mouser Electronics, Inc.	\$0.00
10/28/2025	!0599663	Mouser Electronics, Inc.	\$0.00

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10/28/2025	!0599663	Mouser Electronics, Inc.	\$0.00
10/28/2025	!0599663	Mouser Electronics, Inc.	\$0.00
10/28/2025	!0599663	Mouser Electronics, Inc.	\$0.00

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\$185,263.09

< \$5K Non-Capital Outlay

E7810 <5K Technology Equip - Office/Deptl

6/5/2025	J1379013	TDX429171 7-Surface+7-MBA+ship kjw	\$31,928.75
7/30/2025	TC073025	TDX455028 3-TS P3 Tiny	\$2,985.00
8/7/2025	Q0129337	Amazon Capital SAMSUNG Pro 75" 4K WMB	\$7,783.80
8/14/2025	TC081425	TDX455031 3-iPad Wi-Fi	\$987.00
8/27/2025	!0592178	Amazon Capital Services Inc	\$0.00

E7860 <5K Educational Equipment

9/16/2025	Q0135481	B&H Photo-Video EpiqVision Ultra LS650 3600-Lumen	\$2,294.99
10/6/2025	B1958525	B&H Photo-Video, Inc.	\$0.00

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\$45,979.54

Trustee/Benefits

E7140 Tuition and Fees - Grad Assistants

9/6/2024	J1362409	GRFT for V00894165	\$804.86
9/6/2024	J1362409	SHI1 for V00894165	\$1,022.34
9/6/2024	J1362409	TFGR for V00894165	\$4,221.33
9/6/2024	J1362409	VVSF for V00894165	\$92.94
1/28/2025	J1371039	GRFT for V00894165	\$866.00
1/28/2025	J1371039	SHI2 for V00894165	\$1,100.00
1/28/2025	J1371039	TFGR for V00894165	\$4,542.00
1/28/2025	J1371039	VVSF for V00894165	\$100.00
2/1/2025	J1371004	GRFT for V00978865	\$866.00
2/1/2025	J1371004	SHI2 for V00978865	\$1,100.00
2/1/2025	J1371004	TFGR for V00978865	\$4,542.00
2/1/2025	J1371004	VVSF for V00978865	\$100.00

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\$19,357.47

Totals for 228090

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\$331,717.83

11/21/2025 10:30:17 AM

Page: 7

Index: 855869 - ISBOE IGEM HERC Cyberspace-ISU FY25

Fund: 228288 - ISBOE IGEM HERC Cyberspace-ISU FY25

Subcontracts

ES001 Subaward 1 Expenses

6/16/2025 Q0120909 Idaho State Uni salary, fringe and materials for Award \$14,497.73

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\$14,497.73

Totals for 228288

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\$14,497.73

Totals for UA8090

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\$346,215.56

**SUBJECT**

Semi-Annual Report of Approved Program Requests

**REFERENCE**

February 2022	Board received the semi-annual report
August 2022	Board received the semi-annual report
February 2023	Board received the semi-annual report
August 2023	Board received the semi-annual report
February 2024	Board received the semi-annual report
August 2024	Board received the semi-annual report
February 2025	Board received the semi-annual report
August 2025	Board received the semi-annual report

**APPLICABLE STATUTE, RULE, OR POLICY**

Idaho State Board of Education Governing Policies and Procedures, Section III.G., Postsecondary Program Review and Approval.

**BACKGROUND/DISCUSSION**

In accordance with Board Policy III.G.3.a.ii and III.G.4.b., the Executive Director, State Administrator, or their designees may approve certain actions related to academic and career technical programs or units, as specified in those subsections, prior to implementation.

Consistent with Board Policy III.G.9.a., the Board Office is providing a semi-annual report summarizing academic and career technical program requests from Idaho's public postsecondary institutions that were approved by the Executive Director, State Administrator, or their designees between July 1, 2025, and December 31, 2025. For additional context, the report also includes program requests approved by the full Board during the same reporting period.

**ATTACHMENTS**

Attachment 1 – Semi-Annual Report of Approved Program Requests

**BOARD STAFF COMMENTS AND RECOMMENDATIONS**

The report provides a list of new academic or career technical programs and certificates approved by the Executive Director, State Administrator, or their designees consistent with Board Policy III.G. This includes other instructional activity such as modifications to existing programs, program discontinuations, and other non-substantial changes that require notification to the Board office.

For this current reporting cycle, there were fewer program requests submitted for review and approval than in previous cycles. This consisted of four proposals to establish new academic instructional units and programs:

- Boise State University established a School of Medical Imaging and Radiologic Sciences and a School of Respiratory Care Sciences

**INFORMATIONAL**  
**APRIL 15-16, 2026**

- Idaho State University added an Associate of Arts and Associate of Science in Interdisciplinary Studies
- University of Idaho created a new Master of Science in Climate Science Solutions.

Staff notes a decrease in the number of newly created academic certificates compared to past reports. To provide clearer context for the Board on how proposed certificates relate to existing programs, Board staff updated procedures requiring institutions to identify each certificate as one of the following:

- **Embedded** – students enroll in a degree program and earn the embedded certificate within the credit structure of their degree program
- **Stackable** – students complete an independent credential that is part of a sequence of credentials that can lead to a degree
- **Standalone** – students enroll in a certificate program to acquire a specific set of skills and it is not designed to contribute to a degree

Attachment 1 includes notations indicating certificate type for each newly approved certificate.

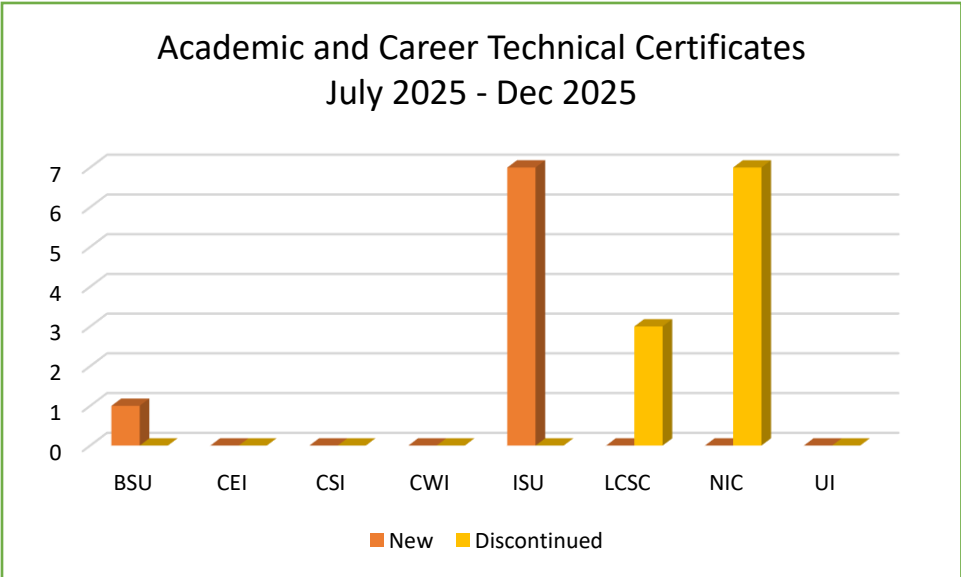
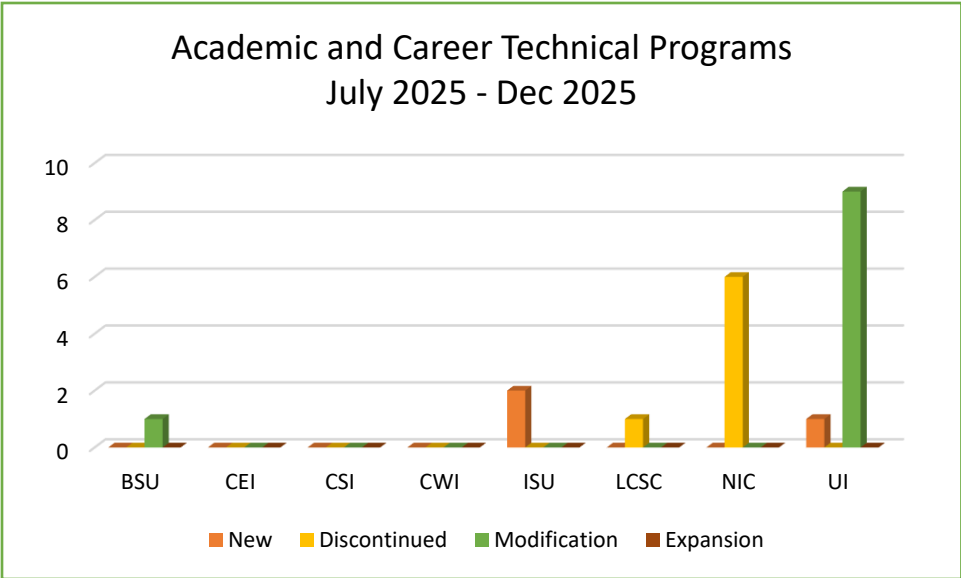
The report also shows a number of discontinuations from North Idaho College. These primarily involved inactive or discontinued programs and were processed to align institutional records with current offerings.

Other changes reported were minor program modifications that do not require approval, only notification to the Board office. Staff will update charts in Attachment 1 and provide a comprehensive annual trend analysis in August 2026.

**BOARD ACTION**

This item is for informational purposes.

**Semi-Annual Report of Approved Program Requests  
July 2025 through December 2025**



**List of Academic Program and Unit Requests Approved by Executive Director or Designee**

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Degree/Certificate</b>	<b>Date</b>
BSU	Instructional Unit	School of Medical Imaging and Radiologic Sciences	N/A	8/1/2025
BSU	Instructional Unit	School of Respiratory Care Sciences	N/A	9/30/2025
BSU	Discontinuance	STEM Institute	N/A	10/27/2025
ISU	New	Interdisciplinary Studies	AA   AS	12/17/2025
LCSC	Discontinuance	Sports Media Studies	BS	11/21/2025
NIC	Discontinuance	Engineering & Technology Teacher Education	AS	10/29/2025
UI	New	Climate Science and Solutions	MS	7/28/2025

**List of Other Academic Program/Unit Changes Notified to Executive Director**

The following program changes or additions do not require approval; however, they require notification to OSBE per policy III.G.

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Certificate Type</b>	<b>Date</b>
BSU	New	Project Management (Embedded Certificate)	Graduate Certificate	12/23/2025
ISU	New	Respiratory Care, Advanced (Stand-alone Certificate)	Specialized Certificate	12/2/2025
ISU	New	Respiratory Care, Advanced: Adult Focus (online)	Specialized Certificate	12/2/2025
ISU	New	Respiratory Care, Advanced: Pediatric Focus (online)	Specialized Certificate	12/2/2025
ISU	New	Healthcare Administration for DNPs (Stand-alone Certificate)	Graduate Certificate	12/2/2025
ISU	New	Speech Language Pathology Assistant (Stand-alone Certificate)	Academic Certificate	12/2/2025
ISU	New	Speech Language Pathology Assistant (online)	Academic Certificate	12/2/2025
ISU	New	Athlete Counseling	Graduate Certificate	12/9/2025
ISU	New	Extracorporeal Membrane Oxygenation (Stand-alone Certificate)	Specialized Certificate	12/23/2025
LCSC	Discontinuance	Movement Psychology	Undergraduate Certificate	11/18/2025
LCSC	Discontinuance	Professional Writing	Undergraduate Certificate	11/18/2025
LCSC	Discontinuance	Marketing Management	Undergraduate Certificate	12/22/2025

**Other Academic Program Changes**

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Program Type</b>	<b>Date</b>
BSU	Name change	Math Learning Center to First-Year Math Program	Unit	7/16/2025
BSU	Name change	Hazard and Climate Resilience Institute to Resilience Institute	Unit	8/12/2025
BSU	New	Echocardiography and Vascular Ultrasound emphasis within the Bachelor of Science in Radiologic Sciences	Emphasis	8/25/2025
BSU	New	Echocardiography and Vascular Ultrasound emphasis within the Bachelor of Science in Advanced Medical Imaging	Emphasis	8/25/2025
BSU	Suspend	Diversity, Equity and Inclusion	Undergraduate Certificate	10/23/2025
BSU	Name change	Department of Physics to the Department of Physics and Astronomy	N/A	11/7/2025
BSU	New	Interactive Film and Mixed Reality	Minor	11/24/2025
BSU	New	Interactive Animation	Minor	11/24/2025
BSU	Suspend	Construction Management	Minor	12/10/2025
BSU	New	Data Science	B.S. emphasis	12/12/2025
BSU	New	Business	B.A. emphasis	12/12/2025
BSU	Name change	Minor in the History of War, Conflict, and Society to History, War, Conflict, and Society	Minor	12/2/2025
BSU	Name change	Minor in the History of Faith and Ideology to Faith and Ideology	Minor	12/2/2025
BSU	Name change	Minor in the History of Law, Justice, and Power to History of Law, Justice, and Power	Minor	12/2/2025
BSU	Name change	Teaching Government to Political Science Education	BS	12/2/2025
BSU	Name change	Sports, Media, Information, and Communications to Sports Information and Communications	Certificate	12/2/2025
BSU	Program Changes	<ul style="list-style-type: none"> <li>• Rename the inactive English, Literature to English Literature</li> <li>• Reactivate newly renamed English Literature program</li> <li>• Discontinue English, Literature: Thesis/Project option</li> <li>• Discontinue English, Literature: Course Work option</li> </ul>	MA	12/5/2025
BSU	Program Change	Change delivery method for Secondary Education from face-to-face to hybrid	MIT	12/9/2025
BSU	Suspend	Time-Based Art emphasis, Bachelor of Fine Arts, Visual Art	Emphasis	12/9/2025

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Program Type</b>	<b>Date</b>
CSI	CIP Change	Change CIP from 16.0101 to 16.0905 for Spanish	AA	8/11/2025
CSI	Name change	General and Liberal Studies Department to General Education and Assessment	N/A	12/1/20205
CSI	Curriculum	Registered Nursing – restructured courses and program outcomes updated to enhance student learning and overall program quality	AS	12/2/2025
ISU	New	Fire Services Administration (online)	Minor	12/2/2025
ISU	New	Pre-Speech Language Pathology	Minor	12/2/2025
ISU	New	Pre-Speech Language Pathology (online)	Minor	12/2/2025
ISU	New	Musical Theatre	Minor	12/22/2025
ISU	New	Musical Theatre: General track	Minor	12/22/2025
ISU	New	Musical Theatre: Music major/minor track	Minor	12/22/2025
ISU	New	Musical Theatre: Theatre major/minor track	Minor	12/22/2025
LCSC	Curriculum	Curriculum changes for the Direct-Entry Master of Science in Nursing	MS	10/23/2025
LCSC	Discontinuance	Fine and Performing Arts	Minor	11/24/2025
LCSC	Curriculum	Nursing Management and Leadership – change credit requirements from 11 to 12	Certificate	11/18/2025
LCSC	Curriculum	Native American Studies – change credits from 24 to 21	Minor	11/18/2025
LCSC	Curriculum	Justice Studies– increase credits from 15 to 18	BA/BS	11/18/2025
LCSC	Name change	Bioinformatics to Computational Biology	BA/BS	11/18/2025
LCSC	Name change	Communication to Communication Arts	Minor	11/24/2025
UI	Modification	Engineering Technology (Moscow)	B.S.Tech.	12/18/2025
UI	Modification	Engineering Technology (Idaho Falls)	B.S.Tech.	12/18/2025
UI	Modification	Engineering Technology (Coeur d'Alene)	B.S.Tech.	12/18/2025
UI	Modification	Rangeland Ecology and Management	Minor	12/18/2025
UI	Modification	Accountancy	M.Acct.	12/18/2025
UI	Discontinuance	Accountancy: Audit and Fraud Examination	M.Acct. emphasis	12/18/2025
UI	Discontinuance	Accountancy: Taxation	M.Acct. emphasis	12/18/2025
UI	Modification	Biochemistry	Minor	12/18/2025
UI	New	International Studies (online)	Minor	12/18/2025
UI	New	Sociology (online)	Minor	12/18/2025

INST.	Request Type	Program Title	Program Type	Date
UI	Modification	Women's, Gender, and Sexuality Studies	Minor	12/18/2025
UI	Modification	Finance: PGA Golf Management	B.S. emphasis	12/18/2025
UI	Modification	Biological Engineering	B.S.	12/18/2025

**List of Career Technical Program Requests Approved by State Administrator (by Type)**

INST.	Request Type	Program Title	Program Type	Date
NIC	Discontinuance	Aviation Flight Training - Helicopter	ATC	10/29/2025
NIC	Discontinuance	Aviation Flight Training - Helicopter	AAS	10/29/2025
NIC	Discontinuance	Aviation Maintenance Technology	BTC	10/29/2025
NIC	Discontinuance	Aviation Maintenance Technology	ATC	10/29/2025
NIC	Discontinuance	Aviation Maintenance Technology	AAS	10/29/2025
NIC	Discontinuance	Administration of Justice	AAS	10/29/2025
NIC	Discontinuance	Aerospace Technology	AAS	10/29/2025
NIC	Discontinuance	Aerospace Technology	ATC	10/29/2025
NIC	Discontinuance	Aerospace Technology	ITC	10/29/2025
NIC	Discontinuance	Aerospace Technology	BTC	10/29/2025
NIC	Discontinuance	Wastewater Treatment Plant Technician	AAS	12/22/2025
NIC	Discontinuance	Diesel Technology	BTC	12/22/2025

**List of Other CTE Program Changes Notified to State Administrator**

The following program changes or additions do not require approval; however, they require notification to OSBE per policy III.G.

INST.	Request Type	Program Title	Degree	Date
CSI	Curriculum	Modifications to existing courses MEDA 109 and CULA 110	N/A	8/11/2025
CSI	Curriculum	Modifications to existing courses CISS 223 Advanced Internship, CISW 217 Database Systems, CISW 240 IT Security, and CISW 298 Comprehensive IT Project	N/A	9/11/2025
CSI	Curriculum	Add ASOM 300 Principles of Business Management to ASOM 385 Industry Internship Experience as a pre-requisite	N/A	10/20/2025
CSI	Curriculum	Add ASOM 320 Operations Project Management to ASOM 480 Operations Management Projects as a pre-requisite	N/A	10/20/2025

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Degree</b>	<b>Date</b>
CSI	Curriculum	Discontinue CISS 212 CISCO Lab and replace with CISS 213 and CISS 216 for Network Systems Technician AAS, Computer Support Technician ITC, Cybersecurity and Programming AAS. This includes creating two new 2-credit courses to correspond to CISS 213 CISCO Networking I and CISS 216 CISCO Networking II.	N/A	11/4/2025
CSI	Curriculum	Practical Nursing – adding course work that aligns with accreditation and regulatory requirements. This includes one course change from 1 to 2 credits.	ITC	12/8/2025
CSI	Curriculum	Veterinary Technician – course change and change to credit requirements from 68 to 67	AAS	12/9/2025
CSI	Curriculum	Aquaculture – course changes to align with transfer requirements with four-year institutions. This included course name changes and description changes.	ITC AAS	12/11/2025
CSI	Curriculum	Law Enforcement – discontinue LAWE 204 course and replace with LAWE 205.	AAS	12/12/2025
CSI	Curriculum	Applied Bookkeeping and Accounting <ul style="list-style-type: none"> <li>• Change name to Applied Bookkeeping</li> <li>• Course changes to align with new program focus and outcomes</li> </ul>	AAS	12/12/2025
CSI	Curriculum	Administrative Assistant Program - Programs have been updated to align with changes made to the Applied Bookkeeping program.	BTC ITC	12/12/2025
CSI	Curriculum	Medical Assistant – expand the selection of general education course options and change to the pre-requisite of BIOL 105 to MEDA 220. Instead BIOL 105 and BIOL 105L OR BIOL 228 and BIOL 228L are now listed as pre-requisites for MEDA 220.	ITC	12/12/2025
CSI	Curriculum	Agriculture – updated learning outcomes and made course changes to the program based on TAC recommendations	AAS	12/16/2025
CSI	Curriculum	Geospatial Technology – course changes to include credit hour changes to GEOL 155L from 1 to 2 credits and removing ENGL 105 as a corequisite.	AAS	12/16/2025
LCSC	Curriculum	Welding Technology- change credit requirements from 76 to 70	AAS	12/5/2025

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Degree</b>	<b>Date</b>
LCSC	Curriculum	Welding Technology-change credit requirements from 64 to 58	ATC	12/5/2025

**List of Academic Program Requests Approved by the Board**

<b>INST.</b>	<b>Request Type</b>	<b>Program Title</b>	<b>Degree</b>	<b>Date</b>
ISU	New	Applied Business and Professional Sales (3YR)	BAS	12/17/2025
ISU	New	Law Enforcement Management and Leadership (3YR)	BAS	12/17/2025
ISU	New	Intelligent and Trustworthy Digital Systems (3YR)	BAS	12/17/2025
UI	New	Nursing, Direct-Entry	M.S.	8/21/2025

**UNIVERSITY OF IDAHO**

**SUBJECT**

University of Idaho – Annual Report

**APPLICABLE STATUTE, RULE OR POLICY**

Idaho State Board of Education Governing Policies & Procedures, Section I.M.3

**BACKGROUND/DISCUSSION**

This agenda item fulfills the Board's requirement for the University of Idaho to provide a progress report on the institution's strategic plan, details of implementation, status of goals and objectives, and information on other points of interest in accordance with a schedule and format established by the Board's Executive Director.

**ATTACHMENTS**

Attachment 1 – University of Idaho Annual Report

**IMPACT**

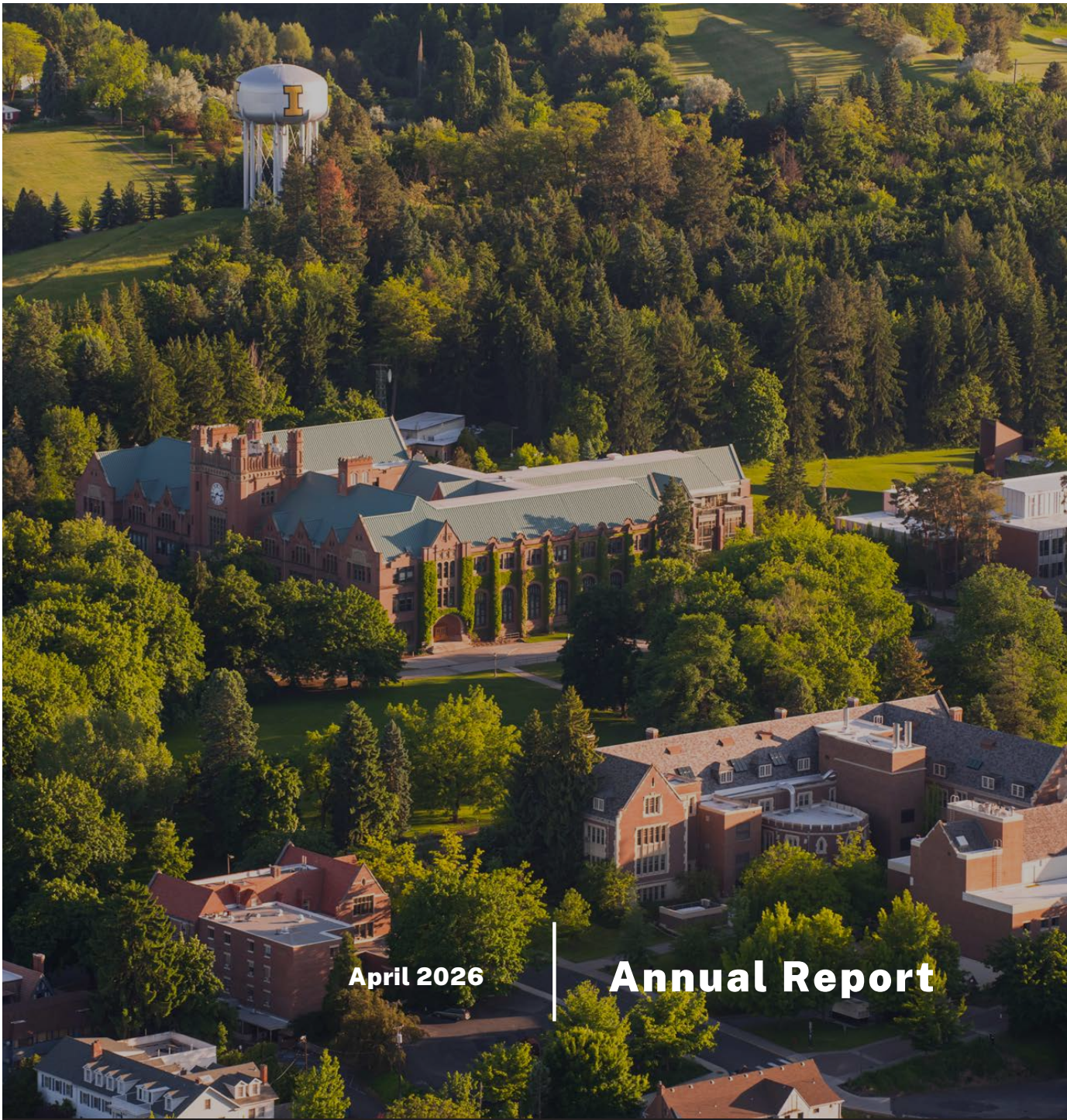
This institutional annual report serves to provide a state of the college update and inform the Idaho Board of Education of the annual Presidential Priorities and how they are and will be used to guide the institution forward.

**BOARD STAFF COMMENTS AND RECOMMENDATIONS**

Informational item; no staff comments.

**BOARD ACTION**

This item is for informational purposes only.



April 2026

Annual Report



University of Idaho



Over the past year the University of Idaho focused on building its foundation for a promising future. After achieving goals in enrollment, research and fundraising, the university introduced a new strategic plan to build on momentum and guide its course through the next five years.

In Fall 2025, the university welcomed the second-largest freshman class in school history. In our 10th straight semester of enrollment growth, we posted the largest spring enrollment in our history in 2026.

The U of I became the first and only institution in Idaho to receive the Carnegie Research 1 (R1) designation. The university produces more research expenditures than all other higher education institutions combined, and has nationally recognized programs in AI, agriculture, forestry, water, engineering and cybersecurity.

When the university's \$500 million fundraising goal was first discussed in 2019, there were many skeptics. But the Vandal Family reached the Brave. Bold. Unstoppable. campaign goal eight months early. The campaign raised over \$550 million — far and away the largest philanthropic campaign in Idaho history.

More than \$160 million from the campaign is dedicated to scholarships, helping the U of I maintain its U.S. News and World Report Best Value status. The average Vandal student receives more than \$7,000 in scholarships and aid, which covers more than 2/3 of yearly tuition for in-state students.

Throughout the 2024-25 academic year, the U of I community came together to create a vibrant new five-year strategic plan. The result is a simple, practical document to guide operations and priorities through 2030.

Building on institutional strengths and utilizing AI technology to improve efficiency and effectiveness, the strategic plan will lead the U of I through a challenging period. The enrollment cliff, funding decreases and a shifting research environment are all challenging higher education and we are investing in strategic areas to get ahead of those changes.

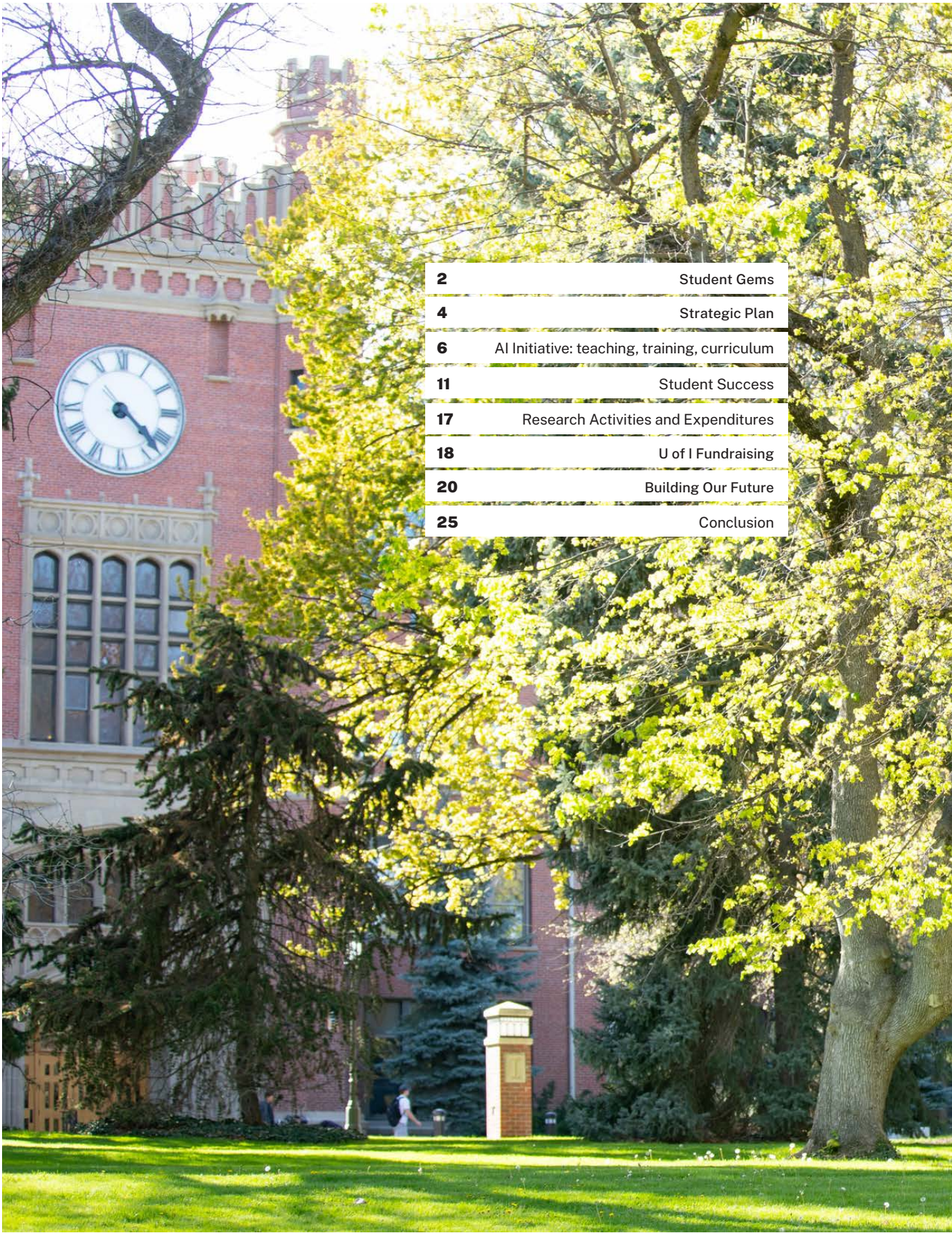
Through intentional planning and sound investment, the U of I is building on its success by implementing new educational and operational models for the rapidly changing world economy.

Go Vandals!



President Scott Green





2	Student Gems
4	Strategic Plan
6	AI Initiative: teaching, training, curriculum
11	Student Success
17	Research Activities and Expenditures
18	U of I Fundraising
20	Building Our Future
25	Conclusion

# I student **GEMS**




# 6<sup>TH</sup> year in a row

U.S. News & World Report **best value** ranking


**75,339**  
K-12 students served

**11,326**  
enrolled in organized clubs



**4-H**

**12,383**



total student count for Fall 2025

**2,762**

degrees and certificates awarded



**54**

U of I Researchers ranked as **THE TOP** in their fields.





Freshman retention **up 1.7%**  
from 2024

Idaho resident  
undergrad enrollment  
**up 5%**  
over 2024



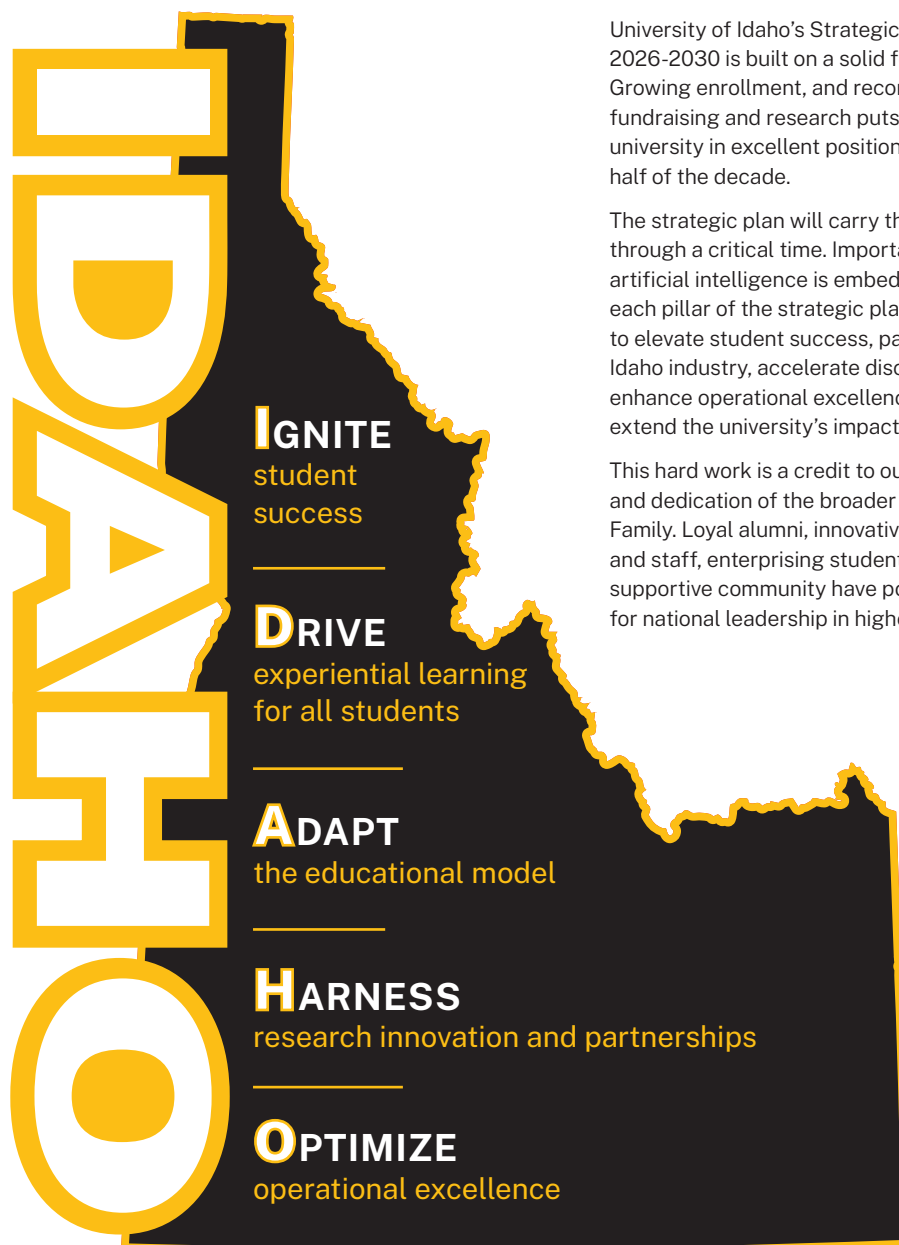
**\$151.5M**  
in research expenditures

McCall Outdoor Science School  
**1,758**  
K-12 students served





# STRATEGIC PLAN



## Intro

University of Idaho's Strategic Plan for 2026-2030 is built on a solid foundation. Growing enrollment, and record-setting fundraising and research puts the university in excellent position for the last half of the decade.

The strategic plan will carry the institution through a critical time. Importantly, artificial intelligence is embedded in each pillar of the strategic plan as a tool to elevate student success, partner with Idaho industry, accelerate discovery, enhance operational excellence, and extend the university's impact.

This hard work is a credit to our employees and dedication of the broader Vandal Family. Loyal alumni, innovative faculty and staff, enterprising students and a supportive community have positioned us for national leadership in higher education.

## Strategic Plan Investment Grants

**Manager:** Michele Bartlett, Director of Executive Projects and Strategic Initiatives

In November, 2025, University of Idaho announced preliminary award decisions for the **2026-2030 Strategic Plan Investment Grant Program (SPIGP)**. These awards reflect a major institutional investment in advancing the new strategic plan and strengthening alignment across our five pillars, as well as the university-wide AI initiative.

Following a rigorous review process by a broad spectrum of internal leaders and stakeholders including employees and students, **35 proposals were selected for funding across five pillars**. These projects reflect broad engagement across the institution and demonstrate strong alignment with university priorities in student success, experiential learning, innovation, research excellence and operational effectiveness.

## Program overview

SPIGP was launched to catalyze high-impact initiatives that advance the 2026-2030 Strategic Plan. Proposals were evaluated for alignment with pillar goals, measurable return on investment, scalability, and potential to transform operations, research, and student experience.

Funding decisions were guided by the principles of transparency, collaboration and strategic balance — ensuring that awarded projects represent both immediate institutional priorities and longer-term capacity-building investments.



## AI initiative: teaching, training and curriculum

**Champion:** Ben Hunter, Dean University Libraries

In addition to the five strategic pillars, a cross-cutting **AI Literacy and Faculty Development Initiative** is advancing campus-wide AI integration in teaching, research and operations.

### Currently

- The university introduced an incentivized training for faculty members using a six-hour course called, “AI in Teaching and Learning.” About 250 people have registered for the training and many have already completed it.
- A team with representation from every college is working on strategies to integrate AI literacy throughout the curriculum, including discipline-specific instruction. This summer, incentives will be available for faculty members to integrate AI into their curriculum.



## AI and Operational Excellence

The University of Idaho was awarded a \$4.5 million grant leveraging generative artificial intelligence (AI) to streamline administrative processes and drive efficiency in research management. The project represents a transformative step toward reducing administrative burdens. Principal Investigator Sarah Martonick, director of the Office

of Sponsored Programs, leads the team, which is funded through the National Science Foundation's (NSF) GRANTED program. The goal is to enhance the U.S. research enterprise by improving administration support infrastructure, increasing service capacity and broadening participation by developing institutions across the national research landscape.



**Strategic Plan Performance  
Measures: 2025 metrics**

Student Access / Annual Enrollment:

**Headcount  
(14,931)  
FTE (10,120)**

Student Retention: **77%**

Student Success /  
6Y Graduation: **60%**

**Student  
Affordability**

US News & World Report Best Value Ranking

Post-graduation success / starting salary:

average: **\$61,279**  
median: **56,670**

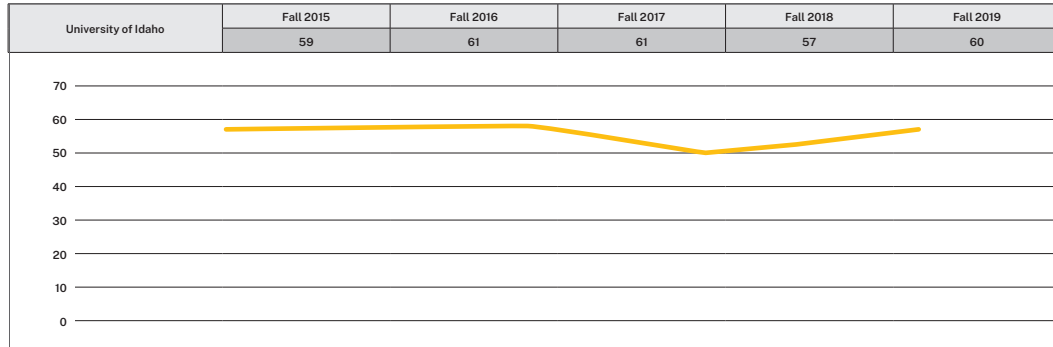
Research Expenditures:

**\$151.5M**

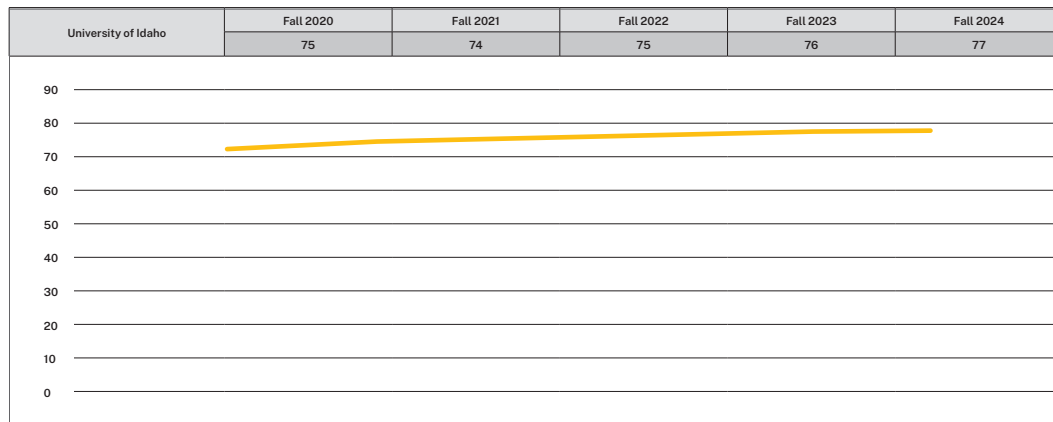


# STUDENT ACHIEVEMENT LONGITUDINAL DATA

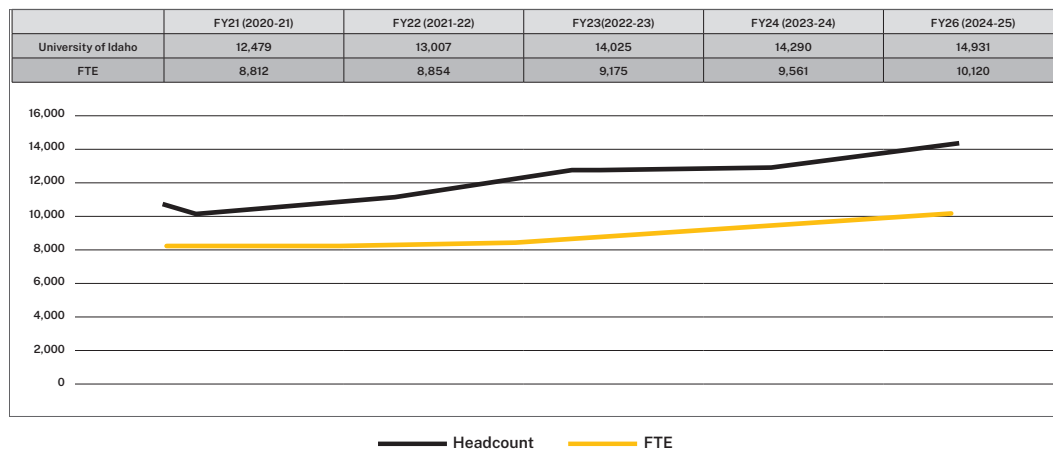
## 6-Year Graduation Rate (First-time Full-time Freshmen)



## First-to-Second Year Retention (First-time Full-time Freshmen)



## UI Annual Enrollment (Source: PSR 1 Annual Enrollment Report)



## **Strategic Plan Conclusion**

University of Idaho's overriding success over the past half decade sets the stage for a promising future. The 2026-2030 Strategic Plan provides distinct priorities and clear direction as the university continues to deliver on its land grant mission.

The university has already invested in executing the plan, backing strategic priorities and supporting units to carry out their respective roles within the plan. Through the use of AI and technology, the university will become more efficient and effective, while equipping students with the skills they need to thrive in the new economy.

As Idaho's R1 research institution, the U of I is well positioned to lead our state through the last half of the decade and beyond.



## STUDENT SUCCESS AND WORKFORCE DEVELOPMENT

### A new path to the logging and forestry workforce

Growing up in the industry, it is no surprise Maria Kinne was one of the first students to enroll in — and graduate from — University of Idaho's two-year program that teaches students to operate logging equipment, plan timber sales and track forest land boundaries, in addition to sustainable forest practices and business competence. Kinne graduated with a job with the state of Idaho.

"It's a seasonal job with the Department of Lands, and after that I will likely apply for another state position, or with a forest management company," said Kinne, who grew up working with her dad, the owner of Odenwald Forestry near Sandpoint.

Although Kinne, who graduated high school in 2021, worked as a receptionist during the week to save money for college, she was in the woods on the weekends operating chainsaws and a mini backhoe to remove and pile forest slash.

Before enrolling at U of I, Kinne considered attending college, but wasn't sure what to study. After a couple of years in the workforce her father told her about a program at U of I that may interest her.

"He learned about it at a logging conference," she said.

The idea appealed to her.

"I knew I didn't want to go to school for another four years, and since this associate's degree could be completed in two years, and I could continue to do what I loved — being in the woods, working in the timber industry, I decided to go for it," she said.

She had already acquired some of the know-how to be employed in the forest resource profession, but the program bolstered her skillset and gave her a broad repertoire.

Using the U of I Experimental Forest as its outdoor classroom — the forest includes 10,300 acres of actively managed, productive working forestland — she learned to operate equipment including a Caterpillar 538 Logging Processor with Waratah attachments and a John Deere 648L Grapple Skidder, hand fell trees and cruise timber.

"We were taught about forest operations on a large scale, and in an office setting," she said. One of her most rewarding classes was a mapping and surveying course in which students laid out a timber sale using GIS coordinates.

"We learned to lay out a unit within land boundaries, which is something you must know if you work in forestry or logging," she said.



## U of I team designs AI-driven solutions for Idaho-based sugar processing company

For nearly three decades, Amalgamated Sugar searched for a reliable way to automate one of its most challenging pieces of equipment: the steam dryer used to process sugar beet pulp. The breakthrough came through a collaboration with University of Idaho, where a graduate student's innovative use of artificial intelligence helped turn years of data into a practical safety and efficiency solution.

After meeting with Amalgamated Sugar's leadership at the company's Nampa facility, doctoral student Hunter Hawkins began thinking about how AI could address the persistent problem of dryer "plugging" events. These blockages force the dryer to be manually shut down and requires employees to enter a hot, pressurized, and potentially flammable environment to clear the system—posing serious safety risks and sometimes costing the company days of lost production.

Hawkins, who specializes in computer science and industrial automation, saw an opportunity. While waiting for a delayed flight with John Shovic, director of the Center for Intelligent Industrial Robotics at U of I Coeur d'Alene, Hawkins began

sketching out an AI-driven approach. Drawing on years of historical data already collected from the dryer—nearly 100 different data points—he proposed a hybrid AI system that could predict problems before they occur.

"I actually combined two models for this project," Hawkins said. "I wanted to combine the prediction power of a deep-learning AI model with the explainability of a traditional machine-learning model. The result is a hybrid model that drives a dashboard, giving the Amalgamated team predictions and alerts to potential issues."

The proactive alert system benefits Amalgamated by reducing risk as well as actual damages. Instead of reacting after a shutdown, operators can now intervene early, often restarting the dryer in less than an hour and avoiding dangerous manual inspections altogether.

For Amalgamated Sugar, which processes more than 7 million tons of sugar beets annually and produces millions of pounds of sugar each day, the system represents a major step forward in both safety and operational reliability. For U of I,

the project highlights the value of industry partnerships that give students real-world problems to solve.

"We feel very lucky to be involved with U of I," said Scott Hyer '10, operations manager at Amalgamated Sugar. "They've come down to us multiple times and that has helped us gain a better understanding of what they've put together and how the process works. Having a local collaboration is very beneficial for both Amalgamated and U of I."



## Education leadership cohorts help Idaho teachers advance

Savannah Fritz '06, '25, an English teacher at Meridian High School, knew it was time for a change. After 20 years in the West Ada School District, she wanted to move into education administration while remaining connected to the high school she both attended and now teaches in. To do that, she needed advanced training designed for working professionals — and she knew exactly where to turn: University of Idaho's College of Education, Health and Human Sciences (EHHS).

Fritz recently earned her Master of Education in educational leadership as part of a two-year online cohort created specifically for West Ada teachers and support staff. The program allowed participants to continue working full time while preparing for administrative roles within their district.

"We call this a 'grow your own' program," said Bethani Studebaker, director of assessment and accreditation in EHHS's Department of Leadership and Counseling. "The need in Idaho for trained administrators is really significant right now, which is why we've created cohort options within our master of education program."

For Fritz, the degree provided a pathway to influence change. She realized that many of her concerns — teacher turnover, mentoring and access to resources — required a seat at the decision-

making table. "I want to solve problems instead of just raising them up," she said.

Fritz completed the program alongside colleagues like Jill Ayabei '25, a West Ada coordinator who valued the collaborative, experience-driven nature of the cohort. "Using the expertise of everyone in the room is extremely important in this job," Ayabei said. The relationships built through the program also paid off professionally: West Ada recently created new Dean of Student Achievement positions, and three cohort members were hired into those roles.

U of I's cohort-based approach extends to the Indigenous Knowledge for Effective Education Program (IKEEP), in which the university supports Native educators pursuing leadership roles while honoring cultural context. Iris Chimburas '05, principal of Coeur d'Alene Tribal School, is earning her principal certification through IKEEP, continuing a family legacy of Native educational leadership.

Across districts and communities, U of I's Master of Education in educational leadership meets the needs of adult learners seeking career advancement, practical preparation, and the opportunity to lead meaningful change — without leaving the classrooms and communities they serve.



## Alumni-led mentorship connects U of I students career-ready skills

Leah Holmgren, a College of Education, Health and Human Sciences undergraduate student athlete, completed her internship under the direction of two other Vandals whose own experience led them to give back by mentoring current students.

Kristi Holden and Allyssa Loesch both earned master degrees in exercise science from U of I and work together at Gritman Medical Center's cardiac rehabilitation clinic.

"I was unsure if working in a clinic would be something I truly wanted. After meeting all the patients in the Cardiac Rehab program I am excited to continue toward a clinic-based career," said Holmgren. "Helping others is something I am excited about. Especially after watching Kristi and Allyssa set such great examples. The patient's success comes from the environment that they create together."

EHHS Instructor Emma Grindley, who coordinates the practicum and internship program, said these hands-on experiences are invaluable for students.

"Practicum and internships allow students to sample different careers, make connections between the classroom and the real world, and gain experience working directly with real clients and patients," she said. "All of this helps students grow in knowledge, skills, professionalism, confidence and clarity in career direction."

Holden said the students who come to cardiac rehab gain valuable, real-world experience from day one.

"Working at cardiac rehab is a great experience. On day one, students interact with patients," she said. "Throughout their time with us, they learn the ins and outs of supervised exercise, education and the career. They also get to connect with patients and learn from them, too."

Hands-on experience is a cornerstone of all EHHS programs, woven into every degree's coursework to ensure students gain real-world skills. Collaborations with industry leaders like Gritman Medical Center provide valuable opportunities for practical learning and professional growth.

"The students are treated like employees. It's like an ongoing interview. It gives them the skills to get a job — not just in cardiac rehabilitation but in other areas as well," Loesch said. "The skills are transferable."

Mentorship plays a key role in helping students grow during their placements.

"I appreciate that Kristi and Allyssa gave me the room to learn without being coddled. This is a great skill to practice for going into the medical field. I also am glad to have gained such valuable hands-on patient experience," said Holmgren.



## Political science major fast tracks through U of I's 3+3 program

As a youngster, Isabella Sindelar made waves in the classroom and the swimming pool as the kid who loved to argue almost as much as she loved to swim.

After earning an associate degree, Sindelar did a deep dive into what she wanted her future to look like. She realized earning a law degree whetted her competitive spirit.

Sindelar is in her third year at University of Idaho School of Law enrolled via the 3 + 3 program, a College of Letters Art and Social Sciences fast track that allows applicants to earn a bachelor's in three years followed by three years of law school.

"Because of the fast-track program, Idaho was the only school I applied to," she said.

After her first year of law school, Sindelar earned her bachelor's, and she and a group of U of I law

students chose to study abroad in Florence, Italy, with peers from Gonzaga University Law.

In 2017, U of I's College of Law became an affiliate school to Gonzaga's Florence Summer Law Program. U of I law students can join the program thanks to the affiliation and study at the Gonzaga campus in Italy.

Sindelar and a U of I teammate won the Best Lawyer-Client Interaction in the program's annual summer mediation competition.

"U of I Law encourages an externship after your first year of law school. I decided I would rather pay for that coursework while learning overseas," Sindelar said. "I went to Italy, and it was such a great experience learning with students from all over the world. It was really a good deal."

Upon her return, she completed an internship in Lewiston at the Clark and Feeney law firm and joined the student bar association, becoming its president. She also gained hands-on experience at the school's Community Law Clinic. The clinic offers third-year law students the opportunity to provide free legal services under the guidance of a supervising attorney with cases commonly handled by Idaho lawyers.

"We do almost everything an attorney does," said Sindelar, whose goal when she enrolled in law school was to pursue family law. "We go to court hearings and trials and see the cases through until the matter is over."

Her most memorable experience at U of I was meeting the state's Supreme Court justices.

"We got to know them and see them in session," she said, "It's pretty rare. We were pretty lucky. I was kind of star struck and amazed at how accessible they are."

Sindelar, who plans to stay in Idaho, said the 3+3 program that brought her to U of I was a great fit for a motivated student.



## Student researchers track Idaho wolves, collect DNA and study pack families

Hearing the howl of a wild wolf in Idaho's wilderness areas is one of the rewards students get after days of 10- to 20-mile hikes in the backcountry to collect wolf droppings, locate dens and document wolf gathering and home sites — called rendezvous sites — as part of an ongoing study of wolves in Idaho led by the College of Natural Resources and its USGS Cooperative Fish and Wildlife Research Unit.

Peter Rebholz, a former carpenter who came to the West to study big wild animals, and earn his master's degree at University of Idaho studying Idaho wolves, has been leading U of I student researchers into Idaho's backcountry for several years as he collects DNA from wolf scat to precisely document the family trees of 20 wolf groups in the state.

"We're out here for nine days at a time hiking, camping, setting up trail cameras and looking for wolves and their rendezvous sites," Rebholz said. "What we want from the rendezvous sites are genetic samples from scat."

From the wolf feces, Rebholz and the students scrape a few flakes off the top layer that contains

the animals' epithelial cells. The flakes harbor the DNA from the individual that dropped the scat. The samples are bagged, marked and later used to identify the specific animals via its DNA.

"We can get a genetic sample from each individual in that pack," Rebholz said. "From that sample we can create pedigrees — large family trees of these wolf packs, and we've been doing this for the same packs for the past 20 years."

From the pedigrees of 20 wolf packs in four main study areas across the state of Idaho — the Coeur d'Alene National Forest, Boise National Forest, Salmon-Challis, and Island Park west of Yellowstone — researchers document the evolution of each wolf pack and annually learn about the pack's structure. They learn which are the dominant wolves, which are parents, whether any wolves have died and which individuals replaced them.

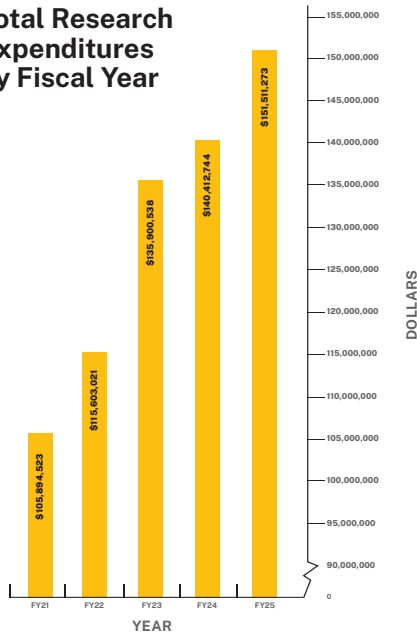
The research helps biologists at Idaho Department of Fish and Game and other agencies learn what effect hunting and trapping has on wolf packs and helps game departments make decisions about wolf management.



# FY25 RESEARCH ACTIVITY AND EXPENDITURES

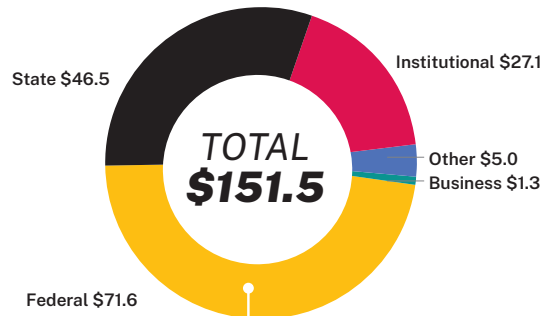
Expenditures are actual dollars spent on research as a measure of research activity. Research activity is the number of proposals and dollars awarded, not all of which is spent at the time of the report.

**Total Research Expenditures by Fiscal Year**



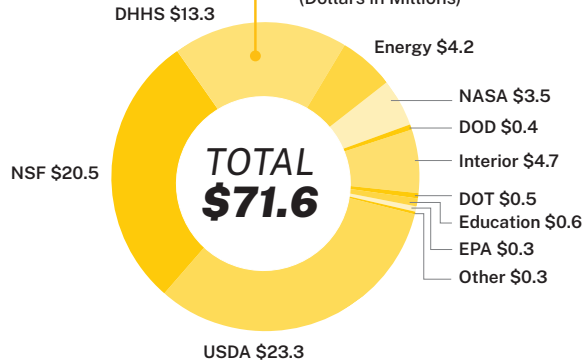
**Total Research Expenditures in FY25 by Funding Source**

(Dollars in Millions)



**Portion of Federal Research Expenditures by Sponsoring Agency**

(Dollars in Millions)



**Summary of Sponsored Proposals & Awards Activity in FY25**

SPONSORED PROJECTS	NUMBER	AMOUNT
Proposals Submitted	764	\$297,990,840
AWARDS RECEIVED	NUMBER	AMOUNT
New Awards	409	\$65,956,437
Other Actions	177	\$44,931,882
<b>TOTAL AWARDS</b>	<b>586</b>	<b>\$100,888,319</b>

<b>FY 25 STATS</b>	<b>\$151.5 M</b> in research expenditures	<b>409</b> new awards	<b>17</b> invention disclosures	<b>3</b> new licenses
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## FUNDRAISING HIGHLIGHTS FOR 2025

In Fiscal Year 2025 (July 1, 2024-June 30,2025), donors contributed the largest amount for a single year in U of I history, making FY25 the fifth year in a row in which donors contributed more than \$50 million to the U of I.

The FY25 fundraising total was \$67.6 million, a 29% increase over FY24. More than 7,600 individuals, families and organizations made 15,384 gifts, with \$19.3 million going to scholarships and student financial aid; \$38.5 million to research and academics; \$7.5 million to faculty support; and \$2.3 million to facilities, operations and community outreach.

Vandal Giving Day 2025 raised \$1.28 million in only 1,889 minutes, the largest total in the event's nine-year history. The one-day effort also pushed the Brave. Bold. Unstoppable. philanthropic campaign beyond the \$500 million milestone eight months before its official end on Dec. 31, 2025. By the end of 2025, the campaign raised more than \$550 million. More detailed information will appear in the 2027 Annual Report.

Donors established 58 new endowments in FY25, including 43 scholarship endowments for funding across colleges, majors and activities, including athletics, 4H, study abroad and Greek Life.



## STUDENT TESTIMONIALS



**Macie  
Grantham '26**  
*Child Development  
and Psychology*

*"Being a Vandal has been such a positive experience for me,*

*and the professors and friends I have met have made every second so worth it. Because of the support I've received through scholarships, I've been able to fully commit myself to strengthening my passion for child development and early education. Donor generosity has opened doors to experiences that have shaped who I am, both personally and professionally. Their investment in students like me truly changes lives, and I am deeply grateful."*



**Jon  
McKenzie  
'28**  
*Law*

*"I took a huge leap of faith by returning to*

*higher education as an older student. Without donor generosity, this opportunity would not have come to fruition. In 2024, I was blessed to graduate alongside my two adult children, and in my first month of law school, I was elected by my class as the 1L representative of the Student Bar Association. My wife, our two adult children, our two grandchildren and I send our endless appreciation for this honor."*



**Luna Migueles  
Miralles**  
*Master of Fine Arts*

*"What I love most about being a Vandal is the sense of gratitude it has instilled in me. This community*

*has connected me with inspiring people and opened unexpected opportunities. Scholarships support reinforces my confidence in my work and my decision to move far from home in pursuit of new opportunities. I will carry this encouragement with me as I continue my artistic journey."*



**James  
Cornelius  
'28**  
*Finance and  
Marketing*

*"My Vandal experience has*

*been nothing short of incredible! I've connected with a community unlike any other, and it's been transformative in many unforeseen ways. I don't take a single moment for granted because I know it's a result of the generosity of others. I only hope that someday I can pay it forward and give other people the same blessings."*



**BUILDING OUR FUTURE**

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## Meat Science and Innovation Center

The **Meat Science and Innovation Center** Honoring Ron Richard opened in early 2026. Located on the Moscow campus this facility will accommodate larger classes of students, greater research and training opportunities, and expanded production to match the prestige of the meat science program and its student-run retail arm, Vandal Brand Meats.

U of I meat science graduates enjoy a 100% job placement rate with employers like Albertsons and AgriBeef. The facility will continue filling a niche as one of the few USDA-inspected plants where northern Idaho ranchers can process their beef. It will also train skilled workers to staff several large meat processing facilities that have opened in Idaho in recent years, including Intermountain Packing in Idaho Falls, True West Beef in Jerome and CS Beef Packers in Kuna. Classes in the new space began this spring semester and the grand opening event is April 10.



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## CAFE

Dairy is the No. 1 agricultural commodity in Idaho and this year the U of I will open the nation's largest research dairy. Located in the heart of the dairy industry in Magic Valley, the **Center for Agriculture, Food and the Environment, or CAFE**, includes all the components of a typical Idaho dairy built to accommodate 2,000 cows, which represents the average herd size in Idaho. The center builds upon current research to develop new technologies to convert dairy manure into valuable products like fertilizers, bioplastics and clean water, helping our dairy farmers achieve sustainable solutions while realizing additional revenue streams. This strategic investment by U of I, in partnership with the state and private industry, will help the Idaho dairy industry compete nationally. By the end of 2026, CAFE will have 400 cows on site, building up to a herd size of 2,000 longer term.



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## Campus housing projects

Major upgrades to student housing on the Moscow campus are underway. The **South Hill housing project** will offer modern, sustainable housing for graduate students, married couples and families at U of I, beginning in Fall 2026. The development includes 451 total beds to meet a range of housing needs and help attract new students. The project replaces apartments that were long overdue for replacement. Undergraduate residence hall improvements are progressing, as well. Ongoing room remodels in Theophilus Tower and Wallace Residence Center are providing amenities like air conditioning. These ongoing projects are crucial for student recruitment and retention.



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## Military Science and Veteran's Assistance Center

State funding awarded in 2025 officially launched the fundraising and planning processes for the **Joint Military Science and Veteran's Assistance Center** on the south end of campus. U of I's land grant mission calls for a focus on military science education, and the new center will greatly elevate the university's ROTC programs. By renovating Targhee Hall, U of I will provide a functional space where multiple units can gather in one location. A consolidated facility promotes interaction and mentorship among Veterans, service members and future officer leadership of all branches.



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## D.A. Huckabay M.D. Medical Education

The **D.A. Huckabay M.D. Medical Education** expansion is nearly complete. Our 80 Idaho WWAMI Medical Education students are already using the extension for simulation training purposes. The extension offers simulation training rooms, faculty and staff offices and a classroom. Use of these spaces will increase with the first cohort of Doctor of Clinical Psychology (PsyD) students that begin instruction in Fall 2026. The extension also offers much needed spaces for other degrees in the U of I School of Health and Medical Professions including: Gerontology, MS; Doctor of Anatomical Sciences, DAS; Masters of Athletic Training, MSAT; Doctor of Athletic Training, DAT. The extension also provides space as well as anticipated future growth in our programming.



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## Maintenance projects

Across the university numerous **deferred maintenance projects** took place in 2025, including upgrades in Hays Hall and new HVAC systems in the Ag Science Building. The projects were funded by the university as well as the state's Permanent Building Fund, the state legislature and the governor. These infrastructure projects help prevent system failures and preserve our historic campus, improving conditions for our students and employees.







## CONCLUSION

After years of steady enrollment growth, increased financial stability, successful fundraising and record research output, the University of Idaho is well-positioned for the future. Across the country, higher education faces a tumultuous future with the enrollment cliff and funding shortages already causing challenges. Thoughtful, community-centered planning and strategic investment in areas of strength —using AI— put the U of I on a path to lead Idaho into the future.





University of Idaho

**NORTH IDAHO COLLEGE**

**SUBJECT**

North Idaho College – Annual Report

**BACKGROUND/DISCUSSION**

This agenda item allows the Board to receive an update from North Idaho College regarding progress report on the institution's strategic plan, details of implementation, status of goals and objectives, and information on other points of interest.

**ATTACHMENTS**

Attachment 1 – North Idaho College Annual Report

**IMPACT**

This institutional annual report serves to provide a state of the college update and inform the Idaho Board of Education of the priorities of the North Idaho College Board of Trustees and institution leadership and their plans to guide the institution forward.

**BOARD STAFF COMMENTS AND RECOMMENDATIONS**

Informational item; no staff comments.

**BOARD ACTION**

This item is for informational purposes only.