

## ISU CAES Associate Director Q1 FY24 Report

### Executive Summary

*Provide a brief overall summary for the last reporting period.*

Between October 1 – December 31, 2023, ISU CAES researchers had published more than 24 peer-reviewed journals, attended five national/international conferences, received over \$670,000 in grants, submitted more than 20 collaborative proposals/pre-proposals, provided more than 9 tours of the CAES building/facilities, engaged with at least 6 private companies/industry, hosted multiple events in CAES and ISU with over two dozen INL researchers, and signed a strategic MoU with the Australian University in Kuwait. Additional strategic MoUs with South Korea and Qatar to come in 2024.

### # Tours Led by University Reps

1. Premier Technology Tour on Dec 13
2. Four tours for the Idaho Falls Camps Executive Director Candidates (12/14/23, 12/15/23, 12/18/23, 12/19/23)
3. CAES and C3 tour (5 ISU attendees including AVP of Marketing and Communication) 12/12/23
4. Tour of CAES with emphasis on 3D printing capabilities (5 attendees, INL and ISU) 11/14/23
5. ISU-INL C3 working lunch and tour (INL and ISU participants around 17) 10/12/23.
6. ARPAE tour 10/16/23 (INL, ISU (including VPR), DOE)
7. Tour of CAES facilities to Teton Prestress Concrete on 10/17/2023
8. Idaho Accelerator Center staff tour of CAES 9-22-2023 (ISU participants)
9. ISU Deputy Associate Director does weekly tours for new researchers who are getting access to CAES

### Section 1. University Publications on behalf of CAES

*List publications and indicate pending, submitted/accepted.*

#### Mostafa Fouda

Title: Lightweight Multi-Class Support Vector Machine-Based Medical Diagnosis System with Privacy Preservation

Journal: MDPI Sensors, vol. 23, no. 22, article no. 9033, Nov. 2023

Authors: Sherif Abdelfattah, Mohamed Baza, Mohamed Mahmoud, Mostafa M. Fouda, Khalid Abualsaud, Elias Yaacoub, Maazen Alsabaan, Mohsen Guizani

Status: Published, doi: 10.3390/s23229033

Title: Novel Evasion Attacks against Adversarial Training Defense for Smart Grid Federated Learning

Journal: IEEE Access, vol. 11, pp. 112953–112972, Oct. 2023

Authors: Atef H. Bondok, Mohamed Mahmoud, Mahmoud M. Badr, Mostafa M. Fouda, Mohamed Abdallah, and Maazen Alsabaan

Status: Published, doi: 10.1109/ACCESS.2023.3323617

Title: Efficient One-Class False Data Detector Based on Deep SVDD for Smart Grids

Journal: MDPI Energies, vol. 16, no. 20, article no. 7069, Oct. 2023

Authors: Hany Habbak, Mohamed Mahmoud, Mostafa M. Fouda, Maazen Alsabaan, Ahmed M. Mattar, Gouda I. Salama, Khaled Metwally

Status: Published, doi: 10.3390/en16207069

Title: Benchmarking the User-Centric Clustering and Pilot Assignment Problems in Cell-Free Networks

Conference presentations: 2023 IEEE Global Communications Conference (IEEE GLOBECOM 2023), Kuala Lumpur, Malaysia, Dec. 4–8, 2023

Authors: Ahmed Aboufotouh, Zubair Md Fadlullah, Mostafa M. Fouda, Muhammad Ismail, and Dusit Niyato

Status: Published

Title: A Dual-Objective Bandit-Based Opportunistic Band Selection Strategy for Hybrid-Band V2X Metaverse Content Update

Conference presentations: 2023 IEEE Global Communications Conference (IEEE GLOBECOM 2023), Kuala Lumpur, Malaysia, Dec. 4–8, 2023

Authors: Sherief Hashima, Zubair Md Fadlullah, Mostafa M. Fouda, Kohei Hatano, Eiji Takimoto, and Mohsen Guizani

Status: Published

Title: Joint Knowledge Distillation and Local Differential Privacy for Communication-Efficient Federated Learning in Heterogeneous Systems

Conference presentations: 2023 IEEE Global Communications Conference (IEEE GLOBECOM 2023), Kuala Lumpur, Malaysia, Dec. 4–8, 2023

Authors: Gad Gad, Zubair Md Fadlullah, Mostafa M. Fouda, Mohamed I. Ibrahim, and Nidal Nasser

Status: Published

Title: Moreau Envelopes-based Personalized Asynchronous Federated Learning: Improving Practicality in Network Edge Intelligence

Conference presentations: 2023 IEEE Global Communications Conference (IEEE GLOBECOM 2023), Kuala Lumpur, Malaysia, Dec. 4–8, 2023

Authors: Anwar Asad, Mostafa M. Fouda, Zubair Md Fadlullah, Mohamed I. Ibrahim, and Nidal Nasser

Status: Published

Title: Optimizing Reconfigurable Intelligent Surface-Assisted Integrated Sensing and Communication Systems

Conference presentations: 2023 IEEE Virtual Conference on Communications (IEEE VCC 2023), Virtual Conference, Nov. 28–30, 2023

Authors: Mohamed I. Ismail, Abdullah M. Shaheen, Mostafa M. Fouda, and Ahmed S. Alwakeel

Status: Published

Title: EMI Performance Analysis in IRS-aided Multi-user Wireless Communication Systems

Conference presentations: 2023 IEEE Virtual Conference on Communications (IEEE VCC 2023), Virtual Conference, Nov. 28–30, 2023

Authors: Rhana M. Elshishtawy, Shima S. Ali, Adly S. Tag Eldien, Mostafa M. Fouda, Mohamed I. Ismail, and Esraa M. Eid

Status: Published

Title: Privacy-Aware and Hardware Acceleration-Based Aggregation Scheme for Smart Grid Networks

Conference presentations: 2023 Eighth International Conference On Mobile And Secure Services (MobiSecServ 2023), South Beach, Miami, Florida, USA, Nov. 4–5, 2023

Authors: Kayla White, Ujunwa Madububambachu, Ahmed Sherif, Kasem Khalil, Magdy Bayoumy, and Mostafa M. Fouda

Status: Published, doi: 10.1109/MobiSecServ58080.2023.10329004

Title: Robust Deep Learning-based Indoor mmWave Channel Prediction Under Concept Drift

Conference presentations: 2023 IEEE 98th Vehicular Technology Conference (IEEE VTC 2023-Fall), Hong Kong, Oct. 10–13, 2023

Authors: Eslam Hasan, Elmahedi Mahalal, Muhammad Ismail, Zi-Yang Wu, Mostafa M. Fouda, Tiago Koketsu Rodrigues, and Nei Kato

Status: Published, doi: 10.1109/VTC2023-Fall60731.2023.10333513

#### Glenn Thackray

Title: Rock glacier distribution and implications for alpine hydrology in the Northern Rocky

Journal/conference presentations: conference presentation

Authors: Olivia Stanley and Glenn Thackray

Status: Published

#### Minhaz Zibran

Title: SBOM Generation Tools Under Microscope: A Focus on the npm Ecosystem

Journal/conference presentations: 39th ACM/SIGAPP Symposium On Applied Computing

Authors: M. Rabbi, A. Champa, C. Nachuma, and M. Zibran

Status: Accepted

Title: AI Writes, We Analyze: The ChatGPT Python Code Saga

Journal/conference presentations: 21<sup>st</sup> ACM International Conference on Mining Software Repositories

Authors: M. Rabbi, A. Champa, M. Zibran, and M. Islam

Status: Submitted

Title: A Four-Dimension Gold Standard Dataset for Opinion Mining in Software Engineering

Journal/conference presentations: 21<sup>st</sup> ACM International Conference on Mining Software Repositories

Authors: M. Islam, M. Rabbi, A. Champa, and M. Zibran

Status: Submitted

Title: ChatGPT in Action: Analyzing Its Use in Software Development

Journal/conference presentations: 21<sup>st</sup> ACM International Conference on Mining Software Repositories

Authors: A. Champa, M. Rabbi, C. Nachuma, and M. Zibran  
Status: Submitted

Title: Analyzing ChatGPT Assistance in Programming  
Journal/conference presentations: 21<sup>st</sup> ACM International Conference on Mining Software Repositories  
Authors: C. Nachuma, M. Rabbi, A. Champa, and M. Zibran  
Status: Submitted

Title: Feature Importance and Fail Points: A Closer Look at Why Phishing Emails Escape  
Journal/conference presentations: 39th ACM/SIGAPP Symposium On Applied Computing  
Authors: A. Champa, M. Rabbi, C. Nachuma, and M. Zibran  
Status: Rejected

#### Chikashi Sato

Title: Integrating microbial fuel cell and hydroponic technologies using a ceramic membrane separator to develop an energy–water–food supply system.  
Journal/conference presentations: Membranes 13, 803.  
Authors: Sato, C., Apollon, W., Luna-Maldonado, A.I., Paucar, N.E., Hibbert, M., Dudgeon, J.  
Status: Published

#### Shannon Kobs

Title: Ancient volcanism may have influenced patterns of hydrated regolith on Mars  
Journal/conference presentations: Icarus  
Authors: Tyler G Paladino, Shannon Kobs Nawotniak, Ehouarn Millour, Suniti Karunatillake, Don R Hood, Augustus Bates  
Status: Published

Title: Effects of Wind on the Stability of Explosive Eruption Plumes  
Journal/conference presentations: Journal of Volcanology and Geothermal Research  
Authors: Tyler Paladino, Shannon Kobs Nawotniak, Bryan Nicholson, Suniti Karunatillake  
Status: Accepted, pending minor revision

#### Mustafa Mashal

Title: Full-scale Cyclic Testing of an Innovative Energy Dissipating Device for Seismic Resiliency  
Journal/conference presentations: Soil Dynamics and Earthquake Engineering  
Authors: Y. Chen, A. Palermo, and M. Mashal  
Status: Published

Title: Extending Application of Titanium Alloy Bars for Retrofitting Reinforced Concrete Buildings  
Journal/conference presentations: 18<sup>th</sup> World Conference on Earthquake Engineering, Milan, Italy  
Authors: H. Al-Ghanim, W. Al-Nahhal, and M. Mashal  
Status: Accepted

Title: Comparative Evaluation of Performance & Behavior of Metallic Dissipaters to Mitigate Seismic Energy

Journal/conference presentations: 18<sup>th</sup> World Conference on Earthquake Engineering, Milan, Italy

Authors: S. Maharjan, J. Cantrell, and M. Mashal

Status: Accepted

Title: ASCE/SEI 7-22 “Minimum Design Loads and Associated Criteria for Buildings and Other Structures”

Journal/conference presentations: American Society of Civil Engineers

Authors: ASCE 7 Committee

Status: Published

Title: ASCE/SEI 41-23 “Seismic Evaluation and Retrofit of Existing Buildings”

Journal/conference presentations: American Society of Civil Engineers

Authors: ASCE 41 Committee

Status: Published

## **Section 2. Conferences Attended on behalf of CAES**

Name: American Nuclear Society (ANS) Winter Meeting

Location: Washington, DC.

Purpose: Presenting publication

Attendees from university/CAES: Amir Ali and Scott Wahlquist

Name: Workshop on Nuclear Materials Research using Activated Materials Laboratory at the Upgraded Advanced Photon Source

Location: Argonne National Laboratory

Purpose: Learn more about up-and-coming facilities relevant to research interests

Attendees from university/CAES: Dan LaBrier

Name: 2023 IEEE Global Communications Conference (GLOBECOM)

Location: Kuala Lumpur, Malaysia

Purpose: Presenting accepted papers and connecting with international researchers

Attendees from university/CAES: Mostafa Fouda

Name: Geological Society of America, Annual Meeting

Location: Pittsburgh, PA

Purpose: Present research results, build collaboration with other scientists working in field.

Attendees from university/CAES: Olivia Stanley, Glenn Thackray

Name: Jared Cantrell

Location: Washington, D.C.

Purpose: Resilience Week / Tech Expo

Jared participated as a panelist in the discussion titled “Training and Exercise to Strengthen Infrastructure Resilience”

Attendees from university/CAES: Mustafa Mashal, Laurie Holien, and Jared Cantrell

### **Sections 3. University Proposals Related to CAES Activities** (use attached table)

#### **Section 4. Patents, Licenses, other IP**

*List all patents, licenses, and/or other IP related to CAES:*

*What were the impactful accomplishments associated with CAES strategic initiatives?*

#### **Section 5. Grants and Awards**

##### Mostafa Fouda

Title: Reinforcement-Learning-Based Approach to Optimizing Quality of Service and Security on Fifth-Generation Networks

Awarding Organization/Institution: Laboratory Directed Research & Development (LDRD)

Timeframe: Feb. 2023 to Sep. 2024

Award Amount: \$150K

Title: Collaborative Research: NeTS: JUNO3: SWIFT: Softwarization of Intelligence for Efficient 6G Mobile Networks

Awarding Organization/Institution: National Science Foundation (NSF)

Timeframe: Sept. 2022 to Aug. 2025

Award Amount: \$225K

##### Glenn Thackray

Title: Rock glacier distribution and implications for alpine rock glacier carbon outflow in the Northern Rocky Mountains

Awarding Organization/Institution: Center for Ecological Research and Education, ISU

Timeframe: 3/23-2/24

Award Amount: \$3,400

Title: Rock glacier distribution and implications for alpine hydrochemistry in the Northern Rocky Mountains

Awarding Organization/Institution: Geological Society of America

Timeframe: 4/23-3/24

Award Amount: \$1,800

Title: Rock glacier implications for alpine stream hydrochemistry in the Northern Rocky Mountains

Awarding Organization/Institution: Geslin Research Fund, ISU

Timeframe: 2/23-2/24

Award Amount: \$1,500

Minhaz Zibran

Title: VizSoft: Interactive Visualization of Software Aspects in IDE

Awarding Organization/Institution: ISU-CAES Seed Grant, Idaho State University

Timeframe: Jan 2023- June 2024

Award Amount: \$ 29,969.39

Title: Internal ISU CAES

Awarding Organization/Institution: Idaho State University

Timeframe: Aug 2023- Dec 2023

Award Amount: \$5,000

**Section 6. Incoming CAES Personnel**

*List any intern, undergrad student, grad student, postdoc, professor, fellow, employee or other visitor that is new to CAES.*

Dan LaBrier

Name: Cody Parkinson, 1<sup>st</sup> year graduate student

Institution: Idaho State University

Focus of work: Sodium metal interactions for advanced nuclear reactors

Mostafa Fouda

Name: Hamza Kaddour, MS student

Institution: Idaho State University

Focus of work: Cybersecurity

Glenn Thackray

Name: Olivia Stanley

Institution: Idaho State University

Focus of work: Field monitoring of rock glacier stream outflow and relationships to topographic setting and hydrological connectivity

Name: Dr. Jennifer Pierce

Institution: Boise State University

Focus of work: Collaboration with Stanley and Thackray on rock glacier hydrologic assessment project.

Name: Madison Bail

Institution: College of Western Idaho

Focus of work: Assisted with field monitoring of rock glacier stream outflow and relationships to topographic setting and hydrological connectivity

Name: Colden Baxter

Institution: Idaho State University

Focus of work: Stream ecology of rock glacier outflows and implications for water management.

Minhaz Zibran / Taher Deemyad

Name: Amir Hafezi

Institution: Idaho State University

Focus of work: Mobile Robots for Security (joint work with Dr. Taher Deemyad)

## **Section 7. Outgoing CAES Personnel**

*List any intern, undergrad student, grad student, postdoc, professor, fellow, employee or other visitor that is leaving CAES.*

Mustafa Mashal

Name: Mahesh Acharya (PhD candidate)

Institution: Idaho State University

Focus of work: Structural materials and machine learning

Name: Kabiraj Phuyal (Masters student)

Institution: Idaho State University

Focus of work: Sustainability and Net Zero

Name: Saksham Maharjan Masters student)

Institution: Idaho State University

Focus of work: Energy dissipaters

Name: Sindi Banda (Bachelors student)

Institution: Idaho State University

Focus of work: Mixed Reality

## **Section 8. Industry Engagement**

*List all new industries you've engaged.*

Chikashi Sato, Bruce Savage, Mustafa Mashal, Kavita Sharma

Name: Claude Goguen, Director of Outreach and Technical Education

Company: National Precast Concrete Association (NPCA)

Project Focus: Claude toured the Environmental Engineering Laboratory at BTC and facilities in EAMS on 11/13/2023. ISU is exploring collaboration on civil and environmental engineering with NPCA.

Name: Doug Workman, CEO and John McClurkin

Company: WERLPOWER, LLC

Project Focus: Martin Blair, Bruce Savage, and Chikashi Sato discussed potential collaboration on "Using the kinetic energy of the outfall from wastewater treatment plants to generate utility scale electricity" on 11/14/2023.

Name: John Crigler, CEO  
Company: Idaho Regional Waste Services  
Project Focus: Collaboration on recycled and processed old tires, concrete sustainability (Bruce Savage, Mustafa Mashal)

Name: Eric Bastian, Director Western Dairy Center & VP Innovation Partnerships  
Company: Dairy West  
Project Focus: Sustainability and wastewater

Name: Doug Sayer, Chief Business Officer  
Company: Premier Technology Inc.  
Project Focus: Additive Manufacturing

Name: Hal Simmons, Owner  
Company: Teton Prestress Concrete  
Project Focus: Nano-cement

## **Section 9. New Equipment**

*List new research equipment associated with CAES.*

### Dan LaBrier

Name: Lever Arm Tester w/High Temperature Furnace (Applied Testing Systems)  
Capability: Mechanical testing over long periods of times (months, years)  
Lifespan: 20+ years  
Cost per CAES partner:  
Location: Eames Building, Pocatello Campus

### Mary Lou Dunzik-Gougar

Name: PI 88 SEM PicoIndenter (Hysitron – Bruker)  
Capability: The PI 88 SEM PicoIndenter, is a depth-sensing nanomechanical test instrument for in-situ experimentation in SEMs and FIB/SEM.  
Lifespan: NA  
Cost per CAES partner: Donated by ISU to MaCS (original quote = \$180,000)  
Location: MaCS, CAES Building

### Rene Rodriguez

Name: Crystal Deposition Monitor  
Capability: In-situ measurement of thin film deposition  
Lifespan: 5-10 years  
Cost per CAES partner: ~\$2,500  
Location: ISU Lab, Pocatello Campus

## **Section 10. Collaborative Research Events**

*List all workshops, events, and planning meetings related to CAES activities:*

Name: ISU-INL C3 Event

Date: October 12, 2023

Location: CAES

Attendees: Various staff from ISU and INL

Results/Impact: New collaboration on computational work, submission of joint pre-proposals to NEUP, EPSCoR, INL LDRD

Name: ISU-INL-CAES-DRC Dog Robot Collaboration

Date: 12/13/2023

Location: ISU Disaster Response Complex Indoor Armory Building

Attendees: INL: Gustavo Reyes, Rajiv Kadka, Amanda Rynes, Kolton Heaps, Kaleb K. Houck, Bryon Marsh; ISU: Mustafa Mashal, Martin Blair, Taher Deemyad, Roy Dunker, Amir Ali, Marianne Cowgill, Sindi Banda, Saugat Acharya, Pramesh Shah, Jared Cantrell

Results/Impact: Discussion and planning of collaborative efforts among the entities to utilize the dog robot in combination with CAES, INL, ISU, and DRC capabilities for various applications. Identification of additional grants and opportunities to pursue in various research fields.

Name: Student Training on SEM at ISU

Date: 10/12/2023 & 10/19/2023

Location: CAMAS, Eames Building ISU

Attendees: Kabiraj Phuyal, Manish Acharya, Samjhana Rajbhandari, Saksham Raj Maharjan

Instructor: Jameson Root

Results/Impact: ISU students participated in an 8-hour training program learning to operate and collect data samples on ISU's FEI Quanta 200 SEM. The training greatly broadened the students understanding and abilities of experimental work in relation to microscopy.

## **Section 11. Research Highlights**

*List significant accomplishments (R&D milestones, etc.) related to CAES people, equipment, projects, and facilities.*

### Glenn Thackray

Description: Completed intensive spring-autumn field monitoring of nine high-elevation streams.

Collected and prepared samples of stream water and biological components of rock glacier outflow streams. Submitted 70 water samples and 8 biological samples for isotopic and hydrochemical analysis

Date: 9/28/23

Impact: Successful collection of root dataset for detailed statistical analysis. Analysis and publication process ongoing.

### Minhaz Zibran/Taher Deemyad

Description: Following is joint work with Taher Deemyad. The project team, in the absence of a dedicated dog robot, utilized the TurtleBot as a test platform for developing a security dog robot, leveraging their

shared software base. Milestones in the development include the installation of the Robot Operating System (ROS) on Ubuntu, establishing the project's software foundation, and achieving both wired and wireless connections between the master computer and the TurtleBot, enhancing operational flexibility. Further progress involved expanding the TurtleBot's capabilities with successful depth and RGB camera testing, implementing object avoidance using the depth camera for autonomous navigation, and completing a comprehensive mapping of the MCERC lab with an RPLiDAR sensor. Future plans aim to integrate a thermal camera and sound sensors to enhance the robot's security capabilities.

Date: 08/21/2023-12/16/2023

Impact: The project brings multifaceted impacts, including technological advancement through enhancing operational flexibility with wired and wireless connections and showcasing success in autonomous navigation and mapping. The cost-effective approach demonstrates efficient resource utilization, and future plans for security enhancements indicate potential contributions to threat detection. The shared software base fosters knowledge transferability, positioning the project as a valuable contribution to robotics and security systems.

#### Mustafa Mashal

Description: Signing a Memorandum of Understanding (MoU) on behalf of Martin E. Blair, Vice President for Research and Economic Development at Idaho State University, with the Australian University in Kuwait.

Date: 11/01/2023

Impact: Preparation and submission of collaborative proposals to Kuwait Foundation for Advancement of Sciences

## **Section 12. Other**

*Important updates from your university that relate to CAES. This could include changes to joint appointments, student engagement, major events, staff changes, high-level visits/tours, stakeholder engagement, lab milestones, collaborative meetings, etc.) and which you want to include in the annual report but don't fit into one of the categories above.*

- ISU ESTEC Nuclear Operations Technology and ISU Nuclear Engineering continue to collaborate on a path forward to allow a way for Nuclear Engineering Technology students a bridge to a Nuclear Engineering Bachelor of Applied Science.
- ESTEC Nuclear Operations Technology students toured INL facilities on November 20 and December 11, 2023.
- ESTEC's report to BEA covering the period of October 1 - September 30, 2023 has been submitted during October 2023.
- Professor Nei Kato, the Dean of the Graduate School of Information Sciences at Tohoku University, Japan, and three of his team visited Dr. Mostafa Fouda at CAES, who provided a tour of the facilities. Prof. Kato collaborates with Dr. Mostafa Fouda from ISU on an active NSF international grant between the USA and Japan.
- FY25 IGEM-HERC Preproposal # 1
  - Title: Additive Manufacturing's Enhanced Role In Commercial Applications (AMERICA)
  - Principal Investigator: Jared Cantrell

- Co-Investigators: Mustafa Mashal, Kunal Mondal (ORNL)
- Industry Partners: Premier Technology, Inc.
- Funding Request: \$1,100,000
- FY25 IGEM-HERC Preproposal # 2
  - Title: Development of Novel Modular Shielding Units for Nuclear and Health Physics Applications
  - Principal Investigator: Dan LaBrier
  - Co-Investigators: Mustafa Mashal, Jared Cantrell, Mahesh Acharya
  - Industry Partners: NA
  - Funding Request: \$250,000
- Rene Rodriguez submitted a Proposal to INL for LDRD Seed Grant “Developing Plasma Methods for Nonparticle Synthesis”, the proposal was not funded
- Cory Bennett (Education) and Shannon Kobs Nawotniak (Geosciences; Honors) have been overseeing a multi-year project funded by INL and the Idaho STEM Action Center to create the REAL STEM (Remote and Equitable Access to Learning Science, Technology, Engineering, and Mathematics) online learning platform for upper elementary students. The platform now includes 12 learning adventure modules and was the subject of a recent Honors thesis project by undergraduate Beckett Bodell. The analysis included a deep-dive analysis of the various modules in terms of Flesch-Kincaid reading level, Mayer’s 12 Principles of Multimedia Design, and the Triple E framework for student engagement. The work has been proposed for inclusion in the College of Education’s Celebration of Excellence event this spring.

## ISU CAES Associate Director Q1 FY24 Report

### Proposal(s) Submitted/Awarded during Reporting Period

*Note: Provide the best detail possible*

PI	Title	Funding Agency	Submittal Date	Start Date	End Date	Amount	Status
Donna Delparte	Thermal remote sensing for spawning fish (Salmon and Red Band Trout) in Idaho river systems	AmericaView	11/15/2023	10/1/2023	9/14/2024	\$25,500	Awarded
Rajib Mahamud	Hybrid Physics Informed Machine Learning Augmented Multiphysics Model for the Simulation of Supersonic Reacting Flow	National Science Foundation	10/25/2023	8/1/2024	7/31/2027	\$577,242	Pending
Benjamin Bolin	NLM Traveling Exhibit - Confronting Violence/Enfrentando La Violencia	Univ of Utah	10/26/2023	1/1/2024	3/31/2024	\$7,759	Pending
Kavita Sharma	The metabolic impact of gamma - aminobutyric acid (GABA) producing probiotics on healthy aging	National Institutes of Health	10/16/2023	7/1/2024	6/30/2026	\$143,001	Pending
Emanuele Zappala	Topological quantum field theory in artificial intelligence	European Research Council	11/20/2023	5/1/2024	4/30/2027	\$2,673,771	Pending
Kristi Moser-Mcintire	FY24 CAES Assistant Safety Officer - BEA	Battelle Energy Alliance LLC	10/13/2023	10/18/2023	9/30/2024	\$127,280	Awarded
Kristi Moser-Mcintire	FY24 CAES Assistant Safety Officer - UI	Univ of Idaho	10/13/2023	10/1/2023	9/30/2024	\$12,716	Pending
Kristi Moser-Mcintire	FY24 CAES Assistant Safety Officer - BSU	Boise State Univ	10/13/2023	10/1/2023	9/30/2024	\$12,716	Awarded
Kristi Moser-Mcintire	FY24 MaCS Lab Personnel Agreement	Boise State Univ	10/19/2023	10/1/2023	9/30/2024	\$95,954	Awarded
Mustafa Mashal	Carbon Negative Concrete: A Paradigm Shift from the Use of Recycled to Upcycled Aggregate to Combat Climate Change	Qatar National Research Fund	11/20/2023	1/1/2024	1/1/2027	\$142,284	Not Funded
Daniel LaBrier	I-Loop Tube: Zircalloy Grayloc Seal Prototypic Testing	Battelle Energy Alliance LLC	11/20/2023	10/1/2023	9/30/2024	\$52,000	Pending
Srinath Pashikanti	Cancer Cell Mitochondrial Membrane Depolarization Utilizing Sphingoid Based Probe	National Institutes of Health	10/25/2023	7/1/2024	6/30/2027	\$412,962	Pending
Xiaomeng Xu	Research Assistantship Spring 2024	Battelle Energy Alliance LLC	11/20/2023	1/1/2024	5/31/2024	\$15,015	Pending
Kristi Moser-Mcintire	FY24 ISU Chemical Purchases To Support INL Research Projects At CAES	Battelle Energy Alliance LLC	11/13/2023	12/6/2023	9/30/2024	\$10,000	Awarded
Leslie Kerby	Collaboration with Glanbia and Dairy West/Western Dairy Center	Build Dairy	12/12/2023	1/1/2024	12/31/2025	\$112,036	Pending