

IGEM Grant Report

Progress (due Jan. 1)

Annual (due Jul. 31)

(due Aug. 31)

IGEM Grant #23-001

Principal Investigator – Prof. Michael Haney

Submission Date – 2024.07.31

Primary Institution – University of Idaho

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

Section 1: Summary of project accomplishments and upcoming plans.

- Continuing to build and expand the Reconfigurable Attack-Defend Instructional Computing Laboratory (RADICL) at the University Place campus in Idaho Falls. This novel, immersive environment is integrating physical processes, full-scale enterprise IT systems, and Internet-scale cyber-attacks on-demand to offer researchers, students, and trainees a controlled live-fire environment like no other currently available. The laboratory will be a hybrid virtual and physical environment allowing access from across the state through the Idaho Cyber Range.
- Worked with Idaho Congressman Mike Simpson to submit a NIST Community Project that will expand the laboratory capabilities initially foreseen in this (HERC-funded grant).
- Continued efforts, including two initial workshop meetings, have resulted in further discussions with industry partners and new partners at area K-12 schools. We are forming a more formal partnership in eastern Idaho to expand access to cyber-physical systems and cybersecurity training using our immersive and engaging environment.
- Development began of the laboratory focused on power system communication and control systems. We have expanded our relationships with industry partners, including Schweitzer Engineering Laboratories, Westinghouse (now WESCO), Datacast Technologies, and Edge Velocity to begin integrating their technologies into the laboratory. This includes significant donations from the vendors to complement Idaho's investments through the HERC IGEN program. We have also used matching funds provided by the university to procure the real-time digital grid simulator and have begun initializing it.
- Delivered a report to the U.S. House of Representatives regarding the cybersecurity of the electric distribution system to be made public in the coming months.
- Continuing to use RADICL spaces and equipment to train college students, active professionals, and high school students and teachers in an immersive research environment.
- Hosted two regional workforce and collaboration workshops with stakeholders in October and April under the UI Level II Intermountain Center for the Cybersecurity of Critical Infrastructure (IC3I) Attendees included representatives from INL, ISU Curtis Wright, City of Idaho Falls, and local industry.

Plans for the upcoming reporting period include a first new graduate research course developed in this environment offered Spring of 2024, and plans for teacher training and K-12 school visits with our mobile lab components.

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)

Proposals submitted

- (1) R. A. Borrelli (PI), Michael Haney (co-PI) - University of Idaho, Thomas A. Ulrich (co-PI) - Idaho National Laboratory. Nuclear Power Plant Cyber-Risk Assessment with Real-Time Reactor Operations. NEUP 25-34477. Preproposal. \$1,000,000. 2025.08.01 - 2027.07.31.
- (2) 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*]

Section 2: High-level summary of budget expenditures for the period just completed.

- Funding of \$700,000 for FY24 is split between UI and ISU co-PIs to manage (\$300,000 subaward to ISU, \$400,000 allocated to UI.)
- During this grant reporting period the focus has been on continued acquisition of equipment, materials, and supplies having expended \$481,382.89 between UI and ISU.
 - Private cloud computing: server and networking equipment and infrastructure
 - Cyber Shooting Gallery: "gadget" components
 - Operations Technology training modules for advanced manufacturing
 - Information Technology training workstations
- At the end of the 2024 fiscal year, we had \$218,617.11 between UI and ISU that remained unencumbered and was approved by the council for a 9-month no-cost extension (NCE). This approved NCE will allow Drs. Borrelli, Roberson, and Koliass to fabricate the Balance of Plant: Heat Tank Loop System in the most cost-effective manner.
- We will continue to support, as requested, two graduate students in the place of the post-doctoral position.

Facilities, materials, and equipment under this grant specifically fall under one of several categories. In order to support the backbone of our cyberspace environment, we have created a private cloud environment that will support the reconfigurable virtual spaces for cybersecurity and energy research and training. We have now doubled the computing capacity of our private cloud environment from the previous year's acquisitions. We have also expanded our networking capacity and are continuing the work in progress to connect all of the associated lab spaces in the Center for Higher Education building in Idaho Falls. Combined, the current spending to date on our private cloud computing environment is over \$300,000.

We have also grown the footprint of the Cyber Shooting Gallery. This environment consists of 6 working and 3 in production target platforms of small-scale cyber-physical systems for students to design, attack, defend, and reconfigure. We have engaged students across our campuses and with a local high school, designing and offering a new course to attract and facilitate more students, all to help us brainstorm and then create the different platforms.

The balance of our expenditures to date are on budget and in accordance with the HERC IGEM requirements and the University of Idaho Office of Sponsored Programs.

Idaho State University

- Procured robotic module to Advanced Manufacturing Trainer and installed it in Idaho Falls.
- Student workers tested functionality of Advanced Manufacturing Trainer.
- Student workers designed red vs. blue attack defend activity involving Raspberry pi Platform. Platform has been used when giving perspective cybersecurity students a tour of ISU's cybersecurity programs. This low-cost kit and activity can be used in middle and high schools as an interest ignition exercise.
- Student workers began design of a hands-on industrial network security proficiency assessment. This included initial description of test objectives, creation of optimal network diagram, description of which equipment was to be virtual vs physical, identification of software to be used on each piece of equipment. This process was informed by input from an industrial cybersecurity network segmentation subject matter expert with experience at Phillips66, Idaho National Laboratory, and the Transportation Security Agency.
- Faculty and student workers designed a motor-control addition for the PLC programming stations procured by this project in the 2022-23 window. They build out an initial proof of concept that they will expand to all 20 trainers in the 2024-25 window.

University of Idaho

The major equipment acquisition for this first year of grant funding was for the RTDS Technologies real-time data simulator for electric grid operations research. This purchase was made possible by \$76,000 from this grant matched by funds from other sources. Additional equipment made available through partnership with Schweitzer Engineering Labs has helped enhance the complexity and realism of simulations for cybersecurity research. As part of this, the Western Services Corporation (WSC) nuclear reactor simulator is in process of integration into this system. WSC is used for a wide range of power systems and cybersecurity research. This integration will enhance capabilities in these fields considerably.

Section 3: Demonstration of economic development/impact.

During this funding period in order to support the sustainability of these and related efforts in the years ahead, the University of Idaho College of Engineering created the Level II Intermountain Center for the Cybersecurity of Critical Infrastructure (IC3I) with Prof. Haney as director. The development, and technology commercialization in support of the cybersecurity of our regional critical infrastructure's cyber-physical systems. We believe these grant efforts are core to the establishment of the IC3I and that the IC3I is core to the direct economic impact of these efforts across our region.

Further, the co-PIs of this grant are involved in the ongoing development efforts of the Idaho Cyber Range to make the Idaho Falls-based laboratories and equipment interoperable with research laboratories and training facilities across the state, including at the INL Cybercore Integration Center. Additionally, we are now working with Montana State University on the development of training and education curriculum for hands-on cyber-physical systems security.

Under the aegis of the Intermountain Center for the Cybersecurity of Critical Infrastructure, a kickoff meeting was held in October 2023 at Smokin Fins in Idaho Falls. Representatives from University of Idaho, Idaho State University, Idaho National Laboratory, College of Eastern Idaho,

Regional Economic Development for Eastern Idaho (REDI), and other local industry were in attendance. Discussion focused on mission and vision of the IC3I, and strategic directions for East Idaho cybersecurity efforts built around educational partnerships, research, workforce development, and economic priorities.

Dr. Sean McBride chairs the Regional Economic Development for Eastern Idaho (REDI) Initiative Cybersecurity Group. In April 2024, the Group held a meeting at the Melaleuca Event Center in Idaho Falls. The meeting was attended by representatives from Idaho State University, University of Idaho, College of Eastern Idaho, and Boise State University. Senator James Risch sent a staff member. Several area high schools, including Madison, Idaho Falls Tech Center, and Rigby sent instructors. Consensus was that the group should approach the state to organize resources to support cybersecurity education at the middle and high school levels.

The REDI Cybersecurity Group obtained the Cyber-Idaho.org Website domain, and began working with MOAT.IT, a Pocatello-based information services, and cybersecurity firm to design and host the Website.

We have made a significant impact on the national discussion regarding the cybersecurity of the electric grid, as Dr. Roberson was the lead technical contributor to a report to the U.S. House of Representatives, via DOE CESER, on the subject. He has also participated in high-level meetings on the topic representing INL through his joint appointment at the national level and is working to secure further funding to continue growing these efforts at UI-Idaho Falls.

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

- 2 Master's students directly funded during FY24
- 1 new student recruited to be directly funded in next reporting period
- 14 additional undergraduate and graduate students directly involved in supporting initial project efforts
- 7 Principal Investigators supported by this grant

This grant effort is by design both multi-disciplined and collaborative. We have set out to create a state-of-the-art research and training facility for advanced cyber-physical systems security. Together, over 20 faculty and students from both UI and ISU 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.

Additionally, a mobile, small-scale RADICL laboratory was assembled. It includes 5 – 7 laptops and three mobile cyber-physical systems platforms, currently used for cybersecurity education purposes, with a variety of fundamental exercises for a junior high school to undergraduate level. The mobile RADICL debuted at the University of Idaho Engineering Exposition in Moscow in April 2024.

Section 5: Updated progress on long-term sustainability and description of future expansion.

- Continued submission of state grant proposals as opportunities arise.

- Continued engagement with private industry partners for workforce training needs.

RADICL and related research laboratory and training facilities have enabled education, research, and workforce development in Idaho Falls and will continue to expand through current and planned external funding. We are continuing development of our model for industry engagement and workforce training opportunities. Recently, the co-PIs, led by Dr. R.A. Borrelli, submitted a preproposal to the Nuclear Energy University Program (NEUP) for Nuclear Power Plant (NPP) resiliency under cyberattacks to expand our WSC capabilities and fund students in several disciplines. Additional grant proposals are in development by the research team as these opportunities arise.

We have begun to organize an advisory group to expand on the engagement we have with our community and industry partners across the region. With the development of our multiple spaces, our private cloud computing environment, our shooting gallery, and the data created and collected for running multiple reconfigurable cyber wargame scenarios, we expect to engage and train a wide variety of industry professionals in different roles and critical infrastructure industries. This engagement will allow for a revenue stream to sustain our staff, equipment, software licensing and other operating expenses indefinitely.

The model for our Idaho Falls facilities and capabilities centers on our engagement with the community and industry partners here and across the region. With the development of our multiple spaces on campus, our private cloud computing environment, our shooting gallery, and the data created and collected for running multiple reconfigurable cyber wargame scenarios, we expect to engage and train a wide variety of industry professionals in different roles and vertical critical infrastructure industries. And now, with the expanded mobile capabilities, we can bring this environment anywhere we can drive. This industry and school engagement will allow for development of a revenue stream designed not for profit but to sustain our staff, equipment, software licensing and other operating expenses indefinitely. Discussion for commercialization paths is nascent, but on the agenda for the upcoming year.

Section 6: Expenditure Report

University of Idaho

Itemized Expenditures

From 7/1/2023 through 6/30/2024

Grant: UA 7231 - ISBOE IGEM HERC: Secure Cyberspace

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	120 Hours	\$11,205.60

E4109 IA/GA Salary

Codling, Heidi	840 Hours	\$18,404.40
Vera, Sebastian	376 Hours	\$8,238.16

\$43,513.76

Fringe Benefits

E4280 Faculty CFR Benefit Expense		\$5,230.07
E4282 Student CFR Fringe Expense		\$666.06

\$5,896.13

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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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
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
2/12/2024	B1923222	Amazon Capital Services Inc	\$0.00
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
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
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

3/20/2024	!0537692	Amazon Capital Services Inc	\$0.00
3/26/2024	Q0045282	Amazon Capital Cherry Stream Keyboard TKL Wired	\$319.84
3/26/2024	Q0045250	Amazon Capital Cherry Stream Keyboard TKL Wired	\$79.96
3/26/2024	Q0045269	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	Q0045271	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	Q0045649	Amazon Capital LUBAN Led Signal Tower Stack	\$38.56
3/28/2024	Q0045650	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
4/15/2024	!0539997	Amazon Capital Services Inc	\$0.00
4/15/2024	!0539997	Amazon Capital Services Inc	\$0.00
4/15/2024	!0539997	Amazon Capital Services Inc	\$0.00
4/15/2024	!0539997	Amazon Capital Services Inc	\$0.00
4/17/2024	!0540186	Amazon Capital Services Inc	\$0.00
4/17/2024	!0540186	Amazon Capital Services Inc	\$0.00
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 ELOOGAA 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

\$28,793.05

\$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
12/6/2023	B1919190	xByte Technologies Inc	\$0.00
12/7/2023	B1919282	xByte Technologies Inc	\$0.00
12/7/2023	B1919282	xByte Technologies Inc	\$0.00
12/8/2023	Q0029475	CDW Computer Ce DELL CTO PE MX750C 2X6334	\$25,996.52
12/11/2023	Q0029523	CDW Computer Ce DELL CTO 10GB PASS THROUGH	\$1,046.32
12/11/2023	Q0029523	CDW Computer Ce DELL CTO PE MX750C 2X6334	\$12,998.26
1/30/2024	Q0035851	Structured Comm 48PORT EX2300	\$11,865.66
2/6/2024	Q0037061	Structured Comm MULTIYEAR CUSTOM CP SUP SVCS	\$2,986.04
2/8/2024	B1923200	Structured Communications Systems,	\$0.00
2/15/2024	B1923566	Structured Communications Systems,	\$0.00

2/20/2024	Q0039274	Structured Comm QFX5120-48Y AIRFLOW IN RED AC	\$14,365.95
2/26/2024	Q0040106	Structured Comm MULTIYEAR CUSTOM CP SUP SVCS	\$5,933.09
3/4/2024	B1924419	Structured Communications Systems,	\$0.00
3/7/2024	B1924697	Structured Communications Systems,	\$0.00
			<hr/>
			\$120,267.10

< \$5K Non-Capital Outlay

E7830 <5K Computer Equipment Other

11/20/2023	Q0027117	Dell, Inc. Special Pricing_Mobile Precision3580 -	\$34,999.80
11/30/2023	B1918622	Dell, Inc.	\$0.00

E7860 <5K Educational Equipment

3/12/2024	Z1071229	Walkata.com. Purchase of (1) Convey Doc Ref:	\$570.00
4/10/2024	Z1072838	Bambulab.com Purchase of (1) Bambu Doc Ref:	\$984.00

E7951 <5K Office Furniture

8/4/2023	Q0013763	W.W. Grainger I TK87870814T Computer Cart All	\$660.99
8/23/2023	B1912991	W.W. Grainger Inc.	\$0.00
9/2/2023	Q0018164	VWR Scientific CPU-HOLDER, FOOT MOUNTED	\$448.96
9/2/2023	Q0018164	VWR Scientific ROLL HOLDER	\$129.41
9/2/2023	Q0018164	VWR Scientific VWR 30 X 60 MANUAL LAMINATE	\$4,638.64
9/2/2023	Q0018164	VWR Scientific VWR 30X60	\$1,776.41
9/2/2023	Q0018164	VWR Scientific VWR 30X60	\$4,325.56
9/2/2023	Q0018164	VWR Scientific VWR 30X72	\$7,841.08
9/2/2023	Q0018164	VWR Scientific VWR 60IN BIN RAIL	\$178.62
9/2/2023	Q0018164	VWR Scientific VWR 72IN BIN RAIL	\$359.64
9/2/2023	Q0018164	VWR Scientific VWR BOTTLE HOLDER	\$57.03
9/2/2023	Q0018164	VWR Scientific VWR EQUIPMENT HOLDER - BAR	\$870.24
9/2/2023	Q0018164	VWR Scientific VWR LIGHT LED 22.44 IN IP50 SKIRT	\$669.40
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
9/13/2023	!0518075	VWR Scientific Products Corp.	\$0.00
10/4/2023	Q0021080	VWR Scientific EQUIPMENT HOLDER - BAR MOUNT	\$580.16
10/4/2023	Q0021080	VWR Scientific VWR EQUIPMENT HOLDER - BAR	\$580.16
10/23/2023	!0521817	VWR Scientific Products Corp.	\$0.00
10/23/2023	!0521817	VWR Scientific Products Corp.	\$0.00
10/25/2023	Q0023671	Workspace Devel Think; Chair, 3D knitColor Scheme:	\$5,721.94
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

\$21,135.00

Totals for 227231

\$284,997.08

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

 \$196,385.81

Totals for 227287

 \$196,385.81

Totals for UA7231

 \$481,382.89