University of Wyoming Budget Committee Meeting

FY23-FY24 Biennium Budget

Monday, August 9, 2021

12:30-2:00

1. University of Wyoming's submission to American Rescue Plan (ARP)

    a. Attachment #1 (ARP funding request priority)

    b. Attachment #2 (UW's submission proposals for the future)

2. Wyoming Innovation Partnership response to American Rescue Plan (ARP)

    a. Attachment #3 (WIP funding request to ARP)

    b. Attachment #4 (Wyoming Innovation Partnership – ARP final)

3. 2023-2024 Biennium Operating Budget Exception Requests

    a. Attachment #5 (2023-2024 – Biennium Budget Exception Requests)

Attachment #1
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Overall Priority Number	Theme Priority Number	Long Standing Capital Requests		Page(s)	Request	Salaries and Personnel	Programmatic Funding and Equipment	Major Capital Expenditures (expected life of 5+ years)	TOTAL
			Foundations for Long-Term STEM and Technology-Based Economic Development for Wyoming	**1-11**					
1	1			2-4	Invest in Tier I Engineering, Computational Infrastructure, and Data Science (also included in Attachment #3 "WIP request to ARP")	$ 7,000,000	$ 8,000,000	$ 10,000,000	$ 25,000,000
2	2			6-7	Develop a Concentration of World-Class Talent	$ 5,000,000	$ 15,000,000	$ -	$ 20,000,000
3	3			10-11	Transform and Enhance Undergraduate STEM Education to Build the Workforce of the Future	$ -	$ 2,000,000	$ 10,000,000	$ 12,000,000
4	4			5	Center for Entrepreneurship and Innovation (CEI) (also included in Attachment #3 "WIP request to ARP")	$ 10,000,000	$ 10,000,000		$ 20,000,000
6	5			8-9	Wyoming Data Hub (Includes $5.6 million for SI Instruments)	$ -	$ 5,600,000	$ 3,000,000	$ 8,600,000
			Growing Students and Teacher Success	**12-16**					
5	1			15-16	Urgent Need for Teacher Preparation, Professional Development, Training, and Support Programs to Address Substantial Student Learning Loss	$ 4,500,000		$ -	$ 4,500,000
			Healthcare for a Thriving Economy	**17-19**					$ -
11	1			18-19	Lack of Access to Healthcare	$ -	$ 10,500,000	$ -	$ 10,500,000
			Agriculture and the Environment	**20-25**					
7	1			21	AMK Ranch	$ -	$ -	$ 12,000,000	$ 12,000,000
8	2			22	Agriculture Research and Extension Renovation	$ -	$ -	$ 20,000,000	$ 20,000,000
9	3			25	Wyoming Outdoor Recreation, Tourism, and Hospitality Center	$ -	$ 1,200,000	$ -	$ 1,200,000
10	4			23-24	Ranch of the Future — Rangeland Systems and Ranch Management	$ 4,785,000		$ 5,215,000	$ 10,000,000
			Board of Trustees Approved Capital Investments	**26**					
		1		28	War Memorial Stadium and Corbett Natatorium	$ -	$ -	$ 74,300,000	$ 74,300,000
		2		27	Law School Building Expansion and Renovation	$ -	$ -	$ 25,000,000	$ 25,000,000
			TOTAL			**$ 31,285,000**	**$ 52,300,000**	**$ 159,515,000**	**$ 243,100,000**

Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

University of Wyoming's Submission for:

Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Submitted to Governor Mark Gordon's Office

5-11-2021

Attachment #2
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Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Foundations for Long-Term STEM and Technology-Based Economic Development for Wyoming

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Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Thriving Long-Term: Invest in Tier 1 Engineering, Computational Infrastructure, and Data Science

Define Opportunity:
Wyoming has consistently sought to contribute to its future by investing in the education and training of its citizens through the University of Wyoming. Recent investments, including the Tier 1 Engineering Initiative, Science Initiative, and Trustee's Education Initiative, along with capital investments in facilities provide a firm basis that focuses on the importance of Science, Technology, Engineering and Mathematics (STEM).

However, investments in the Tier 1 Engineering Initiative, computational infrastructure, and data science are urgently needed in order to stimulate and grow Wyoming's economy through the creation of new talent and research in computing and data across Wyoming's higher education institutions, including new K-12 computer science initiatives to sustain and grow talent into the future.

How to know this is an opportunity:
In the past decade, computing has become an increasingly crucial tool for research, for our graduates, and for almost all sectors of the economy. The University of Wyoming has responded

by hiring faculty who use computing in their discipline, establishing programs like the Data Science Center and the Advanced Research Computing Center (ARCC), and by developing a partnership with the University Cooperation for Atmospheric Research and its NSF-funded National Center for Atmospheric Research (NCAR) around the NCAR-Wyoming Supercomputer Center (NWSC). These have supported new modes of faculty research and increased awareness of computing across the campus.

Cause:
Today, computing's impact is found in virtually every discipline, and simulation and modeling are more important than ever, but are joined by new data science technologies like artificial intelligence, machine learning and blockchain that are starting to transform every academic discipline, every industry, and every aspect of modern society. Access to world-class research, infrastructure and workforce training in computing and data is therefore critical for Wyoming business', its citizens, and for UW's students.

Effects:
A focus around "Computing for All" will develop close relationships and new programs with Wyoming community colleges, K-12 schools, state agencies and other community stake holders and will position the University as a regional leader in computing and data with national impact and global reach.

Furthermore, investments in the Tier 1 Engineering Initiative, computational infrastructure, and data science will coalesce around the establishment of a School of Computing (SoC) at the

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University of Wyoming. The SoC will serve as an engine for the Wyoming Innovation Partnership (WIP) to build out training and education programs for UW and community college students in big data, artificial intelligence (AI), and their applications. A corporate partners program will develop close research connections to Wyoming industries and work with the university's new Center for Entrepreneurship and Innovation to build a talent pipeline from K-12 to the workforce.

Faculty, staff and students will have access to supported computing and data infrastructure in all disciplines to facilitate new research and education opportunities. Faculty will be more competitive for external research funding. More research involving data science and AI will be catalyzed. New activities to increase involvement with WIP and private sector partners will be possible.

Key metrics:
Increased state-wide higher education enrollments in computer/data science courses. Increased state-wide higher education graduates with a computer/data science credential. Increased percentage of state's K-12 educators who have received professional development/training in teaching coding/computer science. Increased corporate partnerships with Wyoming businesses focused on data science solutions and economic development and growth. Increased external funding involving computing and data. Increased educational offering for students involving use of modern cyberinfrastructure. Increased use of national computing and data cyberinfrastructure.

Funding Estimate:
$25,000,000 Total:
- $10,000,000 is for one-time critical infrastructure needs for UW's Advanced Research Computing Center (ARCC). Urgent investment is needed to update ARCCs compute/access nodes, network switches, backup storage and power/cooling equipment. New investment is needed to increase the GPU footprint to enable AI/data science research and applications and provide clusters to support WIP initiatives such as the provision of statewide software engineering education and research projects with the private sector.
- $5,000,000 is for the Wyoming Innovation Partnership (WIP) training program that will develop state-wide computer/data science boot camps, specialized coursework, and teacher/lecturer professional development.
- $3,000,000 is for start-up funds for six new faculty ($500,000 per faculty start-up fund) to establish research programs (e.g., equipment, graduate students, post-doctoral fellows, etc.) with $300,000 of each start-up fund invested in shared computing infrastructure to support their research (e.g., GPUs, unmanned aircraft, sensors, etc.).
- $2,000,000 is for salary and support for visiting faculty scholars to bring immediate expertise in critical areas of need to Wyoming.
- $3,000,000 is for five research scientists/faculty to seed the Corporate Partners Program and establish large-scale research projects. Each of these research scientists/faculty will be expected to eventually bring in substantial external funding to cover their salary and/or research students (e.g., each scientist will be responsible for securing approximately $2,000,000 per year in external funds).
- $2,000,000 is for graduate research students who will provide core research workforce, develop technology transfer from faculty research, and contribute to education and training.

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Notes:

It is understood that American Rescue Plan (ARP) funds are time-limited and not a source of ongoing funding for programs. Accordingly, when the ARP funding expires, the program will be (a) transferred to other funding (i.e., self-generated revenue, philanthropic/private donor support, etc.), if available, or (b) sunset.

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Center for Entrepreneurship and Innovation (CEI)

Define Opportunity:

Wyoming's higher education entrepreneurship and innovation assets are not coordinated, efficient, nor fully aligned with the state's priority economic sectors and workforce development/retention needs. The CEI serves as the coordinating entity to facilitate entrepreneurship and innovation activities across UW and Wyoming's community colleges in collaboration with proposed UW School of Computing and in support of the Wyoming Innovation Partnership (WIP). The center is a state-wide interdisciplinary integrator for programs that have potential for supporting the state's priority economic sectors in addition to activating new business sectors and supporting state workforce objectives.

How to know this is an opportunity:

Active discussions with various stakeholder groups, to include current entrepreneurs, small business owners, investors, and educators, combined with findings in recent state economic diversification studies, have identified Wyoming as having an underdeveloped entrepreneurial ecosystem. The current system is not coordinated and inefficient, making it difficult to fully engage available resources that support new business creation in addition to assisting the state's existing business communities. Entrepreneurs employ more than 50% of the private workforce, and generate more than half of the nation's GDP.

Cause:

Not having a centralized, coordinated, and efficiently delivered model that supports state-wide entrepreneurship and innovation.

Effects:

Challenges attracting and retaining the creative, educated, and entrepreneurial populations that typically support these ecosystems.

Key Metrics:

New business starts, existing business growth/retention, business recruitment, increased access to capital, new job creation

Available Funding:

None. $20,000,000 programmatic start-up investment.

Notes:

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Develop a Concentration of World-Class Talent

Define Opportunity:
Recruit human capital talent and expertise to Wyoming that will develop a concentration of world-class faculty and staff.

How to know this is an opportunity:
Exceptional faculty and staff talent directly supports the application of knowledge – a contribution to the state and its communities that the university is uniquely positioned to make. By attracting high-quality faculty and staff talent and expertise to the state, UW has the distinct ability to put knowledge to work for the direct benefit of Wyoming and its citizens – whether that is development of economic opportunities or helping solve challenges and public policy issues.

Cause:
Recruiting outstanding faculty and staff talent across all market sectors is important to the future of the state's economy, including healthcare, agriculture, advanced manufacturing, energy, the creative economy, hospitality and tourism, technology-based economic development (e.g., blockchain), and others, and deploying the knowledge and expertise of the recruited talent throughout the state via the Wyoming Innovation Partnership (WIP).

Effects:
Developing a concentration of world-class faculty and staff talent in Wyoming and distributing access to that talent through the Wyoming Innovation Partnership (WIP) will provide the state with the knowledge and intellectual capital needed to address the panoply of problems and opportunities it is facing today or will face tomorrow in areas such as education and the economy; agriculture and food; rural healthcare; data and computational science; hospitality and tourism; financial technology; community revitalization and renewal; children, youth, and families; and the environment, energy, and natural resources.

Key Metrics:
External research funding, patent and intellectual property, graduate students and post-doctoral fellows ("post-docs"), long-term partnerships with top-tier universities, national laboratories, and corporations, research publications, faculty membership in national academies.

Available Funding:
 Very little to none. $20,000,000 total over three years. $15M of the $20M total would be for one-time start-up funds to recruit outstanding faculty talent in areas of technology development and data science with application to different markets and academic disciplines in areas that align with the economic needs of the state (the on-going salaries of recruited faculty would be covered by other UW funds). $5M of the $20M total would be funding for visiting faculty and staff with

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expertise in critical areas/disciplines that need to grow in the state. This high-caliber visiting talent would come for periods of a few months to a year with the purpose of catalyzing new programs and external partnerships at UW and across the Wyoming Innovation Partnership (WIP) that will drive economic growth.

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Wyoming Data Hub

Define Opportunity:

Create a Wyoming Data Hub with Flagship, High Value Datasets.

How to know this is an opportunity:

Data is an important asset and properly stewarded is critical to advance disciplinary and interdisciplinary high impact research, enrich student learning, facilitate private-public partnerships, and improve institutional operations. A new Wyoming Data Hub will support students, faculty, administration (at UW and at Wyoming's Community Colleges), and state agencies' utilization of data analytic tools and Wyoming-centric data sets to expand the frontiers of knowledge, analyze and propose solutions to problems of interest, and inform policy decisions. The Hub will provide services for data to be highly searchable and accessible, enabling innovation around reusable and sharable data. The Hub will support technology-based approaches to specific important areas including biodiversity, agriculture, energy, health sciences and advanced manufacturing. The Hub will provide an essential research tool for School of Computing faculty and students to develop, evaluation and utilize new computational and analytic tools to mine and synthesize data. The Data Hub will support sovereignty of data, e.g. it will support working with the Wind River communities to enable their usage of Wyoming data protecting their agency over the sovereignty of their data.

Initial important, high value data sets that will drive the development and broad use of the Data Hub will be created and shared through new, unique instruments for the Science Initiative. This activity will implement an open culture for data sharing and data innovation among its inaugural faculty and student programs and with Wyoming Community Colleges, state agencies and industries. These instruments include light/electron microscopes, CT scanners, ion beams, mass spectrometers, spectrographs, and high throughput phenotyping equipment. The instrumentation and creation of shared data sets will include opportunities for students across the state to be trained in state-of-the-art analysis and data techniques.

Cause:

Universities that are implementing data initiatives are capitalizing on the data resources, culture and services in place. Support for data science and data policy at an institutional level is important for competitive external funding which now requires data management plans, and for facilitating research and private industry collaboration. It is important that Wyoming is able to steward its own high value data to encourage research and education that focuses on state needs.

Effects:

Wyoming-centric data will be more integrated into student classroom and experiential learning activities. More interdisciplinary research on critical Wyoming issues. Catalyzing of AI activities

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which require training data sets. New innovations and entrepreneurship made possible from accessible data.

Key metrics:

Increased external funding involving data science. Increased educational offerings using Wyoming specific data. New private-public research partnerships based on data.

Available funding:

Total: $8.6M (Data Hub $3,000,000 over 3 years for infrastructure and management, $5,600,000 for Science Initiative instrumentation and creation of flagship data sets). NSF provides competitive funding for the more novel parts of campus computing infrastructure through programs such as CC* (up to $400K) and MRI (novel instrumentation, highly competitive, up to $4M). To be competitive for these programs requires a campus cyberinfrastructure plan and existing core infrastructure.

Notes:

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Transform and Enhance Undergraduate STEM Education to Build the Workforce of the Future

Define Opportunity:
Undergraduate student experiential STEM learning and research.

How to know this is an opportunity:
The Science Initiative provides the scaffolding and opportunity to fundamentally transform undergraduate education through research at UW. Involving students from broad disciplines in interdisciplinary research and learning is essential for the most important issues in Wyoming including invasive species, human health and rural health disparities, water management, animal migration, agriculture and their connection climate changes and economic development. These pressing societal needs in Wyoming can only be solved through fundamental research in data-intensive work that provides predictive power from atoms to whole organisms and the systems in which they live. This research and student training requires controlled conditions for organisms, instruments for imaging traits from atoms to whole organisms, equipment for field manipulations to test how controlled conditions translate, and computing infrastructure to analyze data and control instrumentation from anywhere in the state and make testable predictions through models. Through team-based research projects and partnerships with data-intensive industry, students will also be trained in key new skills needed for careers that will build Wyoming's economy.

The Science Initiative will provide modern research spaces and collaboration spaces for faculty-led research teams conducting new and convergent studies in the life sciences. Fundamentally designed to be interdisciplinary, collaborative and student focused, the building will catalyze new innovations between biologists, botanists, geologists and other disciplines. The facility will enable science majors of all disciplines – including future science teachers – to participate in experiential learning, with a focus on undergraduate research experiences, mentoring and active learning techniques that are all important enablers for student success.

Building out the Student Collaborative Research, Outreach and Learning Laboratory (SCROLL) in unfinished space in the SI will maximize the impact on student learning in the SI research environment. SCROLL will feature student lab spaces, computing areas, collaborative breakout rooms, active learning training spaces and multi-use spaces.

To provide hands-on experiences for undergraduate research in the life sciences, we will closely partner with and build on the success and groundwork laid by the NIH INBRE Research and Education network and the NSF EPSCOR. INBRE has already worked to develop a successful network of student research experiences across the community colleges leading students into advanced degrees in biomedical and applied health sciences. Additional SI infrastructure and programmatic support will support broad undergraduate research and expose students to entrepreneurship and innovation training and networks.

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Cause:

Opportunity to provide transformational STEM learning and research experiences for undergraduates.

Effects:

The interdisciplinary Science Initiative building will catalyze and support STEM research and active student learning, touching many departments across the university, and addressing critical Wyoming issues.

Key Metrics:

Undergraduate research experiences, undergraduate entrepreneurship experiences, STEM majors, student success, retention, and graduation.

Available Funding:

Total funding $12M. An NIH proposal has been submitted to fund $6M for research infrastructure and shared lab.

Notes:

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Growing Students and Teacher Success

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Urgent Need for Teacher Preparation, Professional Development, Training, and Support Programs to Address Substantial Student Learning Loss

Define Problem:

In-service and pre-service educator preparation to address impending learning losses and educator shortages (teacher shortages, particularly). While teacher shortages and matriculations into teacher preparation programs were on the decline prior to the pandemic[1], these concerns have been highlighted, if not exacerbated, by COVID-19.

How to know this is a problem:

According to Mark Schneider, the Director of the Institute of Education Sciences, "The Organization for Economic Co-operation and Development (OECD) has estimated that the United States will lose $30 trillion in net present value GDP if COVID-related learning losses are not overcome." The problem of learning loss is made more significant by teacher shortage areas, such as mathematics and special education; and by shrinking enrollments in teacher education programs nationally since 2009 (Sutcher, Darling-Hammond, and Carver-Thomas, 2019: https://files.eric.ed.gov/fulltext/EJ1213618.pdf).

Cause:

According to the National Center for Education Statistics Schools and Staffing Survey (https://nces.ed.gov/surveys/sass/tables/sass1112_2013314_t1s_002.asp) 25.3% of Wyoming's teachers are 55 years or older, indicating that within the next decade, there will be significant turnover in Wyoming's teaching population. Teaching in the middle of a pandemic has been particularly stressful for educators, which likely will lead to continued shortages.

Effects:

The data reflecting total number of vacant positions in the state and number of current teachers nearing retirement (see citations in pandemic-related section), along with direct conversations with Wyoming school district administration, confirms the current shortages and upcoming retirement cliff in the teaching sector.

Key Metrics:

School districts facing shortages and seeking to hire new teachers; enrollments in community colleges' and the University of Wyoming's education programs; participation in Teacher Cadets

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[1] The national teacher workforce shortage is a real concern here in Wyoming. "...Since 2010, total enrollment nationwide in teacher preparation programs has declined by more than one-third..." (Partelow, 2019: https://www.americanprogress.org/issues/education-k-12/reports/2019/12/03/477311/make-decliningenrollment-teacher-preparationprograms/#:~:text=Nearly%20every%20state%20in%20the,students%20completing%20teacher%20preparation%20programs.)

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programs providing clear programs of study/career paths for Wyoming high school students, and expanding Perkins funding eligibility for the school and district.

Available Funding:

Some private foundation support. $4,500,000 to expand and enhance the University of Wyoming Trustees Education Initiative (TEI). The Trustees Education Initiative has as part of its vision ongoing work to increase the pipeline of students into its educator preparation programs, increase the quality of the teacher candidates who complete its program, provide support throughout new teacher induction periods, and connect educators with professional development opportunities throughout their careers. More information about existing specific TEI projects and innovations can be found here. Additional projects that could address learning loss include the following:

- Provision of after-school tutoring for K12 students, delivered by the university's College of Education (CoE) teacher candidates, through in-person and/or distance modalities, in collaboration with the Wyoming School-University Partnership;
- Development and delivery of a minor or certificate program that would provide secondary-level teacher candidates in the CoE with special education licensure.

TEI's "*E1: Exploration of Field*", is implementing and leading a number of initiatives to address this program, including: the Teacher Cadets program, now in its pilot year, which introduces high school students to the field of teaching and strengthens relationships between school districts, community college teacher preparation programs, and the University's teacher preparation programs; deliberate partnership with UW admissions, to develop and execute a strategic recruitment strategy for teacher preparation programs (and other CoE programs); and partnering with the UW CoE School of Teacher Education to identify programs facing highest need for students and graduates (based on enrollment numbers and demands in the state).

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Healthcare for a Thriving Economy

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Lack of Access to Healthcare

Define problem:

Wyoming's healthcare system is challenged by its frontier status.

How to know this is a problem:

The healthcare workforce, health outcomes, and access to healthcare in Wyoming lags behind other US states and regions. For instance, almost one third of Wyomingites do not have a healthcare provider, and many live long distances from regional medical centers and lack transportation to physically access healthcare services. Also, as noted in the Wyoming Department of Health's 2018 State Health Assessment, Wyoming is a rapidly aging state with the elderly population (65+) is projected to constitute over one-fifth of the state's residents by 2030. In addition, Wyoming ranks third in the nation for suicide deaths, with a rate that is nearly double the national rate.

Cause:

The COVID-19 pandemic only exacerbated the critical needs of Wyoming's healthcare system that require improvement, especially if the state is intends to accelerate the diversification of its economy. Successful economic development requires a high quality of living (of which access to quality healthcare is a substantial component) in order to attract businesses, talent, and investors.

Effects:

The 2018 State Health Assessment identified the following opportunities for improving the state's healthcare system:
- Monitoring health status
- Assuring a competent workforce
- Research and innovation
- Linking to health services
- Evaluation services
- Greater alignment of priorities and data across partners
- Diversifying partnerships, especially among academic and tribal health partners
- Improving access to data
- Expanding the public health workforce

Key Metrics:

Reduce barriers to access and innovation in the healthcare ecosystem of Wyoming; quantity of healthcare providers in the state; healthcare outcomes; overall quality of life of state's residents.

Available Funding:

Very limited to none. $10,500,000 for three years of programmatic funding to establish the

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Rural Health Innovation Institute (approximately $3.5M per year). The University of Wyoming's Rural Health Innovation Institute would harness the technological, data science, research and development, professional health sciences, public health, and economic development expertise found throughout the state's university, community colleges, department of health, and hospitals and healthcare providers to accelerate the transformation of Wyoming's healthcare ecosystem. This includes new collaborations that will eliminate duplication of efforts and provide access to critical resources and expertise that will enhance all phases of research (bench to bedside), commercialization of innovations and ensure greater inclusion of all stakeholders in this work. The Institute will support faculty and communities to engage in collaborative research and commercialization of intellectual property to meet rural health grand challenges in our digital age.

Notes:

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Agriculture and the Environment

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AMK Ranch

Define Opportunity:

The University of Wyoming – National Park Service (UW-NPS) Research Center facility within the Grand Teton National Park at the historic AMK Ranch on Jackson Lake will promote understanding of Wyoming's wonders and their connections to the world by:

- Inspiring discoveries: Advance the frontiers of knowledge by creating unique opportunities for scholars in Wyoming's iconic landscapes
- Elevating experiences: Enhance and expand opportunities for place-based learning for UW students, community scholars and experts, and the public
- Connecting communities: Share research and learning opportunities that cross boundaries and foster cooperation, understanding, and discourse.

How to know this is an opportunity:

To achieve our vision, UW students and faculty partner with the National Park Service and others to increase opportunities for research, scholarship, creative and cultural activities, and courses connected to Wyoming's iconic landscapes and ecosystems, its Native American culture and heritage, and its traditions from ranching to recreation.

Cause:

The AMK Rank currently is not positioned to achieve its potential success in large part due to the fact that the physical facilities, centered on historic buildings, need critical updates.

Effects:

Invest in infrastructure updates and expansions of the AMK Ranch facilities to support the next 30 years or more of world-class activity. Complete maintenance backlog, update existing buildings per architectural report, and add new dorm per NPS EA report.

Key Metrics:

Increased UW use and scholarly impact associated with investing in facilities; new scholarly products (e.g., scholarly publications; creative output) worthy of national-level press coverage; expanded place-based learning associated with promoting opportunities for courses; new large federally funded research programs centered at the UW-NPS facility; the number of courses offered through the AMK Ranch and workshops; new internship and research opportunities for undergraduates; long-term push to give every UW student an experience at the AMK Ranch.

Funding Estimate:

$12,000,000

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Agricultural Research and Extension Renovations

Define Opportunity:
Agricultural Research and Extension renovations.

How to know this is an opportunity:
Agriculture is one of Wyoming's core industry sectors and is a critical factor in other important areas of concern, including energy, tourism, environmental science, water management and biodiversity. Data science and computing are revolutionizing agricultural research and management. Agricultural research, education and outreach stands ready to capitalize on new plans in place at UW for interdisciplinary research, computing and data science, and entrepreneurship. A critical barrier to this is the infrastructure at our Experimental Stations to support agricultural research which has significantly deteriorated over the last 30 years. Our stations lack modern equipment, do not have adequate networking to access computing or data infrastructure, do not have abilities for on-site sample preparations and analysis, and do not have housing for researchers to make it possible to fully utilize our potentially substantial research stations.

Cause:
The deterioration of agricultural research stations is a recognized issue across the USA that reflects some 30 years of underinvestment.

Effects:
Without investment, substantial new opportunity for modern agricultural research through our various experimental stations is not able to be recognized. New ideas for work with edge computing/AI (drones, robots, sensors) in agriculture, modeling and prediction, large scale experimental studies, Smart Ranch/Farming, will not be possible. Research active faculty and researchers are more difficult to recruit and retain. New investment in the research stations will make agricultural researchers more competitive for external funding and enable them to partner in interdisciplinary research.

Key metrics:
Research funding for agricultural, number of interdisciplinary research projects, usage metrics for experimental stations, outreach activities of extension offices.

Available funding:
None identified. Critical outstanding maintenance needs $8.6M and upgrade of facilities to current standards additional $11.4M.

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Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Ranch of the Future – Rangeland Systems and Ranch Management

How to know this is an opportunity:

Ranching in Wyoming and the Mountain West is different from ranching across much of the nation. Wyoming operations utilize public lands on which there are competing interests for the use of this land from many sectors. Relevant natural resource management issues such as invasive annual and perennial grasses, migration corridors, wildfire mitigation, energy development, endangered species, wildlife-livestock interactions, all impact operations. Technology applications would improve operational efficiencies improving management decisions on rangelands involving water resources, forage and soil quality through use of real-time sensors and visioning technology. A ranch could have a "dashboard" to track animal growth, movement, illness, in real time improving animal welfare. Adding revenue streams to ranches based on ecosystem services provide new opportunities for monitoring strategies tied to the blockchain for environmental monitoring/credits and carbon capture above and below ground.

Cause:

A unique issue across Wyoming and the Mountain West is the vastly different landscapes, including forested pastures in the summer, high and cold prairie, and irrigated bottomlands that ranchers must manage as part of their operations adding to management complexity. A single stand-alone ranch prototype would not be able to capture the range of ranch operations across the state. Development of a "ranch of the future" utilizing our current Research and Extension Centers as a base, would provide the capability to develop and evaluate technology solutions in a number of different ecosystems.

Effects:

Without investment in technology that will help to maintain the economic and environmental sustainability of ranching in Wyoming, there is a risk that the state will lose many of these operations and the value they provide in terms of food production, open spaces, water resource management and environmental quality.

Key metrics:

Impacts of research, education and extension activities would be monitored. Development of a Wyoming Rangeland Task Force comprised of an interdisciplinary team of rangeland scientists, weed scientists, landscape ecologists, animal scientists, economists, computational biologists, wildlife habitat specialist working with industry representatives, and rangeland managers would provide management recommendations, technical insight, and consulting to inform public policy decisions in Wyoming.

Student experiential learning and leadership training, research, engagement activities and demonstration projects that foster sustainable rangeland management will provide knowledge needed to maintain these lands and with it, quality of life in rural communities across the state.

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Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Available funding:

None identified. Facilities improvements at McGuire Farm ($3,000,000), SAREC including Rodgers Research Center ($927,000), Sheridan ($200,000), Powell ($1,000,000), LREC ($88,000) Total: $5,215,000. Technology infrastructure support and instrumentation ($3,000,000), graduate assistantships (8 @ 3 yr each, $720,000), faculty support ($100,000 x 3 yr, $300,000), IMAGINE coordinator ($120,000 x 3 yr, $360,000) and data scientist ($135,000 x 3 yr, $405,000).

Notes:

It is understood that American Rescue Plan (ARP) funds are time-limited and not a source of ongoing funding for programs. Accordingly, when the ARP funding expires, the program will be (a) transferred to other funding (i.e., self-generated revenue, philanthropic/private donor support, etc.), if available, or (b) sunset.

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Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Wyoming Outdoor Recreation, Tourism, and Hospitality Center

Define Opportunity:

Establishment of Wyoming Outdoor Recreation, Tourism, and Hospitality (WORTH) Center, an interdisciplinary center providing education, outreach, applied research for outdoor recreation, tourism, and hospitality serving the state's industry partners.

How do you know this is an opportunity?

Tourism is the second largest industry in the state. In 2019, domestic and international visitors in Wyoming spent $3.95 billion. Wyoming welcomed 9.2 million overnight visitors that generated $203 million in local and state tax revenues. The state's tourism industry supported 32,570 full and part-time jobs. Each Wyoming household would pay $870 more in taxes without the tax revenue generated by the travel and tourism industry. Employment market demand for graduates earning a closely related degree in outdoor recreation and tourism ranks very highly nationally at 82%.

Wyoming lost $1 billion in tourism revenues and 6,000 jobs in the sector in 2020. The rebound in the sector will be strong in 2021 and beyond, and WORTH will provide innovative solutions to the industry to capitalize on this rebound to make it sustainable.

Cause:

WORTH will provide a one-stop solution center for Wyoming's hospitality, outdoor recreation, and tourism industries.

Effect:

Enhanced services to the ORTH industry.

Key metrics:

Enhanced rebound and sustained increase in tourism, outdoor recreation, and tourism industries; increased per person spending in state during visits.

Available Funding:

Very limited to none. $1.2 million for 3 years is requested for start-up funding. One-time, three-year funding; sustaining funding will be identified from within UW, from external agencies, or from corporate or philanthropic partners.

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Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

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Board of Trustees Approved Capital Investments

Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

Law School Building Expansion and Renovation

Define Opportunity:

The proposed facility improvements will include approximately 19,000 square feet of building addition and 23,400 square feet of exterior and interior renovation to the main College of Law building. The exterior improvements will wrap around the north end of the existing building and provide a new building facade toward Willet Drive, while creating a more formal traditional stone main entrance for the College of Law. The interior building expansion and renovation will provide additional legal clinic and legal center office and meeting spaces, re-organize the Law School administrative and faculty offices, and construct a new main entry and a secondary entry dedicated to the legal clinics' public clients. The new clinic facility named in honor of Wyoming Senator Alan K. Simpson (within the Law building expansion) will have significant impact on the College of Law and the state's citizens. The College of Law's clinic and experiential learning program is a primary provider of direct legal services for low income people throughout the state. Students working under faculty supervision receive training and provide representation to indigent Wyoming citizens in hundreds of cases across Wyoming's 23 counties

How to know this is an opportunity:

The proposed facility improvements will greatly enhance the recruitment of potential students and faculty to the UW College of Law and support the greater public interest role of the University of Wyoming in providing free legal services to the citizens of Wyoming amounting to approximately $3.5 million in free legal services each year.

Funding Estimate:

$25,000,000

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Attachment #2
University of Wyoming's Submission for:
Proposals for the Future: Wyoming's Response to the American Rescue Plan (ARP)

War Memorial Stadium and Corbett Natatorium

Define Opportunity:

The University of Wyoming's goal is to raise the standard for the football program and better meet the needs of everyone who utilizes the facility from both a fan and operational (e.g., media, visiting team coaches/staff/student-athletes, etc.) perspective. An upgrade of the existing facilities will (1) create additional revenue generation opportunities, (2) provide a better game day experience for fans and (3) and better serve the needs of our national media and TV partners.

The west side stands of War Memorial Stadium need immediate upgrades. The stands and related facilities are outdated and have untapped potential for spectator experience and overall campus engagement. Renovations will provide opportunities to generate additional revenue via various mediums including, but not limited to, loge boxes, upgraded seating, separate ticket areas (e.g., club area) and upgraded fan amenities (e.g., such as concession areas/points of sale). In addition, game-day operational spaces (e.g., media working areas, visiting team locker rooms, etc.) and upgraded bathroom facilities will be incorporated into the design.

The existing Corbett pool facility, which was built in the mid-1970's, lacks several facets important to the success of the University's student-athletes. Throughout the Mountain West Conference and across the nation, 50-meter swimming and 5-meter diving capabilities are medians for competition aquatics facilities. The current facility does not meet the NCAA Division I requirements for competition facilities. The diving area is too shallow to accommodate anything more than a 3-meter springboard, yet Mountain West Conference and Western Athletic Conference teams must compete in 3, 5 and 10-meter diving categories. Additionally, the water body is contiguous, which makes it impossible for dual practice or hosting of simultaneous events. The College of Health Sciences' Department of Kinesiology and Health is also located in the existing Corbett facility and an expanded facility would allow the College of Health Sciences to modernize its approach to educating the next generation of healthcare professionals and offer additional academic programs such as physical therapy. When the pool is not in use by Athletics, the new facility will provide greater aquatic opportunities for Club Sport and Intramural athletes, recreational swimmers, and Outdoor Programs participants. In addition, the potential to host training camps would create a revenue opportunity.

How to know this is an opportunity:

Both portions of the project are directly related to the Mission of the University as defined in the 2017-2022 Breaking Through Strategic Plan by promoting opportunities for athletic competition. The proposed renovations create additional revenue opportunities through improvement of spectator and user experiences.

Funding Estimate:

$74,300,000

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WYOMING INNOVATION PARTNERSHIP (WIP) RESPONSE TO THE AMERICAN RESCUE PLAN (ARP)

Tentative Priority	Page(s)	Problem	UW	Other Partners	TOTAL
1	4-6	Invest in Tier I Engineering, Computational Infrastructure, and Data Science (also included in Attachment #1 "ARP funding request")	$ 25,000,000	$ -	$ 25,000,000
2	3-4	Center for Entrepreneurship and Innovation (CEI) (also included in Attachment #1 "ARP funding request")	$ 20,000,000	$ -	$ 20,000,000
3	1-3	Infrastructure - - The State of Wyoming has limitations of existing broadband coverage, lack of fiber-optics, minimal incubator space, and digital educational opportunities	$ -	$ 30,000,000	$ 30,000,000
4	6-8	Priority Sector Program Collaborations	$ 15,000,000	$ 34,200,000	$ 49,200,000
5	9	WIP Partner Program / Support	$ -	$ 2,000,000	$ 2,000,000
	TOTAL		$ 60,000,000	$ 66,200,000	$ 126,200,000

Wyoming Innovation Partnership (WIP)
Response to the American Rescue Plan (ARP)
Submitted to Governor Mark Gordon's Office
5-13-21

Provided proposals support modernizing and refocusing Wyoming's higher education system to increase collaboration between the University of Wyoming and the state's community colleges with emphasis on developing innovative solutions that support and enhance Wyoming's economy and workforce.

Requested investments will assist with development of strategic programming in key areas focused on Wyoming's needs. Emphasis will be placed on workforce development in highpotential areas; supporting and training entrepreneurs and new business startups; a research and market analysis agenda aimed at technology transfer and commercialization; and developing outside revenue sources such as corporate partnerships to provide new opportunities for students.

WIP is intended to support the state's overall economic vision set forth by the Wyoming Business Council and support education attainment goals developed by the state, allowing the state to better focus its resources to assist both existing industries, and areas identified as having significant growth potential.

Pursuant to recent WIP leadership retreat, ARP funding priorities are grouped into the following areas: Programs, Infrastructure, and Partners. Emphasis is placed on workforce development and retention, economic resilience, and supporting the state's economic development strategy.

Recognizing proposed Center for Entrepreneurship and Innovation and School of Computing models are designed to support WIP partners and the state's economic/workforce development agenda, they have been included.

Total WIP Request: $126M

INFRASTRUCTURE

Define the Problem:

The State of Wyoming has an underdeveloped infrastructure that limits access to education and workforce/industry needs. Limitations of existing broadband coverage, lack of fiber-optics, minimal incubation space and digital educational opportunities have created barriers that prevent the state from achieving desired objectives.

How do you know this is a problem?

The WIP, led by the Presidents Steering Group, held a retreat on May 3, 2021 to discuss the primary factors limiting advancement and response to education, workforce and industry in the state. Examples include:

- Low college going rates of adults, low postsecondary attainment rates, etc.
- Lower skilled populace, without postsecondary education that makes economic diversification, business recruitment/relocation a challenge
- Applicant pools numbers are declining, employee turnover is increasing, etc.

- Significant deferred maintenance logs that aren't being addressed, lost operating dollars as a result of stagnant and declining state revenues, etc.

Cause:

The following infrastructural elements have been identified as key areas of need for successful response to state educational, workforce development, and economic objectives:

- Broadband connectivity and stability across the state, including delivery in rural and previously unsupplied regions
- Expand and develop existing extension offices, creating physical space for education, service, and innovation based activities.
- Leverage IMPACT 307 model state-wide (update/retrofit existing incubator spaces) and provide greater access to start-up initiatives connected to the primary economic sectors
- Strain from COVID-19, competition with local job opportunities, reduction in programs and services because of budget cuts (lost confidence by the consumer), affordability and lack of financial aid, competition with other providers, not enough of the right programs being offered, decreased funding for recruitment and marketing, etc.
- Marketing/messaging campaign is necessary to build awareness and availability of resources that impact educational and workforce opportunities. Marketing and messaging needs hinge on the ability to deliver information to historically inaccessible regions of the state
- High touch and high tech learning spaces across the state are needed to support instructional programs. Digital classrooms that allow for active and engaged learning and shared experiences within a shared resource model, create efficiencies and diminish the geographical challenges that impact Wyoming
- Student success practices that focus on first year students, adult learners, focused on retraining, and traditional transfers will be key to delivering a highly trained and credentialed workforce. New investments in Student Success Management systems (e.g. Navigate) will allow for real time and intrusive responses to insure student success and degree completions as well as tracking enrollment, application, and retention statistics
- Modifying existing learning spaces to accommodate experiential learning, special company projects, innovation exercises, etc.
- Address student transfer inefficiencies by developing broader pathways for 4 year degrees that support the state's priority economic sectors and allow for quicker onramping of students into educational areas with high employability upon credential completion.
- Building a Wyoming Workforce and Corporate "work base" creates opportunities for workers to stay in Wyoming while attracting companies with funding for educating their workforce to the state. This further encourages companies with apprenticeship and internship programs to look to Wyoming for talent as well as attracting talent from out of state with funds to cover tuition
- Lack of financial assistance to engage/re-engage Wyoming's adults in postsecondary education or training
- Fewer graduates to enter the workforce, declining tuition and fee revenue, inability to recruit new/relocating businesses to the area and state, etc.

Effects:

Workforce, Industry and Educational needs are elevated and connected in a manner that allows flexibility for responding to the growth and changing needs of the state's priority economic sectors.

Key Metrics:

Existing business growth/retention, business recruitment, workforce development and retention aligned with priority economic sectors, increased education attainment

Available Funding:

None. Requesting $30M investment for noted causal areas.

PROGRAMS

Center for Entrepreneurship and Innovation (CEI)

Define Opportunity:

Wyoming's higher education entrepreneurship and innovation assets are not coordinated, efficient, nor fully aligned with the state's priority economic sectors and workforce development/retention needs. The CEI serves as the coordinating entity to facilitate entrepreneurship and innovation activities across UW and Wyoming's community colleges in collaboration with proposed UW School of Computing and in support of the Wyoming Innovation Partnership (WIP). The center is a state-wide interdisciplinary integrator for programs that have potential for supporting the state's priority economic sectors in addition to activating new business sectors and supporting state workforce objectives.

How do you know this is an opportunity?

Active discussions with various stakeholder groups, to include current entrepreneurs, small business owners, investors, and educators, combined with findings in recent state economic diversification studies, have identified Wyoming as having an underdeveloped entrepreneurial ecosystem. The current system is not coordinated and inefficient, making it difficult to fully engage available resources that support new business creation in addition to assisting the state's existing business communities. Entrepreneurs employ more than 50% of the private workforce, and generate more than half of the nation's GDP.

Cause:

Not having a centralized, coordinated, and efficiently delivered model that supports state-wide entrepreneurship and innovation.

Effects:

Challenges attracting and retaining the creative, educated, and entrepreneurial populations that typically support these ecosystems.

Key Metrics:

New business starts, existing business growth/retention, business recruitment, increased access to capital, new job creation

Available Funding:

None. $20M programmatic start-up investment

- Training in entrepreneurship for all students at UW and CCs
    - o Courses, seminars, etc.
    - o Bootcamps and other applied learning opportunities
    - o Associate degrees, Bachelor's degrees, minors,concentrations, certificates, etc.
    - o Faculty/staff support
    - o Investment: *$5M*
- Coordinated state-wide mentoring network o Alumni, associations, special interest groups, businesses, etc.
    - o Web based mentor connection platform
    - o Staff support
    - o Investment: *$1M*
- State-wide business incubators, lab spaces, and innovation learning hubs
    - o UW and CC facilities retrofit and upgrades
    - o Technology updates/upgrades to connect WIP partners
    - o Investment: *$10M*
- Innovation workshops, student projects, business/corporate engagement
    - o Faculty / staff support
    - o Investment: *$2M*
- Corporate Relations Office
    - o Engagement staff and support resources
    - o Investment: *$2M*

Notes:

It is understood that American Rescue Plan (ARP) funds are time-limited and not a source of ongoing funding for programs; however in this instance, the ARP funds would be used as initial seed funding to jump start the program and accordingly when the ARP funding expired, the program would be transferred to other funding (i.e., self-generated revenue, philanthropic/private donor support, etc.).

School of Computing

Define Opportunity:

Wyoming has consistently sought to contribute to its future by investing in the education and training of its citizens through the University of Wyoming. Recent investments, including the Tier 1 Engineering Initiative, Science Initiative, and Trustee's Education Initiative, along with capital investments in facilities provide a firm basis that focuses on the importance of Science, Technology, Engineering and Mathematics (STEM).

However, investments in the Tier 1 Engineering Initiative, computational infrastructure, and data science are urgently needed in order to stimulate and grow Wyoming's economy through the creation of new talent and research in computing and data across Wyoming's higher education institutions, including new K-12 computer science initiatives to sustain and grow talent into the future.

How do you know this is an opportunity?

In the past decade, computing has become an increasingly crucial tool for research, for our graduates, and for almost all sectors of the economy. The University of Wyoming has responded by hiring faculty who use computing in their discipline, establishing programs like the Data Science Center and the Advanced Research Computing Center (ARCC), and by developing a partnership with the University Cooperation for Atmospheric Research and its NSF-funded National Center for Atmospheric Research (NCAR) around the NCAR-Wyoming Supercomputer Center (NWSC). These have supported new modes of faculty research and increased awareness of computing across the campus.

Cause:

Today, computing's impact is found in virtually every discipline, and simulation and modeling are more important than ever, but are joined by new data science technologies like artificial intelligence, machine learning and blockchain that are starting to transform every academic discipline, every industry, and every aspect of modern society. Access to world-class research, infrastructure and workforce training in computing and data is therefore critical for Wyoming business', its citizens, and for UW's students.

Effects:

A focus around "Computing for All" will develop close relationships and new programs with Wyoming community colleges, K-12 schools, state agencies and other community stake holders and will position the University as a regional leader in computing and data with national impact and global reach.

Furthermore, investments in the Tier 1 Engineering Initiative, computational infrastructure, and data science will coalesce around the establishment of a School of Computing (SoC) at the University of Wyoming. The SoC will serve as an engine for the Wyoming Innovation Partnership (WIP) to build out training and education programs for UW and community college students in big data, artificial intelligence (AI), and their applications. A corporate partners program will develop close research connections to Wyoming industries and work with the university's new Center for Entrepreneurship and Innovation to build a talent pipeline from K-12 to the workforce.

Faculty, staff and students will have access to supported computing and data infrastructure in all disciplines to facilitate new research and education opportunities. Faculty will be more competitive for external research funding. More research involving data science and AI will be catalyzed. New activities to increase involvement with WIP and private sector partners will be possible.

Key metrics:

Increased state-wide higher education enrollments in computer/data science courses. Increased state-wide higher education graduates with a computer/data science credential. Increased percentage of state's K-12 educators who have received professional development/training in teaching coding/computer science. Increased corporate partnerships with Wyoming businesses focused on data science solutions and economic development and growth. Increased external funding involving computing and data. Increased educational offering for students involving use of modern cyberinfrastructure. Increased use of national computing and data cyberinfrastructure.

Funding:

$25M Investment:

- $10,000,000 is for one-time critical infrastructure needs for UW's Advanced Research Computing Center (ARCC). Urgent investment is needed to update ARCCs compute/access nodes, network switches, backup storage and power/cooling equipment. New investment is needed to increase the GPU footprint to enable AI/data science research and applications and provide clusters to support WIP initiatives such as the provision of statewide software engineering education and research projects with the private sector.
- $5,000,000 is for the Wyoming Innovation Partnership (WIP) training program that will develop state-wide computer/data science boot camps, specialized coursework, and teacher/lecturer professional development.
- $3,000,000 is for start-up funds for six new faculty ($500,000 per faculty start-up fund) to establish research programs (e.g., equipment, graduate students, post-doctoral fellows, etc.) with $300,000 of each start-up fund invested in shared computing infrastructure to support their research (e.g., GPUs, unmanned aircraft, sensors, etc.).
- $2,000,000 is for salary and support for visiting faculty scholars to bring immediate expertise in critical areas of need to Wyoming.
- $3,000,000 is for five research scientists/faculty to seed the Corporate Partners Program and establish large-scale research projects. Each of these research scientists/faculty will be expected to eventually bring in substantial external funding to cover their salary and/or research students (e.g., each scientist will be responsible for securing approximately $2,000,000 per year in external funds).
- $2,000,000 is for graduate research students who will provide core research workforce, develop technology transfer from faculty research, and contribute to education and training.
  Notes:

It is understood that American Rescue Plan (ARP) funds are time-limited and not a source of ongoing funding for programs; however in this instance, in addition to the significant one-time computational infrastructure expenditures, the ARP funds would be used as initial seed funding to jump start the program and accordingly when the ARP funding expired, the program would be transferred to other funding (i.e., self-generated revenue, philanthropic/private donor support, etc.).

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Priority Sector Program Collaborations

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Define the Opportunity:

The Wyoming Innovation Partnership (WIP) is poised to deliver needed collaborative and creative leadership in response to the economic and industry needs of the state. Led by the Presidents Steering Group, the WIP comprises the senior leadership from Wyoming's eight

institutions of higher education, the Community College Commission, Governor's office and business and industry partners.

How do you know the opportunity exists?

Four primary economic sectors have been identified as key areas for investment and programmatic development. Through WIP, teams have performed an initial assessment and identification of programmatic opportunities to respond to industry, workforce development and economic needs.

Cause:

- **Agriculture -** it is clearly recognized that underdeveloped strengths exist across the state between institutions that point to strong and immediate opportunities to respond to agricultural industry needs. Agribusiness, Animal and Plant Sciences, Range/Ranch Management (with energy and tourism crossover opportunities), Ag Communications, INBRE program with biomedical research (with health sciences crossover), and blockchain applications represent immediately available areas for response.

- **Energy / Manufacturing -** multiple opportunities are available for scaling up existing programs, improving synergies across the eight institutions, and developing new programs that leverage existing expertise and capital resources. More than 50 energy related credentials are currently available across the eight institutions, with opportunity for accelerated pathway development between institutions. Emerging opportunities to respond to industry and economic needs of the state include: Power lineman, Hybrid Diesel Technology, low-voltage fiber optic implementation, wind and solar energy and storage, carbon storage, and advanced manufacturing.

- **Hospitality/Tourism -** the state is well positioned to meet current and future workforce development needs related to the hospitality, tourism, and outdoor recreation sectors; specifically, further development of degree offerings, certificate programs, and just-in-time credentials to address critical needs in workforce recruitment and retention.

- **Technology / Health-tech –** a collaborative effort is underway to develop a 2-year software engineering degree with clear pathways to a 4 year degree at UW in response to statewide and national demand for software developers across all industry sectors. All 8 of the state's higher education institutions, along with international and industry partners (Wyoming based businesses) have contributed to this initiative; an initiative that will catalyze additional program development in areas such as artificial intelligence, machine learning, and cyber security.

Effects:

Education attainment aligned with the state's priority economic sectors. Increased workforce development and retention.

Key Metrics:

Increased output of graduate (credential holders) and overall increase in qualified workforce.

Funding:

$49M investment:

- **Programmatic Support ($3M):** To maximize opportunities in existing programs and support launch of new academic pathways, contracted support personnel dedicated to the marketing and promotion is critical. Marketing requirements (two, six week campaigns per primary economic sector, min). Contract support to provide articulation alignment support required to update/maintain/create academic pathways.

- **Agriculture ($10M):** it is clearly recognized that underdeveloped strengths exist across the state between institutions that point to strong and immediate opportunities to respond to agricultural industry needs. Agribusiness, Animal and Plant Sciences, Range/Ranch Management (with energy and tourism crossover opportunities), Ag Communications, INBRE program with biomedical research (with health sciences crossover), and blockchain applications represent immediately available areas for response. Five of the State's community colleges have Ag programs for which there is potential to expand to meet the needs for precision Ag, value-added Ag processing and meeting new business opportunities. o Program start-up, faculty, equipment, experiential learning, scholarships = $10M

- **Energy / Advanced Manufacturing ($15M):** multiple opportunities are available for scaling up existing programs, improving synergies across the eight institutions, and developing new programs that leverage existing expertise and capital resources. Seamless pathways need to be developed between the community colleges and the University to expand opportunities in advanced manufacturing, from two-year technical programs to four-year engineering programs. There is forecasted demand for this STEM pathway as the State looks to recruit more manufacturing companies and expand surface mining operations. More than 50 energy related credentials are currently available across the eight institutions, with opportunity for accelerated pathway development between institutions. Emerging opportunities to respond to industry and economic needs of the state include:
    - Power lineman = $2M o Hybrid Diesel Technology = $2M
    - Low-voltage fiber optic implementation, wind and solar energy and storage, carbon storage, and advanced manufacturing = $5M
    - Industrial programs = $6M

- **Hospitality/Tourism ($6M)** - the state is well positioned to meet current and future workforce development needs related to the hospitality, tourism, and outdoor recreation sectors; specifically, further development of degree offerings, certificate programs, and just-in-time credentials to address critical needs in workforce recruitment and retention: o WORTH Center programing = $2M o Existing curricular program expansion, faculty, equipment = $4M

- **Technology ($5M):** a collaborative effort is underway to develop a 2-year software engineering degree with clear pathways to a 4 year degree at UW in response to statewide and national demand for software developers across all industry sectors. All 8 of the state's higher education institutions, along with international and industry partners (Wyoming based businesses) have contributed to this initiative; an initiative that will catalyze additional program development in areas such as artificial intelligence, machine learning, and cyber security. o Faculty, equipment, programming support = $5M

- **Healthcare/science/tech ($10M):** This industry represents significant opportunity for economic growth and diversification. From direct provider/clinician job opportunities, to manufacturing, advancements in medicine, and telehealth, many opportunities exist. Five of the seven community colleges identified this as an area of immediate need for workforce development:
  - Faculty, equipment, programming support = $10M

PARTNERS

WIP Partner Program / Support

Define Problem:

Prior efforts have identified that cross sector collaborations are needed, but lacked the leadership and agility needed to take action. Governor Gordon recognized the critical need for the state's educational leaders to champion the response to economic needs in the state by creating the Wyoming Innovation Partnership.

How do you know this is a problem?

Building off the identification of the state's opportunity sectors from previous economic diversification initiatives, WIP is an action oriented network of decision makers that can move their respective organizations in response to the needs of the state. Better coordination and engagement of WIP's current and prospective partners presents an opportunity to more efficiently advance identified education and workforce initiatives.

Cause:

Educational leadership provides a non-competitive environment for multiple partners to become engaged in the response to Wyoming's economic growth agenda.

Effects:

Public, private partnerships create broad spectrum responses to existing needs and highlights areas of growth for entrepreneurship and innovation across the state. New partnerships must be prospected while identifying new ways to add value to existing relationships. Opportunities for sponsoring entrepreneurial, intrapreneurial, and innovation activities will lead to increased business growth/retention and serve as a catalyst for new business and job creation. State-wide, national, and international partners will have opportunities to sponsor projects, research, and other business strategy activities while also having access to talent via internships, externships, and other placement and career development programs with WIP partners.

Key Metrics:

Relevant program delivery translates to increased business sustainability, new business/talent recruitment, new business creation, diversification of core industries, student recruitment, sponsored faculty research and new revenue sources.

Funding:

$2M investment:

- Organizational support for prospecting and stewarding WIP partners, identifying opportunities for sponsored engagement that leads to increased state-wide industry engagement and diversification.

UW Priority	Budget Book Page and Budget Office Rec	Program Name	On-Going	One-Time	One-Time Match	Total	Description
1		University State Aid Block Grant -Salary Increase Plan	$9,000,000			$9,000,000	The university's top priority is to ensure that employee salaries remain competitive to attract and retain a high-quality workforce. Talented, dedicated faculty and staff are the most important asset of the university --- higher education is an undertaking by and for people. The university competes in national, international and regional markets for faculty, staff and leadership. In 2017 the University created a task force to study compensation and develop a procedure for salary adjustments that are based on market and merit, considering such important factors as compression, inversion, equity and contribution towards the University's mission and strategic plan. However, since the plan was approved in March of 2018 institutional revenue, primarily in the form of state appropriations, has been substantially reduced. The University has made continuous efforts to implement operational efficiencies and reallocate existing revenue streams for the explicit purpose of funding a compensation pool but budget reductions imposed through declines in state appropriations coupled with significant inflationary costs have decimated these efforts. The difficulty for employees is further compounded by the continued implementation of the employee out-of-pocket contribution of the employee share of retirement and shifting of health insurance cost onto employees. Using the most recent market analysis available, university employees continue to be paid substantially below market and the gap continues to grow. UW must close the gap between its salaries and those of its competitors to in order retain and recruit high performing employees. Recent turnover spikes, driven at least in part by trends toward remote work opportunities, at the institution are startling and a constant reminder of the high costs of recruiting and training new employees. The request for $9,000,000 is intended to be split into uniquely applied $3,000,000 salary pools for FY2023 and FY2024. Bringing employees closer to market is an important goal and will be a component of the adjustment; however, in today's very competitive marketplace paying for excellent performance is equally important in retaining employees and creating a culture of rewarding performance. Therefore, the available salary pool will be split with XX percent for market and XX percent for merit. If fully implemented in the FY2023-2024 biennium an additional $3,000,000 will be required in subsequent biennium. Absent funding for raises in the past biennium, the University has continued to lose ground in the ability to provide competitive salaries and in doing so continues to lose valued members of the UW community to more attractive offers and the prospect of more consistently funded compensation plans at peer institutions.

UW Priority	Budget Book Page and Budget Office Rec	Program Name	On-Going	One-Time	One-Time Match	Total	Description
2		Rodeo		$200,000		$200,000	The University of Wyoming is requesting that the legislature continue the state appropriation of $200,000 for the FY 23-24 biennium to enhance the University of Wyoming Rodeo Team. This funding allows the Athletics Department to continue serving the rodeo team with strength and conditioning training. It also allows the Athletics Department to continue providing for graduate assistants to supervise and coach the students. The funding has been appropriated as one-time funding since FY 2015-2016. The athletic training that is funded with this appropriation allows for rapid return from injuries and strength conditioning that is essential to peak performance. The funding has been appropriated as one-time funding since FY 2015-2016.
3		UW Operations	$2,500,000	$320,000		$2,820,000	The University campus is comparable to a small municipality, complete with its own utility systems, including more than 2,000 acres in Laramie and 16,890 acres statewide. The Laramie campus includes 7.35 million gross square feet of space. Oversight of the maintenance of a campus of this size and complexity requires exceptional management to minimize cost of maintenance. Personnel with specialized knowledge in building automation systems and specific scientific equipment requirements are necessary to ensure proper building function. The newest buildings on campus also house a great deal of sensitive information, whether in electronic devices or on paper, and there is high level of need to provide adequate security for its protection. The Facilities Management department is the heart of the maintenance wing of UW Operations covering Electrical, Plumbing, Controls, Preventive Maintenance, Key/Lock, Grounds and Structural. The University is requesting $150,000 plus benefits per year to hire a deputy director of facilities management to oversee this unit. Without this position the Associate Vice President for Operations will have thirteen direct reports with seven of them representing departments within Facilities Management. In addition to the need for a Deputy Director, the increased square footage of the Science Initiative Building coming online during the 2023-2024 biennium will require a minimum additional three custodians. The recurring funding needed for these positions is a combined $100,000 plus benefits per year. The University has made extensive investments in energy efficiency and has been able to control campus utility costs. However, load increases due to additional square footage of facilities served and utility rate increases have fully consumed the ability to manage the utilities budget without additional funding. The University has not received an increase in funding for utilities since the FY2017-2018 biennium and has sustained substantial decreases in state support. The University is requesting $1 million per year recurring to cover anticipated shortfalls in the utilities budget and an additional $320,000 one time to replace failing Operations division equipment.

UW Priority	Budget Book Page Number	Program Name	On-Going	One-Time	One-Time Match	Total	Description
4		ORED	$2,000,000			$2,000,000	The mission of the University of Wyoming (UW) Office of Research and Economic Development (ORED) is to work with faculty, staff and students in all of UW's colleges and outreach programs to link research, technology transfer, and economic development efforts to enhance federal, state and private sector support for faculty and graduate student scholarship. As the state of Wyoming addresses budget concerns and traditional Wyoming industries face economic pressures, it is imperative that the state's only four-year degree granting institution be on the forefront of responding to the driving forces behind research and economic change. UW needs to provide students with the education and skills they need to compete for employment in the technical and digital world as well as hire faculty who perform cutting edge research in scientific, technological, social science, and humanity fields. Research faculty in all disciplines require a certain level of central administrative staffing to assist with the complex regulations and policies associated with grant funding. As evidenced through external evaluation and comparison to other universities of similar size, UW is woefully understaffed in all areas of research administration. As such, UW seeks $1 million per year in supplemental recurring funding to support 12 hires in critical areas of research administration and provide service to campus and support state investments in research infrastructure. In addition to research administration staff, universities require technical staff to manage and operate highly technical research facilities and instrumentation. The State of Wyoming has made substantial investments in research facilities and instrumentation in recent years. Without the proper staffing to manage the buildings and the highly technical instrumentation contained in the buildings, the investment is wasted. UW is currently classified as R2 – "higher research activity" in the Carnegie classification for doctoral granting institutions. As UW aspires to reach the Carnegie R1 "highest research activity" classification for universities, as well as achieve Tier 1 status in engineering, UW must substantially increase staffing in the areas of pre-award proposal development, technology transfer, and shared research facility management. Additional staffing in all of these areas is imperative to establish a foundation of research support for all UW researchers and for adequately preparing students for the workforce. The ORED staffing shortage was confirmed through a November 2020 study conducted by an outside consulting firm (Attain). UW hired Attain to write a request for proposals (RFP) to solicit vendors of electronic research administration systems. To determine the requirements for the RFP, Attain conducted a series of interviews with ORED pre-award, compliance, and technology transfer staff; Office of Sponsored Programs (OSP) post-award staff; department business managers; and faculty researchers. The interviews asked for strengths and weaknesses in campus research services. The overwhelming weakness voiced in the interviews was that ORED is sorely understaffed. As a comparison, other R2 universities with similar annual research expenditures to UW (Boise State University and University of Idaho) have double the number of pre-award and compliance staff as UW. In January 2021, President Seidel created a campus working group to revise UW Regulation 9-2: Indirect Costs Policy and provide recommendations for a proposed new distribution of indirect costs at the University of Wyoming. The working group examined the broader questions of how to: (1) promote and enhance research at UW; and (2) determine how indirect funds from sponsored programs can be best used to maintain and grow UW's

						research enterprise. To accomplish this, the working group developed a spreadsheet titled, *Baseline Services Needed to sustain and Build UW's Research Enterprise and Meet Compliance and Contractual Obligations.* The working group reviewed staffing of peer institutions and determined what positions at UW were needed to ensure compliance with federal, state, local, and UW regulations and policies; bolster staffing to avoid overwork and burnout of current staff; and meet a legislative or contractual obligation. The working group created a spreadsheet listing needed positions and categorized them based on the criteria listed above. The top priority hires met all criteria - compliance insurance, reduce workload of current staff, and meet a contractual obligation. The working group identified over 40 positions needed to enhance research activity at UW. Seven of the top priority positions were included in the FY22 budget in anticipation of additional indirect cost revenue to ORED resulting from a change in the indirect cost distribution policy. However, the expected increase in indirect cost revenue to ORED will only cover 25% of the costs for all the positions. An additional $1 million of recurring supplemental funding will allow for another 25% increase in critical hires for ORED. (See Table 1 for additional detail)
5		Academic Affairs	$4,000,000			$4,000,000	The ability to recruit and retain talented faculty and staff is the single most important factor in the university's capacity to provide high quality education and research. Exceptional faculty and dedicated staff directly support the application of knowledge – a contribution to the state and its communities that the university is uniquely positioned to make. By attracting high-quality faculty and prepared staff and expertise to the state, UW has the distinct ability to put knowledge to work for the direct benefit of Wyoming and its citizens – whether that is development of economic opportunities or helping solve challenges and public policy issues.
6		Center of Innovation for Flow Through Porous Media		$3,000,000	$3,000,000		The Center of Innovation for Flow through Porous media (COIFPM), located in the University of Wyoming's High Bay Research Facility, is one of the most advanced oil and gas research facilities in the world. The research and discovery performed by the faculty, research scientists, post-doctoral fellows, and graduate students associated with the COIFPM are integral components of the University's Tier-1 Engineering Initiative and the School of Energy Resources and is lead by Dr. Mohammad Piri. The University's exception request is for one-time funding from the general fund of three million dollars ($3,000,000). These one-time funds would be used to match research grants and contracts awarded to the COIFPM by private industry. This request of funding is only for matching funding during the 2023-24 biennium time period – meaning, the funding would be used to provide the FY2023 and FY2024 matching fund requirements for either existing multi-year research grants/contracts already in place or new grants/contracts awarded to the COIFPM between July 1, 2022 and June 30, 2024.

7		College of Agriculture and Natural Resources	$1,818,000	$1,698,000		$3,516,000	The University is requesting $909,000 per year for salary and benefits and a one-time request of $1,315,000 in start-up funding for 7 new positions in the College of Agriculture and Natural Resources. These positions are mission critical and provide expertise for the core College missions of "Wyoming Agriculture" and "Community Vitality and Health". Each position fully aligns with President Seidel's 4 pillars and with the objective of building the best in class 21st Century Land Grant University true to its Wyoming roots. The requested positions provide expertise to build out the highly visible Ranch Management and Agricultural Leadership across the state, IMAGINE Initiative and the "Farm/Ranch of the Future" by adding faculty positions in high-tech agriculture and computational biology and support for Community Vitality and Health in a much-needed Nutrition faculty member that will bring us to capacity to be able to offer a 4+1 BS/MS program, with 5th year content on-line. The establishment of Enterprise Development Specialists within UW Extension (UWE) is a bold strategy to advance our strategic objectives associated with economic development, entrepreneurial support, economic diversification, and revenue enhancement in the agricultural sector of the Wyoming economy that is fully integrated with academic faculty on campus. (See Table 2 and position descriptions attached after the summary table) In addition to start-up funding and positions, the University is requesting funding for a Confocal Microscope with FRAP/FRET Capabilities. This request is for a microscope that can serve the needs of many investigators on campus by allowing scientists to visually monitor and quantify several biochemical processes going on inside living cells simultaneously with high resolution and sensitivity. Having this instrument opens a new area of bioscience investigation not currently possible on campus. Much of what happens in modern bioscience research can be outsourced to companies or centers for a fee, for example DNA or RNA sequencing, DNA synthesis, crystallography, mass spectroscopy, but visualizing what is happening inside live cells in real time must be conducted site. The quoted cost of the microscope (delivered) is $382,957.
		Biennium Operating Budget Exception Request Subtotal	**$19,318,000**	**$2,218,000**	**$3,000,000**	**$24,536,000**	
NA		Academic Affairs					Request reauthorization of any remaining AML prior balance funds originally appropriated for the UW Energy Science Student Stipends program. The authorization of these funds has expired.

Table 1: ORED Estimated Cost of Requested Hires

Position	# of FTEs	Base Salary	Salary+Fringe (49.9%)
Technology Transfer Office (TTO) – Business Development Assoc.	1	$75,000.00	$112,425.00
Technology Transfer Office (TTO) – Office Assoc.	1	$45,000.00	$67,455.00
Research Compliance – Animal Research Facility Manager	1	$75,000.00	$112,425.00
SI – Program and Building Manager	1	$90,000.00	$134,910.00
SI - Greenhouse Manager	1	$65,000.00	$97,435.00
SI – CASI Manager	1	$75,000.00	$112,425.00
College Research Coordinators - It is anticipated that the colleges/units will cover ½ of the salary of each position. ORED will pay the other ½. The cost shown here is the cost to ORED for 4 Coordinators.	4	$45,000 ea, ORED pays ½ = $90,000	$134,910.00
Genome Tech Lab Manager	1	$68,000.00	$101,932.00
EcoBGC Lab Manager	1	$68,000.00	$101,932.00
Totals	**12**	**$666,000.00**	**$975,949.00**

An additional $1 million would allow ORED to hire 12 positions, each described below. The cost of these positions, based on current salaries for similar positions, is listed in Table 1.

1. **Technology Transfer Office (TTO) – Business Development Associate** – Currently, the TTO has 3 full-time staff – A Director, Licensing and Patent Manager and a Technology Manager. The Business Development Associate would report to the Director and conduct initial assessment of commercial potential of new technologies, develop marketing materials, evaluate market size, identify potential licensees and key contacts, make initial marketing contact with potential licensees, maintain industry contacts and assist other TTO personnel with case management, with a focus on the marketing aspects of each case.

2. **Technology Transfer Office (TTO) – Office Associate –** With the TTO having the specialized positions of Director, Licensing/Patent Manager, Technology Manager and a Business Development Associate, an Office Associate is needed to manage the day-to-day business affairs of the office. This position would report to the Director of TTO.

3. **Research Compliance – Animal Research Facility Manager –** UW has numerous animal research facilities scattered around campus. The number of animal research subjects will increase when the new vivarium at the Science Initiative Building opens in the spring of 2022. UW does not have a position to oversee the practices and procedures taking place in these various animal research facilities. Lack of oversight to ensure consistent practices and adherence to federal laws on animal care and makes UW vulnerable to findings during federal inspections. An animal research facility manager is needed to be responsible for the day-to-day supervision and overall management of laboratory animal care personnel and the animal facility. Specific duties of this position may include implementing and evaluating new procedures; monitoring experiments to ensure research study protocols are being followed and notifying proper personnel if deviations are noted; and coordinating facility inspections. This position would report to the ORED Director of Research Compliance and Integrity.

4. **College Res Coordinators (4)** – Pre-award assistance coordinators (four of them) would be placed in the colleges/schools that are the most research intensive. This includes the College of Agriculture and Life Sciences, College of Engineering and Physical Sciences, College of Health Sciences, and one coordinator shared by the School of Energy Resources/Haub School/Humanities, Social Sciences, Arts College. These positions would assist faculty in those colleges with preparation of research funding proposals so that faculty can focus on writing and developing the substantive content of the proposal. ORED would request that each college or

units sharing the coordinator contribute to 50% of the salary cost of the position. The four Coordinators would report to the ORED Director of Research Services.

5. **SI – Program and Building Manager** – The new Science Initiative (SI) building is slated to open in the spring of 2022. A building manager is necessary for oversight of activities in the building, managing building visitation, ensure maintenance and repair of the building, facilities, and equipment within the building. This is a high priority hire and should be hired prior to occupancy of the SI building. This position would report to the Science Initiative lead within ORED.

6. **SI - Greenhouse Manager** – a specialized technician is required to manage the greenhouse space and research/educational activities in the SI building. This position would report to the SI Building Manager and is a top priority hire.

7. **SI – CASI Manager** – The SI building will house the Center for Advanced Scientific Imaging (CASI). This facility will contain millions of dollars of highly specialized imaging equipment to be shared among research faculty and students. A specialized technician is needed to oversee use, maintenance, and repair of the instrumentation. This position would report to the SI Building Manager and is a top priority hire.

8. **Genome Tech Lab Manager** – The Genome Technology Lab is a new facility created with funding by the current National Science Foundation (NSF) EPSCoR grant ($20 million over 5 years). As a condition of that funding, UW is obligated to sustain this lab for the long term. A laboratory technician position is currently funded from the NSF grant but will need to be funded once the grant ends in the summer of FY22. This position will report to the ORED Associate Vice President for Research.

9. **EcoBGC Lab Manager** - The Ecobiogeochemistry Lab is a new facility created with funding by the National Science Foundation(NSF) EPSCoR ($20 million over 5 years). As a condition of that funding, UW is obligated to sustain this lab for the long term. A laboratory technician position is currently funded from the NSF grant but will need to be funded once the grant ends in the summer of FY22. This position will report to the ORED Associate Vice President for Research.

Table 2. College of Agriculture and Natural Resources Positions Requested and Cost Estimates

Position	Title/Level	Salary	Start-Up	Location
Assistant Director, Agricultural Experiment Station	Associate/Full,12 mo	$135,000	$200,000	Laramie
Computational Biology, Molecular Biology	Lecturer, 9 mo	$75,000	$90,000	Laramie
Partnership in Wyoming Agriculture				
Advanced Technologies//Plant Science	Assistant Professor, 9 mo	$86,000	$300,000	Laramie or R&E Center
Rangeland UWE, Ecosystems Science and Management	Enterprise Development Specialist, Assistant/Associate Fixed Term, 11 mo	$86,000-120,000	$175,000	Western, statewide
Plant Science UWE, Plant Science	Enterprise Development Specialist, Assistant/Associate Fixed Term, 11 mo	$86,000-120,000	$175,000	Western, statewide
Partnership in Rural Community Vitality and Health				
Nutrition, Family & Consumer Science	Assistant Professor, 9 mo	$86,000	$200,000	Laramie
Food, Health, and Nutrition UWE, Family and Consumer Science	Enterprise Development Specialist, Assistant/Associate Fixed Term, 11 mo	$86,000-120,000	$175,000	Casper, statewide
Total Recurring Salary* **Total Recurring Benefits (estimate)** **TOTAL**		**$640,000-742,000** **$269,000-312,000** **$909,000-1,054,000**		
Total One Time Expenditures			**$1,315,000**	

*Salary funds available, $15,000 annually from Foundation funds

Appendix

Position Descriptions

Associate/Full Professor, Assistant Director, Agricultural Experiment Station

Anticipated Salary	$135,000	Anticipated Start-up Cost total	$200,000
Anticipated Courses	6 – 9 cr per year in area of specialization		
New position	Associate/Full Professor with home department in any department in College		

Mission Critical: The Assistant Director of the Agricultural Experiment Station would manage the internal operations of the research enterprise at the College of Agriculture and Natural Resources, freeing the Associate Dean and Director of AES to focus on engagement with external stakeholders, major grants, infrastructure projects and national programs. CANR has the second largest research enterprise at the university next to A&S which has a substantially larger faculty. The complexity of the CANR research enterprise requires managing over 10 multi-state programs, numerous umbrella projects, and operations of 4 research stations including research on-campus necessitating hiring an assistant director, a position that has been vacant for over 4 years and is reducing our capacity to be competitive for funding nationally for large grants.

Support of the Four Pillars:
Digital: ensuring research across the college is relevant and cutting edge, including training in computational biology, artificial intelligence, and emerging technologies in data science.
Entrepreneurship: provide support for faculty to obtain grant and contracts, encourage development of patentable technology and technology transfer including spin-off companies.
Interdisciplinary: Agriculture and Natural Resource fields are intrinsically interdisciplinary. Assistant Director would build and manage interdisciplinary and cross-disciplinary research teams involving individuals in the College, across the university and at other institutions as part of multi-state projects
Inclusive: This individual would be primary liaison with US Department of Agriculture on diversity programs. S/he would be tasked with recruiting a more diverse graduate student population. S/he would encourage inclusivity by supporting undergraduate and high school engagement in research and STEM.

College Strategic Priorities: This position supports all of the CANR's strategic goals:
Student Success: provide opportunities for students at all levels to engage in productive and exciting research that will prepare them for successful careers.
Academic Innovation and Distinction: promote collaborative research at the private/public nexus that is distinctive and innovative.
Community Engagement and Strategic Partnerships: disseminate research and technology transfer through Extension to local communities. Promote partnerships with regional, state and federal agencies, NGOs and private businesses.
Transformational Driver of Economic Growth: applied research will drive economic development in rural communities. 70% of WY is range and ranch land, much forested and

agriculture research that supports economic growth in these sectors will be a major emphasis for this position. Workforce development aspects from the College research enterprise incorporates practical experiences, research-based technical knowledge, real-world problem solving, and interactions with stakeholders to diversity the state economy and to ensure that agricultural businesses are economically and environmentally sustainable.

Assistant Professor - Plant Science – Advanced Technologies

Anticipated Salary	$86,000	Anticipated Start-up Cost total	$300,000
Anticipated Courses	6-9 cr per year, dependent on field of specialization		
New position	Associate/Full Professor with home department in any department in College		

Mission Critical: Agriculture is currently undergoing a digital revolution. Autonomous robotic planters and weeders, precision nutrient and pesticide application equipment, aerial crop scouting with satellites and UAVs, harvest yield monitors, and other current agricultural technologies are becoming commonplace on farms across the country. Vast amounts of data are being collected and analyzed to improve crop production efficiency and to lower the environmental footprint. As a result of the rapid changes in the crop production industry, employers are looking for graduates with high-tech skills – programming, data science, GIS and others. This individual would partner with 2 Enterprise Development Specialists in UW Extension

The vision for this position would be a faculty member who understands the current landscape of how technology is impacting farms including the management of invasive plants and the impact of water availability and other climate related factors. S/he would teach courses in at least one area of current and future ag technology development. We would define the position broadly with respect to research interests to interest a diverse array of applicants. Teaching for this position would likely be in the areas of:

- Aerial scouting methods, data processing and interpretation
- Data science - programming for and analysis of large agronomic data sets, which are often variable and spatial in nature
- Precision agriculture/remote sensing - incorporating spatial and climate variability into planning and real-time decision making. Broader applications include ecosystem monitoring and validation of environmental and carbon capture schemes on a blockchain.

The coursework from this faculty member would be offered online or through hybrid online/on-site labs in collaboration with colleagues at the UW R&E Centers and community colleges, enhancing our ability to offer a robust and rigorous B.S. degree and graduate education to students in Laramie and across the state in Sheridan, Powell, and Torrington. This faculty member would contributor to broader UW programs in data science, interacting closely with faculty in WyGISC, Botany, Mathematics & Statistics, and other departments.

Support of the Four Pillars:
Digital: this is a data science heavy position using emerging technologies in remote sensing, aerial scouting and data analysis to address questions with management of large plant ecosystems. Provide data science support for other investigators.
Entrepreneurship: an important faculty collaborator on grant and contracts that could lead to patents, technology transfer opportunities, potentially spin-off companies including consulting firms.
Interdisciplinary: This faculty member would expand the scope of collaborations in Plant Sciences.

Inclusive: S/he would encourage inclusivity by engaging undergraduate and high school engagement in agricultural research and STEM through 4-H robotics and school programs. Cross-disciplinary scope would foster inclusiveness.

College Strategic Priorities: This position supports all of the CANR's strategic goals:
Student Success: provide opportunities for students at all levels to engage in exciting opportunities in a high-tech area that will prepare them career success.
Academic Innovation and Distinction: promote innovative and collaborative research across disciplines that addresses important global problems in agriculture in resource management.
Community Engagement and Strategic Partnerships: disseminate research and technology transfer to communities through demonstrations (actual and virtual) and through Extension.
Transformational Driver of Economic Growth: Will improve economic and environmental sustainability in agriculture by providing producers with tools that they can use for real time decision making. Provides opportunities for new and small business growth associated with instrumentation, sensors, testing, monitoring, data handling and services.

Funding: This position is supported by state funds. Position would support the Institute for Managing Annual Grasses Invading Natural Ecosystems (IMAGINE) for which fundraising efforts are underway. Foundation support would be available for pilot projects and graduate student support.

Assistant Professor, Human Nutrition

Anticipated Salary	$86,000	Anticipated Start-up Cost total	$200,000
Anticipated Courses	Scientific Study of Foods, Experimental Foods, Food Systems Production, and graduate courses		

Mission Critical: The Didactic Program in Nutrition and Dietetics (DPND) offered by the Human Nutrition program in FCS is accredited through the Accreditation Council for Education in Nutrition & Dietetics (ACEND; a U.S. Department of Education Title IV gatekeeper). According to the BLS, <u>employment for RDs is expected to increase much faster than average</u>. Students cannot become a Registered Dietitian Nutritionist (RDN) without graduating from an accredited program. Similar to many other allied health professionals in the U.S., as of 2024 the credentialing agency for RDNs will require a master's degree before students can take the RDN credentialing exam. To remain competitive with peer institutions, attract quality students, produce students who can successfully pass the national licensing RDN exam, and increase the numbers of RDNs graduating from and remaining as professionals in Wyoming, the UW DPND program must move toward a 4+1 master's degree program. This will require a minimum 3 faculty and 1 fixed-term director: currently we have 2 faculty and 1 fixed-term director. We were approved for a position in Fall 2019, however we learned that same semester one of our nutrition faculty had accepted a position at another university. We were forced to pivot and use the FY20 CPM position to instead fill this critical void in clinical and metabolic experience. Thus, instead of ensuring we can implement our 4+1 program, we find ourselves back to 2 TT faculty and 1 director, still leaving us without expertise in food service management and not enough instructional or graduate advising capacity to implement the new program. This individual would also partner with an Enterprise Development Specialist in UW Extension.

Support of the Four Pillars:
Interdisciplinary: The DPND program prides itself on its interdisciplinary nature, exposing students to a wide range of fields (e.g., Molecular Biology, Zoology, Kinesiology). Our faculty have research collaborations with other departments, colleges, universities, and community organizations. Further, the new graduate curriculum will require intense experiential learning experiences within community, hospital, and foodservice settings across Wyoming. Collaboration with existing UW entities such as Extension, Community Outreach and Engagement, and other allied health profession majors at UW (e.g., nursing and pharmacy) will be important to the program. In addition, nutrition faculty have consistently been involved in the WWAMI program. This critical partnership can continue, on load, if we secure this position. Ongoing collaboration between the nutrition faculty and WWAMI ensures better educational outcomes for students, increased research collaborations, and faculty development opportunities.
Inclusivity: Students will be placed around the state in their final year, this program would require many courses to be moved to distance/online delivery, hence **increasing online course offerings** (as currently the DPND program only offers one 1000-level online course). This will increase access.

College Strategic Priorities: This position supports each of CANR's strategic goals:
Student Success: includes increasing student access to internships and community engagement, service learning, off campus experiences, real-world career experiences, and interactions with

professionals. This position will allow us to add the required large number of experiential learning opportunities and internship hours, with UW entities such as dining and student health services, ACRES, and athletics, as well as community hospitals and agencies across the state.

Academic Innovation and Distinction: By hiring an outstanding researcher into this position, we can increase research output and funding.

Community Engagement and Strategic Partnerships: include building community-based collaborations, promoting rural community vitality and health across Wyoming, and meeting workforce needs. Again, the partnerships created by this program will build statewide collaborations that benefit both students and our partners and will further demonstrate UW's commitment to rural community health. In addition, the prevalence of overweight and obesity, as well as chronic diseases related to dietary choices, has increased in the U.S. and the state of Wyoming. Because of this, the demand for RDNs is increasing (supported by BLM projections), and we must continue to prepare students to meet this workforce demand.

Transformational Driver of Economic Growth: Many nutritionists are independent consultants or have small businesses. These businesses would be located across the state, many in small communities.

Funding: The FCS department has been very fortunate to have strong financial support. The FCS Endowment fund can support this position in two ways. First, it could supplement the position reducing the level of state funding needed, possibly through a named fellowship that would contribute $15,000 per year to the position. Second, we plan to use some of these funds to help support students in the new DPND program in their 5th year. Thus, students with Hathaway could finish the program with little to no debt, and out of state students would be enticed by UW's economical undergraduate education and the possibility of departmental financial assistance in their 5th year.

Assistant Lecturer, Molecular Biology (Computational Biology)

Anticipated Salary	$75,000	Anticipated Start-up Cost total	$90,000
Anticipated Courses	Bioinformatics, computational biology applications, data analysis		

Mission Critical: This Assistant Lecturer position increases the effectiveness of instruction computational biology across a diverse array of undergraduate courses that would address the need of students in biological science across campus to become competent in this area. Additionally, this individual would be the principal driver for the development of an on-line MS and post-baccalaureate certificate program in Computation Biology. Existing university faculty that have competency in a wide-variety of computational biology applications – bioinformatics, modeling, generation and analysis of large data sets – are among the most productive on campus. They are busy with core instructional assignments, managing funded research programs, and are inordinately tapped to serve on University committees. Computational biology has become a core competency for all of the diverse fields of biology and UW needs to have a designated individual (this proposed position) whose central duty is to see that instructional programing addresses the needs of our students majoring or pursuing advanced degrees in the biological sciences.

Support of the Four Pillars:
Digital: As the position would expand educational efforts in both computational and information sciences and be the principal driver of a new online degree program it would help usher UW into a more digital future.
Entrepreneurship: The position would be entrepreneurial in two ways. First, it would be the key to the generation of a low-cost delivery option for an on-line MS and post-baccalaureate certificate program that would be revenue generating, potentially growing to both fund the requested position and provide revenue to support existing instructional programs. Second, all biotechnology ventures are at least partially dependent on a robust computational biology component. The Molecular Biology Department has incubated two SBIR funded startup biotech companies and their reliance on computational biology stands as a prime example of the importance of this area.
Interdisciplinary: This position supports an endeavor that is interdisciplinary, cutting across department and college lines. The Data Science Center, the undergraduate and graduate minors in computational science, and the INBRE Bioinformatics Core are natural collaborators for the development of Masters and post-baccalaureate certificate program in Computation Biology. Interested parties just within the College of Agriculture include Molecular Biology, Animal, Plant and Veterinary Sciences, and Ecosystem Management. Similarly, multiple programs in the Colleges of Arts & Science and Health Sciences would be natural collaborators. There is extensive human capital and courses that could be leveraged to develop this effort, but we require a dedicated expert to stitch those resources together and fill in the gaps to create a functional program.
Inclusive: The Department of Molecular Biology and the College of Agriculture and Natural Resources are deeply committed to fostering diversity, and will make every attempt to identify, interview, and hire an applicant that moves our program towards a more inclusive environment.

College Strategic Priorities: This position supports all of the CANR's strategic goals:

- **Student Success:** Provides necessary competencies in computational biology for individual in biology and health sciences fields.
- **Academic Innovation and Distinction:** Provides education tools and technical support for faculty and students engaged in innovative life science studies through improvement of their ability to utilize computational and data science tools.
- **Community Engagement and Strategic Partnerships:** Provide educational support and programming for Extension educators in the state. Form strong partnerships with INBRE and community colleges.
- **Transformational Driver of Economic Growth**: Providing students with stronger quantitative skills that help them solve real world problems gives them the skills and mindset to use technologies in new ways that could lead to greater business success or new business opportunities.

Funding: The position is state funded. However, distance program revenue could supplemental salary (for summer) and provide operating expenses.

UW Extension Enterprise Development Specialist – Rangeland Livestock
Assistant or Associate Professor, Ecosystem Science and Management

Anticipated Salary	$86,000-120,000	Anticipated Start-up Cost total	$175,000
Anticipated Courses	Research/Extension Appointment, no classroom teaching		

Department: Ecosystem Science and Management
Office Location/Service Area: western Wyoming/Statewide
Personnel Classification: NTT Faculty
Employment Term: Fixed-term w/ 3 (5) year rolling contract
Appointment/Funding: 11-month Extension and research/UWE,WAES

Support of the Four Pillars:
Digital: Individual would be competent in relevant ag related tech such as aerial surveillance or remote sensing, developing applications useful in the field where connectivity is limited. Develop blockchain applications for forage quality, animal health and traceability and environmental credits.
Entrepreneurship: The position would be entrepreneurial in that it supports livestock producers to be more successful. Educational programming in this position would support the needs of small business across the state and WIN.
Interdisciplinary: Position integrates several aspects of agricultural business operations, land and livestock management and technology.
Inclusive: Program has regional reach. Technology focus would attract students from other STEM field to consider agriculture for their discipline.

College Strategic Priorities: This position supports all of the CANR's strategic goals:
Student Success: Provides opportunities for applied research and internship opportunities for students in ranch management, range ecology, animal science and engineering
Academic Innovation and Distinction: Provides educational and technology tools and technical support for faculty, students and community members working on range issues across the state.
Community Engagement and Strategic Partnerships: Partner with Plant Science, ESM and Animal Science faculty. Provide demonstrations and technical support for agriculture producers and stakeholder groups including agencies and NGOs,
Transformational Driver of Economic Growth: Provide technical support so that agriculture producers can remain economic and environmentally sustainable. Encourage development of new markets and technology applications that could create new jobs.

Funding: The position is state funded. However, grants and contracts would support operating for this position.

UW Extension Enterprise Development Specialist – Forage Crops/Invasive Species
Assistant or Associate Professor, Plant Science

Anticipated Salary	$86,000-120,000	Anticipated Start-up Cost total	$175,000
Anticipated Courses	Research/Extension Appointment, no classroom teaching		

Department: Plant Sciences
Office Location/Service Area: Powell R&E Center (preferable)/Statewide
Personnel Classification: NTT Faculty
Employment Term: Fixed-term w/ 3 (5) year rolling contract
Appointment/Funding: 11-month Extension and research/UWE,WAES

Support of the Four Pillars:
Digital: Individual would be competent in relevant ag related tech such as remote sensing, precision agriculture (tracking water, inputs, pest management), developing applications useful in the field where connectivity is limited. Develop blockchain applications for management of plant species (forage and invasive species), and environmental credits such as carbon capture.
Entrepreneurship: The position would be entrepreneurial in that it supports agronomic crop producers to be more successful in this drought prone, high altitude environment. Educational programming in this position supports the needs of small business across the state and WIN.
Interdisciplinary: Position integrates several aspects of agricultural business operations, land and water management and sensor and aerial based big data applications.
Inclusive: Program has reach across the state and region through producers and stakeholder groups.

College Strategic Priorities: This position supports all of the CANR's strategic goals:
Student Success: Provides opportunities for applied research and internship opportunities for students in plant science, soil and water science, geography, and botany.
Academic Innovation and Distinction: Provides educational and technology tools and technical support for faculty, students and community members working on agronomic and invasive plant issues across the region.
Community Engagement and Strategic Partnerships: Partner with Plant Science, ESM, Animal Science and ecology minded faculty across campus. Provide demonstrations and technical support for agriculture producers and stakeholder groups including agencies and NGOs.
Transformational Driver of Economic Growth: Provide technical support so that agriculture producers can remain economic and environmentally sustainable. Encourage development of new production methods and technology applications that could create new jobs.

Funding: The position is state funded. However, grants and contracts would support operating for this position.

UW Extension Enterprise Development Specialist – Food, Health, and Nutrition
Assistant or Associate Professor, Family and Consumer Science

Anticipated Salary	$86,000-120,000	Anticipated Start-up Cost total	$175,000
Anticipated Courses	Research/Extension Appointment, no classroom teaching		

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- a. Department: Family Consumer Sciences
- b. Office Location/Service Area: Casper/Statewide
- c. Personnel Classification: NTT Faculty
- d. Employment Term: Fixed-term w/ 3 (5) year rolling contract
- e. Appointment/Funding: 11-month Extension and research/UWE,WAES
- f. Hiring Rank: Assistant or Associate Professor

Support of the Four Pillars:
Digital: Individual would collaborate with health care professionals on research into delivery of virtual allied medical services such as nutrition consultation. Surveys involved with this line of work are data intensive.
Entrepreneurship: The position would be entrepreneurial in that it supports the development of small nutrition related services across the state Educational programming in this position supports the needs of small business across the state and WIN.
Interdisciplinary: Nutrition is an interdisciplinary field with practices in community nutrition, food service management and clinical/medical nutrition specifically medical nutrition therapy. Professionals must be competent in the biomedical sciences, psychology, statistics. In outreach, professional must have excellent communication skills and be able to convey nutrition knowledge to the general public.
Inclusive: Program has reach across the state and region through community contacts reaching individuals of all ages and health status.

College Strategic Priorities: This position supports all of CANR's strategic goals:
Student Success: Provides opportunities for applied research and internship opportunities for students in nutrition, food science, pre-medical studies, and communication.
Academic Innovation and Distinction: Provides scientific and educational support for faculty, students and community members working in nutrition, health and food security across the region.
Community Engagement and Strategic Partnerships: Partner with Family and Consumer Science and nutrition minded professionals across campus. Provide educational sessions on nutrition and health to the community, in partnerships with medical professionals, schools, agencies and NGOs.
Transformational Driver of Economic Growth: Encourage development nutrition-based practices that improve the quality of life in the community, making it a better place to live.

Funding: The position is state funded. However, grants and contracts would support operating for this position.

Supporting documentation

Justification: Unique to Campus Confocal Microscope with FRAP/FRET Capabilities

SPECIFICATION
STELLARIS 5 is a true confocal point scanning system, including **White Light laser** as the excitation light source and is equipped with a highly sensitive **Power HyD®S spectral detection system**. The extended detection ranges up to 850 nm plus the expanded excitation range of the White Light Laser in the visible from 485 nm up to 685 nm allow the application and separation of an extended range of spectrally overlapping fluorophores. The enhanced detection efficiency and the optimal match of excitation and detection enable long term gentle live cell imaging. The combination of a **Tandem scanner** with dynamic signal enhancement delivers superb image quality at full speed and in super-resolution. Including **TauSense**, STELLARIS 5 offers a lifetime-based tool set that provides access to functional imaging, allows to remove undesired signal contribution and enables to separate spectrally overlapping fluorophores which open the capability of the lifetime FRET imaging in live cells. Optimization with the advanced FRAP/FRET module provides a user-friendly interface for the best image analyses for dynamic protein-protein interaction.
We currently have no microscopes on campus capable of the **lifetime FRET imaging** that the STELLARIS 5 system can perform. Acquisition of this instrument opens up new experimental opportunities for a number of projects being carried out at UW.

APPLICATION TO RESEARCH ON CAMPUS
Eunsook Park: This microscope is the best solution to monitor dynamic changes of calcium, reactive species oxygen, or ATP concentrations in live cell upon pathogen infection by using the transgenic plants which express new FRET-based sensors.
Grant Bowman: research would benefit from the improved temporal and spatial resolution in FRAP that this system offers. We'd also like to perform high-resolution protein interaction experiments in live bacterial cells with the improved FRET capabilities of the system.
Jay Gatlin: Procurement of the STELLARIS 5 imaging system, specifically with its TAUSENSE module, will allow us to monitor spatiotemporal changes in FRET signals (i.e. forces) within mitotic spindles in ways that are currently not possible on the UW campus.
Todd Schoborg: The lifetime FRET imaging with the fastest scanner of STELLARIS 5 will allow us to define the kinetics of the interaction of proteins to understand fundamental gene function for human disease using the fruit fly.
Dan Levy: The highly sensitive signal detectability with dynamic signal enhancement of STELLARIS 5 will be beneficial to obtain super resolution images for the research in my lab.
Thomas Boothby: The white light laser of the STELLARIS 5 will allow us to monitor dynamic protein complex formation occurring during development of stress tolerance using a variety of florescent proteins.
Dan Wall: The enhanced detection efficiency and the optimal match of excitation and detection enable long term gentle live cell imaging to confirm bacterial cell-to-cell communication.
David Fay: The advance in separation of the spectrally overlapped fluorophores will be a good addition for imaging vesicle trafficking in C. elegans.

We anticipate that there will be users from other departments across campus.

<u>Potential application for your research</u>
- Live cell imaging and quantification of calcium, pH, ROS, or ATP flux by using modern fluorescence-based sensors.
- In vivo confirmation of the protein-protein interaction by using optimized FRET measurement.
- Monitoring dynamic localization of multi-proteins in cells simultaneously by using modern variants of fluorescent proteins in various excitation/emission spectra.