



Office of Research and Economic Development Strategic Plan

# BREAKTHROUGHS IN RESEARCH 2018-2022





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# PREAMBLE

As the University of Wyoming's strategic plan, "Breaking Through," foreshadows, the research enterprise of UW will have to nimble, proactive, and expansive if it is to assert research and economic development leadership. Research practices demand their own set of breakthroughs if the university and state of Wyoming are to succeed. Key will be establishing a culture of research partnership. It will be founded on the recognition that all of Wyoming – the UW campus, the sovereign nations on the Wind River Reservation, the community colleges, businesses – must join forces in research if UW is to serve as the citizens of Wyoming deserve. Goals and questions that drive this plan are:

- **Breaking through in sponsored research** – How can UW increase research supported by external sponsors in all fields in areas of statewide, national and global interest? What is required to raise institutional expectations and rewards regarding research intensity and external research sponsorship?
- **Breaking through to the marketplace** – How can barriers in protecting intellectual property and bringing ideas to market be reduced so that faculty and students are best prepared to join and support a growing stream of entrepreneurs in Wyoming? How can UW's research enterprise best serve the state in promoting diversification of Wyoming's economy?
- **Breaking through to new research horizons** – What practices, policies, and infrastructure investments need to be made to allow UW to successfully respond to disruptive events and developments in research in the next decade and beyond? How do we promote a research culture that celebrates engagement across disciplines and between institutions? How does UW best use the state investments made in Tier 1 Engineering, STEM education, and the Science Initiative?
- **Breaking through to new research talent** – What practices and infrastructure will broaden the vitality and accessibility of research opportunities for students from both the UW campus and Wyoming's community colleges? How can UW increase the diversity of research- and scholarship-intensive faculty across the disciplines?
- **Breaking through with excellence in research administration** – How can UW breakthrough bureaucracies and established practices whose value has diminished with time so that UW's investments in research can be optimally used to the benefit of Wyoming's students and faculty, driving innovation and making an economic impact in this state?

"Breaking through" research and administrative barriers to enable the genius of Wyoming's best and brightest to serve the state, nation, and globe is needed more than ever. This plan is a starting point. It's maturation and execution will be driven by active engagement with university faculty as well as other statewide stakeholders. It recognizes that business as usual will not be sufficient if the UW research enterprise is to rise to educational and economic needs of the state.

As the economic future of Wyoming will be defined by those who pass through UW's corridors and research labs, student education must prepare them for a future only they can define. At the core of their educations must be the defining experience of coming to understand that they have the capacity to change the world for the better. At the highest level, this is what ORED and UW has to enable.



Edmund J. Synakowski  
Vice President for Research and Economic Development



# RESEARCH AT THE UNIVERSITY OF WYOMING, AND THE VISION AND MISSION OF THE OFFICE OF RESEARCH AND ECONOMIC DEVELOPMENT

The vision of the research enterprise at the University of Wyoming is to assert leadership to address disciplinary and grand multidisciplinary challenges, benefitting citizens statewide, nationally, and globally. Building on chosen areas of excellence, this will be enabled by a culture of partnership within and across disciplines, and enabling reach across borders. Spanning STEM disciplines, humanities, education, social sciences, and the professions, UW research will be a resource for stimulating thought leaders as well as catalyzing Wyoming’s enterprises to create practical value as it expands the frontiers of the mind and spirit. Students will experience the transformation of one’s sense of place and capability by revealing the world through research, fulfilling this land grant university’s leading mandate to educate and support an enlightened citizenry.

The Office of Research and Economic Development (ORED) has a leading role in enabling this research vision to be realized. ORED’s vision and mission statements are as follows:

**Office of Research and Economic Development (ORED) Vision 2022** – ORED will efficiently administer research programs in areas of statewide, national, and global importance, enabling translation of impactful research ideas to the marketplace. ORED will promote research partnerships where demanded in strategically important areas across disciplines, between educational institutions, and with industry. Supporting the best and brightest researchers in all fields and qualified only by their excellence, ORED’s highest-level goal will be promoting the educational experience of students so they graduate from UW with the knowledge that they can understand and influence the world for the better.

**ORED Mission** – The mission of the University of Wyoming’s Office of Research and Economic Development is to support the campus and statewide research and economic development enterprise through excellence in research administrative practices and outreach. This includes effective management of interfaces between faculty, sponsors, and community. It also includes strong performance in activities aimed at stimulating partnerships across disciplines, with government sponsors, between research institutions, and with industry.







# SUMMARY GOALS, OBJECTIVES, AND ALIGNMENT WITH UW'S *BREAKING THROUGH*

**UW Goals: *Breaking Through***

**UW Goal 1: Driving Excellence** – Join together as an intellectual community already renowned for its regional, national and global relevance and impact by fostering and rewarding excellence in teaching, scholarship, innovation and creative endeavor.

**UW Goal 2: Inspiring Students** – Inspire students to pursue a productive, engaged and fulfilling life and prepare them to succeed in a sustainable global economy.

**UW Goal 3: Impacting Communities** – Improve and enhance the health and well-being of our communities and environments through outreach programs and in collaboration with our constituents and partners.

**UW Goal 4: A High Performing University** – Assure the long-term strength and stability of the university by preserving, caring for and developing human, intellectual, financial, structural and marketing resources

**UW Research Goals: *Breakthroughs in Research***

**ORED Goal 1: Breaking through in sponsored research** – Increase research supported by external sponsors in all fields in areas of statewide, national and global interest. Raise institutional expectations and rewards regarding research intensity and external research sponsorship  
– Aligned with UW *Breaking Through* Goals 1-4

**ORED Goal 2: Breaking through to the marketplace** – Facilitate intellectual property protection of ideas born from UW research, lead business development resources at the university, and work with the state and its initiatives to increase of the number and diversity of businesses launched  
– Aligned with UW *Breaking Through* Goals 1-4

**ORED Goal 3: Breaking through to new research horizons** – Increase UW’s capacity to respond to disruptive research developments that cannot be predicted, especially those that demand transdisciplinary responses and that are of national and global importance  
– Aligned with UW *Breaking Through* Goals 1, 2, and 4

**ORED Goal 4: Breaking through to new research talent** – Increase research opportunities for UW campus and Wyoming community college students, enabled by a new Office of Undergraduate Research. Support increasing the number of underrepresented faculty who perform research and apply for grants that support growth in minority student representation.  
– Aligned with UW *Breaking Through* Goals 1-4

**ORED Goal 5: Breaking through with excellence in research administration** – Implement an ORED organizational structure and practices to enable efficient and transparent research program administration and to engage a broad range of stakeholders  
– Aligned with UW *Breaking Through* Goals 1-4





# ORED GOAL ONE

Breaking Through in  
Sponsored Research

INCREASE RESEARCH SUPPORTED BY EXTERNAL SPONSORS IN ALL FIELDS IN AREAS OF STATEWIDE, NATIONAL AND GLOBAL INTEREST. RAISE INSTITUTIONAL EXPECTATIONS AND REWARDS REGARDING RESEARCH INTENSITY AND EXTERNAL RESEARCH SPONSORSHIP  
- ALIGNED WITH UW *BREAKING THROUGH* GOALS 1-4

## Drivers

Within the Carnegie Classification of Institutions of Higher Education, the University of Wyoming’s research activity is classified in the second tier out of three for doctorate-granting institutions (“Doctoral: Higher Research,” as compared to “Doctoral: Highest Research” and “Doctoral: Moderate Research.”) Also, the National Science Foundation (NSF) annually provides rankings of institutions by research expenditures. While both rankings for UW are aligned with those of most of UW’s regional peers, a long-term goal is elevating UW’s research activity so that it is recognized by most measures as being among the elite research institutions of the nation. This is in part because of the special place UW has in the state as its only four-year university, its land-grant obligation to serve, and the call to action for UW to be an engine for economic diversification. Cited as metrics here are factors used by Carnegie and the NSF to determine the level of research activity at an institution of higher learning.

## ORED Enabling Forces

- Lead campus-wide institutional gaps and opportunities analyses in research and in infrastructure
- Partner with faculty in regular communications with national sponsors
- With faculty, lead in exploring business partnership opportunities
- Develop pre-proposal support for grant proposal writing
- Strengthen ORED research administration capacity (see ORED Goal 5)





## ORED GOAL TWO

Breaking Through to  
the Marketplace

FACILITATE INTELLECTUAL PROPERTY PROTECTION OF IDEAS BORN FROM UW RESEARCH, LEAD BUSINESS DEVELOPMENT RESOURCES AT THE UNIVERSITY, AND WORK WITH THE STATE AND ITS INITIATIVES TO INCREASE OF THE NUMBER AND DIVERSITY OF BUSINESSES LAUNCHED  
- ALIGNED WITH UW *BREAKING THROUGH* GOALS 1-4

### Drivers

A key responsibility to students, faculty, businesses and entrepreneurs statewide is providing services that enable protection of intellectual property, and that also enable the safe harbor and nurturing of creative ideas as their business potential is developed. Major forces include the state's ENDOW initiative. Resources include the university's new Institute for Innovation and Entrepreneurship, and economic development units of the Wyoming Business Council that report to ORED. Shepherding to the marketplace research ideas of students and faculty, and those of Wyoming's businesses and entrepreneurs, is a leading goal of *Breakthroughs in Research 2018-2022*.

### ORED Enabling Forces

- Increase capacity of Tech Transfer office in IP protection
- Launch outreach programs to faculty to educate them regarding services available in IP protection.
- Engage with the Wyoming and national business community to make them aware of UW research capacity, partnering opportunities, and resources for protecting ideas and bringing them to the marketplace
- Close cooperation with the State of Wyoming, the ENDOW initiative, and the Wyoming Business Council in optimizing resources to promote entrepreneurship
- Provide leadership to the Institute for Innovation and Entrepreneurship (IIE)





# ORED GOAL THREE

**Breaking Through to  
New Research Horizons**

**INCREASE UW'S CAPACITY TO RESPOND TO  
DISRUPTIVE RESEARCH DEVELOPMENTS THAT  
CANNOT BE PREDICTED, ESPECIALLY THOSE  
THAT DEMAND TRANSDISCIPLINARY RESPONSES  
AND THAT ARE OF NATIONAL AND GLOBAL  
IMPORTANCE. THIS DEMANDS PRACTICES THAT  
PROMOTE INTERDEPARTMENTAL COOPERATION,  
INCLUDING TRANSDISCIPLINARY PROGRAMS AND  
SHARING OF RESOURCES**

**- ALIGNED WITH *BREAKING THROUGH* GOALS 1 AND 2**

## **Drivers**

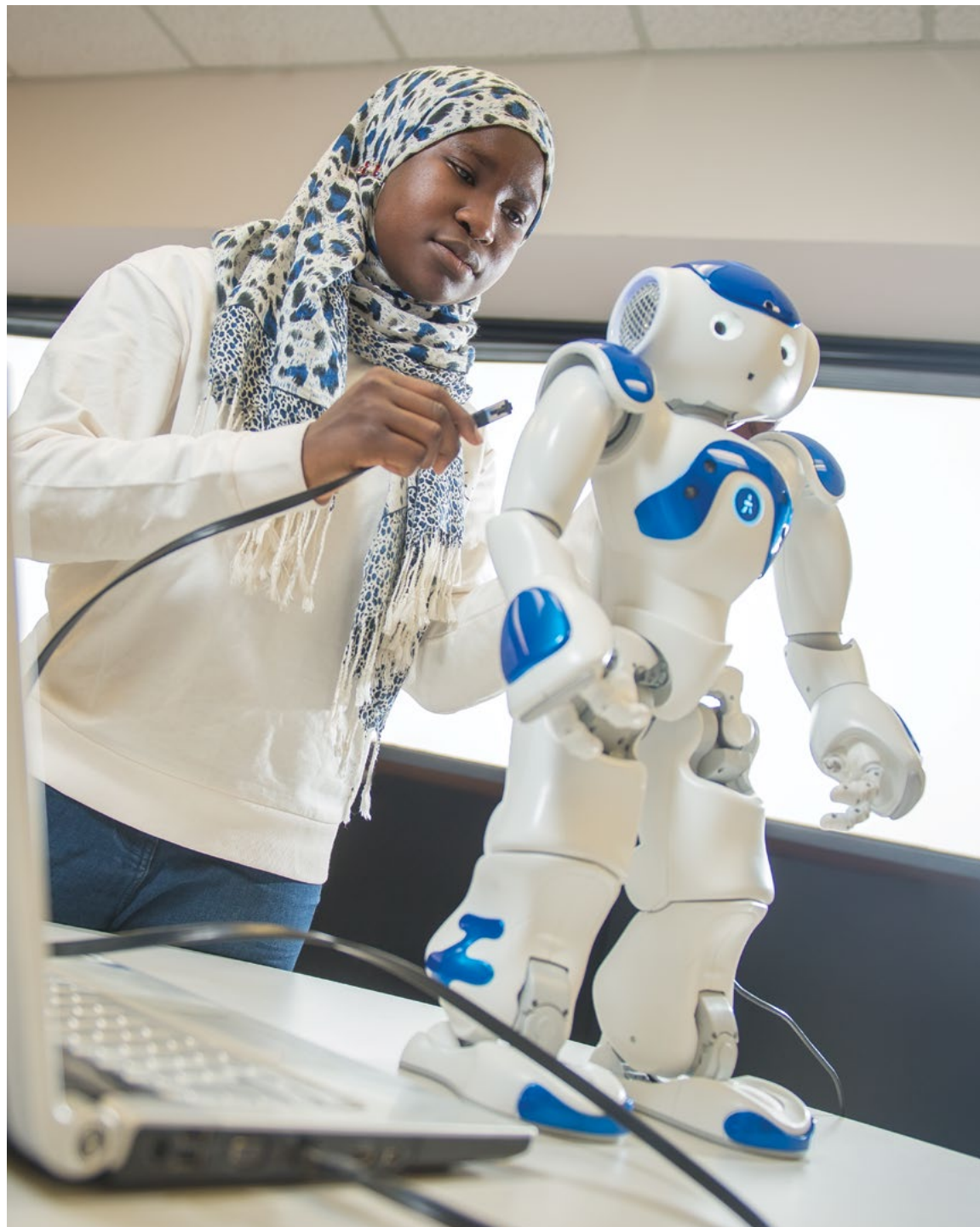
The research landscape is changing at a dramatic pace. In many areas, the present state of research ten years ago could not have been predicted. Also changing is the relationship among research institutions, federal and state sponsors, foundations, and industry. Partnerships are far more important than they were even ten to twenty years ago.

Successful research leaders will therefore be ones who can adapt quickly to this shifting landscape, are readily informed about the nature of changes on the national research scene, and are able to respond to calls to actions with research tools that are broadly enabling. Flexible partnering practices between STEM, humanities, and social science disciplines will be essential.

## **ORED Enabling Forces**

- Support strategic investment in research resources that are broadly enabling, including research computing and flexible research platforms such as those designed into the Science Initiative and Tier 1 Engineering research facilities.
- Launch ORED-sponsored seed programs in transdisciplinary research that addresses national and global needs and strengthens practices of partnership between departments, other research institutions, and industry.
- ORED leadership and faculty engage regularly with national sponsors and the National Academies of Engineering and Science.





## ORED GOAL FOUR

**Breaking Through to  
New Research Talent**

**INCREASE RESEARCH OPPORTUNITIES FOR UW CAMPUS AND WYOMING COMMUNITY COLLEGE STUDENTS, ENABLED BY A NEW OFFICE OF UNDERGRADUATE RESEARCH. SUPPORT INCREASING THE NUMBER OF UNDERREPRESENTED FACULTY WHO PERFORM RESEARCH AND APPLY FOR GRANTS THAT SUPPORT GROWTH IN MINORITY STUDENT REPRESENTATION.**

**- ALIGNED WITH UW *BREAKING THROUGH* GOALS 1-4**

### **Drivers**

The leading power of research as a vehicle for higher education is its ability to transform a student's own sense of place and capability in a complex world. Research will train students with a flexible skill set applicable to a future economy whose details cannot be fully known at this time. Thus, a goal is creating research opportunities for all of Wyoming's college students by creating a new research network with its colleges and community colleges. Central to this will be developing new tools to enable research at a distance, and standing up the Office of Undergraduate Research. ORED will also work to address the number and performance of underrepresented groups in the UW research enterprise. Enjoining previously untapped opportunities to apply for grants that support research for minorities will be promoted by ORED, as will supporting Academic Affairs in identifying promising faculty researchers.

Key opportunities for growing research opportunities for students will be available in the Tier 1 Engineering, STEM Education, and Science Initiatives. ORED work with Academic Affairs and with deans and directors, and IT Services to increase the research opportunities for students.

### **ORED Enabling Forces**

- Working with UW leadership, including deans and directors, launch or strengthen research programs accessible to students, including developing incentives for faculty to mentor
- Seek UW Foundation support for student research programs, including those that can capitalize on state investments in Tier 1 Engineering, STEM Education, and Science Initiatives
- Launch Office of Undergraduate Research, reporting to ORED
- Working with UW leadership, identify ideal candidates for faculty positions from a wide range of backgrounds





# ORED GOAL FIVE

**Breaking Through with  
Excellence in Research  
Administration**

**IMPLEMENT AN ORED ORGANIZATIONAL  
STRUCTURE AND PRACTICES TO ENABLES  
EFFICIENT AND TRANSPARENT RESEARCH  
PROGRAM ADMINISTRATION AND TO ENGAGE  
A BROAD RANGE OF STAKEHOLDERS  
- ALIGNED WITH *BREAKING THROUGH* GOALS 1 AND 2**

## **Drivers**

Even the most modest research and economic goals of the University of Wyoming will only be realized if administrative practices are efficient and transparent, clearing the way for faculty, students, and entrepreneurs to exercise their creative powers. The start of 2018 is characterized by gaps in the Office of Research and Economic Development that need to be filled, by new positions that need to be created to meet ORED's ambitions, and the need to exercise a new organizational structure that will, in part, effectively interface ORED to stakeholders.

## **ORED Enabling Forces**

- Filling gaps of ORED organization, and defining ORED organizational structure appropriate for growth in UW research and tech transfer, including interfacing with Institute for Innovation and Entrepreneurship
- Strengthening ORED capacity in pre- and post-award administration
- Optimization of resources to ORED office to support administrative support functions



# MEASURING SUCCESS

## ORED GOAL 1: INCREASE RESEARCH SUPPORTED BY EXTERNAL SPONSORS

Metrics	Baseline	2022 Target
Carnegie Classification and National Science Foundation research activity metrics, including total research expenditures	\$106M (2016)	30% increase over baseline value (exceeds the high level “Breaking Through UW goal of 20%)
External research awards received	\$95.8M (2016)	30% increase over baseline value
Number of research-intensive faculty: percentage of faculty applying for external funding	29% of the faculty applied for external funding	50% increase over 2017 value apply for external funding
Number of research-intensive faculty: percentage of faculty receiving external funding	29% of faculty received external funding	50% of faculty receive external funding
Faculty/staff training for grant proposal writing	none	Conduct grant proposal writing training at least annually and on demand

## ORED GOAL 2: BREAKING THROUGH TO THE MARKETPLACE

Metrics	Baseline	2022 Target
Patents filed	Two-year average for FY 2016 & 2017 = $2017(33+72)/2 = 53$	100% increase in two-year average 2021-2022
Invention disclosures	Two-year average for FY 2016 & 2017 = $(113+144)/2 = 129$	100% increase in two-year average, 2021-2022
Income-bearing IP licenses	2-3 per year	8-10 per year (exceeding the high level “Breaking Through UW goal of 5 or more per year)
Start-up companies created	Two-year average for FY 2016 & 2017 = $(6+2)/2 = 4$	100% increase in two-year average, 2021-22
Wyoming communities served	19 municipalities served in FY 2016 (invention disclosure assistance)	Broader services offered to entrepreneurs, businesses, and researchers in all Wyoming counties, working with the Institute for Innovation and Entrepreneurship (IIE) and units supported by the Wyoming Business Council
Integration of statewide services of Wyoming Business Council (WBC) units, managed by ORED, with IIE practices	WBC units reporting to UW presently not an optimized whole	IIE and WBC units serve the state as part of a cohesive whole, with clearly defined roles and responsibilities



ORED Goal 3: Breaking through to new research horizons

Metrics	Baseline	2022 Target
Number of UW proposals submitted with participants from more than one department	61 proposals were submitted with participants from more than one department	30% increase
Interdisciplinary seed programs	Arts and Sciences recently executed one such program; highly successful. Others have been carried out on an ad-hoc basis	ORED-sponsored seed programs established
Centralized management of laboratory research resources; facilitated transdisciplinary research; efficiency of research tool use	---	Established Office of Research Resources (ORR) to manage shared hardware use and maintenance.  Established Office of Research Coordination and Stimulus (ORCS) to support infrastructure, programs in transdisciplinary research including the Science and Tier 1 Engineering Initiatives, and shared enabling research support staff

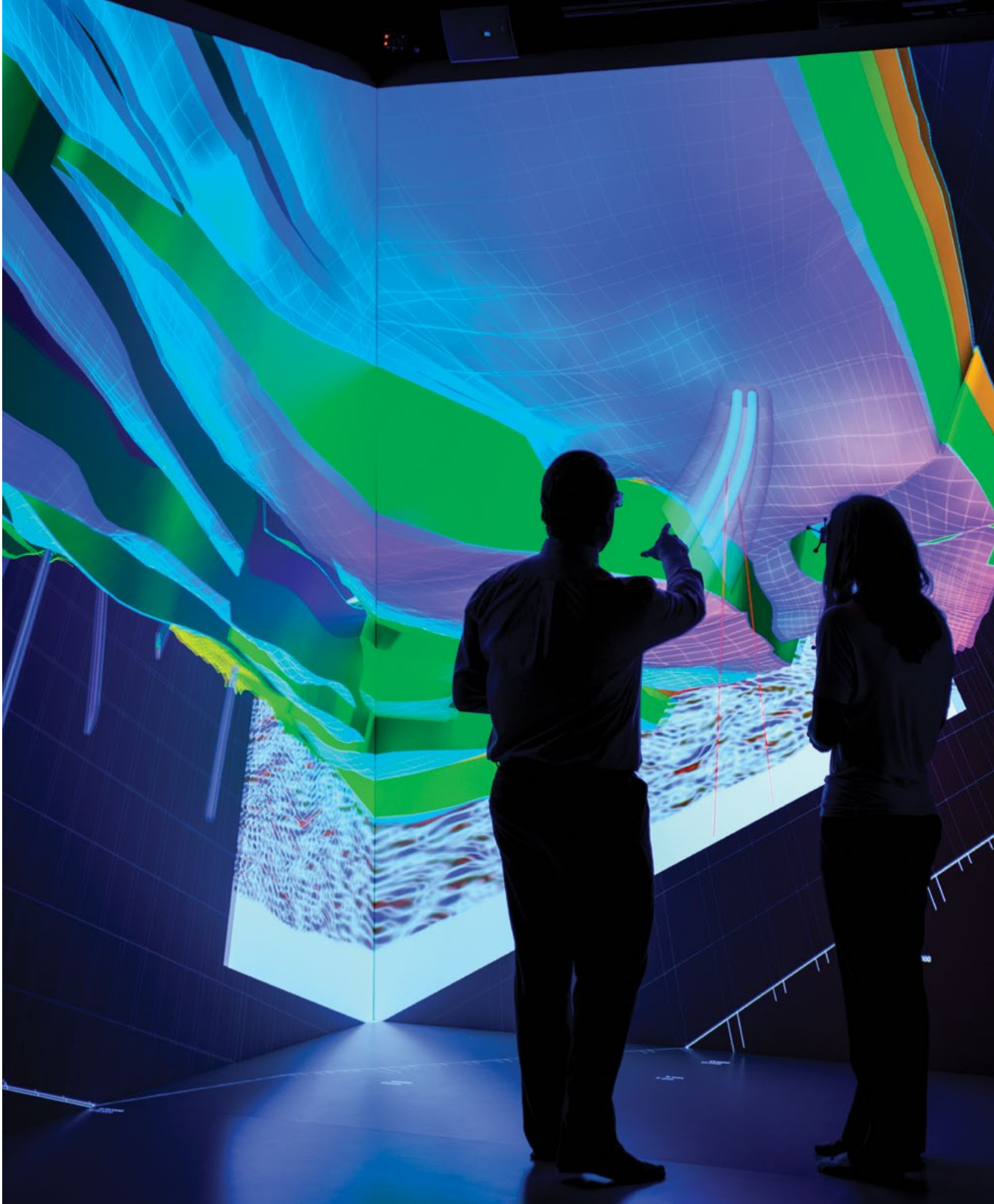
ORED Goal 4: Breaking through to diversify Wyoming’s research talent

Metrics	Baseline	2022 Target
Average number of student hours per semester dedicated to laboratory and field research	2017 levels	50% increase in student hours directed towards research as compared to baseline
Promotion, coordination, and tracking of undergraduate research opportunities	---	Office of Undergraduate Research (OUR) established to promote, coordinate and track undergraduate research
Advanced pedagogical methods in training of community college educators	LAMP program - 4 educators trained in 2017	50 trained in Wyoming’s community colleges by the end of 2022
Elevation of research opportunities for students statewide	---	UW/Community College Research Network established
Strengthened role in research by underrepresented groups		ORED has begun executing on plan to identify research faculty talent from diverse pools of candidates, with support of Offices of Diversity, Equity, and Inclusion and Academic Affairs



ORED Goal 5: Breaking through with excellence in research administration

Metrics	Baseline	2022 Target
Filled vs. vacant positions in pre- and post-award administration and tech transfer. Administrative capacity vs. projected needs	Vacant leadership and support positions in pre-award, post-award, and Tech Transfer	Positions filled and organization optimized to meet needs of growing UW Research and Economic Development enterprise
Grant setup times for faculty access to awarded research resources	2017 performance	Grant setup packages established in 1 week
Compliance	2017 performance	Zero findings. High sponsor satisfaction
Systematic processes for making ORED investments	Investment choices not informed by strategic vision. Faculty path to request resources unclear	Mature processes in place for evaluating against strategic considerations faculty startup requests, ORED financial support for proposals, and ORED financial support for research activities and infrastructure
Optimization of use of financial resources	ORED financial state vulnerable to unanticipated demands and fluctuations in sponsored research	Optimized indirect (F&A) funds flow, improvement in conflict of interest/commitment policy and forms, and application of intellectual property funds







UNIVERSITY OF WYOMING

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