

# **MUS Research Initiative**

***Montana's Research & Economic Development  
Initiative - MREDI***

**FY 2016 – FY 2017**

# TOPICS

- ❖ **Overview** -- *What is the MUS Research Initiative?*
- ❖ **Background** -- *How did it come about?*
  - Board of Regents and MUS Strategic Plan
  - Project Design and Communication Efforts
  - MSU Research Tour
  - Governor's Budget/Legislative Process
- ❖ **Competitive Process** -- *How is funding distributed?*
- ❖ **Accountability** -- *How will effectiveness be measured?*
- ❖ **Funded Projects** -- *What research is funded?*

## *What is the MUS Research Initiative?*

- ❖ State funded seed money to leverage university-based research into strategic advancements for Montana's economy
- ❖ Specific goals:
  - Solve Montana problems with Montana solutions
  - Create good Montana private-sector jobs
  - Grow emerging research sectors to strengthen and diversify Montana's economy
- ❖ \$15 million appropriation to the MUS to carryout this initiative
  - One-of-a-kind, first ever, state funded research initiative for the MUS

## *How did this initiative evolve?*

### **1. Board of Regents identified Research as a top priority**

- Research & Development is key component within MUS Strategic Plan
- Following the 2013 Legislative session, Regents develop and prioritize an agenda for the next legislative session, include research as top priority

MUS Strategic Plan

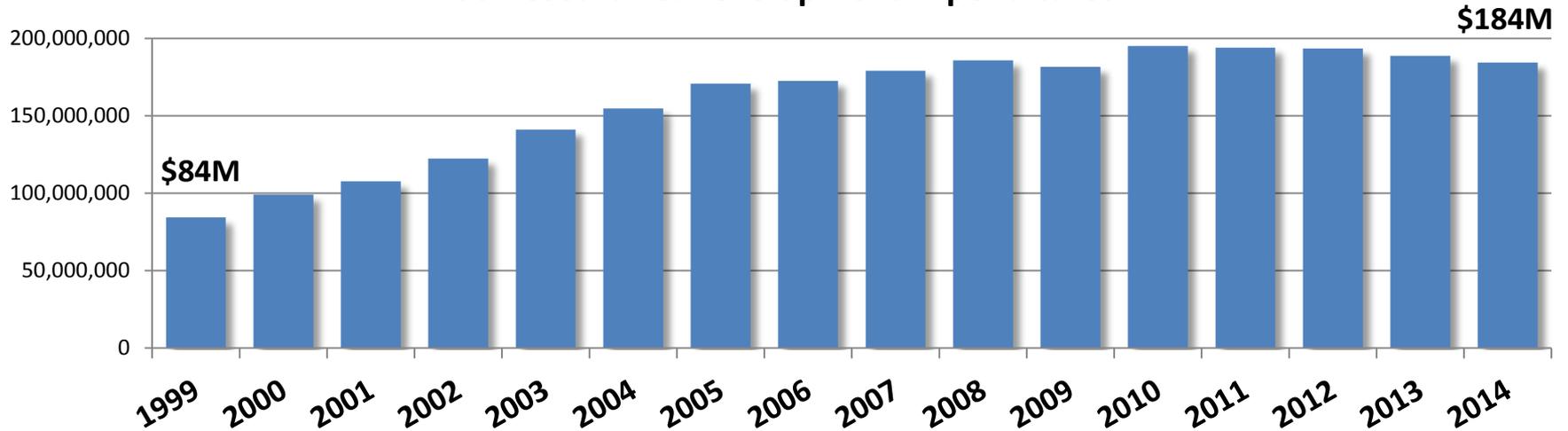
## **Research & Development**

### **Goal Statement**

Establish collaborative programs among institutions, the private sector, and the state to expand research, technology transfer, the commercialization of new technologies, and the development of our entrepreneurs

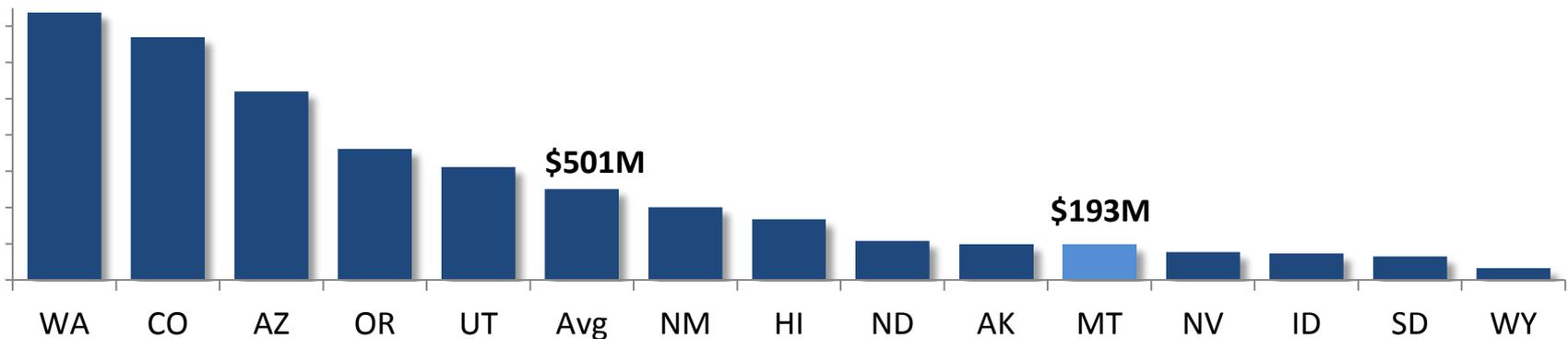
## Strategic Plan Metrics

### MUS Research & Development Expenditures



### Research & Development Expenditures by State, 2012

(public institutions only)



## *Strategic Plan Metrics*

### MUS Research & Development Expenditures by Institution

Campus	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
MSU Bozeman	\$109,481,694	\$102,767,291	\$112,304,270	\$110,929,895	\$109,612,283
MSU Billings	\$5,183,761	\$4,563,253	\$3,407,301	\$2,924,336	\$2,583,462
MSU Northern	\$3,817,090	\$2,744,180	\$3,906,350	\$3,140,745	\$1,579,318
UM Missoula	\$66,961,101	\$63,857,146	\$61,543,835	\$59,306,533	\$60,189,000
MT Tech	\$9,656,552	\$9,296,423	\$11,765,000	\$11,059,000	\$10,500,000
UM Western	\$698,633	\$781,628	\$560,173	\$648,325	\$153,000
<b>MUS Total</b>	<b>\$195,798,831</b>	<b>\$184,009,921</b>	<b>\$193,486,929</b>	<b>\$188,008,834</b>	<b>\$184,617,063</b>

source: MUS Annual Research Report; note: expenditures include all sponsored projects  
 note: MSU Bozeman figures do not include MAES

### MUS Technology Transfer Activity

Tech Transfer Stats	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Patents Issued	27	14	14	8	10	8
Active Licenses (Total)	206	215	231	238	240	287
Active Licenses (in MT)	118	121	112	97	83	88
% Licenses w/ MT Companies	57%	56%	48%	41%	35%	31%
License/Patent Revenues	\$305,893	\$271,330	\$215,628	\$663,586	\$454,479	\$315,560
Reimbursed Patent Costs	\$271,142	\$211,061	\$169,616	\$258,379	\$131,007	\$250,155

source: MUS Annual Research Report

## *How did this initiative evolve?*

### 2. OCHE and campus leaders designed parameters for the initiative

- Need for a significant state investment
- Strong connection to Montana's economy
- Focused on specific areas of expertise within the U-system
- Need to communicate the value of university research and the potential opportunity for the State

## Montana **REDI**

Research and Economic Development Initiative:

*Leveraging technology, agribusiness, energy and entrepreneurship into more jobs.*

### Investing in Research—scaling up new ideas into new industries

Citizens, government leaders, business leaders and public university systems in all 50 states widely recognize the role of research as a catalyst for economic development. The U.S. Chamber of Commerce finds that “states most likely to grow in the next decade” will be those where government, universities and the private sector “collaborate effectively to make sure that more new ideas developed by companies and in research labs scale up into industries (*Enterprising States: Policies that Produce/2012*).”



MONTANA  
UNIVERSITY SYSTEM



## ***Project Design & Communication Efforts***

### ➤ **Research Initiative: *Areas of Focus***

- ❖ Agriculture
- ❖ Natural Resources and Energy
- ❖ Materials and Manufacturing
- ❖ Health and Biomedical Sciences
- ❖ Information Technology and Computer Science

### ➤ **Research Initiative: *Goals***

- ❖ Solve Montana problems with Montana solutions
- ❖ Create good Montana private-sector jobs
- ❖ Grow emerging and important research sectors
- ❖ Leverage the MUS research enterprise

## *Project Design & Communication Efforts*

### ➤ Communicating the Benefits of Research



- The Montana University System is the largest research and development enterprise in Montana, with total research expenditures in excess of \$180 million annually.
- About 90 percent of those funds come from non-state funded external grants that are earned by university researchers in a highly competitive national and international arena.

## Project Design & Communication Efforts

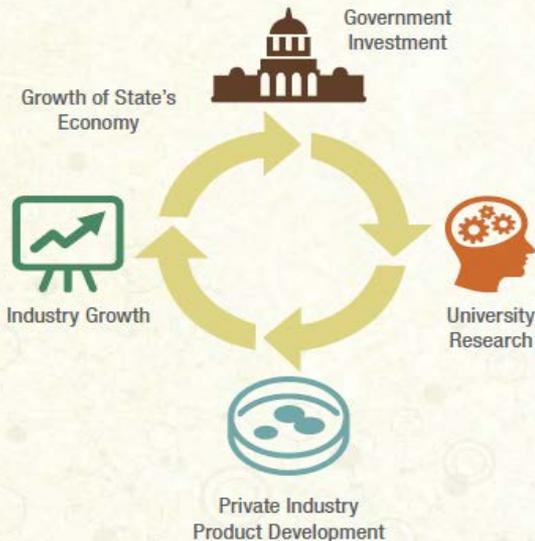
### ➤ General descriptions of R&D, Technology Transfer

#### WHAT IS R&D?

**University research** advances our fundamental understanding of the sciences, performs groundbreaking work in engineering and creates new understanding in economics, business, health care, the arts, humanities and other disciplines.

New technologies may result from university research, providing the foundation for **private industry development** that can lead to spin-off companies and new jobs.

#### How it Works

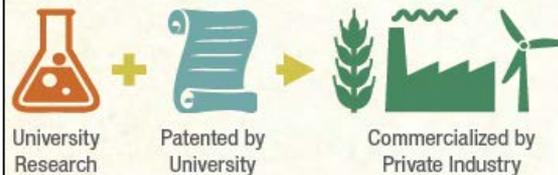


#### WHAT IS TECHNOLOGY TRANSFER?

When university faculty make a discovery with potential commercial application, that discovery is patented by the university and then made available for license by private companies.

Technology transfer is a common practice at universities across the United States.

#### How it Works



Number of Montana University System Active Licenses in Use by Private Industry and Other Entities

**289**

#### THE BIG PICTURE

- **U.S. is falling behind**

Over the last ten years, R&D expenditures as a share of economic output have remained nearly constant in the U.S. but have increased by nearly 50% in South Korea and nearly 90% in China.

*(Source: NSF S&E Indicators, 2012, Figure 0-3)*



10-Year Growth in R&D Expenditures As Share of Economic Output

## *Project Design & Communication*

- **Specific Examples in MT:** *Companies developed by or benefiting from university research*

**Rivertop Renewables** Formed in 2008 from research done at the University of Montana by Chemistry Professor Emeritus Dr. Don Kiely. Rivertop supplies MDOT with a renewable product added to the salt brine that is sprayed on roadways to keep them ice-free in winter.

**Takeda Vaccines** (formally LigoCyte Pharmaceuticals) spun out of MSU in 1999 by Dr. Rob Bargatze upon completion of his doctorate in immunology and infectious diseases. LigoCyte was then acquired in 2012 by Takeda for more than \$60 million. Currently, Takeda Vaccines in Bozeman is working on a vaccine for norovirus.

**Bridger Photonics** Bridger Photonics spun out of Montana State University in 2006 when two MSU graduates, Drs. Peter Roos and Randy Reibel, completed their doctorates in physics and electrical engineering. Bridger Photonics is a world leader in developing laser-based technologies for extremely precise and fine distance measurements.

## *Project Design & Communication*

➤ **Specific Examples in MT:** *Companies developed by or benefiting from university research*

**Montana BioAgriculture, Inc.** Montana BioAgriculture, Inc. licensed a natural herbicide technology from Montana State University in 2003. After further development the Missoula company successfully partnered with Certis USA to bring to the market the MSU technology that confers a nonspecific immunologic boost for a wide range of crops.

**Water & Environmental Technologies (WET)** The majority of the firm's technical employees are graduates of Montana Tech. Water & Environmental Technologies also collaborates with Montana Tech and the Montana Bureau of Mining and Geology on water and environmental issues.

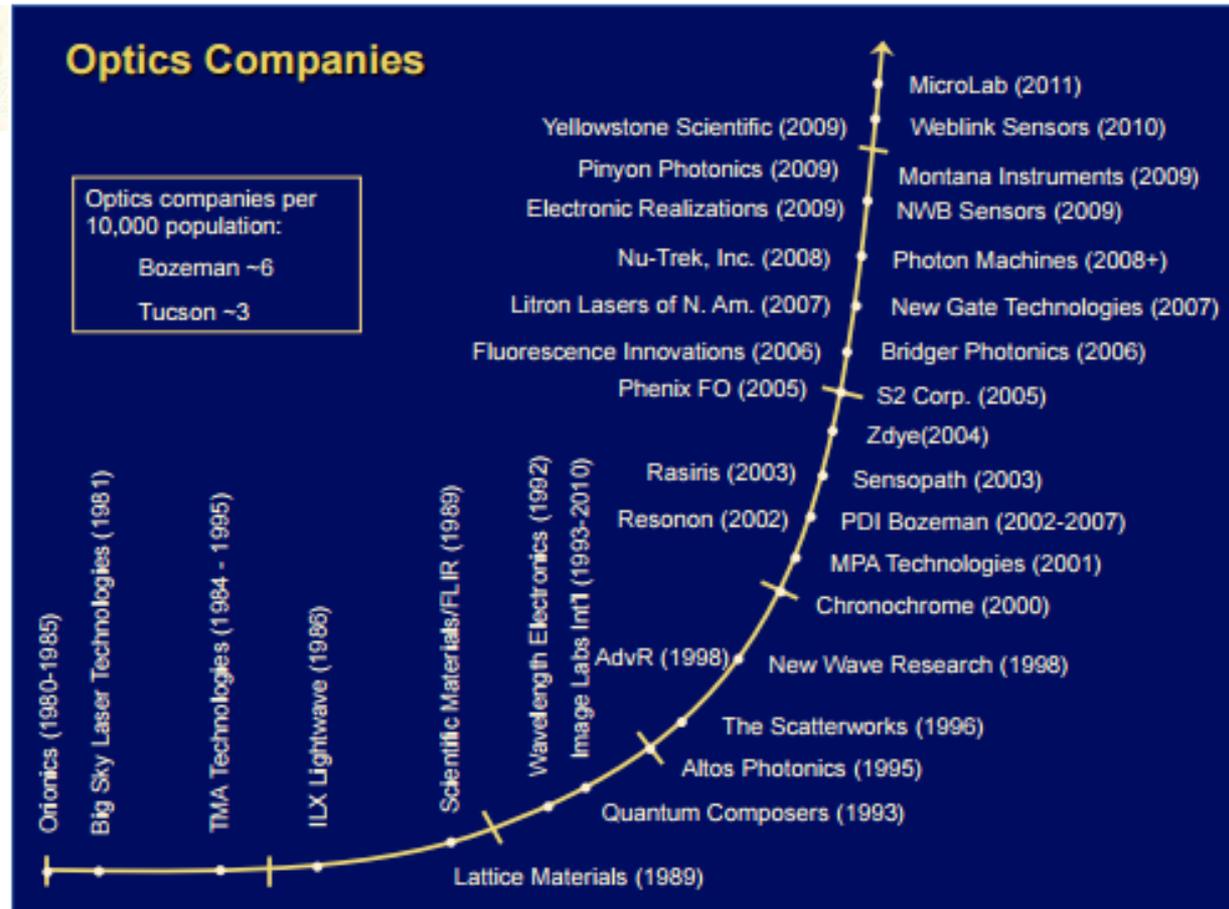
**Pioneer Technical Services** Pioneer Technical Services, Inc. is an employee-owned, full-service engineering, environmental services and construction management firm. Many of Pioneer's more than 60 engineers are graduates of Montana Tech. The company also frequently collaborates with Montana Tech and the Montana Bureau of Mining and Geology.

## Project Design & Communication

- **Specific Examples in MT:** *Companies developed by or benefiting from university research*

### CASE STUDY: OPTICS COMPANIES

With funding from the National Science Foundation in 1995, investments in research and faculty have given Bozeman more optics companies per capita than the nation's optics capital, Tucson, Ariz.



## *Project Design & Communication*

### ➤ Examples from other states

## Utah

### The Utah Science, Technology and Research (USTAR) Initiative

Generated  
return exceeds  
investment by  
**44%**

Today, Montana faces a situation that is not dissimilar to Utah in 2006 when its legislature began funding the Utah Science, Technology and Research (USTAR) initiative. The USTAR vision is to excel in job creation, innovation, entrepreneurship, global business and a quality workforce. A recent state audit of USTAR found the University of Utah generated \$92.3 million and Utah State University generated \$45.6 million in research related grants, exceeding the cumulative investment by 44 percent.

**ROI:** 44 percent: The amount grants earned exceeded state investment.

## *Project Design & Communication*

### ➤ Examples from other states

## Georgia

### The Georgia Research Alliance (GRA)



In 1990, a group of Georgia leaders established the Georgia Research Alliance as a not-for-profit 501(c)(3) organization to allow business, research universities and state government to collaborate to build a technology-driven economy fueled by breakthrough university research. Since its formation in 1990, GRA has leveraged \$595 million of state funding into: \$2.6 billion of direct investment in Georgia; 300+ newly launched companies; 6,000+ high-skill, high-value jobs; and a broad portfolio of technologies.

**ROI:** 6,000: The number of high-value jobs created.

## *Project Design & Communication*

### ➤ Examples from other states

## Arizona

### The Technology and Research Initiative (TRIF)



Invention  
Disclosures  
To Date

**100s**

The Technology and Research Initiative Fund (TRIF) is a special investment in higher education made possible by the passage of Proposition 301 by Arizona voters in 2000. The TRIF portion of the proceeds from a six-tenths of a cent increase in state sales tax are administered by the Arizona Board of Regents and awarded to the state's public universities. To date, the initiative has generated hundreds of invention disclosures and patents in bioresearch, optical sciences and technology, and water and environmental sustainability.

## *MUS Research Tour*

- **Summer 2014 Research Tour** -- MUS publically announces the *Research Initiative* through a legislative and business leaders tour of the MUS research enterprise



## *Statewide Support*

- **Governor Steve Bullock endorses the Research Initiative:** includes \$15 million in his budget going forward to the 2015 Legislature.
- **2015 Legislature fully funds the Research Initiative: \$15 million** appropriated to the MUS for the Research Initiative.



## *Competitive Process*

➤ Administer by OCHE:

*“The Commissioner of Higher Education will administer competitive grants to researchers on the basis of each new project’s potential for private-sector job creation, commercialization, and economic return on investment for the State of Montana”*

➤ Campuses to vet proposals for academic and scientific merit

- ❖ conducted by Vice President Research Offices at MSU and UM, in conjunction with smaller campus Research Officers

➤ Research Advisory Panel to provide recommendations to the Commissioner of Higher Education

## *Research Advisory Panel*

- The appropriation for the MUS Research Initiative included Legislative language:
  - appointing the Commissioner of Higher Ed. to chair an advisory panel
  - directing advisory panel composition, one member from each area:

**Legislators:** Montana House of Representatives | Montana Senate

**Industry Reps:** Agriculture | Natural Resources | Health/Biomedical

**MUS:** Commissioner | MT State University | University of MT

- Commissioner Clayton Christian appointed:

**Legislator - Senate**

Senator Llew Jones

**Legislator – House**

Representative Ryan Lynch

**Agriculture/Agribusiness**

Lola Raska, MT Grain Growers Assoc.

**Natural Resources Industry**

Larry Simkins, Washington Companies

**Health/Biomedical Industry**

Ron Zook, Swan Valley Medical

**Montana State University**

President Waded Cruzado

**University of Montana**

President Royce Engstrom

## *Call for Proposals*

### ➤ ***Eligibility and Funding Level***

- ❖ All research and tenure-track faculty from a MUS campus are eligible and encouraged to apply
- ❖ Proposals will be funded up to \$2.5M for two years
- ❖ A total \$15M is available and it is anticipated that 6 to 12 proposals will be funded
- ❖ Research proposals must demonstrate how they will contribute toward meeting the overall MUS Research Initiative goals:
  1. Address Montana issues/needs - solve Montana problems with Montana solutions
  2. Create Montana jobs - create good Montana private-sector jobs
  3. Help support the Montana economy - grow emerging and important research sectors that contribute to the diversity of Montana's economy
  4. Provide a strong ROI to Montana – leverage the MUS research enterprise

## *Call for Proposals*

### ➤ *Research Areas of Focus*

- ❖ Proposals must concentration in one of the following categories:

Agriculture

Natural Resources and Energy

Materials and Manufacturing

Health and Biomedical Sciences

Information Technology and Computer Science

## *Call for Proposals*

### ➤ *Allowable Expenses*

- ❖ **Personnel/staff expenditures** are allowed but may not be used to pay for existing state supported faculty or staff positions. May be used for summer or graduate research support but ***may not offset academic year general fund salaries***. All personnel funds must be dedicated solely to the proposed research.
- ❖ **Private industry partnerships** are allowed and encouraged, but should not constitute more than 35% of the total budget. Requests exceeding this percentage require sufficient justification.
- ❖ **Equipment** should not constitute more than 35% of the total budget. Requests exceeding this percentage require sufficient justification.
- ❖ **Travel/transportation** costs necessary to carry out programmatic aspects of the research project are allowed.
- ❖ **Miscellaneous** expenses should be described in the program budget.
- ❖ Unacceptable expenses:
  - Overhead/F&A/Indirect Cost Recovery
  - Construction/Renovation

## *Call for Proposals*

### ➤ *Review Process*

Two-step review process:

- ❖ The first is the scientific review at the campus level.
- ❖ The second level of review is performed by the Research Advisory Panel that will make recommendations to the Commissioner of Higher Education.
- ❖ Only applications that are recommended for approval at both the campus level and the Advisory Panel will be recommended for funding.
- ❖ Proposals selected for second level review will be required to make short oral presentations in front of the Research Advisory Panel.

## *Timeline*

- Legislative Biennial Appropriation – funds must be spent and outcomes achieved in a 2-year period.
  
- Timeline – Round 1
  - April 9          Release [Call for Proposals](#)
  
  - May 26          Deadline for returning proposals to Chief Research Officers
  
  - June 15          Six proposals from each side of the system forwarded to OCHE
  
  - June 19          Research Advisory Panel meets to review and rank projects
  
  - July 1 - 8        Selected proposals notified and funds distributed

## *Outcomes & Deliverables*

- Legislative Biennial Appropriation – funds must be spent and outcomes achieved in a 2-year period.
- All funded projects will create detailed timelines, expected outcomes and deliverables.
- Research project spending, timelines, and outcomes will be transparent and fully displayed on MUS Research Initiative website.
- Project tours planned for Summer 2016.
- Legislative presentations to Education & Local Gov't committee throughout 2015 and 2016 interim.
- Presentation to Legislature in 2017

## *How will effectiveness be measured?*

### **MUS Research Initiative Goals:**

1. Address Montana issues/needs - solve Montana problems with Montana solutions
2. Create Montana jobs - create good Montana private-sector jobs
3. Help support the Montana economy - grow emerging and important research sectors that contribute to the diversity of Montana's economy
4. Provide a strong ROI to Montana – leverage the MUS research enterprise

## *The Road Ahead*

- **Round 1 Proposals** (funding dispersed in July 2015)
  - ❖ Fully Funded Projects
  - ❖ Partially Funded Projects
  - ❖ Resubmit – reframe proposal to address specific area of need
  - ❖ Unsuccessful
  
- **Additional Funding Rounds** (funding dispersed in Fall/Winter 2015)
  - ❖ Smaller awards focusing on individual researchers/projects
  - ❖ Aimed at catalyzing new research