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# Serving Wyoming and the Nation Through Research Partnership

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# Research drives economic growth and transformation

- *In 1987, the Nobel Prize was awarded to economist Robert Solow (MIT), “for his contributions to the theory of economic growth”*
  - ***From the Royal Swedish Academy of Sciences:***
    - Solow showed that “...technological development will be the motor for economic growth in the long run... (I)f continuous technological progress can be assumed, growth in real incomes will be exclusively determined by technological progress.”



# The relationship between research universities and industry is evolving to respond to economic needs

- “Universities and industry have been collaborating for over a century, but the rise of a global knowledge economy has intensified the need for strategic partnerships that go beyond the traditional funding of discrete research projects. World-class research universities are at the forefront of pioneering such partnerships.”
  - From “Making Industry-University Partnerships Work,” Science-Business Innovation Board, 2012



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**To move here and stay, established and emergent businesses need to be part of a compelling Wyoming research community**

Businesses need

- local access to a research network that is flexible and coupled to compelling economic drivers
- a research network that is capable of acting across disciplinary lines, because the world's leading challenges are multidisciplinary



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# The need and ambition reflected in ENDOW requires bold action

We need to

- imagine without apology a Wyoming future that is not presently in hand
- invest in the kinds of research capacity required to drive economic change
- understand that a strong Wyoming research base can form the basis for exciting, new partnerships with industry
- consider our research competitors as future partners



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# The University of Wyoming is now conducting much research that leads on national and global stages

- Computing
- Biomedical
- Data visualization
- Ecology
- Energy



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**... but it also has gaps. To drive economic transformation, the University of Wyoming requires further research investment and new partnerships**

- While UW departments have excellent performers, the ability to respond as fully as we can to national opportunities will require deep research capacity in areas of national need and opportunity.
- Consider a Wyoming Research Network: UW, community colleges, national labs, other universities. Industry can be attracted here if they have access to it, with UW as a portal to it

***ENDOW can recommend identifying gaps in UW research capacity as compared to national opportunities, and investment into UW into gap areas***



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# With sufficient research capacity, research partnerships can be developed that are essential to transforming regional economies

- *From the NY Times, “The Cities on the Sunny Side of the American Economy,” with a focus on Denver (March 31, 2016, P. Cohen):*
  - “The ingredients to that formula seem to be some combination of great research universities and knowledge-intensive industries...”
  - Areas likely appropriate for new or strengthened research partnership in Wyoming include enhanced oil recovery, cybersecurity, data analytics for natural resource management, rural health care



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# **The most productive industry-university partnerships are strategic and long-term**

- They are built around a shared research vision and may last for over a decade, developing deep professional ties, trust and shared benefits
- They require individuals that understand both worlds – academia and business
- They give unanticipated benefits to all through a virtuous circle of interactions

From “Making Industry-University Partnerships Work,” Science-Business Innovation Board, 2012

**ENDOW can recommend that a long-term commitment of the state for university/industrial partnerships be promoted through policies to attract businesses and through investments in university research capacity**



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# There is an opportunity to strengthen existing Wyoming industries through research partnership

- Industries presently contributing to Wyoming's economic base can benefit from innovation spawned by research. Examples include
  - Agriculture
    - biological processes to have great impact in high altitude agriculture
  - Mineral and petroleum extraction and land reclamation
    - research-informed land reclamation techniques has potentially large markets well beyond Wyoming's borders
  - Tourism
    - research can strengthen the hospitality industry, and marketing research can strengthen Wyoming's brand. These are
- More generally, Wyoming provides a platform for research in areas that have national or global potential, including rural health care delivery and distance education



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# **There is opportunity to diversify the economy and meet national needs through university/industry/government partnership**

- The administration is looking for universities and industry to step up to address vulnerabilities
- National interests and opportunities include research in energy security, cybersecurity, health and human welfare, defense
- Relevant agencies include
  - Dept. of Health and Human Services
  - Dept. of Defense
  - Dept. of Energy
  - Dept. of Homeland Security
  - National Science Foundation



# **ENDOW can recommend forming Centers for Emerging Technologies and Innovation**

- Instill practices that allow motion between academia and industry
- State incentives, including partnership with UW as a portal to the CETI, are what would encourage industry to locate and stay in Wyoming
- Partner broadly: view the Front Range universities and businesses as a resource, not as competition, as long as they lead to Wyoming jobs

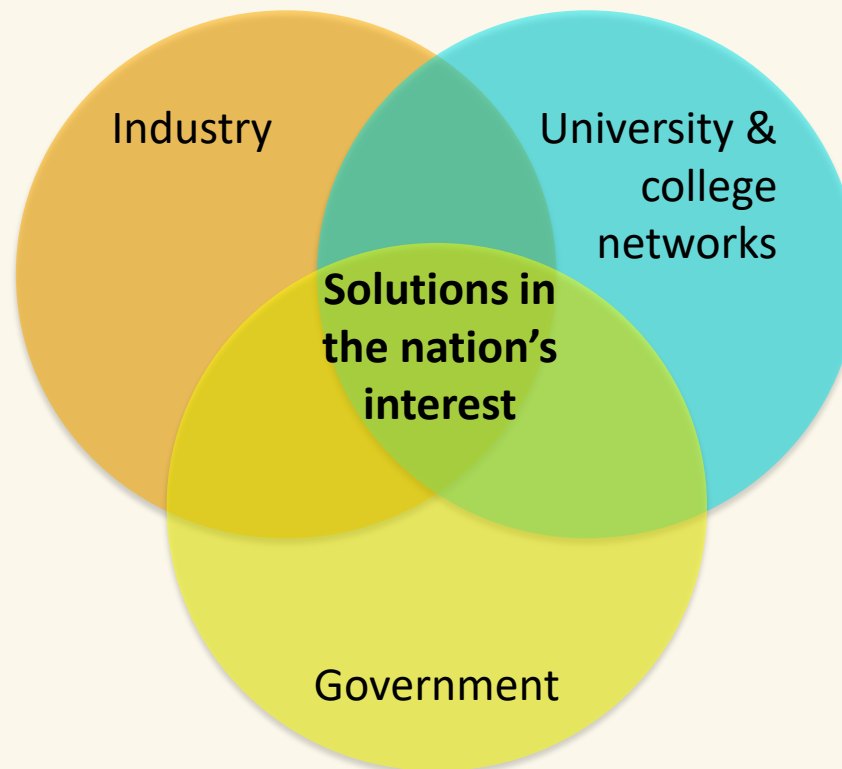




# CETIs would have strong coupling between industry, academia, and government

CETIs would be incentivized by state investment in research infrastructure, policies favorable for industry

Wyoming could be host to several CETI's, each serving a national need



## Wyoming benefits

- High tech jobs
- Flexible, talented workforce
- Spin-off companies
- Wyoming reputation for national service
- Invigorated, collaborative research enterprise



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# A vibrant example of such partnering: SUNY Nanotech

## SUNY POLYTECHNIC INSTITUTE

### Combined Industry and Academic Mission

- ~3000 graduate and undergrad students
- Interdisciplinary academic research
- Industry R&D partnerships statewide
- Track record of CNSE graduates hired by research labs in industry & academia



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Prior to initiating these partnerships in the 1990's, SUNY Albany was in the second tier of the Carnegie Research Rankings, as UW is now. SUNY Albany is now in the top tier and has spun off the SUNY Polytechnic campus. *UW can make this step as well*



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# **First steps in forming CETIs – make Wyoming's interest and commitment in serving known to federal agencies and to major industries**

- Reach out to federal agencies and indicate an interest to serve
- Reach out to regional and national business leaders and ask: what are your concerns that research can address?
- Demonstration of interest from the state of Wyoming



## What ENDOW can do

- Support UW bringing together leaders from industry, state and federal sponsors, and academia to identify areas of long-term, sustainable research need
- Recommend UW develop statements of interest in research partnering opportunities for consideration by potential sponsors in Wyoming and in Washington
- Support a gaps and opportunities analysis to inform decisions to deepen research capacity in areas of strategic opportunity
- Recommend CETIs be pursued where near- and long-term opportunity is found, with business research partnership with Wyoming Research Network ultimately incentivized by state investment and policy
- Urge new state practices and policies be developed to incentivize businesses to partner in research, locate and remain in Wyoming



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*Thank you*



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