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# UNM's Role as a Flagship, Carnegie Very High Research University, its programs, and its economic impact on the state

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The University of  
**New Mexico**

**Office of the Vice President for  
Research and Economic  
Development**

**Presentation to the Legislative  
Finance Committee:**

*UNM's role as a Flagship, Carnegie  
Very High Research University, its  
programs, and its economic impact  
on the state*

**August 12, 2010**

**Dr. Julia E. Fulghum, VP for Research**

## Requirements of a Research University

- Faculty whose research creates new knowledge and innovation, who then pass that knowledge on to students, and use that knowledge to improve the communities in which we live
- Students who will actively participate in the process of knowledge creation and application
- Infrastructure to support these faculty and students!
  - Robust facilities, lab space, specialized equipment
  - Attractive financial aid packages, including merit scholarships, employment, and research opportunities
  - Extensive support infrastructure, including skilled staff support
  - Flexible funding streams that can be used for faculty recruitment and retention, facility renewal, and grant matching funds



## ***Education Benefits of a Research University***

- Research opportunities for undergraduate students provide jobs and financial aid, as well as increase retention and graduation rates
- Supportive research environment and infrastructure allows us to compete for top faculty; cutting edge faculty research attracts talented graduate students
- Faculty members with federally funded research grants are involved in significant K12 outreach and education efforts
- There is a strong correlation between curriculum development, faculty research expertise, and the identified needs of the state
- The combination of these increases the value of a UNM degree, helps recruit and retain NM's best and brightest, and provides the state with a highly skilled workforce



## ***Economic Development Benefits of a Research University***

- Federal research dollars spent in New Mexico translate into the creation of jobs and recruitment of students with approximately a 2x economic multiplier
- Faculty and student research results in the creation of new intellectual property, leading to patents, start-ups, and spin-offs
- Faculty expertise, research infrastructure, and a highly skilled workforce play a large role in attracting high tech companies
- Leading edge Science and Technology Corporation facilitates technology transfer from the lab to the marketplace
- Science and Technology Park offers incubator and prototyping space for new companies
- Faculty and student resources available to provide assistance and expertise to companies, entrepreneurs, policy makers, and state agencies



## ***Quality of Life Benefits of a Research University***

- Preparing and positioning students for high-skilled, high-paying jobs
- Improving the health of the citizens of New Mexico through cutting edge research resulting in new medical devices, disease prevention, and state-of-the-art treatments
- Creating clean and renewable energy technologies and advanced approaches to energy storage and supply management
- Short and long term climate change effects across the state
- Providing expertise and assistance to state and local governments on short and long term planning and policy development
- Contribute to a rich cultural environment through the creation of art, music, and literature



## Main Campus Research Performance

- \$396.5M in awards under management
- \$175.8M in new FY10 research awards
- \$34.3M in ARRA research awards
- \$120.4M in FY10 research expenditures
  - Over \$60.0M spent on compensation
  - Additional indirect/induced impact of \$128.6M
  - Total economic impact of main campus research in FY10 was over \$249.0M



## Some examples of UNM Research

- UNM has a broad research portfolio with many areas in which we are among the best in the world:
  - Nanotechnology, materials, and semiconductors
  - Climate change and long term ecology
  - Addictions and substance abuse
  - Health Policy
  - Emerging and sustainable energy technologies





## **Nano at UNM: The value of sustained investment**

**1983 Center for High Technology Materials (CHTM) - \$1.65M state investment to create a Center of Technical Excellence**

1989 Center for MicroEngineered Materials (CMEM)

1990 Advanced Materials Laboratory (Sandia-UNM-LANL)

1992 National Laboratory Professorships (UNM-Sandia-LANL)

1994 First spin offs – Nanopore and Superior Micropowder

1994 First NSF REU (Still going! Now based in NSMS)

1997 CHTM Building

2000 National Nanotechnology Initiative (NNI)

2001 Zia Laser, Inc.

2001 ISI ranks UNM Nanomaterials in the Top 5 nationally

2002 Center for Integrated Nanotechnologies (CINT)

2002 NSF EPSCOR chooses Nanotechnology as thrust area

2004 NM ranked #3 in the nation as a Nano “Hot-Spot” by Small Times

**2005 Center for Biomedical Engineering (CBME)**

2005 Nanoscience and Microsystems IGERT funded by NSF

2006 Nanoscience and Microsystems (NSMS) degree program

2008 Center for Emerging Energy Technologies (CEET)

2009 ABQ Ranked 5<sup>th</sup> in the nation as a “top metro” for research in NanoTech

**2009 Nano-Bio Buildout in CEC**

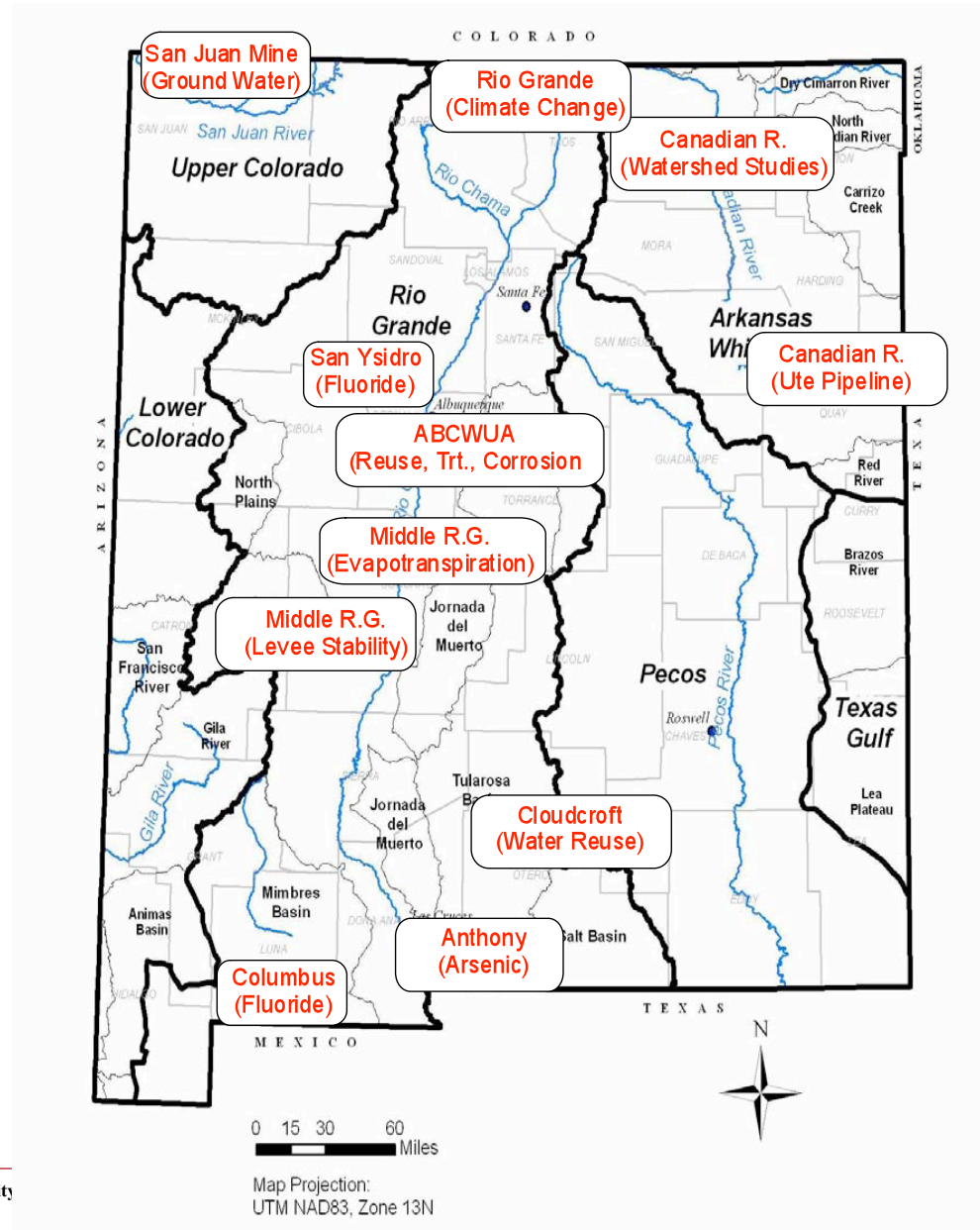
2010 NSMS Science Masters Program

## Climate Change Research

- Over \$65M in current grant funding
  - NSF GK-12 puts UNM students in public schools in Belen, Socorro, and Laguna Pueblo
  - Schoolyard LTER works with middle school students to collect data along the Rio Grande. Students then take the data back to their schools for use in the classroom
- Water budget and ecology of Middle Rio Grande
  - Constraining vegetation water use (a major piece of water budget)
  - Impact of severe drought, local drought cycles, etc
  - Affect on ecosystem structure and functioning
- Gulf Coast Oil Spill Research
  - DataONE project received a new grant to develop the Gulf Coast Oil Spill Biodiversity Tracker, a method of tracking spill damage and ecosystem recovery through the surveying of beaches and marshes for birds.



## Statewide Water Research



## Center on Alcoholism, Substance Abuse and Addictions (CASAA)

### Overview

- Approximately 50 full- and part-time faculty and staff
- ~\$7 million dollars in FY 2009-2010 across ~25 current annual contracts and grants
- 30-40 undergraduate and 10 graduate students/year

### Major Areas of Research at CASAA

- Fetal alcohol spectrum disorders (FASD)
- Reduction of risk from heavy drinking/drug use
- Adolescent HIV risk reduction
- Psychopharmacologic treatments for alcohol/drug problems
- Psychosocial treatments for alcohol/drug problems



## Emerging & Sustainable Energy

- Current energy research is primarily focused in the Center for Emerging Energy Technologies (CEET) and the Center for Micro-Engineered Materials (CMEM)
  - Approximately \$9.8M in energy-related funding at CEET
  - Approximately \$4M in energy-related funding at CMEM
  - Collaborative activities with 23 private companies, 6 national labs, 23 national universities, and 4 international universities
  - 26 tenured/tenure-track faculty with research and teaching backgrounds related to energy and sustainability
- In addition to CEET and CMEM, there is significant energy research taking place in CHTM, the Department of Chemistry, and the Department of Physics & Astronomy



# Health Policy Research

- Robert Wood Johnson Foundation Center for Health Policy
  - Collaboration between main campus & HSC
  - The purpose of the Center is to increase the diversity of those with formal training in the fields of economics, political science and sociology who engage in health services and health policy research.
  - The RWJF Center scholars will learn to become a new generation of health policy leaders through on-the-job research, policy analysis training, leadership development and community capacity building.

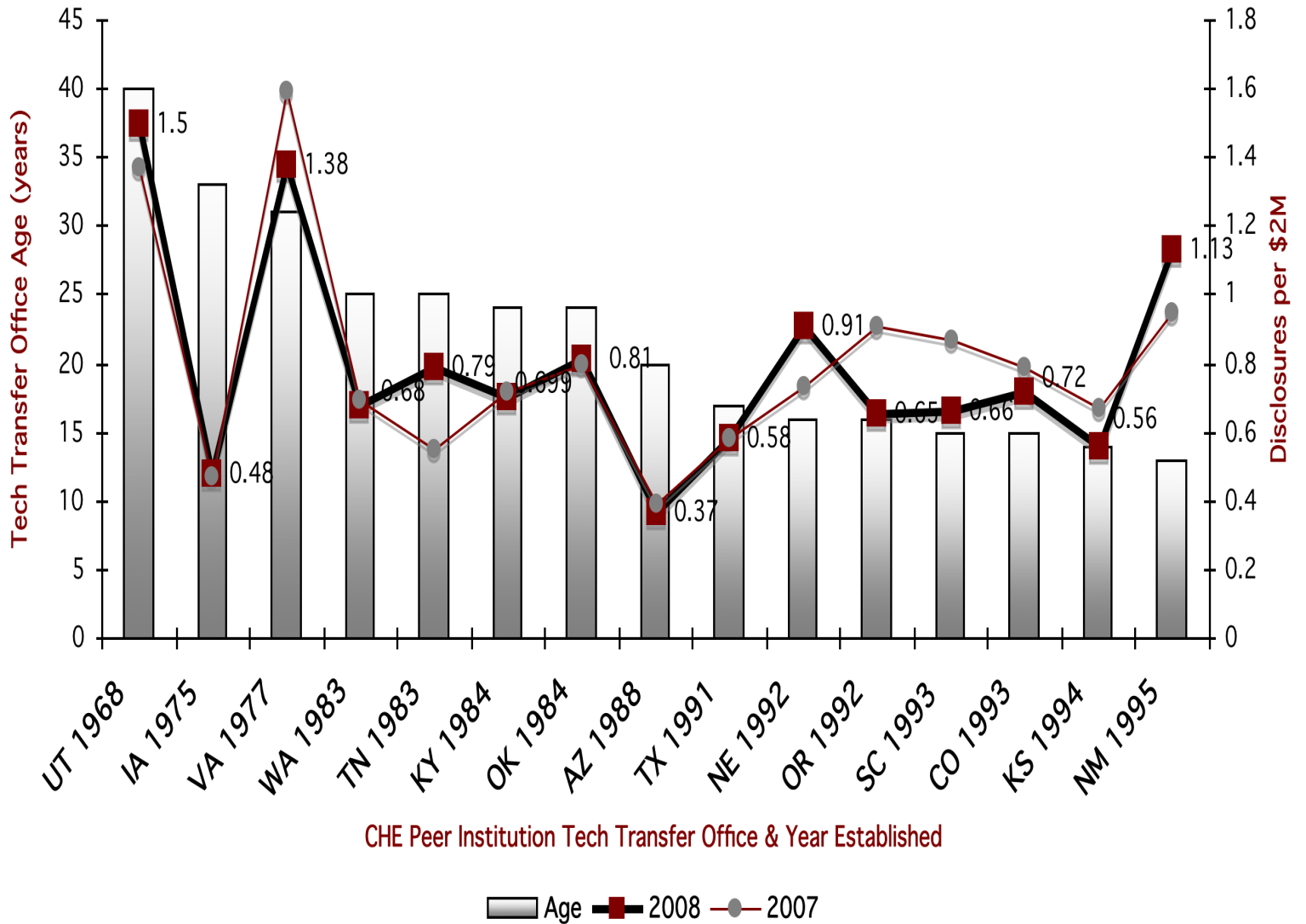


## STC.UNM – The Economic Impact of Start-Up Companies

- In 2009, UNM faculty research resulted in 113 invention disclosures, 84 patent applications, 15 issued patents, 38 license agreements, and 8 start-up companies
- 2004 BBER Study analyzing the economic impact of STC during it's first 7 years of operation:
  - Creation of 8 start-up companies that have:
    - Attracted \$12.5M in VC investment
    - Had \$8.8M in sales
    - Paid \$6.8M in salaries & benefits
    - Employed 73 people with average salaries of over \$80,000
    - Induced economic benefit is an additional \$15.8M and 71 new jobs
- We are in the process of updating this study to include the economic impacts of the 32 new companies started since 2004

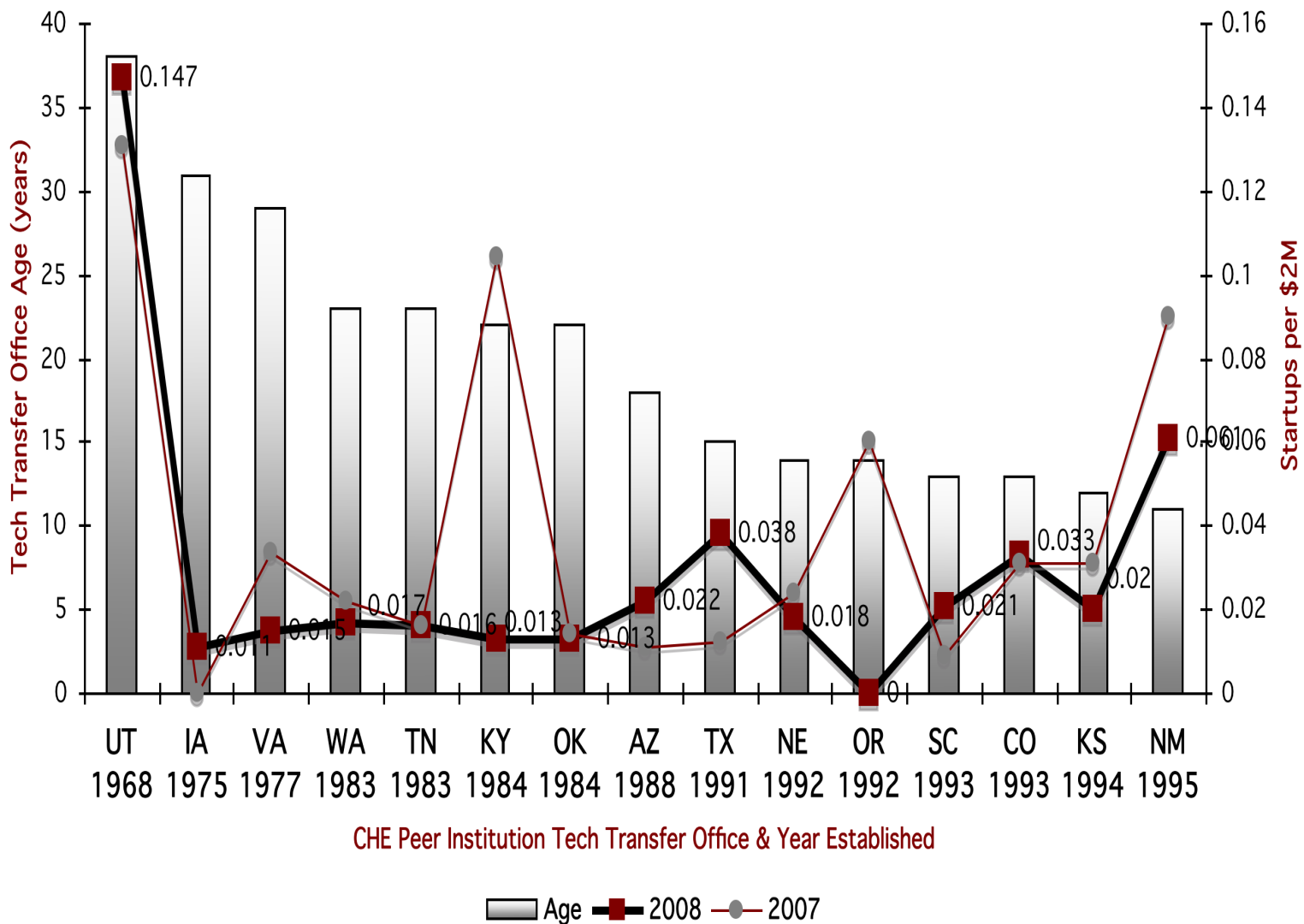


### STC Peer Institution Comparison: Disclosures/\$2M Research Dollars





## STC Peer Institution Comparison: *Start-ups Formed/\$2M Research Dollars*



# Moving Forward

- We have a number of strengths and successes, but we can improve on articulating our research goals and reporting impacts and outcomes
- Some possible outcome measures:
  - \$ of research awards under management
    - Better indicator of productivity than annual awards or expenditures
  - Faculty research awards, fellowships, articles & presentations
  - Student research awards & fellowships, MS & PhD's awarded, and job placement after graduation
  - Patent disclosures, awards, and licensing revenues
  - Start-ups & spin-offs



## Research University Funding

- The unique missions of Research Universities result in unique funding requirements!
  - Research active faculty require more resources
    - Recognition of increased scope of work, including managing research groups and mentoring undergraduate and graduate students
  - Recruitment and retention of talented faculty requires substantial resources for laboratory space, equipment, research support
  - The renewal and replacement of specialized equipment and laboratories is more expensive than traditional facilities



# Research University Funding

- The funding formula should recognize these differences in missions!
  - The current funding formula recognizes the increased cost of research active faculty through it's tiered weighting of student credit hours
  - However, there is no differentiation in the “one-time” components of the formula
    - BR&R and ER&R are funded at the same rate at all institutions, despite the increased costs at research universities
  - In addition, there is no mechanism to provide funds for recruitment (start-up packages) and retention (counter-offers) for faculty members, or institutional support funds for large grants



## Conclusion

- UNM's role as a flagship research university provides opportunities for excellence and leadership in research and education on a national stage
- Research universities provide significant tangible benefits across the state:
  - Education
  - Economic Development
  - Quality of Life
- The increased costs research universities are only partially addressed by the current funding formula

