NSF EPSCoR 21st National Conference 2009

# It Takes a State

Paul G. Risser
University of Oklahoma

# Scientists and the public think…

- Public view of science's effect on society mostly positive – 84%
- Scientists think public doesn't know much about science – 85%
- Public sees scientists' political involvement as appropriate – 78%

The Pew Research Center. 2009. A survey conducted in collaboration with the American Association for the Advancement of Science. 98p

# Who thinks science contributes ‘a lot’ to society’s well being…

| | |
|---|---|
| Military | 84% |
| Teachers | 77 |
| Scientists | 70 |
| Medical doctors | 69 |
| Engineers | 64 |
| Clergy | 40 |
| **Journalists** | **38** |
| Artists | 31 |
| Lawyers | 23 |
| **Business executives** | **21** |

The Pew Research Center. 2009. A survey conducted in collaboration with the American Association for the Advancement of Science. 98p

# Opinions on global change

Think that the earth is getting warmer because of human activity

- Public 49%
- Scientists 84%

Percent who say scientist generally agree that earth is getting warmer because of human activity

- Public 56%
- Scientists 84%

The Pew Research Center. 2009. A survey conducted in collaboration with the American Association for the Advancement of Science. 98p

# Collaborative research

- **Multi-authored papers more cited, higher impact**
  - Increasing in all disciplines science, engineering, social sciences, arts and humanities
- **Multi-university collaborations**
  - fastest growing authorship
  - highest impact papers if a top-tier university
  - increasingly stratified by in-group university

Jones, B.F., S. Wuchty and B. Uzzi. 2008. Multi-University research teams: shifting impact, Geography, and Stratification in Science. Science 322:1259–1262

Wuchty, S., B.F. Jones and B. Uzzi. 2007. The Increasing Dominance of Teams in Production of Knowledge. Science 316:1036–1038

# Oklahoma Shines

Employment rate
Housing
Loans
Media
CNN
Etc.

but...

# Oklahoma's preparation for today's economy

- Workers employed in "knowledge-based jobs, 39th
- Science and technology, 77 indicators, Milken, 38th
- Globalization, innovation, etc. 29 indicators, Kauffman, 43th
- NSF, 6/35 above average indicators of education, workforce, R&D

# Research and development

| | OK | US |
|---|---|---|
| R&D as share of GDP (%) | 0.70 | 2.44 |
| Federal R&D obligations per civilian worker ($) | 156 | 753 |
| Federal R&D obligations per individual in S&E occupation ($) | 5,469 | 20,396 |
| Industry-performed R&D as share of private-industry output (%) | 0.41 | 2.04 |
| Academic R&D per $1000 GDP | 2.40 | 3.63 |

NSF Science and Engineering Indicators, 2008 *Science and Engineering Indicators* (http://www.nsf.gov/statistics/seind08/c8/data_result.cfm)

# Oklahoma Innovation and Technology Plan 2009

www.okedge.org/resources/plan

# Economic benefits of colleges and universities

- Between 1 and 2 new jobs in local economy for every job at a college
- Every $1.0 million in research grant produces 36 jobs
- Nationwide, universities create one new business every 2 days
- University research parks, one job creates 2.6 jobs

# Importance of talented immigrants

- International students and immigrants = half the science researchers
- Half Silicon Valley start-ups = half has at least one founder as an immigrants or first-generation American
- 26% of all start-ups created by immigrants, most came as students, started businesses after being here an average of 13 years

# College-educated people create more new businesses

- Degrees: Bachelor's, 92%; Master's, 31%, Ph.D, 10%
- About half degrees in science, technology, engineering, mathematics (STEM); one-third in business
- Those with MBA degrees started companies fast than other degrees
- Companies started by high school degrees rather than college, less than half the annual revenues and many fewer employees
- Nearly half started companies in state where received college degree

# Innovation & Technology Plan Recommendations

1. Shared information within business clusters
2. Convey business research needs to Oklahoma's researchers
3. Rapid access to innovative technology
4. Workforce benefits from STEM teachers
5. Workers who combine advanced technical and business skills
6. Business-directed centers of excellence
7. Start-up and emerging businesses (EDGE)

# EDGE Action Plan

- Research (education, health, business environment)
- Tangible
  - $1.0 B for *Research Capital of the Plains*
  - $150 M endowment
  - EPSCoR involved throughout
- Intangible
  - Changing statewide discussion
  - Endowed chairs, seed venture capital
  - Capital bond with focus on science facilities
  - Enabled National Lambda Rail (NLR) participation
- Increased the policy capacity of Oklahoma to address science and technology

# OK Cyberinfrastructure Initiative

- Triggered by NSF EPSCoR RII Track 1 proposal (2008).
- MOU between U Oklahoma and Oklahoma State U.
- Resources:
  - All academic institutions in the state are eligible to sign up for free use of OU's and OSU's centrally-owned CI resources – over 50 remote Oklahoma users so far!
  - Other kinds of institutions (government, NGO, commercial) are eligible to use, though not necessarily for free.
- Education, Outreach, Training
  - "Supercomputing in Plain English" workshop series
  - "What the Heck is Supercomputing?"

# Cyberinfrastructure Education

Cyberinfrastructure Education for Bioinformatics and Beyond" ($250K, NSF CI-TEAM grant)

University of Oklahoma provided "Supercomputing in Plain English" workshops via videoconferencing in Fall 2007 and Spring 2009.

Spring 2009: **425 people at 90 institutions** (academic, government, industry, non-governmental) in 29 US states plus Puerto Rico, as well as Mexico, Argentina, India and Switzerland, including 16 institutions in Oklahoma

**9 private companies** participated, including both small local companies and large multinationals in aerospace, software, risk management and pharmaceuticals.

# National LambdaRail Infrastructure


National Scope

# CCEW Intern Program

## Boot Camp

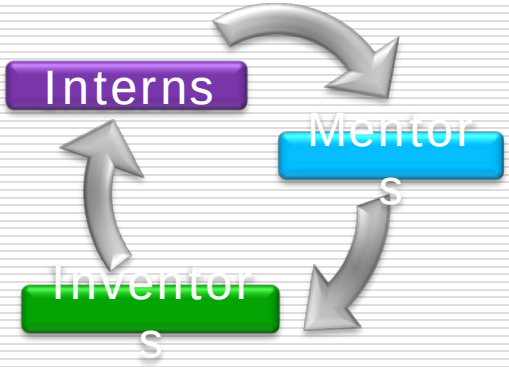
- Broad overview of entrepreneurial process

## CCEW Academic Course

- Deepen learning
- Topic experts
- Networking
- 3 hours credit
  - Business
  - Engineering
  - Arts & Sciences
  - Honors

## Commercialization Teams

- Commercialize technology




- $1,200 stipend

## Final Presentation

- Present findings and recommendations

THE UNIVERSITY OF OKLAHOMA
CCEW
CENTER FOR THE CREATION OF ECONOMIC WEALTH

# CCEW Case Studies

## Synthesized Nano Coatings

SYNTHESIZED Nano Coatings

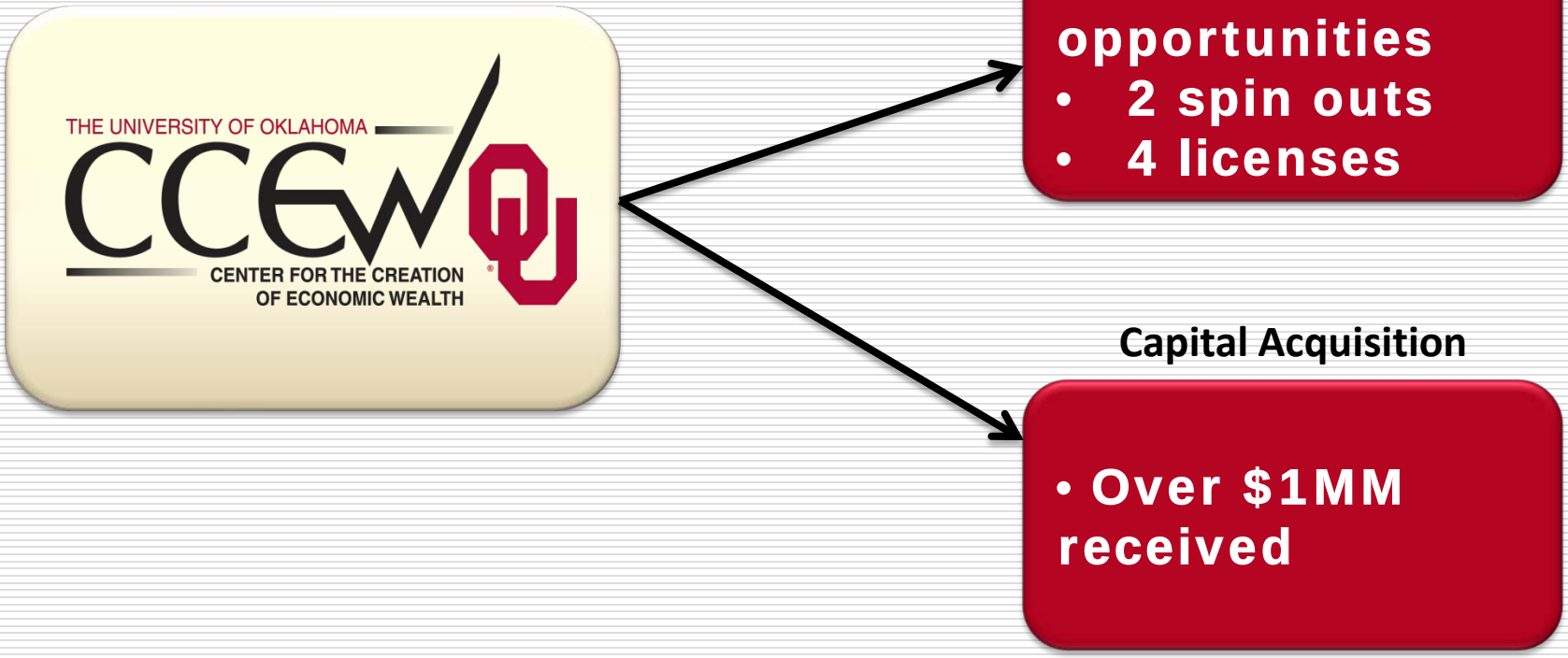
**Water and stain repellent cotton fibers**

- Raised $700k
- Placed 1st in 2008 Governor's Cup Business Plan competition
- 2009 Oklahoma Innovator of the Year Award
- Negotiated licensing agreement
- Recruited management team
- Created post-graduation job for CCEW alumnus

## OU2GO

- OU's official iPhone application
- Developed exclusively by 11 CCEW interns
- ~ 10,000 downloads in 1 month
- Project managed by CCEW in collaboration with departments across OU
- Exploring commercialization options

# CCEW Commercialization Impact: 2006 - 2009



# Ohio Department of Development

SRI International and Georgia Institute of Technology's Enterprise Innovation Institute evaluated returns on **Ohio's $681 million investment** in several technology based economic development programs.

**Benefits of investments over tax rebates:**

- **7X economic activity**
- **6X employment growth**
- **11X wage growth for Ohio's economy**

http://development.ohio.gov/ohiothirdfrontier/Documents/RecentPublications/OH_Impact_Rep_SRI_FINAL.pdf

# Ohio Department of Development