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...

<table>
<thead>
<tr>
<th>Role</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Military</td>
<td>84%</td>
</tr>
<tr>
<td>Teachers</td>
<td>77%</td>
</tr>
<tr>
<td>Scientists</td>
<td>70%</td>
</tr>
<tr>
<td>Medical doctors</td>
<td>69%</td>
</tr>
<tr>
<td>Engineers</td>
<td>64%</td>
</tr>
<tr>
<td>Clergy</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Journalists</strong></td>
<td><strong>38%</strong></td>
</tr>
<tr>
<td>Artists</td>
<td>31%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>23%</td>
</tr>
<tr>
<td><strong>Business executives</strong></td>
<td><strong>21%</strong></td>
</tr>
</tbody>
</table>

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


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

<table>
<thead>
<tr>
<th></th>
<th>OK</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D as share of GDP (%)</td>
<td>0.70</td>
<td>2.44</td>
</tr>
<tr>
<td>Federal R&amp;D obligations per civilian worker ($)</td>
<td>156</td>
<td>753</td>
</tr>
<tr>
<td>Federal R&amp;D obligations per individual in S&amp;E occupation ($)</td>
<td>5,469</td>
<td>20,396</td>
</tr>
<tr>
<td>Industry-performed R&amp;D as share of private-industry output (%)</td>
<td>0.41</td>
<td>2.04</td>
</tr>
<tr>
<td>Academic R&amp;D per $1000 GDP</td>
<td>2.40</td>
<td>3.63</td>
</tr>
</tbody>
</table>

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 faster 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 they 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.
# CCEW Intern Program

## Boot Camp
- Broad overview of entrepreneurial process
- Deepen learning
- Topic experts
- Networking
- 3 hours credit
  - Business
  - Engineering
  - Arts & Sciences
  - Honors

## CCEW Academic Course
- Commercialization Teams
- Commercialize technology
- Present findings and recommendations

## Final Presentation
- $1,200 stipend
CCEW Case Studies

Synthesized Nano Coatings

• 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

- 14 opportunities
- 2 spin outs
- 4 licenses
- Over $1MM received

Business Development

Capital Acquisition
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

Ohio Department of Development

- **Ohio’s Direct Investment**: $681 M
- **Additional Investment Attracted**: $4,152 M
- **Economic Impact of Investment**: $6,611 M

**Ohio Third Frontier**
- $681 M

**Tax Rebate (Hypothetical)**
- $681 M

Source: SRI International