

# State Investment in University Research:

## Leveraging R&D for Economic Development

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# Shifting Sources of Wealth

## Inherited Assets

Geography

Climate

Natural Resources

Population



## Created Assets

Top Universities

Research Centers

Talented People

Entrepreneurial Culture

Networks

World-Class Amenities

# The Role of Universities

## Highly effective

- Education & talent creation
- Research & new ideas
- Attraction of firms, entrepreneurs, people, etc.
- Anchor institution & public space
- Extension & technical assistance, outreach
- Faculty acting as consultants
- University-industry collaborations

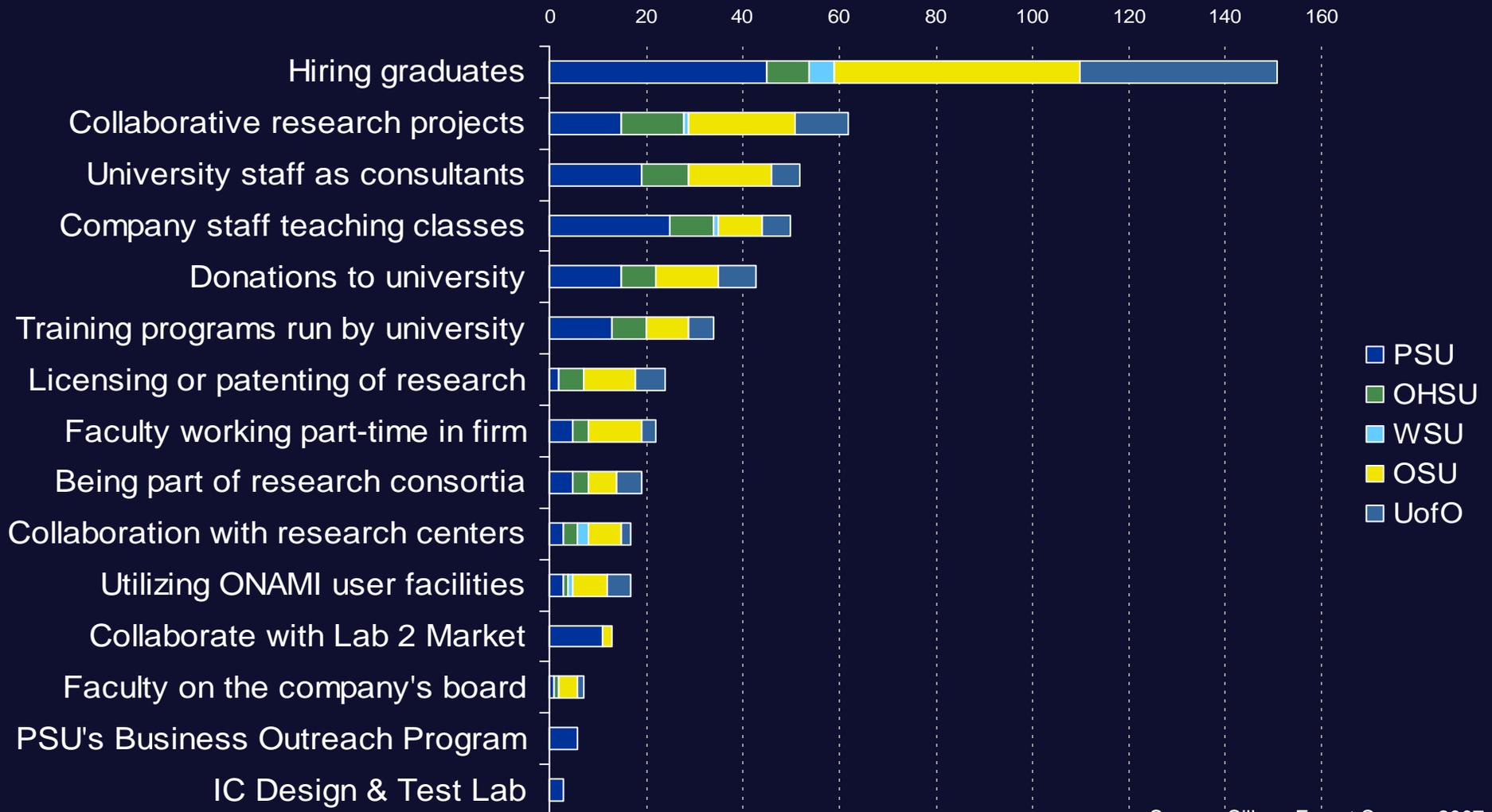
## Limited

- Entrepreneurial startups & support
- Technology transfer & commercialization
- Patenting & licensing

# University-Industry Relationships

Silicon Forest Survey of High-Tech Firms:

Which of the following types of relationships has your firm had with the Oregon universities?



Source: Silicon Forest Survey, 2007  
Note: N=112

# Industrial Innovation is Changing

**Companies are more and more interested in**

**PARTNERING & COLLABORATING**

**with universities**

Why?

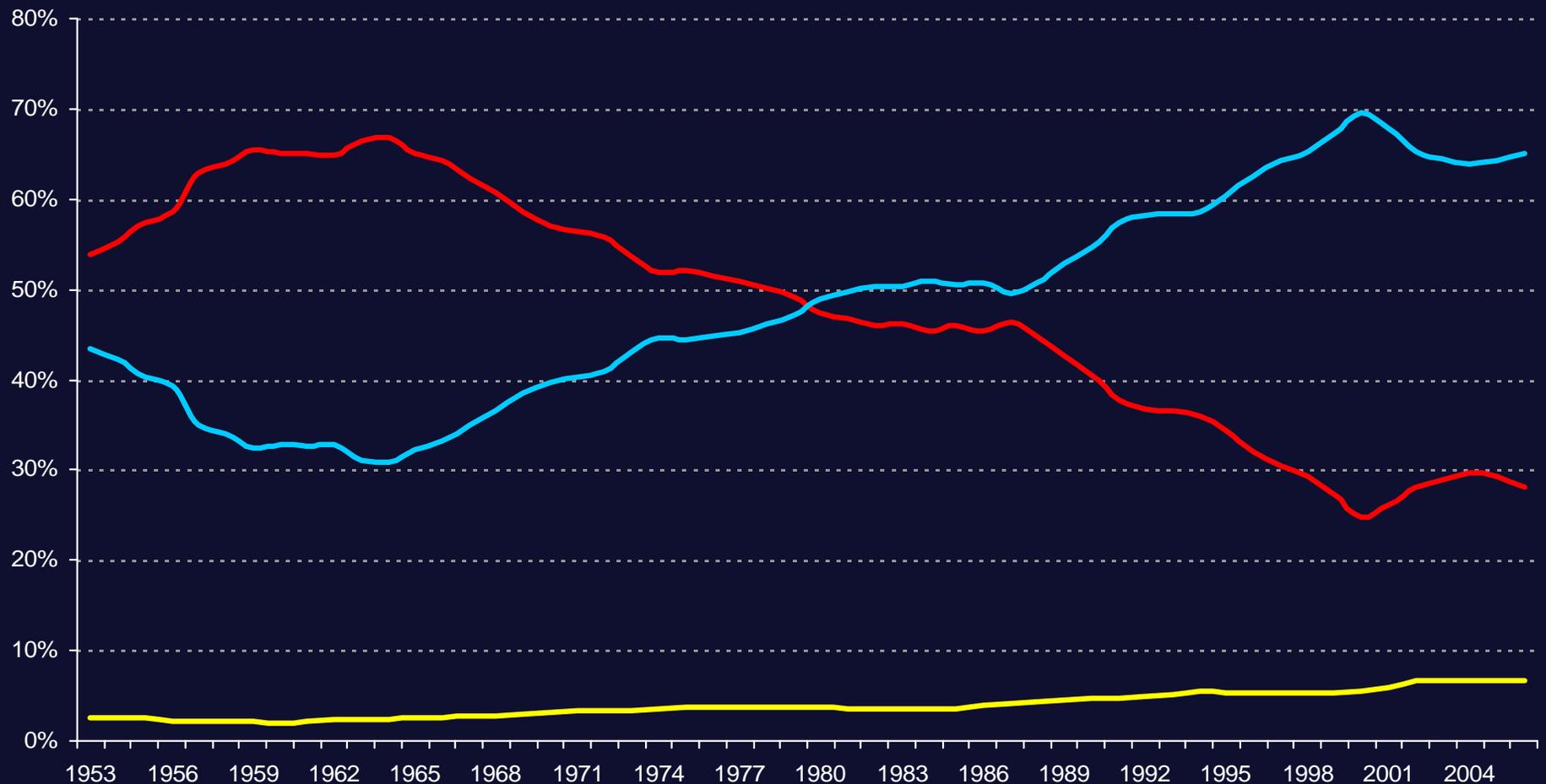
- Decline in in-house R&D
- External sources of knowledge reduce cost & risks

Examples

- Intel's "tablets"
- Procter & Gamble
- Virginia Tech College of Science & Oxford Diffraction Inc.
- VT's Micron Technology Semiconductor Processing Laboratory

# R&D Funding in the United States

Federal R&D funding share declines as industry's rises



Source: National Science Foundation

— Federal — Industry — Other

# State R&D Investment Funds

- Most states have dedicated R&D funds
- Evolution of funds
  - 1980s: Small amounts to build research capacity
  - Today: Partnerships, collaboration, industry engagement
- Funds are used for
  - Research: Collaboration, Leverage, Synergies, Social Problems
  - Talent: Eminent scholars, Scholarships
  - Facilities: Centers of Excellence, Laboratories
- HOW states spend money is just as important as how MUCH is spend

● **WASHINGTON**

*Life Sciences Discovery Fund (\$350 million over 10 years)*  
Washington's fund is dedicated to bioscience research that provides economic and health benefits to the state's residents.

● **NORTH DAKOTA**

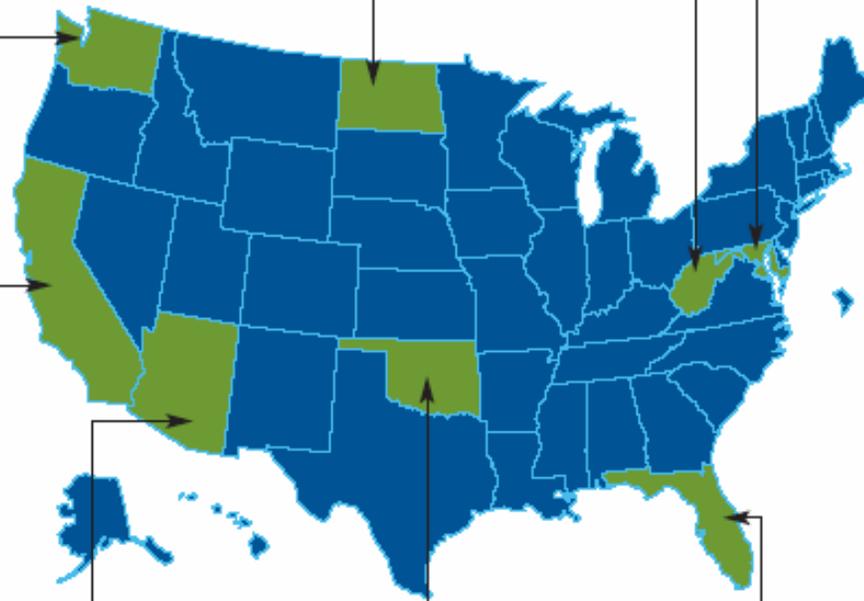
*Centers of Excellence (\$50 million)*  
North Dakota funds public-private centers of excellence that focus on state strengths such as surface protection, leveraging at least a 2:1 match from the private sector (total, \$150 million).

● **WEST VIRGINIA**

*Research Challenge Fund (\$4 million annually)*  
Using a unique funding mechanism harnessing lottery revenue, West Virginia makes targeted investments to increase competitiveness for federal and other outside R&D funding.

● **MARYLAND**

*Stem Cell Research Fund (\$23 million annually)*  
Recognizing an emerging need in stem cell research, Maryland's fund focuses its investments on quickly translating new treatments into benefits for patients.



● **CALIFORNIA**

*Institutes of Science and Innovation (\$400 million)*  
California's initiative unites universities and industry partners to address state problems such as climate change, energy and traffic congestion. An additional \$800 million was raised from private-sector partners (total, \$1.2 billion).

● **ARIZONA**

*Science Foundation Arizona (\$135 million)*  
To strategically strengthen the state's scientific, engineering and medical research programs, Arizona established a public-private non-profit partnership that receives half of its money from the state and half from the private sector (total, \$270 million).

● **OKLAHOMA**

*Oklahoma Center for the Advancement of Science and Technology (\$29 million annually)*  
Oklahoma is investing millions in nanotechnology research and other fields in order to become the "research capital of the plains."

● **FLORIDA**

*Scripps Florida (\$310 million)*  
As one of many steps taken to establish bioscience excellence, Florida recently built a new facility to house the world-class Scripps Institute.

# How Do States Fund Investments?

Type of Funding	Examples
Earmarked Taxes	<b>Arizona:</b> Proposition 301 <b>West Virginia:</b> Research Challenge Fund
General Fund Appropriation	<b>Georgia:</b> Georgia Research Alliance <b>Kentucky:</b> Bucks for Brains
Tobacco Settlement Money	<b>Washington:</b> Life Sciences Discovery Fund
Tax Increment Financing	<b>Kansas:</b> Emerging Industry Investment Act
Bonds	<b>California:</b> Institute for Regenerative Medicine
Privatizing State Assets	<b>Missouri:</b> MOHELA <b>Indiana:</b> Hoosier Lottery
Foundations	<b>Minnesota:</b> Medica <b>Indiana:</b> Lilly Endowment <b>Pennsylvania:</b> Heinz Endowment
Leveraging Industry Support	<b>North Dakota:</b> Roundtable on higher ed



# Georgia

**Eminence in  
Research**

## Georgia Research Alliance

- \$30M annually
- \$400M since 1990

## Eminent Scholars Program

- 57 Scholars
- 18 Centers of Excellence
- \$2B leveraged
- 125/4000+ firms/jobs

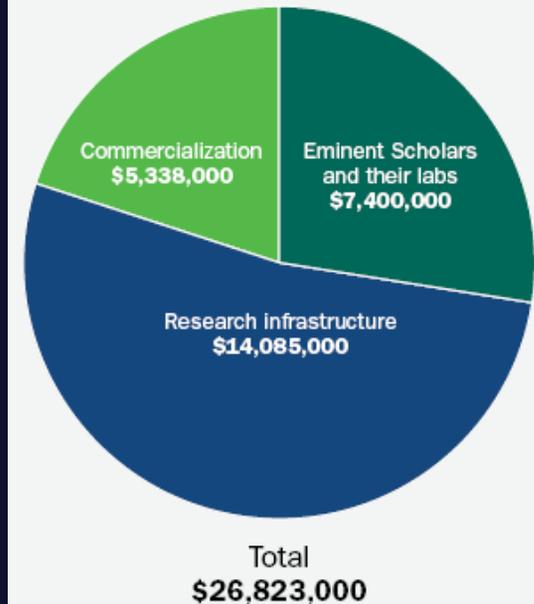
## Venture Lab

- \$8M from GRA since 2002
- 66 early-stage companies

**Tech  
Transfer &  
Commercialization**



Snapshot: GRA's FY 2006 investment portfolio



**Source of Funds:** The funding for this program is provided by the State of Georgia.

Investments  
in Georgia  
Research  
Alliance  
reach across  
the state!



**THE REACH OF GRA: Communities with connections to Georgia's research universities through corporations, start-up companies and laboratories.**

# Kentucky

- Kentucky Postsecondary Education Improvement Act
- Research Challenge Trust Fund or “Bucks for Brains”
  - \$350 M
- Kentucky Science & Engineering Foundation
- Kentucky Innovation Act
  - \$53M

Kentucky Reaping  
Benefits from

**Bucks for Brains**

# Arizona

8 big steps to create  
a bioscience niche

1. Industry Clusters
2. University Research & New American University (\$1B/20yrs)
3. Bioscience Road Map
4. Genomics
5. Research Facilities
6. Community Colleges
7. Science Foundation Arizona (\$25M)
8. Personalized Medicine

Ongoing: Measuring Results



# The Virginia Situation

- Growing economy & high job creation rates
- Reliant on high-tech service industries
- Strong urban-rural divide
- Need to upgrade traditional industries
- Innovation rankings fall short
- Low rates of entrepreneurship

# A Good Start: Commonwealth Research Initiative

Initiatives (GF \$ in M)	FY 2007	FY 2008	Total
Biomedical Research & Biomaterials Engineering	\$19.6	\$19.6	\$39.2
Modeling & Simulation	\$5.8	\$5.8	\$11.6
Debt Service for HEETF research supplement	\$0.0	\$6.0	\$6.0
Institute for Advanced Learning & Research	\$2.1	\$2.4	\$4.5
Research Commercialization*	\$5.0	\$0.0	\$5.0
Graduate Financial Aid	\$5.0	\$5.0	\$10.0
<b>Total</b>	<b>\$37.5</b>	<b>\$38.8</b>	<b>\$76.3</b>

Source: State Senate Finance Committee

\*Includes \$2M for CTRF with 1-to-1 match of non-general funds.

## 6 Guidelines for R&D Investments

1. Put all the pieces together
2. Make the right bets
3. Invest in collaboration
4. Enlist experts, outside peer reviewers
5. Be consistent while embracing change
6. Measure results

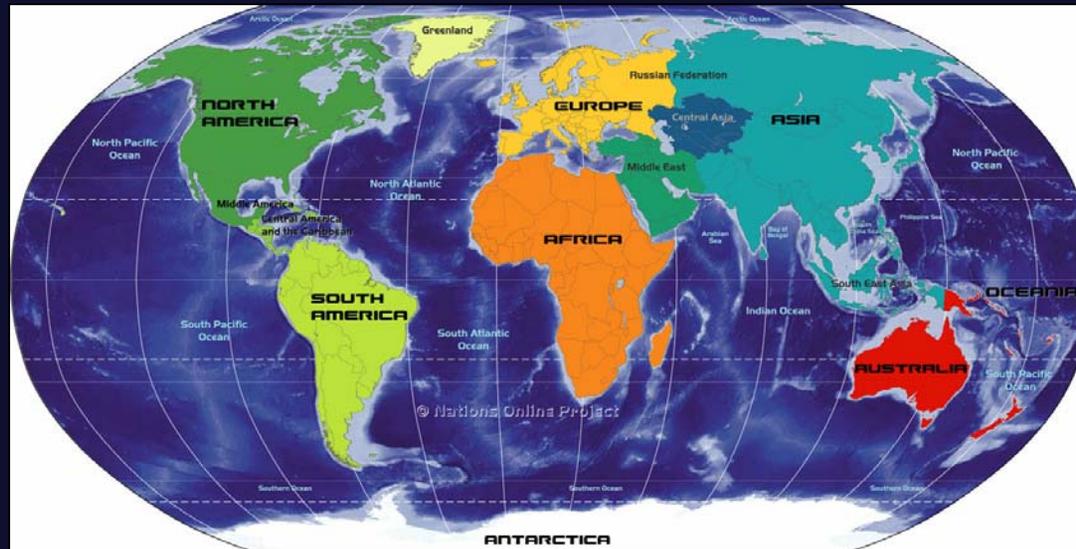
# Why Do We Need to Invest?

Canada:  
\$105M to 7 centers  
of excellence; Quebec: \$888M

United Kingdom:  
\$2B for innovation  
& tech development

Finland:  
€465 M in  
R&D projects

United States:  
America  
Competes Act  
authorizes  
\$43.4B in S&T  
spending for  
FY08-10;  
No national  
innovation  
policy; State  
R&D funds  
less than 3%



Germany:  
Funding for  
elite universities

India:  
100 incubators

Ireland:  
Science Foundation  
invested \$700 M  
between 2000 and 2006

Bahrain:  
Plans for a \$1B  
Science & Technology  
Park

Singapore:  
Doubling R&D  
budget; \$8.9B  
between 2006  
and 2011

# Thank You!

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Report is available from National Governors Association:

<http://www.nga.org/Files/pdf/0707INNOVATIONINVEST.PDF>