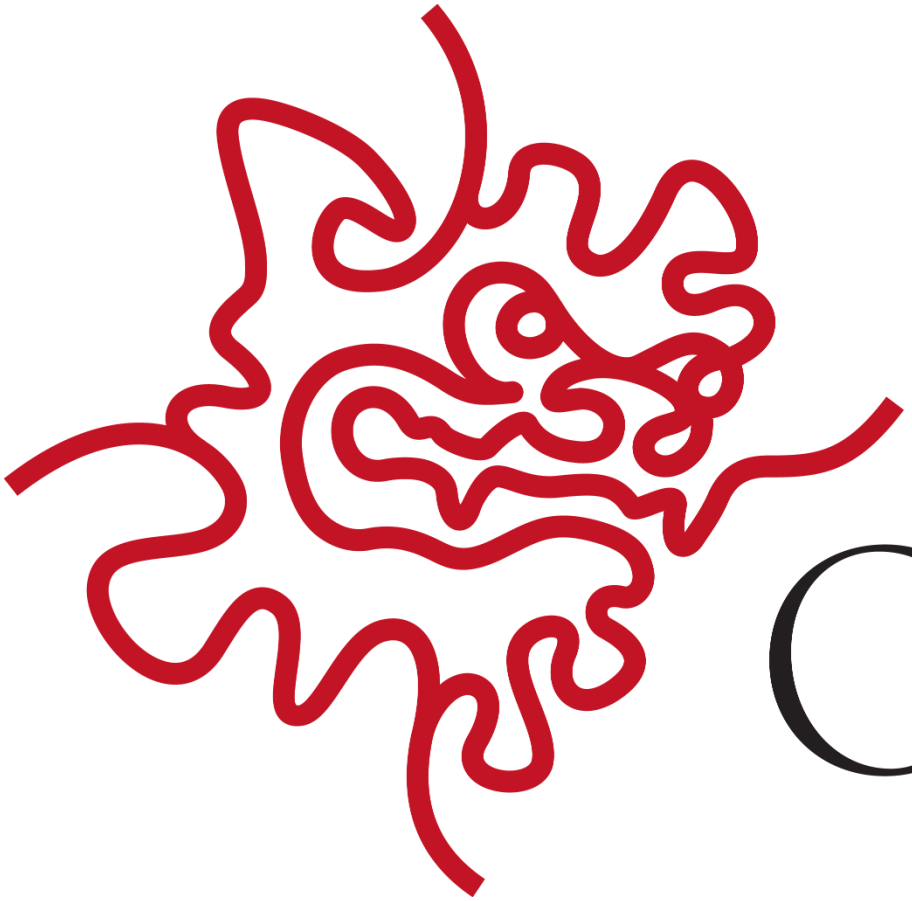
CSUVENTURES
Innovation at Work

Technology Commercialization: A Mode of Knowledge Transfer

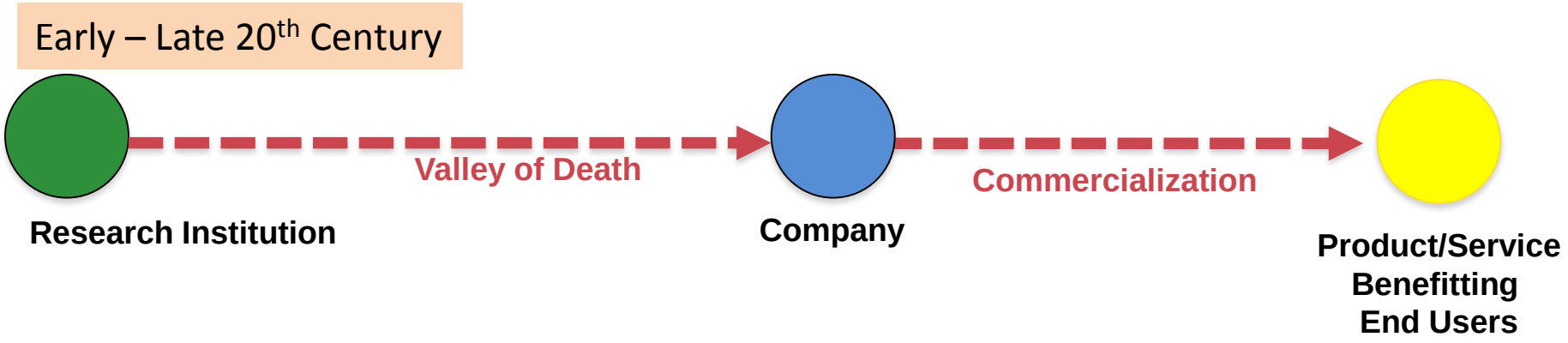
Denichiro "Denny" Otsuga, Ph.D.
Registered Technology Transfer Professional



OIST

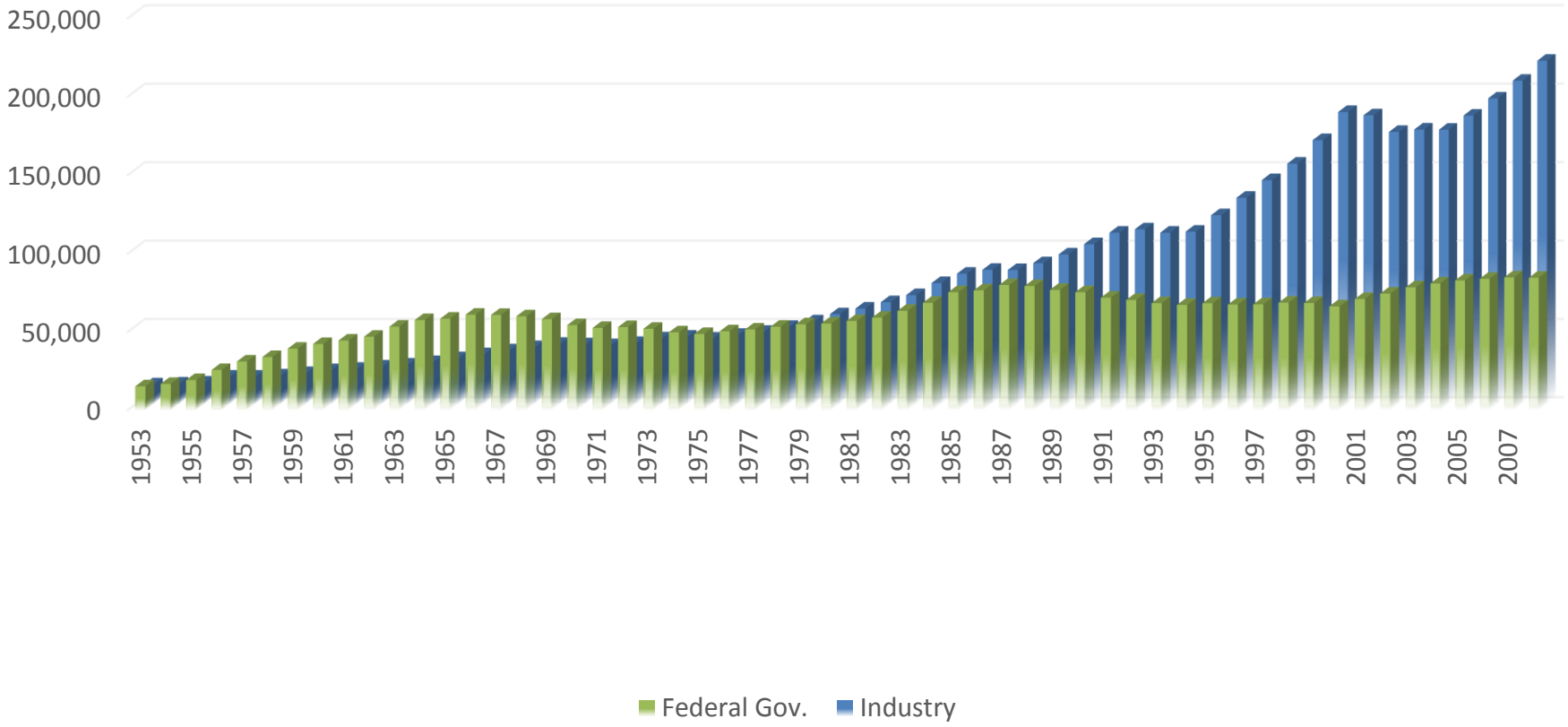
Mission Statement:
The OIST Graduate University shall conduct internationally outstanding education and research in science and technology, and thus contribute to the sustainable development of Okinawa, and promote and sustain the advancement of science and technology in Japan and throughout the world.

Connecting the Dots: Research to Products

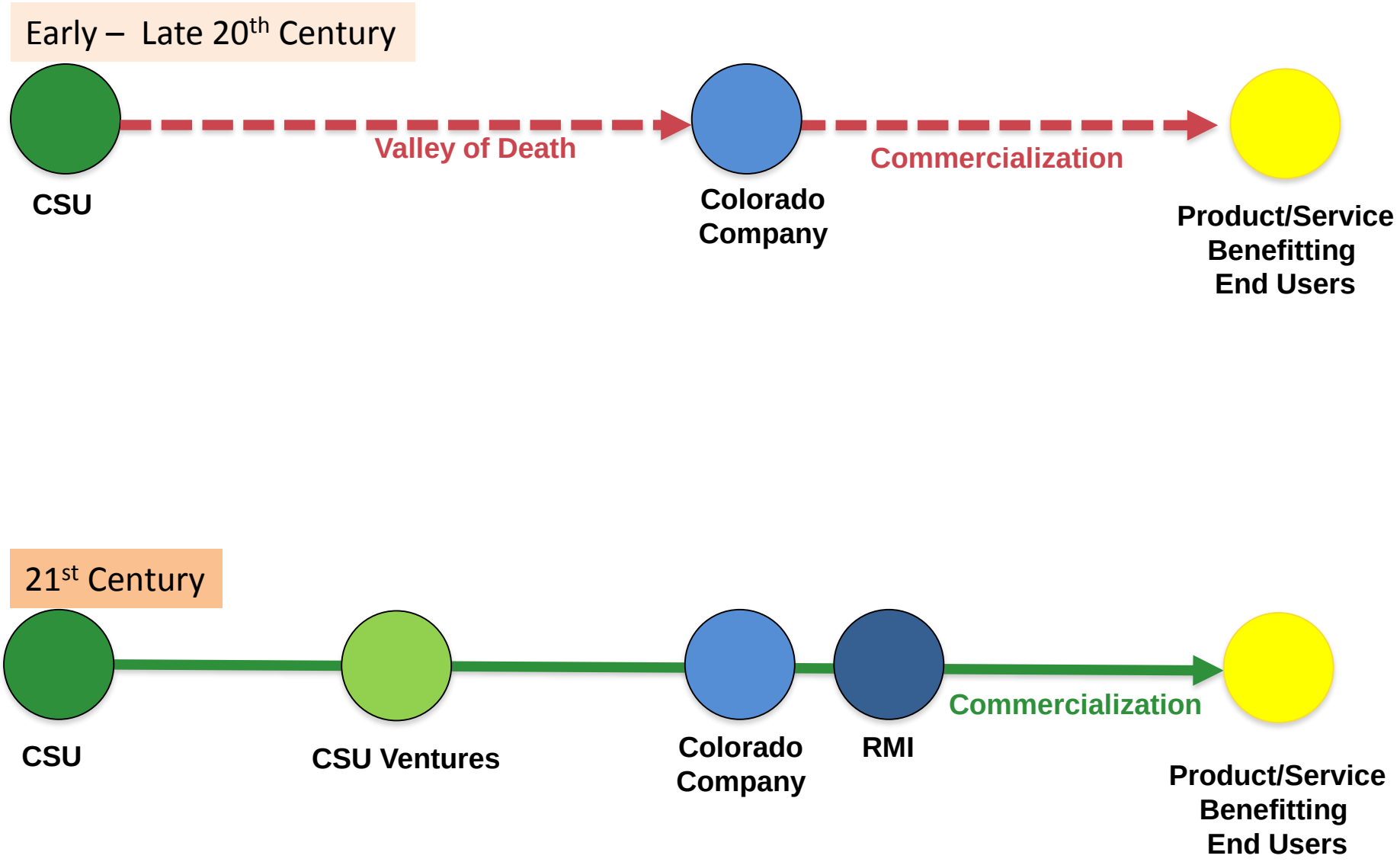


U.S. R&D Funding by Source, 1953-2008

In millions of constant dollars for year 2000



Connecting the Dots: Research to Products



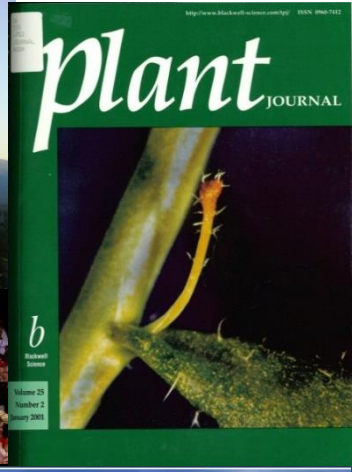
CSUVENTURES
Innovation at Work

Introduction:
- About me
- About Colorado State University and CSU Ventures
- About Technology Commercialization

Technology Commercialization: Success Stories from CSU/CSU Ventures
- **Envirofit**
- **Food Friends**
- **Abound Solar**

Technology Commercialization: Pieces of the Puzzle
- **Research**
- **Administration**
- **Technology Commercialization Ecosystem**
- **Technology Transfer/Licensing Office**

CLEVELAND BROWNS

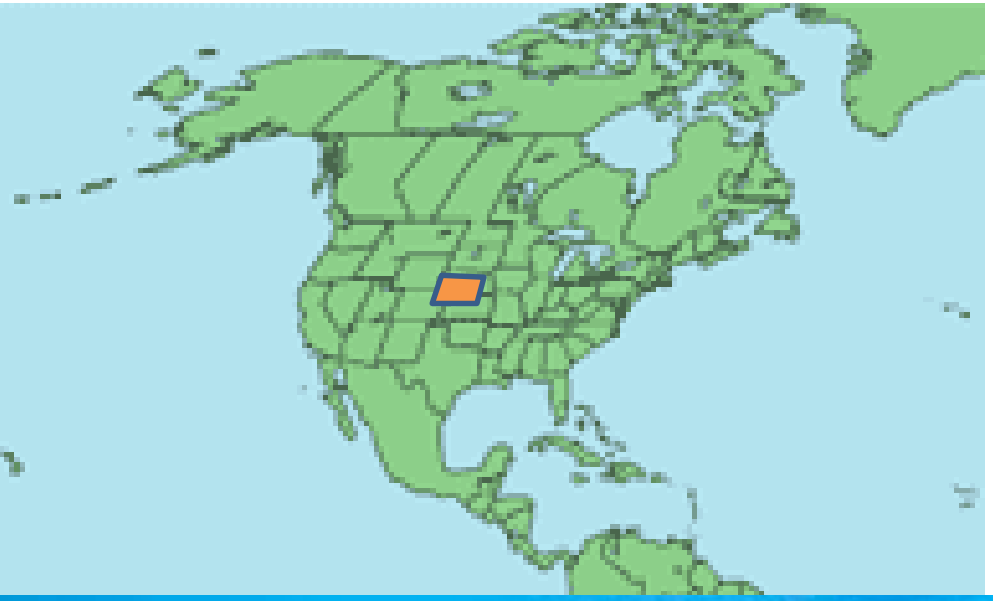


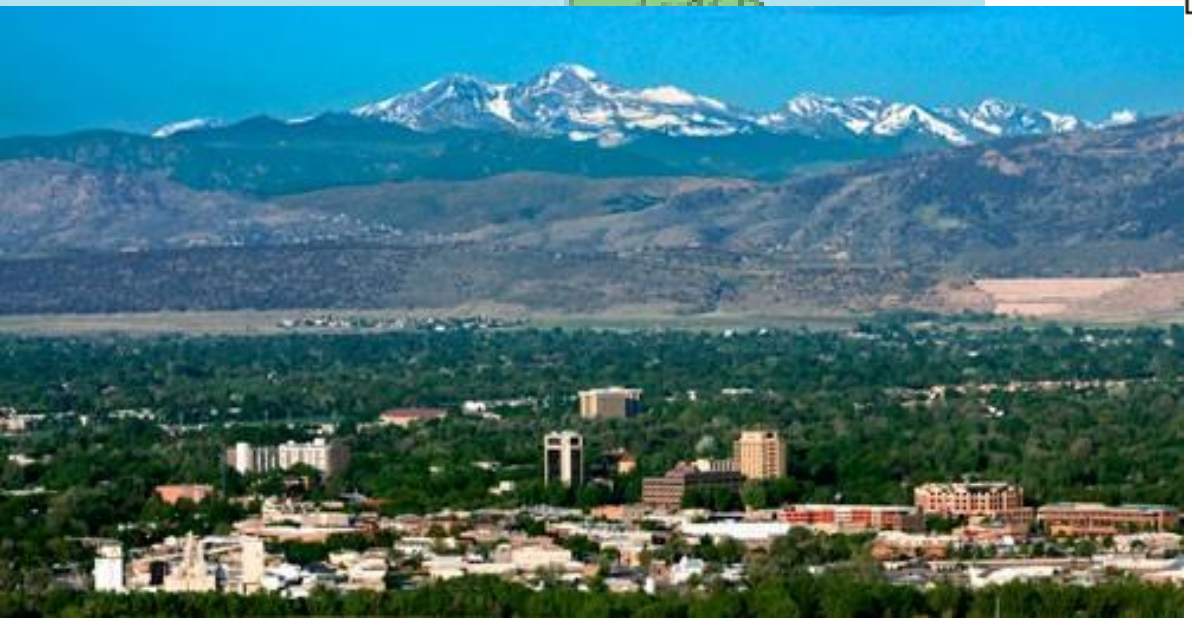
CSUVENTURES
Innovation at Work

c e r e s

SOUTH DAKOTA STATE
JACKRABBITS

Where is Colorado State University, Fort Collins, Colorado?





Fort Collins, Colorado
Elevation: 5,003 ft. (1,525m)
Population: 143,986 (2010)

Entities Involved in Creation and Management of Innovation

Entity	Entity Type	Mission
Colorado State University	Land grant university – State government entity	• Education • Research • Service • Extension
CSUVENTURES	Non-profit corporation	• Manage/Transfer CSU technologies • Protect CSU intellectual property • CSU technology based startups • Support CSU-industry relationship

Key University facts

Founded: 1870

Enrollment: 26,735

- Undergraduate: 22,300
- Graduate: 4,435
- Doctor of Veterinary Medicine: 548
- International students: 1,133
- Non-degree seeking: 3,715

Number of Countries Represented: 91

School Colors: Green and gold

Research Funding: More than $330 million in research expenditures

Operating Budget: Nearly $867 million annually

Economic Impact: More than $4 billion annually

Faculty: 1,559

Student-Faculty ratio: 18:1

Programs Offered:

- 71 Baccalaureate degrees
- 73 Master's degrees
- 43 Ph.D. programs
- 1 Doctor of Veterinary Medicine program

Colleges: 8

- College of Agricultural Sciences
- College of Applied Human Sciences
- College of Business
- College of Engineering
- College of Liberal Arts
- College of Natural Resources
- College of Natural Sciences
- College of Veterinary Medicine and Biomedical Sciences

Alumni: CSU has more than 180,000 living alumni from all 50 states and 135 countries.

Athletic Mascot: Cam the Ram

Athletics: The CSU Rams compete in the Mountain West Conference. CSU Athletics sponsors 16 NCAA Division 1 sports, with eight women's teams and eight men's teams. In addition, more than 5,000 students participate in intramural and club sports.

Missions of CSU Ventures

CSU Ventures, Inc. (CSUV) is a 501(c)(3) non-profit corporation that actively supports and promotes the transfer of Colorado State University (CSU) research and innovations into the marketplace for the benefit of society.

CSU Ventures…

- Serves CSU faculty and researchers who wish to protect and license intellectual property
- Builds relationships with industries and investors seeking to engage with CSU
- Leverages CSU innovation to foster business formation and enhance regional economic vitality

Commercialization Process

1 Research

Colorado State University conducts over $300 million of sponsored research annually. Some is federal, some is private – but all of it has the potential to produce valuable discoveries and innovations with benefit to the public and private sectors.

2 Contact Us

Tell us about your innovation! We want to hear about it, the earlier the better, at any stage of development. Ultimately, we will need you to submit an invention disclosure form, but feel free to contact us first to discuss.

3 Protect IP

There are a variety of ways to protect intellectual property (IP) and we work with you to determine the best strategy for your innovation. When a patent is appropriate, we get the process started right away and defer the final decision on whether to proceed until later.

4 Market or Form a Startup

We look for companies that want your innovation. We use a variety of tools and resources and do most of the work, but you can help by providing suggestions along the way. Alternatively, you may want to start your own company to commercialize the innovation – we help with that, too.

5 License

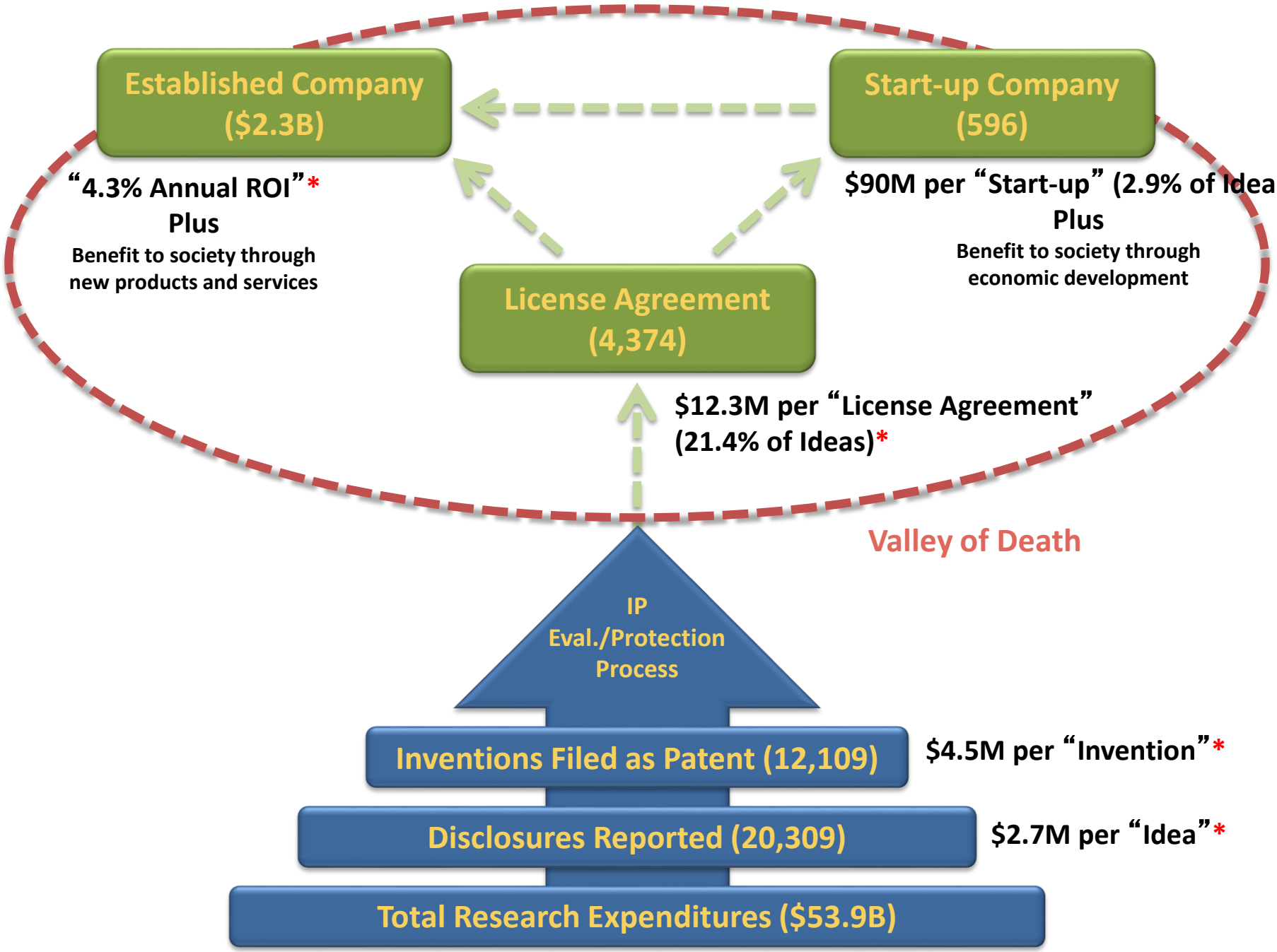
We negotiate a license so that the interested company has a competitive advantage and an incentive to invest in your innovation. We strive to be fair and flexible so that the deal benefits all sides.

6 Commercial Development

Most of the time, significant product development is required before the company can incorporate your innovation into a product or service that the public can use. Usually the company does this on its own, but sometimes it sponsors research in your lab or hires you as a consultant.

7 Impact

Commercializing your innovation can have a number of positive outcomes, from improving people's lives to creating new jobs to increasing awareness of the valuable contributions that you and your research are making. You will also be rewarded financially, as you are entitled to a share of all revenues we receive.



* Not scientific figures, provided for conceptual/discussion purpose

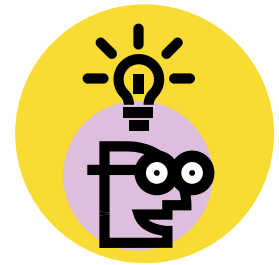
FY2009 AUTM Licensing Survey

Famous University Inventions

INVENTION	INSTITUTION	INVENTOR(S)	YEAR
Insulin	Univ. of Toronto	Frederick Banting, Chas Best	1922
Penicillin	Oxford Univ.	Howard Florey, Ernst Chain	1939
Electronic Computer	Univ. Pennsylvania	John Mauchly, J. Presper Eckert	1946
Magnetic Core Memory	MIT	Jay Forrester	1940s
Polio Vaccine	Univ. Pittsburgh	Jonas Salk	1955
Seat Belt	Univ. Minnesota	James Ryan	1963
Gatorade	Univ. Florida	Robert Cade, Dana Shires	1966
LCD	Kent State	James Fergason	1967
Hepatitis B Vaccine	Univ. Pennsylvania	Baruch Blumberg, Irving Millman	1969
MRI Scanner	State Univ. of New York	Raymond Damadian	1977
Kentucky Bluegrass Hybrid	Rutgers Univ.	C. Reed Funk	1977
Laser Cataract Surgery	UCLA	Patricia Bath	1988
Emtriva (HIV Drug)	Emory Univ.	Raymond Schinazi, Dennis Liotta, Woo-Baeg Choi	1996
Lyrica (Neuropathic pain)	Northwestern Univ.	Richard Silverman	2004

"Famous University Inventions," Univ. Virginia Patent Foundation

Benefits of Commercialization



- Economic Development
  - Technology-based local economic development
  - Start-up companies/Job creation
  - Social Impact from new products/services

CSUVENTURES
Innovation at Work

Introduction:

- **About me**
- **About Colorado State University and CSU Ventures**
- **About Technology Commercialization**

Technology Commercialization: Success Stories from CSU/CSU Ventures

- **Envirofit**
- **Food Friends**
- **Abound Solar**

Technology Commercialization: Pieces of the Puzzle

- **Research**
- **Administration**
- **Technology Commercialization Ecosystem**
- **Technology Transfer/Licensing Office**

Example 1: Social Impact (Product)

ENVIROFIT
making the world fit for humanity

Example 2: Social Impact (Service)

Example 3: Technology, Capital, Jobs

300+ Technology Jobs, $300M Investment, $400M Gov. Support

“Innovation distinguishes between a leader and a follower.” - Steve Jobs

CSUVENTURES
Innovation at Work

Introduction:

- **About me**
- **About Colorado State University and CSU Ventures**
- **About Technology Commercialization**

Technology Commercialization: Success Stories from CSU/CSU Ventures

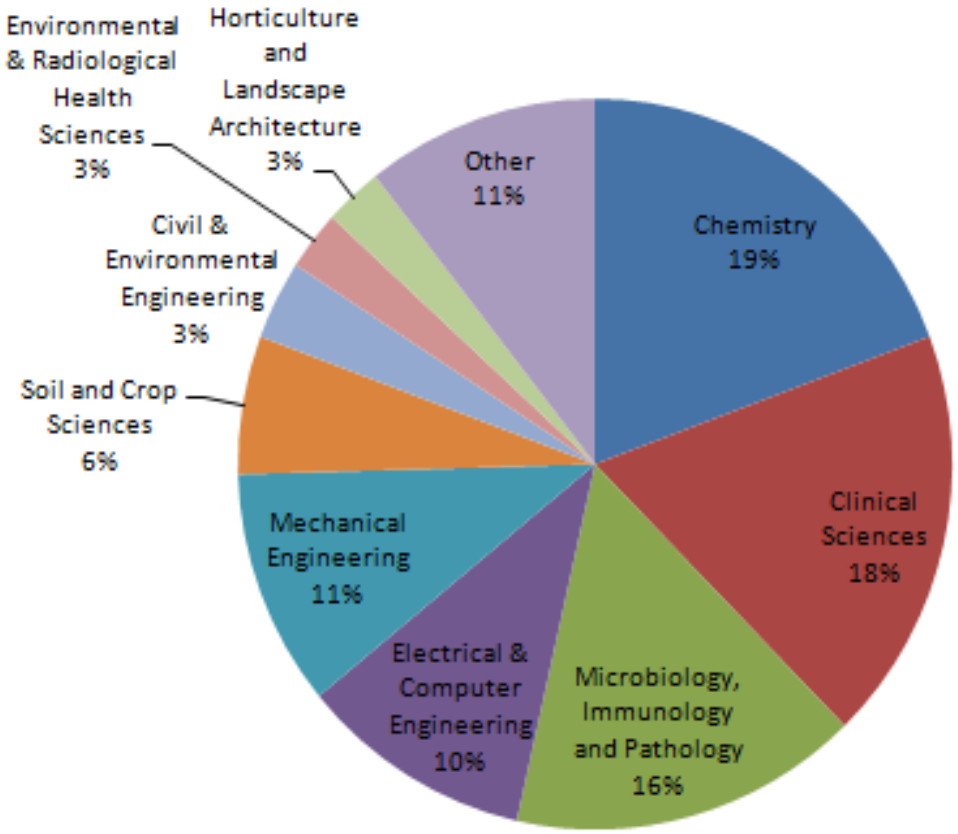
- **Envirofit**
- **Food Friends**
- **Abound Solar**

Technology Commercialization: Pieces of the Puzzle

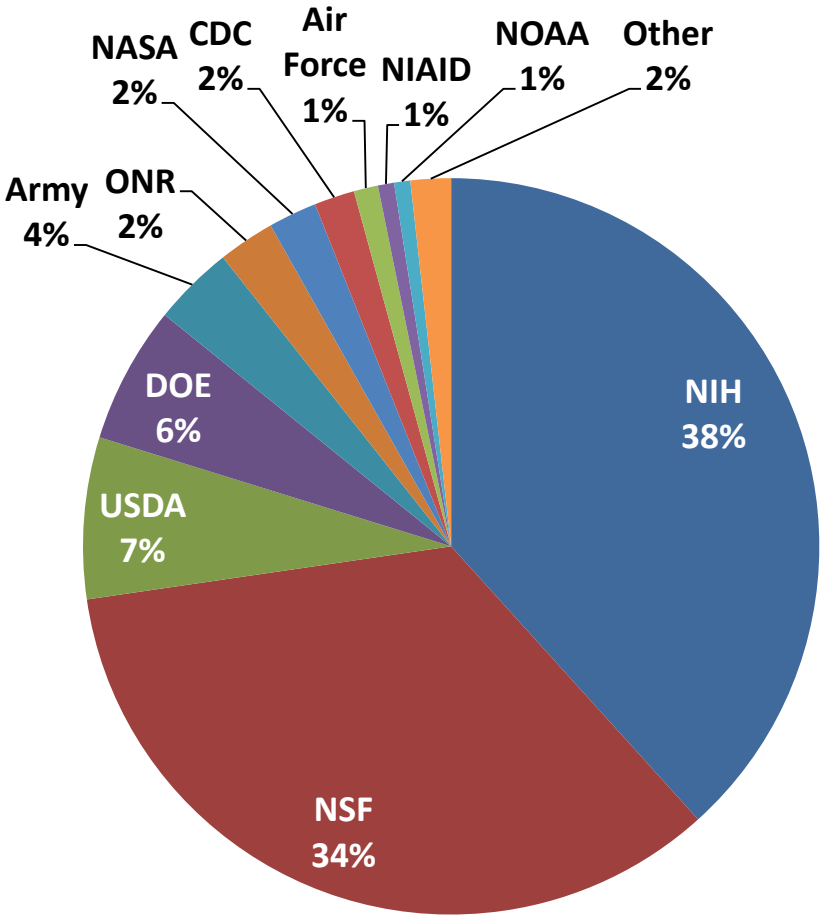
- **Research**
- **Administration**
- **Technology Commercialization Ecosystem**
- **Technology Transfer/Licensing Office**

Sources of CSU Inventions Reported to CSU Ventures

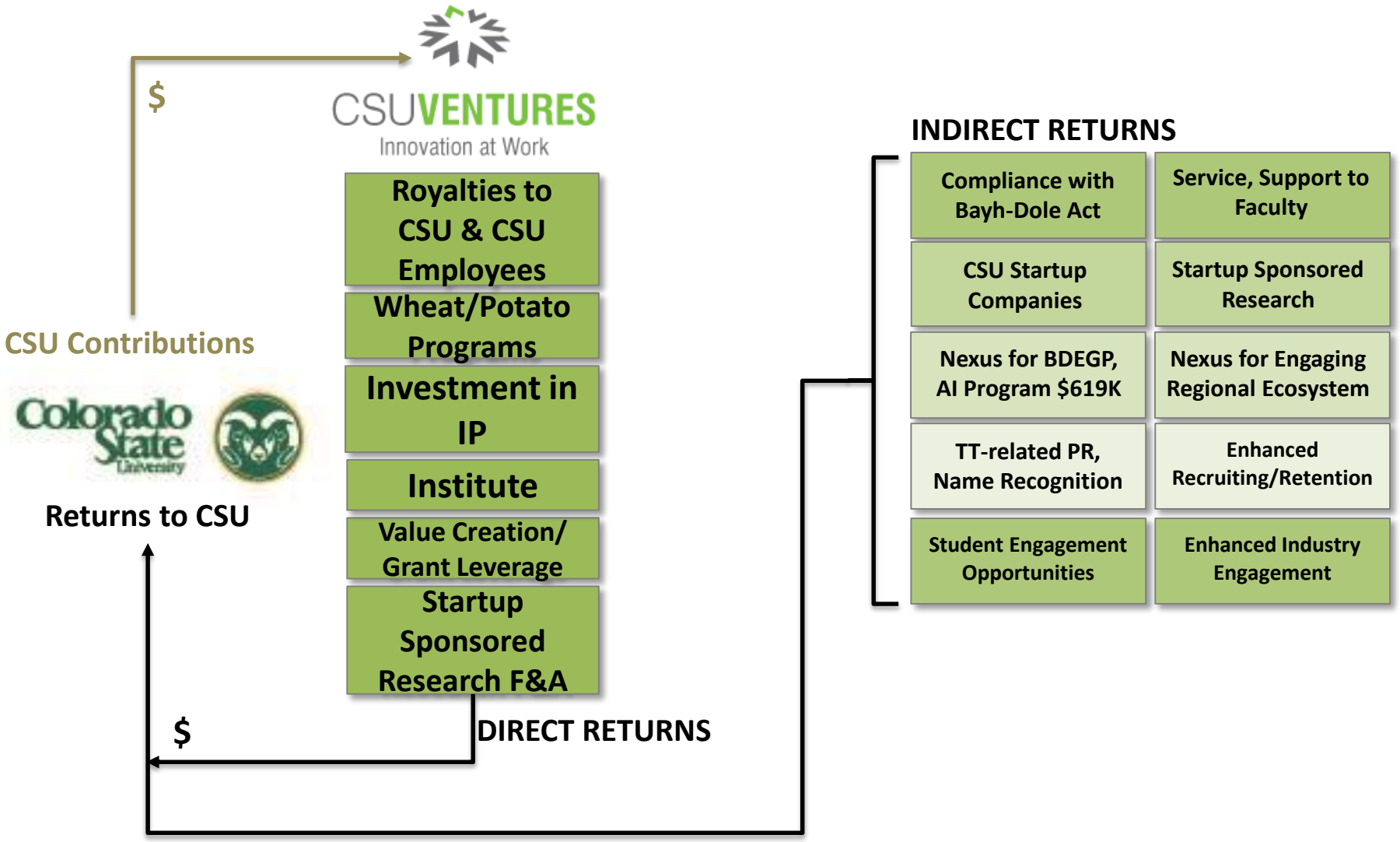
Inventions By Department FY2012

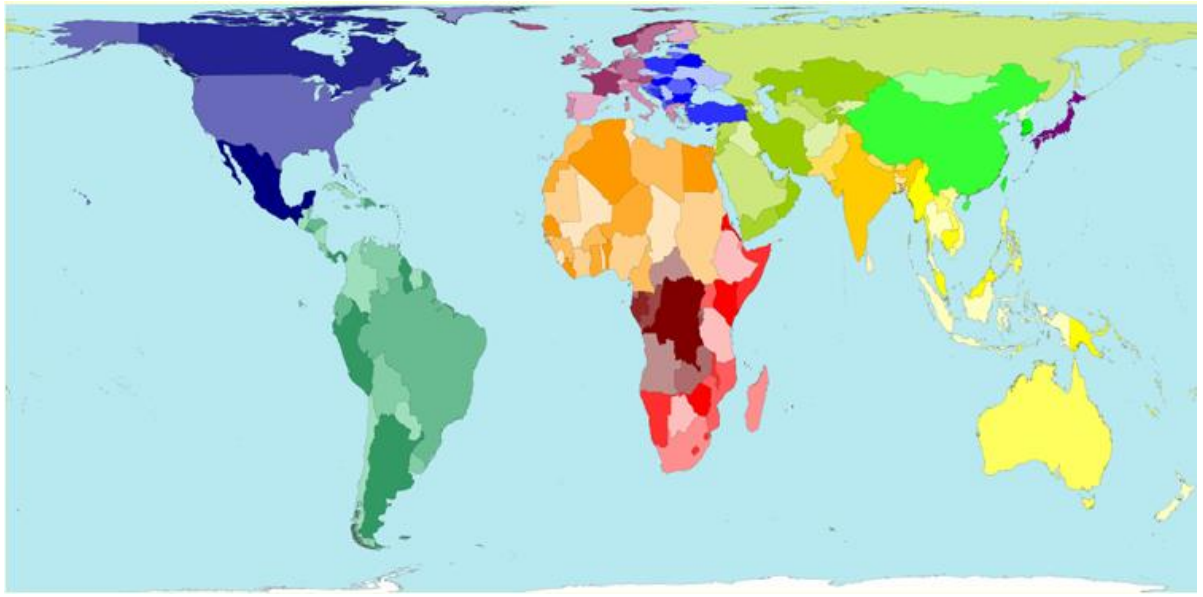


Federally Funded Inventions (Last 10 FY)

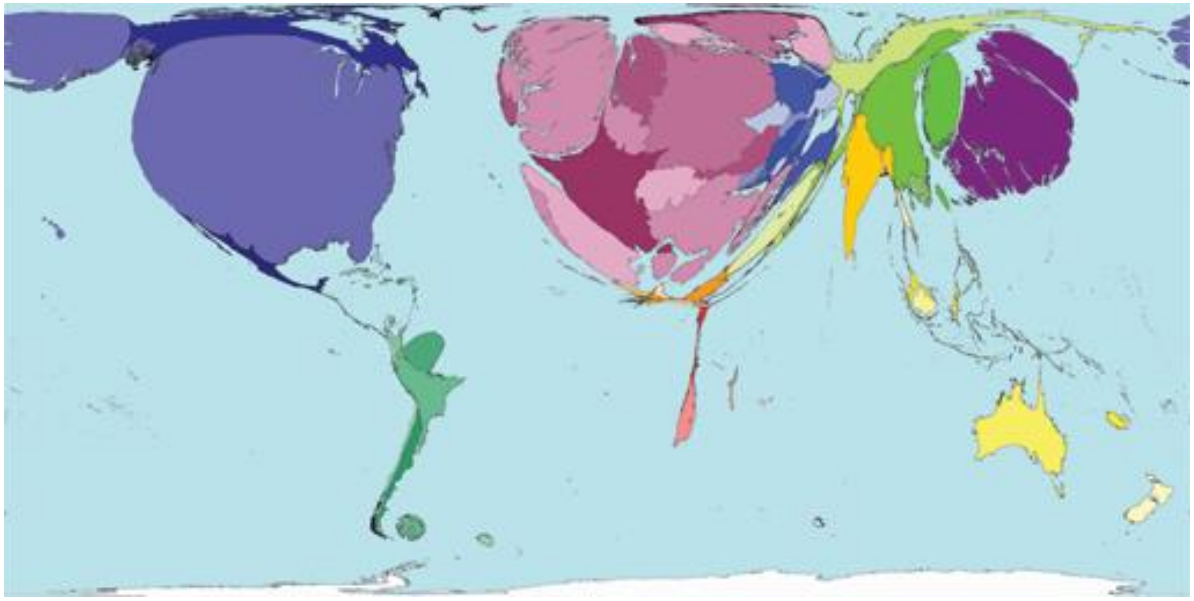


CSU Contributions and Returns



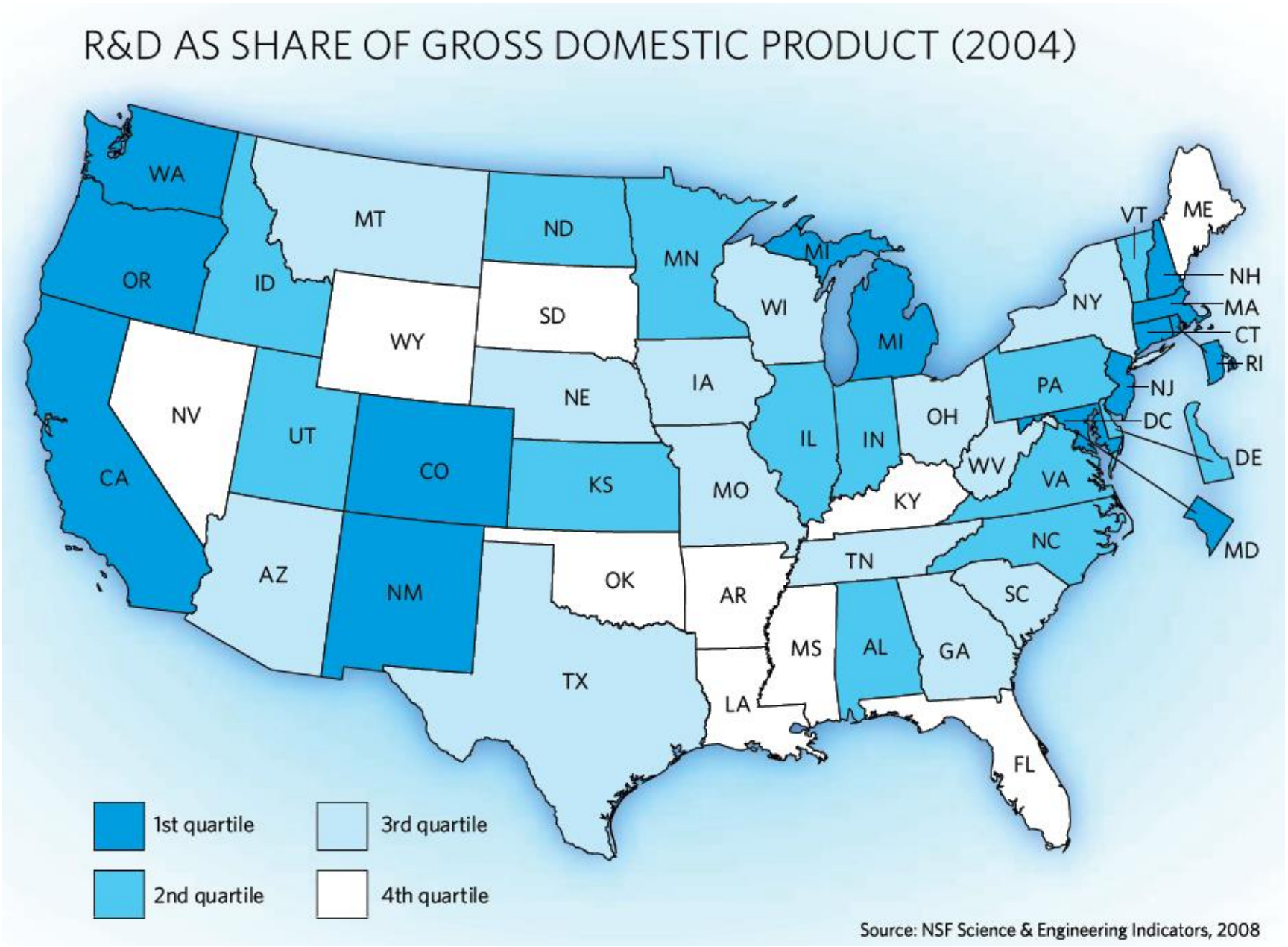


World as we know it



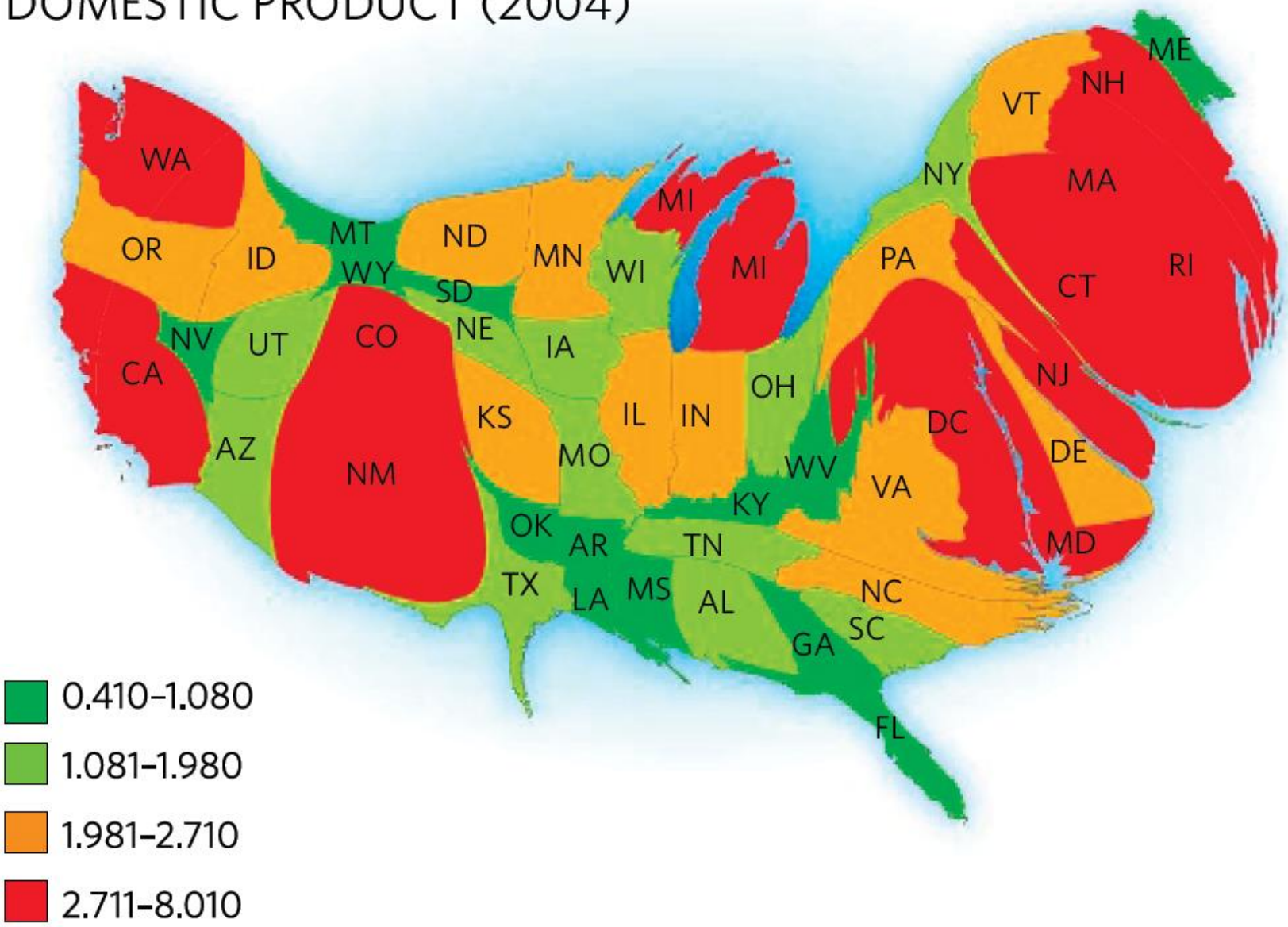
World of Knowledge

Worldmapper.org



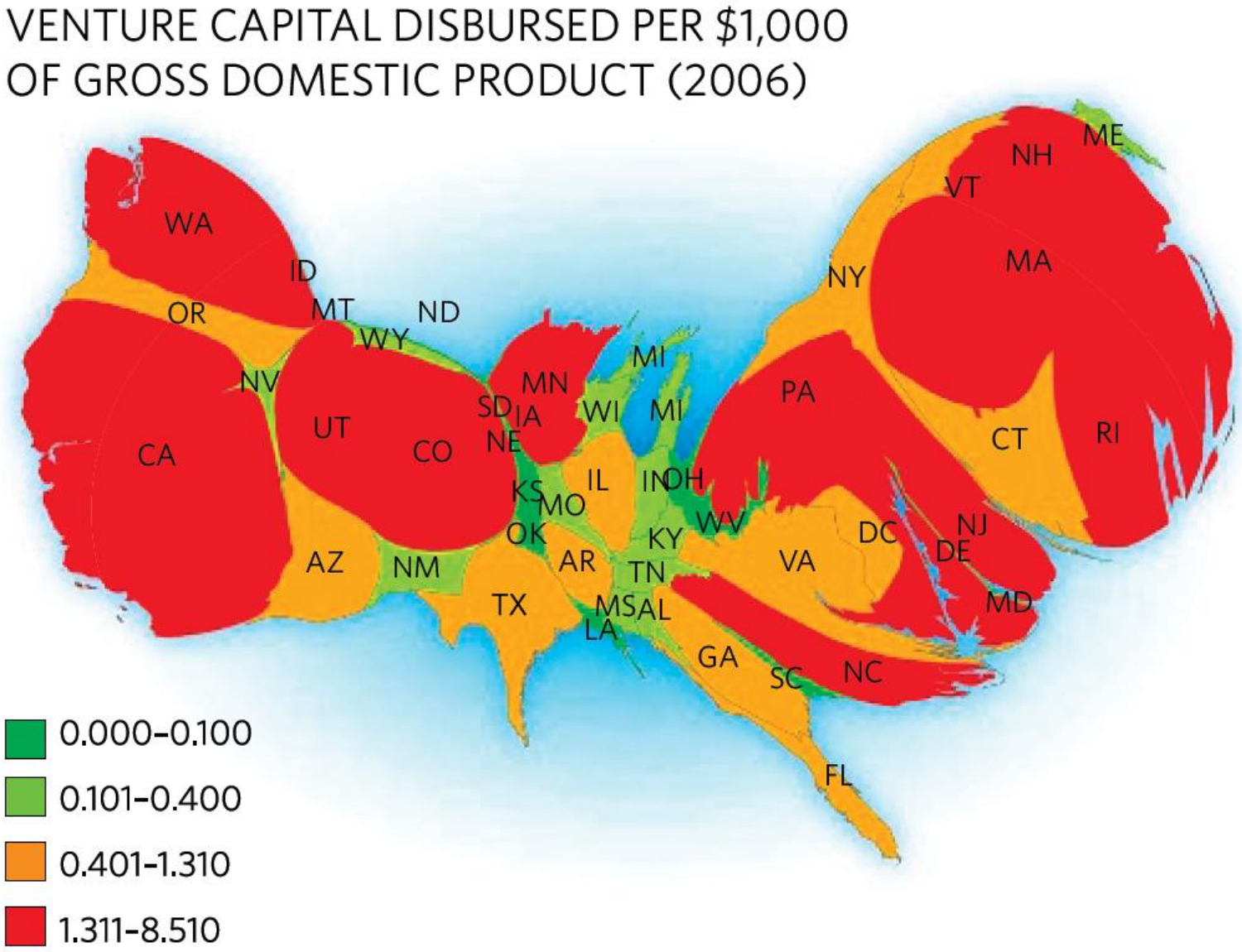
Nature v.455 p.270 Declan Butler

R&D AS SHARE OF GROSS DOMESTIC PRODUCT (2004)



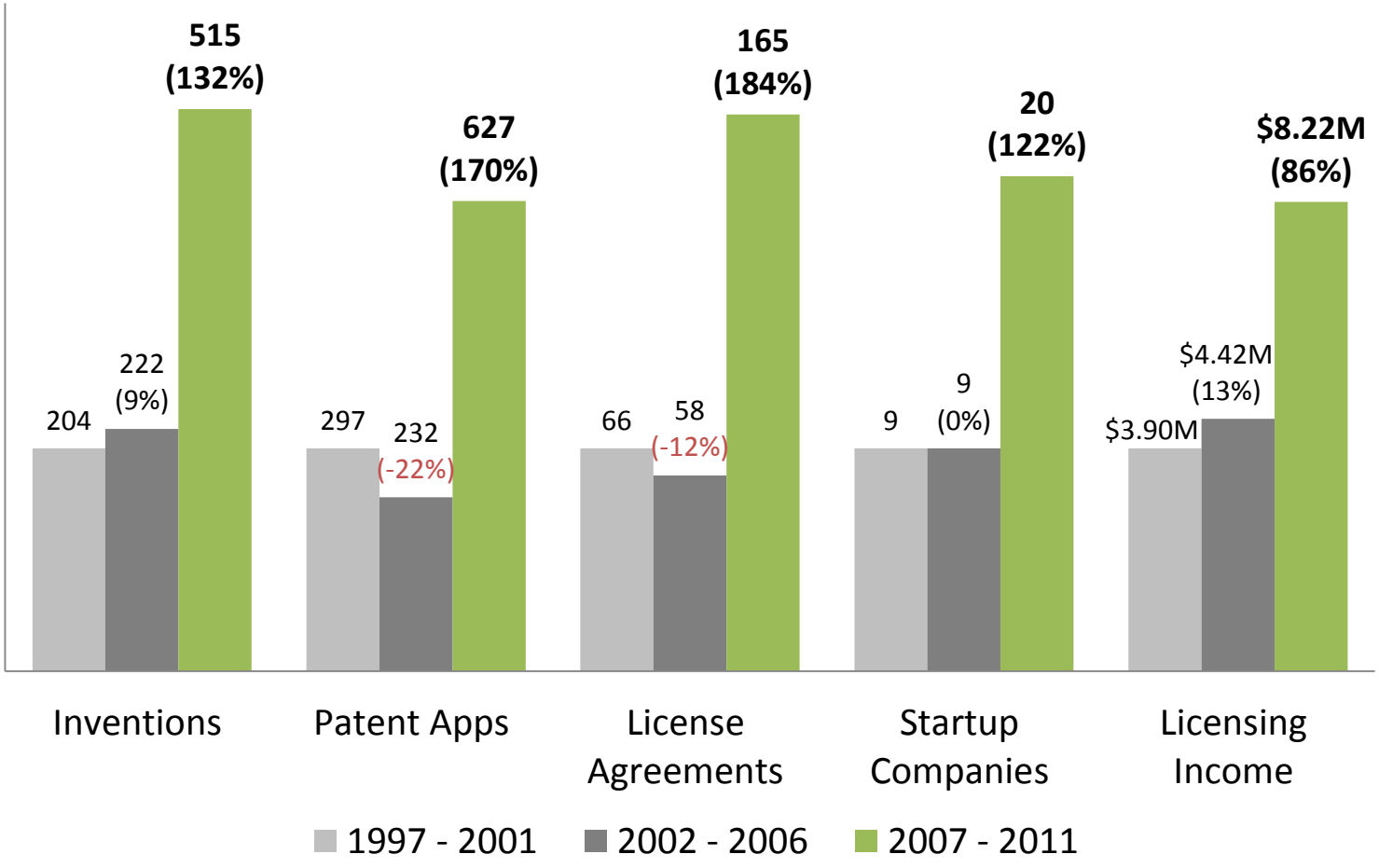
Nature v.455 p.270 Declan Butler

Technology Investments in US

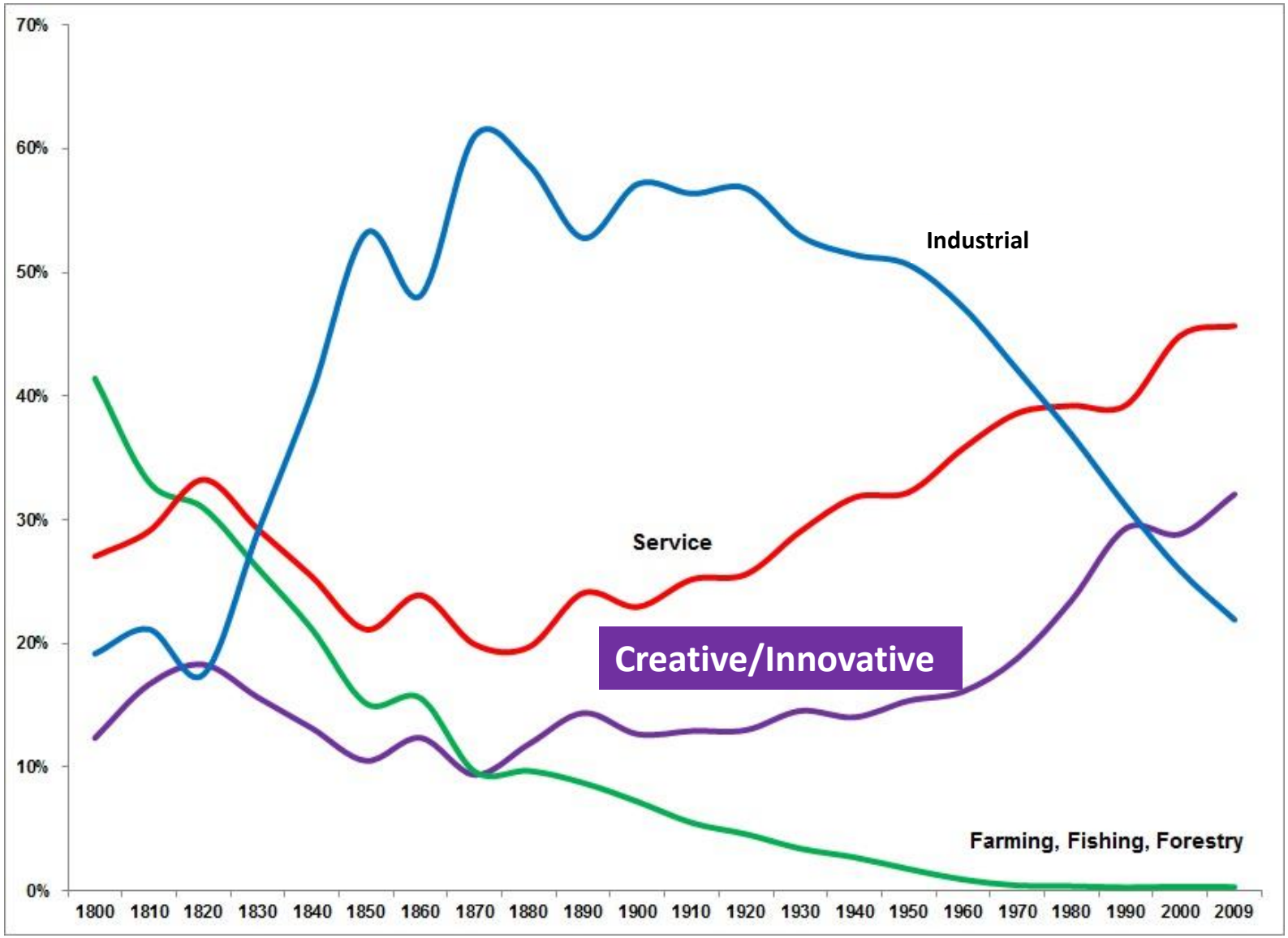


Nature v.455 p.270 Declan Butler

CSU Ventures Impact, 5-Year Comparisons



Changing Economy: Agriculture and Innovation



The Rise of the Creative Class: Richard Florida

“Universities are among the most important engines of the knowledge economy.”

The Economist Sep. 8, 2005

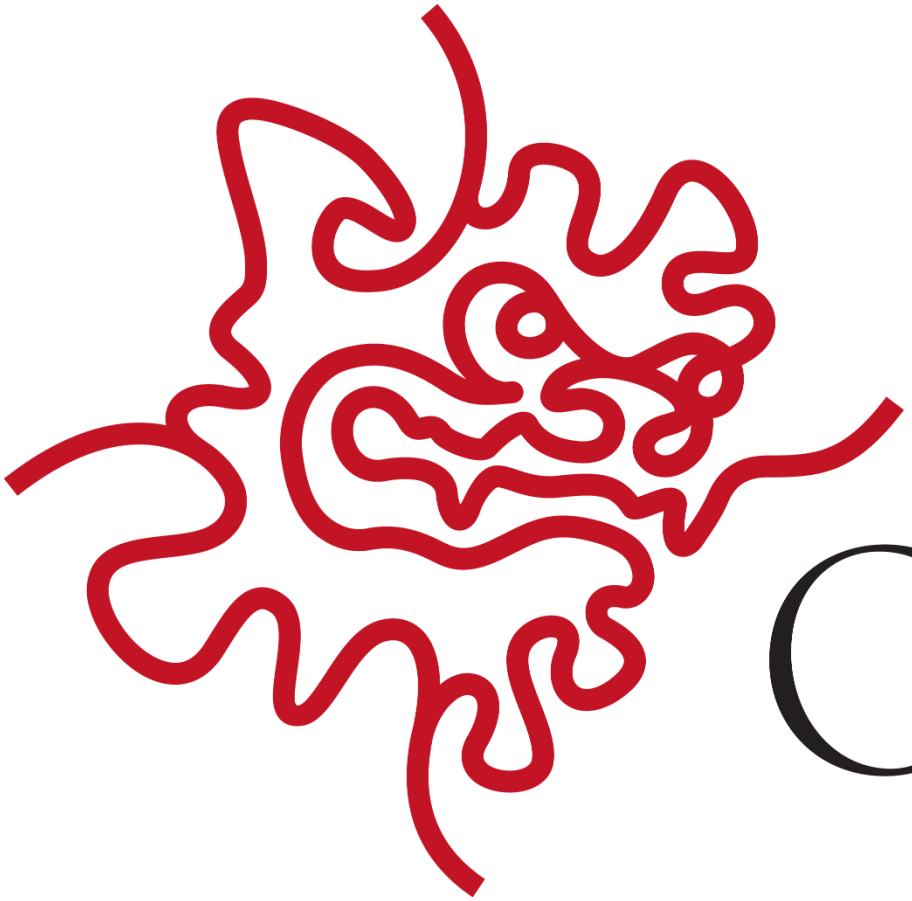
“Innovation distinguishes between a leader and a follower.”

**“Innovation has nothing to do with how many R&D dollars you have.
When Apple came up with the Mac,
IBM was spending at least 100 times more on R&D.**

It's not about money.

It's about the people you have,
how you're led,
and how much you get it.”

- Steve Jobs



OIST

Mission Statement:
The OIST Graduate University shall conduct internationally outstanding education and research in science and technology, and thus contribute to the sustainable development of Okinawa, and promote and sustain the advancement of science and technology in Japan and throughout the world.

Thank You !

Contact Information:

Colorado State University Ventures, Inc.
Vice President
Denichiro “Denny” Otsuga, Ph.D.

D.Otsuga@ColState.edu