

Collaborative Networks in the U.S. Innovation System

Fred Block

University of California, Davis

National Diet Library, March 1st

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The mythology: the garage or the
giant corporate laboratory



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The reality: two key locations for innovation

1. Government laboratories.
 - military
 - Department of Energy
 - National Institutes of Health
 - many others.
 - 280 laboratories; 2600 distinct facilities
2. Federally funded interdisciplinary centers mostly on university campuses.

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Both of these are “Collaborative Public Spaces”

1. Government funded researchers work side by side with scientists and engineers from small and large businesses.
2. Collaborations are organized in many different ways extending from use of equipment and facilities to shared research agendas over multiple years.

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Why have firms moved away from reliance on their own corporate labs?

1. Changes in science—greater complexity, rise of interdisciplinary team science.
2. Changes in business—financial pressures and need for cutting edge science.
3. Changes in government—policymakers have been building on U.S. successes in computer and biotech.

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Collaborative Public Spaces Work to Solve the Problem of “Network Failure”

1. Innovation requires firms to connect with expert scientific collaborators and other firms that provide key inputs.
2. Think of smart phone—Apple or Samsung work with cell phone carriers, chipmakers, app developers, assemblers, etc.
3. But finding network partners who are competent and trustworthy is difficult and costly. Hence, many failures.

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Overcoming Network Failure

1. Government officials or academics funded by government assemble skilled technologists and potential business partners.
2. Within the collaborative public space, it is easier to find partners and gain assurance on their competence.
3. The neutral conveners also discourage opportunism including theft of intellectual property.

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A Key Program—National Science Foundation Industry-University Collaborative Research Centers

Program started in 1970's.

Organized by a star scientist.

Requirement to recruit dues paying industry members.

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Advanced Knowledge Enablement (CAKE)

Dubna International University

Florida Atlantic University

Florida International University

University of Greenwich

The Center's mission is to conduct industry-relevant studies in the representation,

management, storage, analysis, search and social aspects of large and complex

data sets, with particular applications in geospatial location-based data and healthcare

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Advanced Mammalian
Biomanufacturing Innovation Center

Clemson University

Johns Hopkins University

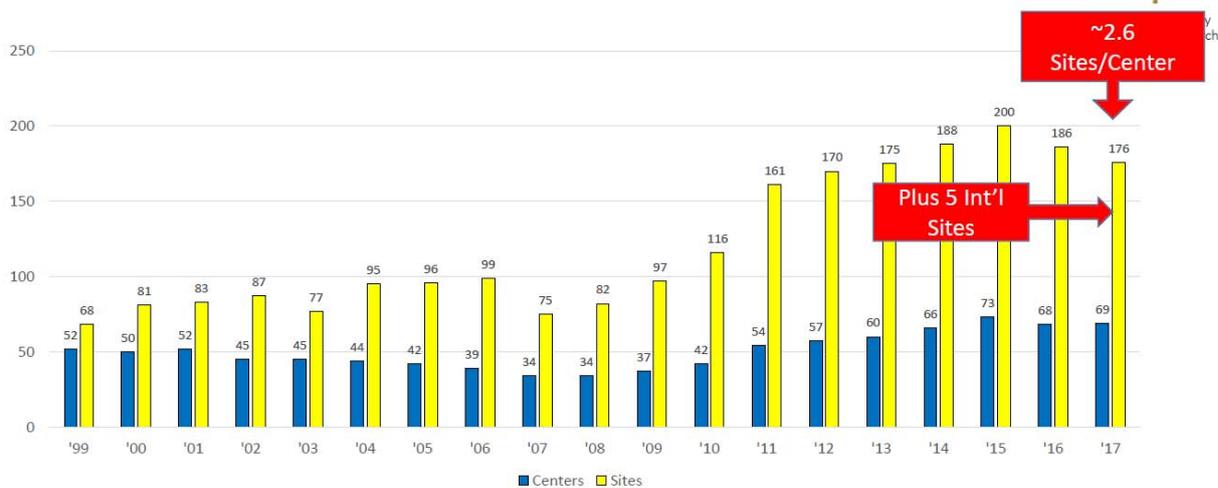
University of Delaware

University of Massachusetts, Lowell

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Active Centers and Sites by Year*



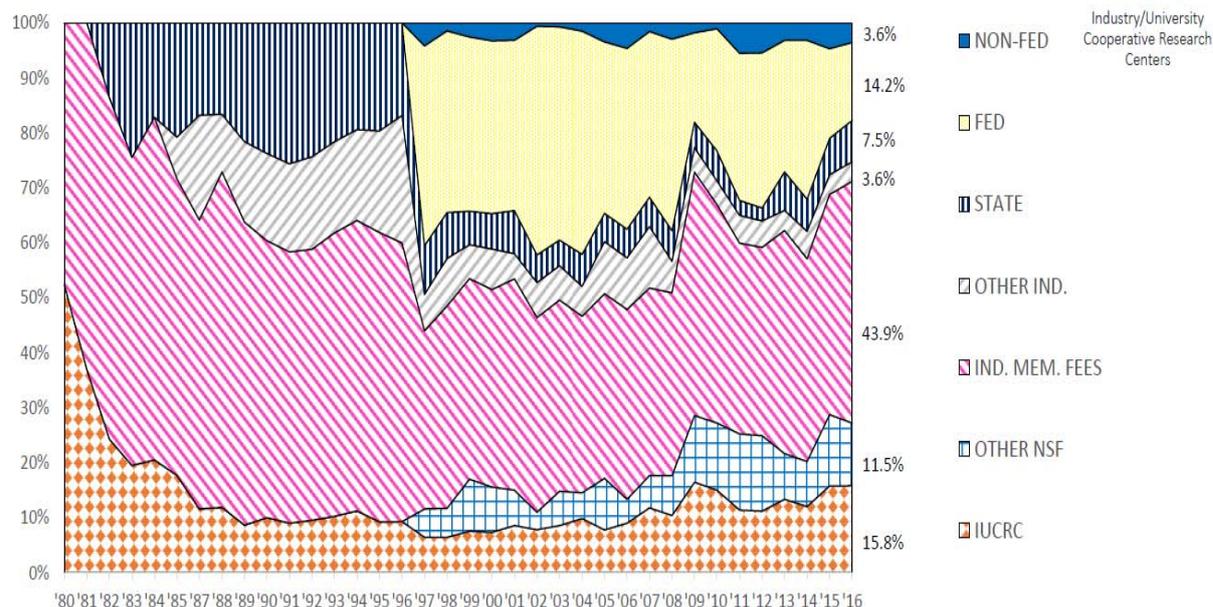
*Data Current for FY2017

Total Number of Memberships





Total Funding by Source in Percentages[^]



[^]Univ. & Other Cash Excluded

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Model has been copied across federal agencies

1. Other NSF Centers in Chemistry, Engineering, and Materials-- 95 centers funded with \$230 million/year.
2. Frontier Energy Research Centers (Dept. of Energy) 46 centers funded with \$99 million/year.
3. Nanotechnology Major User Facilities on campuses-- 16.

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Model has been copied across federal agencies

4. Same model now used by other agencies—Homeland security, Transportation, EPA.
5. In Bioscience, centers tend to be virtual—a central agency coordinating researchers across many universities.
6. Most recent step--Advanced Manufacturing Institutes—14 funded with \$225 million per year of federal dollars—program started in 2012 by Obama.

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Advanced Manufacturing Institutes

www.manufacturingusa.com

Examples of their research areas.

- 3D printing/additive manufacturing.
- advanced robotic manufacturing.
- advanced composite materials.

At the end of 2016, the first eight institutes had 753 partners contributing to the cost—mostly businesses.

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What about Trump?

President's first budget proposed slashing funding for these programs.

However, Congress has so far protected these initiatives that are supported by business lobbyists.

Probable that these programs will be continued and will be expanded in the future because they are working.

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Conclusion

In 2018, the U.S. innovation system does not resemble the “free market” rhetoric that U.S. politicians invoke.

It is instead a highly decentralized system that is financed, managed, and directed by the federal government.

It is organized around public spaces designed to facilitate collaboration among scientists and engineers.

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