



# Building an Innovation Ecosystem

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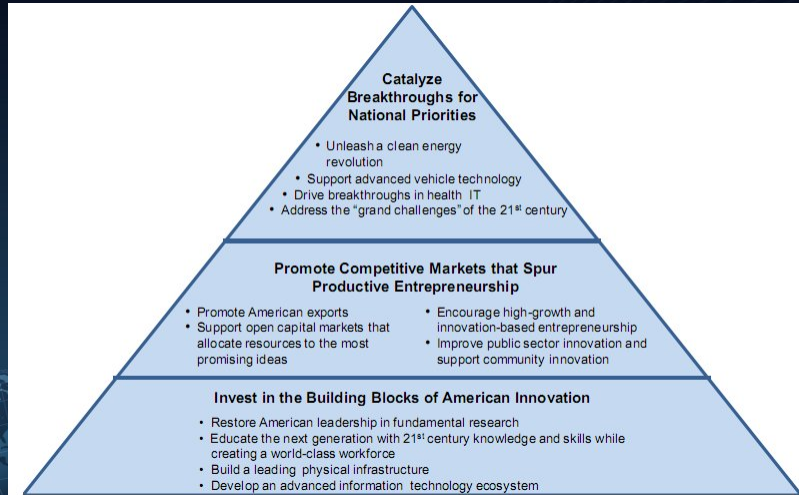


# Creating an Innovation Ecosystem





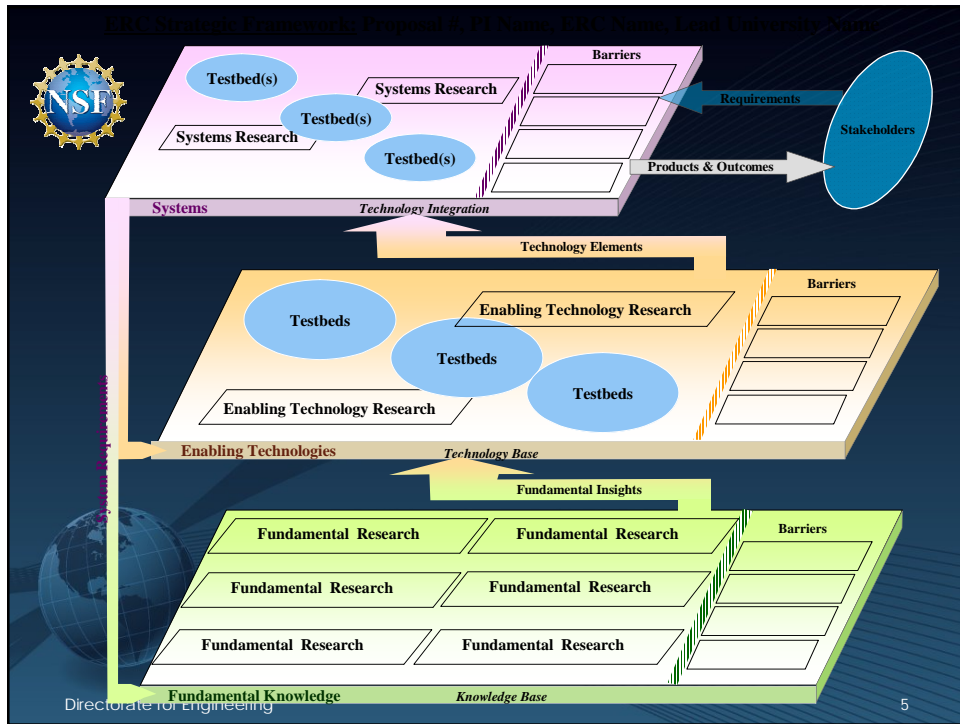
# Innovation for Growth



# Three layers in the Innovation Triangle

- Basic Research (the foundation)
- Entrepreneurship (translational research)
- Responding to National Priorities





**Innovation Through Translational Research**

The slide features the NSF logo in the top left corner and a globe graphic in the bottom left corner. The text "Directorate for Engineering" and the number "6" are located at the bottom of the slide.



## Translational Research

- Is interdisciplinary by nature
- Involves a team
- Relies on partnerships
- Results in clear benefit to society



## NSF Engineering Centers Programs

The Directorate for Engineering supports two Centers programs that build university cultures that join discovery and innovation in partnership with industry:

- **Engineering Research Centers (ERC)**  
Established in 1985, 48 Centers funded

**Industry/University Cooperative Research Centers (I/UCRC)**

Established in 1979, 72 Centers funded



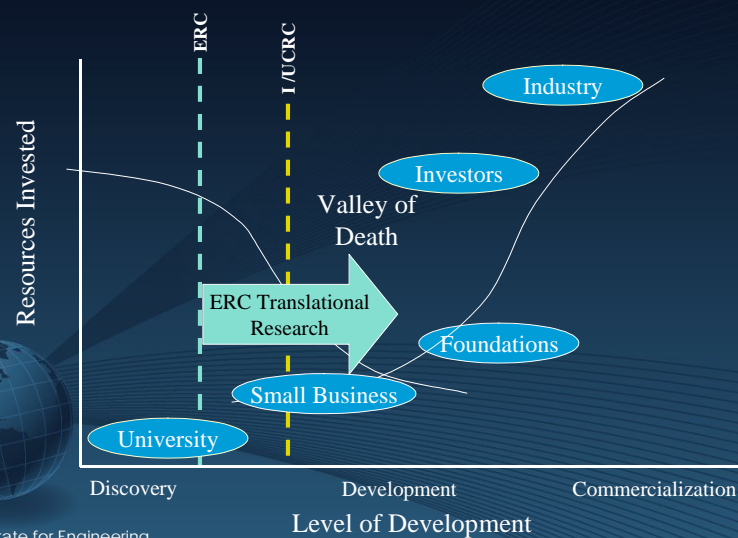


## Engineering Centers Program Goals

- Create a culture in academe that joins research, education, and innovation
- Build partnerships with industry to strengthen the innovative capacity of the U.S. in a global context
- Leverage NSF funds with industry to support graduate students performing industrially relevant research
- Produce engineering graduates who are creative and innovative practitioners, more capable of leading teams to advance technology in established firms or leading new firms



## The Innovation Spectrum







# All Technology Sectors

Lead Institution shown



- Advanced Electronics (15)
  - Biotechnology, Healthcare and Service (16)
  - Advanced Manufacturing and Fabrication (19)
  - Energy, Sustainability, and Infrastructure (18)
  - Advanced Materials (4)
  - Information, Communication, and Computing (14)
- Directorate for Engineering



# NSF Engineering Centers





## Characteristics of the Innovation Ecosystem

- University research is key, often driven by industrial needs.
- Faculty are involved along the innovation continuum, working with industry at all stages.
- A focus on translational research smooths the handoff of technology from universities to industry—resulting in rapid, efficient innovation.



## NSF Resources for the Innovation Ecosystem

- Grow the existing portfolio and strengthen the translational phase
- Extend the reach of industry-driven research initiatives
- Educate to innovate
- Better understand the social dimensions of innovation (SciSIP)



## ENG ARRA AWARDS



## ENG Use of ARRA Funding

- ◎ **Young Investigators**
  - > 80 additional CAREER awards
  - > 15 additional BRIGE awards
  - > 16 additional GRF in addition to the 80 Women in Engineering (WENG) GRF Fellows funded annually by ENG
  - > 1 additional IGERT in the area of energy
- ◎ **Education and Workforce Development**
  - > 40 Postdocs in Industry
  - > 17 additional REU/RET awards
  - > 76 additional Education awards, including 4 for veterans/GI Bill activities
- ◎ **High Risk / High Reward**
  - > 7 additional EFRI awards in the areas of Biosensing & Bioactuation and Hydrocarbons from Biomass
- ◎ **Translational Research**
  - > 257 additional small business awards (50% increase)
  - > 9 additional I/UCRC awards
  - > 2 additional PFI awards
  - > 21 additional GOALI awards





## NSF R&RA Budget (\$M)

Directorate	FY 2009 Omnibus Actual	FY 2009 ARRA Actual	FY 2010 Estimate	FY 2011 Request	FY 2011 Request			
					Change over FY 2009 Omnibus		Change over FY 2010 Estimate	
					Amt	%	Amt	%
BIO	\$656.62	\$260.00	\$714.54	\$767.81	111.19	16.9	53.27	7.5
CISE	574.50	235.00	618.83	684.51	110.01	19.1	65.68	10.6
ENG (less SBIR/STTR)	574.60	215.08	618.16	682.81	108.21	15.8	64.65	10.5
SBIR/STTR	90.39	49.91	125.77	142.86	52.47	36.7	17.09	13.6
GEO	808.53	347.00	889.64	955.29	146.76	18.2	65.65	7.4
MPS	1243.88	474.97	1,351.84	1,409.91	166.03	13.3	58.07	4.3
SBE	240.56	84.97	255.25	268.79	28.23	11.7	13.54	5.3
OCI	199.23	80.00	214.28	228.07	28.84	14.5	13.79	6.4
OISE	47.45	13.98	47.83	53.26	5.81	12.2	5.43	11.4
OPP	473.55	171.89	505.16	527.99	54.44	11.5	22.83	4.5
IA	241.58	129.85	275.04	295.93	54.35	22.5	20.89	7.6
U.S. Arctic Research Commission	1.50	0.00	1.58	1.60	0.10	6.7	0.02	1.3
<b>Research &amp; Related Activities</b>	<b>\$5,152.39</b>	<b>\$2,062.64</b>	<b>\$5,617.92</b>	<b>\$6,018.83</b>	<b>866.44</b>	<b>16.8</b>	<b>400.91</b>	<b>7.1</b>



## NSF Where Discoveries Begin

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