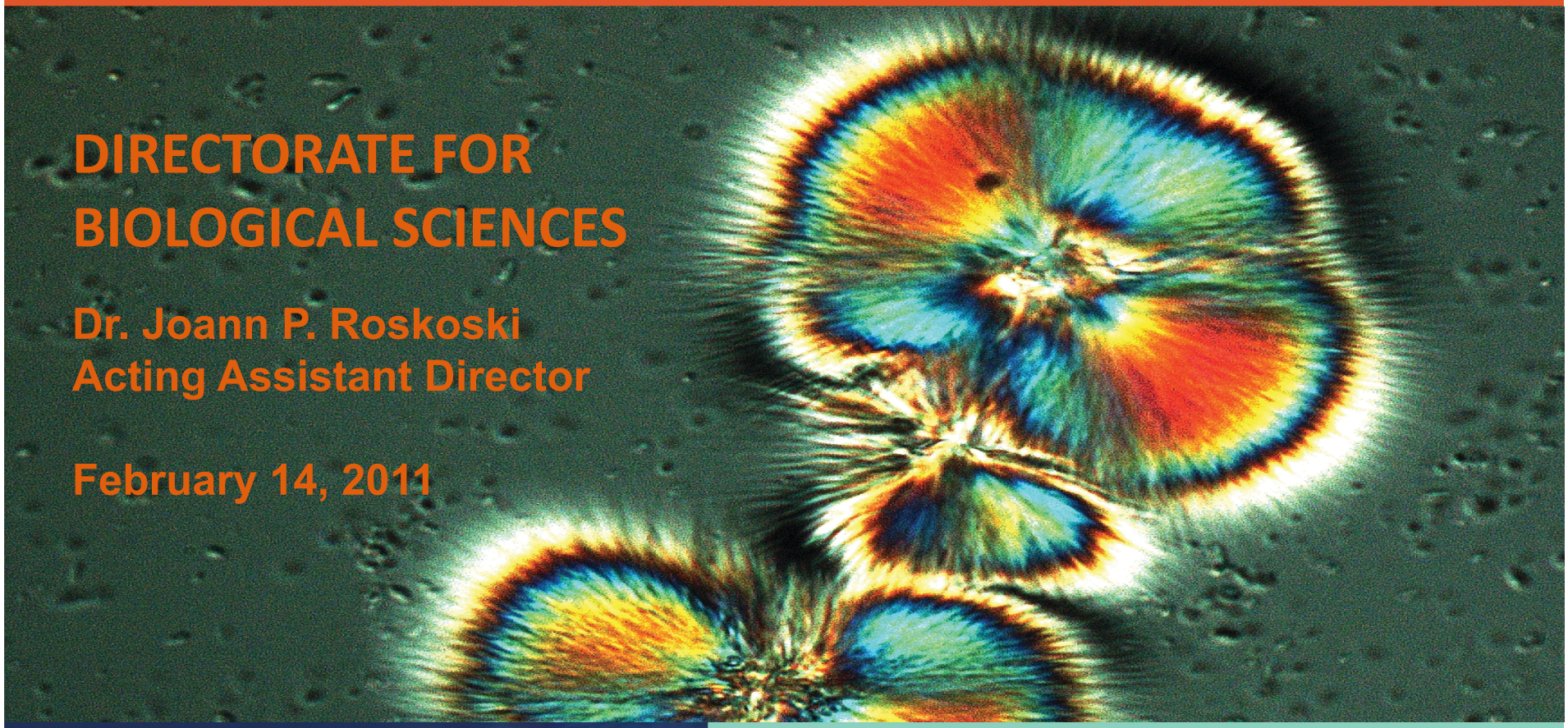
UNITED STATES
National Science Foundation



DIRECTORATE FOR BIOLOGICAL SCIENCES

Dr. Joann P. Roskoski
Acting Assistant Director

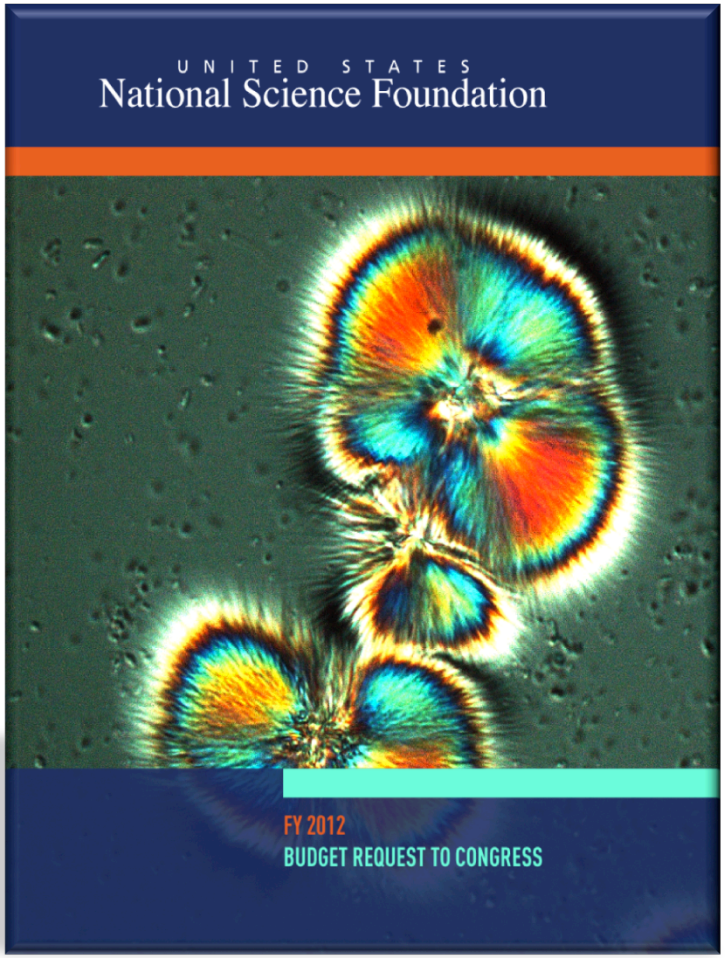
February 14, 2011

FY 2012
BUDGET REQUEST TO CONGRESS

NSF FY 2012 Budget Request

TOTAL: $7.767 billion

Increase: 13 percent over 2010 enacted level



BIO FY 2012 Budget Request

BIO Funding

(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 ARRA Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
Molecular & Cellular Biosciences (MCB)	$125.90	-	$125.59	$145.72	$20.13	16.0%
Integrative Organismal Systems (IOS)	216.32	-	216.25	231.65	15.40	7.1%
Environmental Biology (DEB)	142.50	-	142.55	156.40	13.85	9.7%
Biological Infrastructure (DBI)	127.19	0.35	126.86	135.95	9.09	7.2%
Emerging Frontiers (EF)	102.85	-	103.29	124.77	21.48	20.8%
Total, BIO	**$714.77**	**$0.35**	**$714.54**	**$794.49**	**$79.95**	**11.2%**

Totals may not add due to rounding.

Administration Priorities

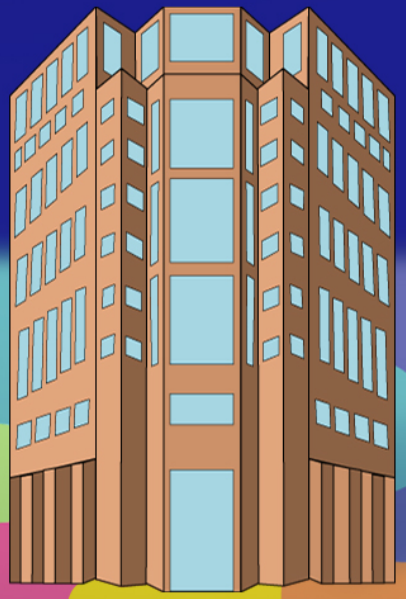
"We need to out-innovate, out-educate, and out-build the rest of the world."

President Barack Obama
State of the Union Address
January 25, 2011

OneNSF

catalyze human capital development

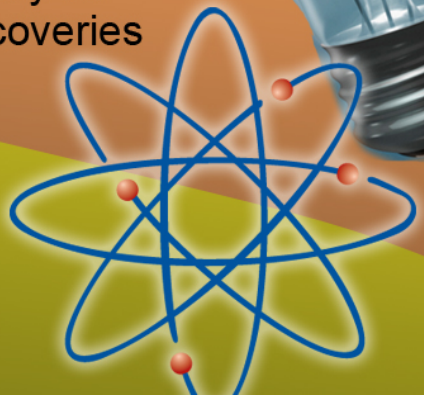
improve organizational efficiency



create networks and infrastructure for the nation

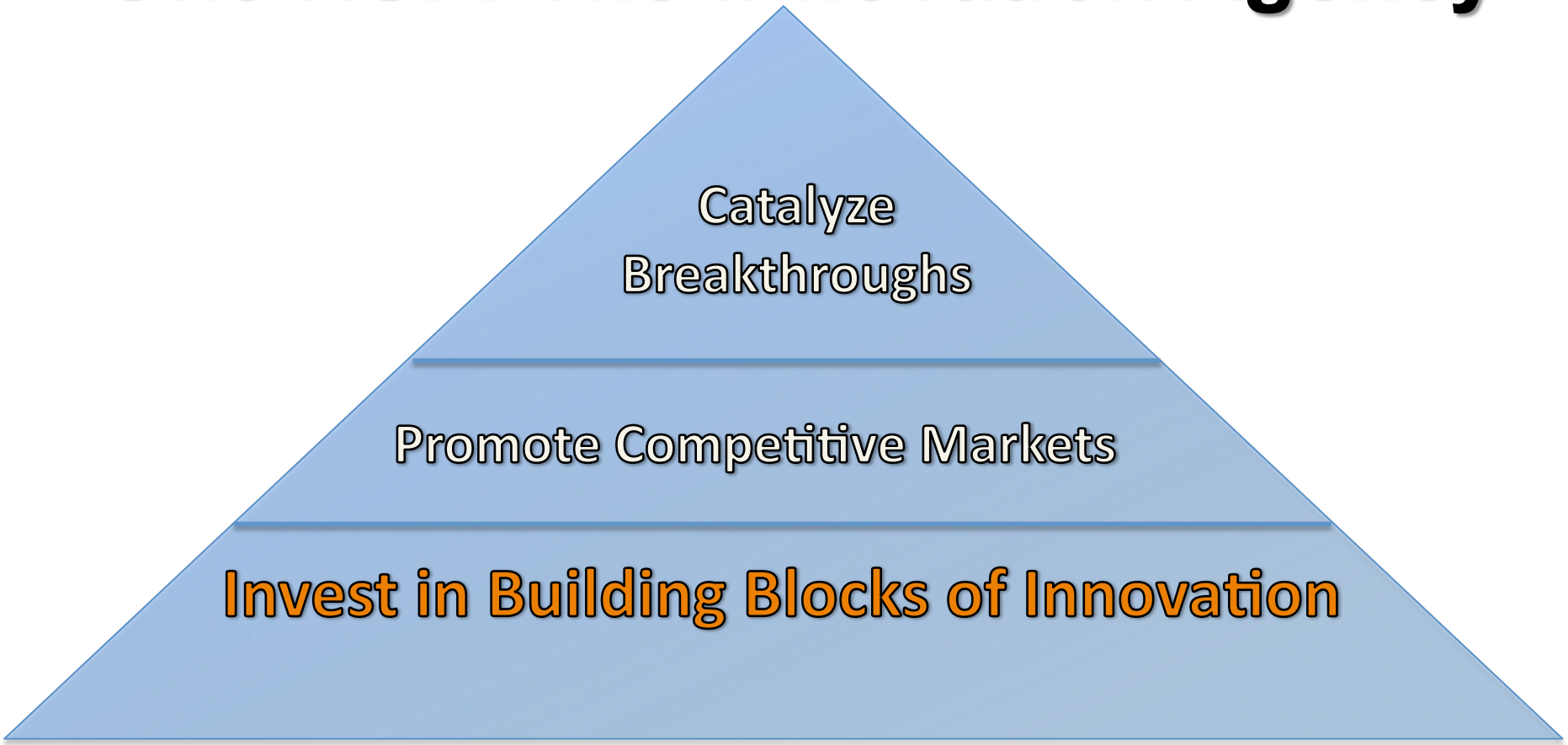
spark greater innovation and opportunity for scientific discoveries

address multidisciplinary challenges of national/global significance



support fundamental research in all disciplines

One NSF: The Innovation Agency



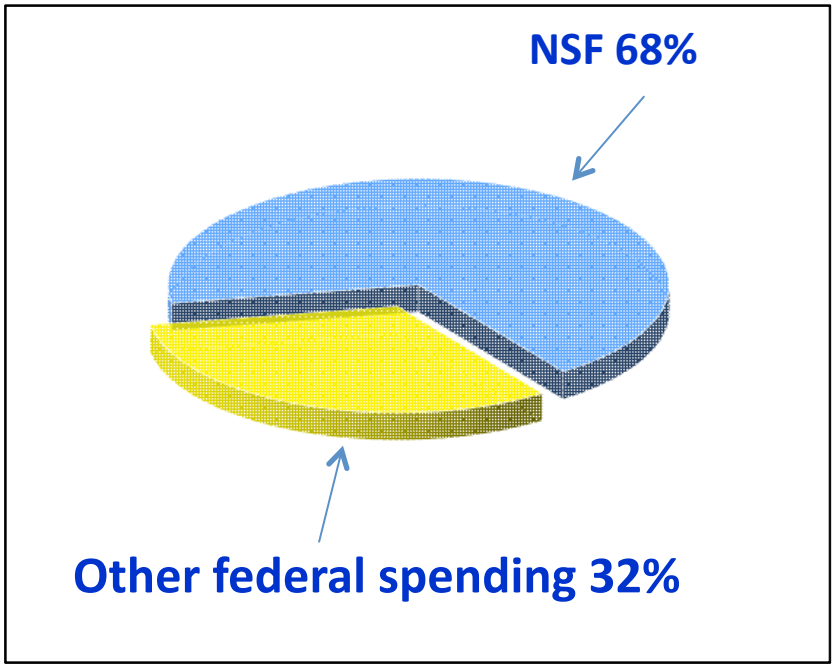
Strategies for American Innovation

Invest in Building Blocks of Innovation

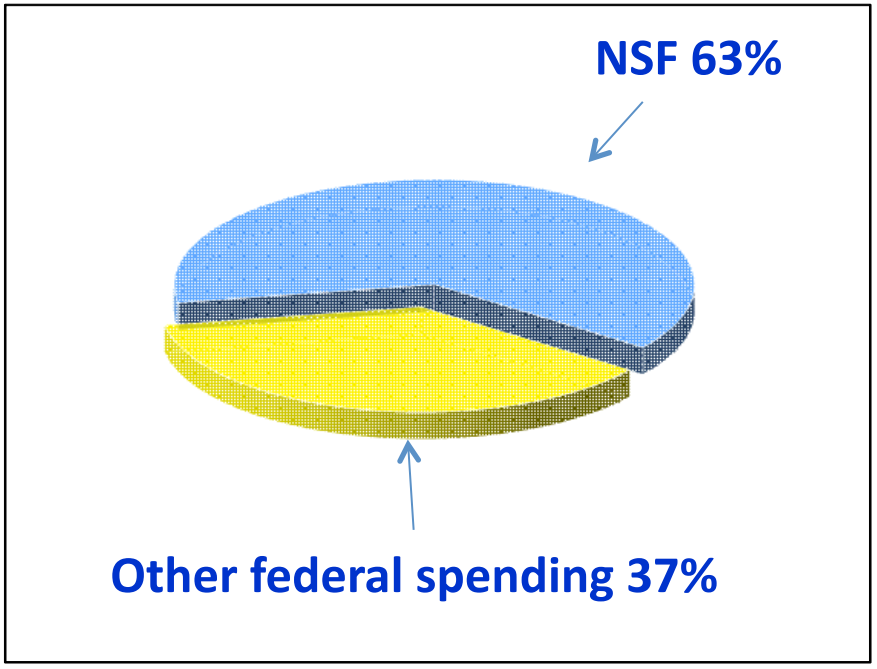
- **Fundamental Research**
- ***INSPIRE: Integrated NSF Support Promoting Interdisciplinary Research and Education***
- **BioMaPS**
- **STEM Education**
- SEMBL

BIO Support for Basic Research

Federal Support for Basic Research in Non-Medical Biological Sciences at Academic Institutions

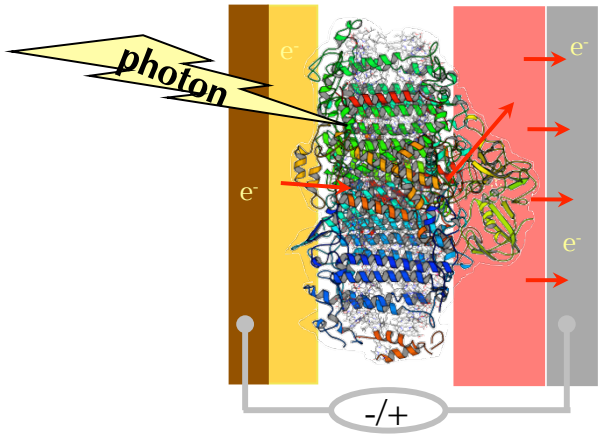


Federal Support for Basic Research in Environmental Biology at Academic Institutions



Fundamental biological research will be the inspiration for future industries and economic prosperity.

Invention, development, production, and application of biological products and systems to develop clean energy systems, improve agricultural productivity, advance manufacturing in nano- and information technology, and analytical instrumentation as well as enhance environmental sustainability



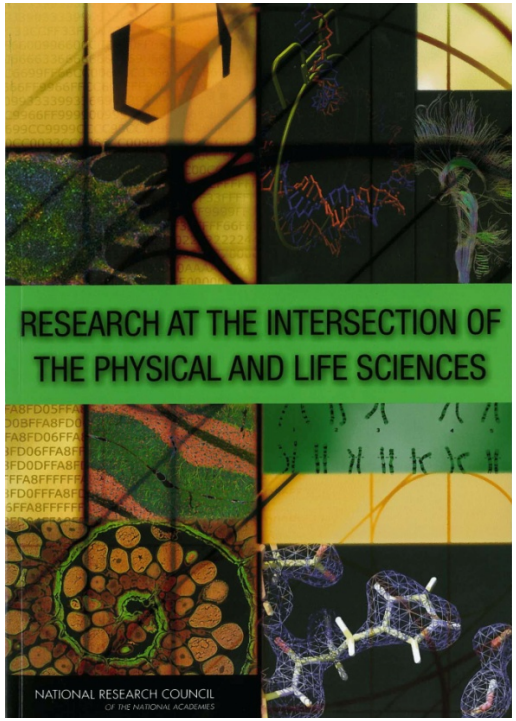
National Priorities in the Life Sciences

"Are efforts to understand biomolecules, the smallest of biological constructions, a facet of chemistry or biology? Are attempts to understand the environmental effects of greenhouse gases a concern of physical science or of biology? …many of the most interesting scientific questions and pressing societal issues will require the collective expertise from multiple fields."

Research at the Intersection of the Physical and Life Sciences,
The National Academies Press, 2010

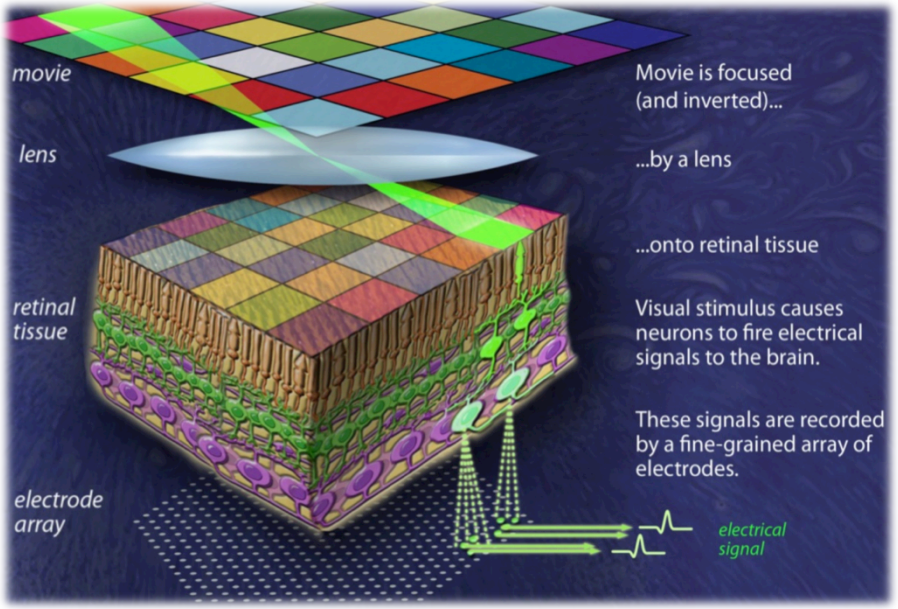
Grand Challenges

1. *Synthesizing Lifelike Systems*
2. *Understanding the Brain*
3. *Predicting Individual Organisms' Characteristics from their DNA Sequence*
4. *Interactions of the Earth, its Climate and the Biosphere*
5. *Understanding Biological Diversity*



Biological, Mathematical & Physical Sciences and Engineering (BioMaPS)

- Goal: Discover fundamental new knowledge at the **intersections** of the biological, mathematical and physical sciences and engineering
- FY 2012 priorities:
  - *Accelerate understanding of biological systems to enable innovation in clean energy, climate science, and advanced manufacturing*
  - *Attract future scientists and engineers*
- FY 2012 Request:
  Total: $76M; BIO: $33M

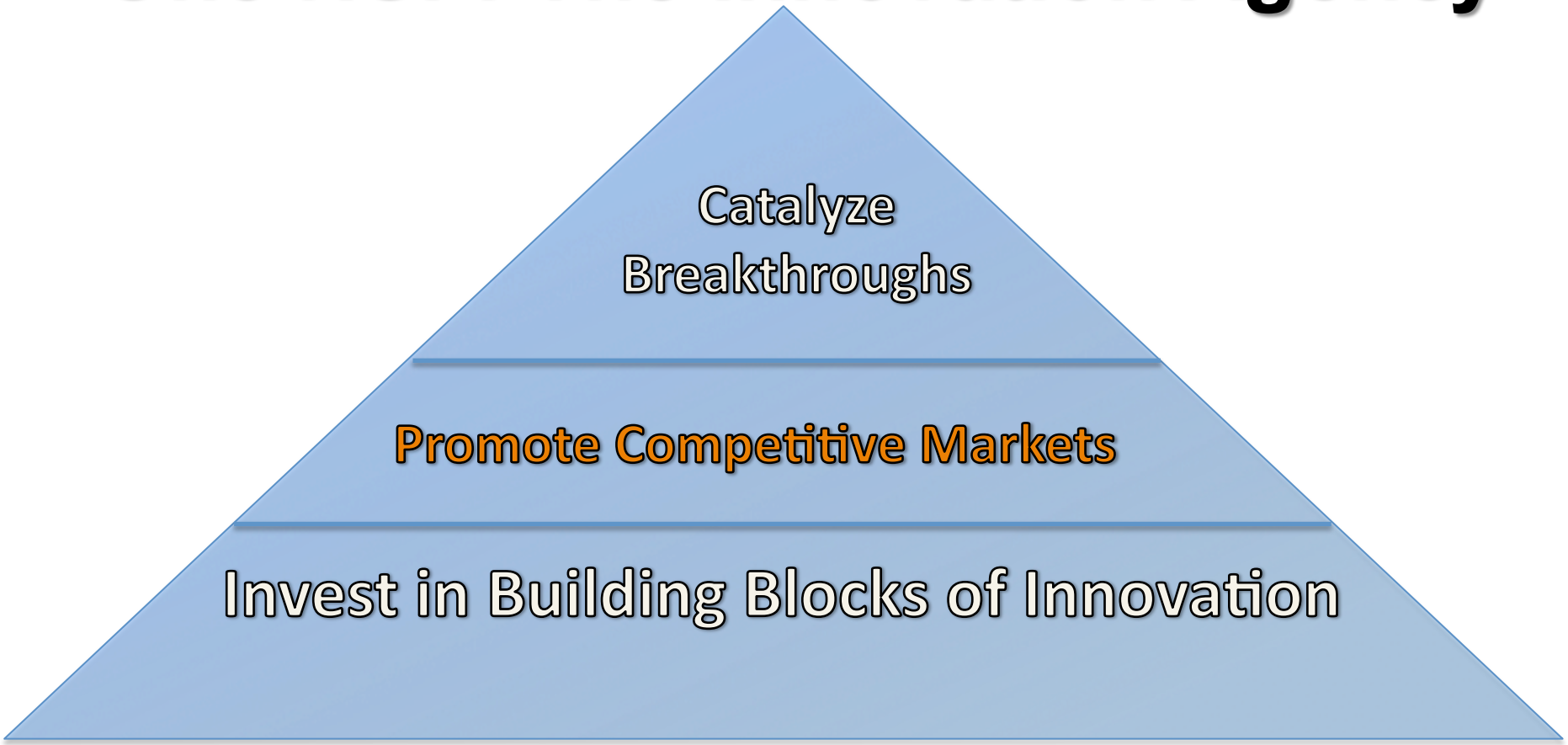


STEM Education

Widening Implementation and Demonstration of Evidence-based Reforms (WIDER)

- **Transforming Undergraduate Biology Education (TUBE)**
- **Climate Change Education**

One NSF: The Innovation Agency



Strategies for American Innovation

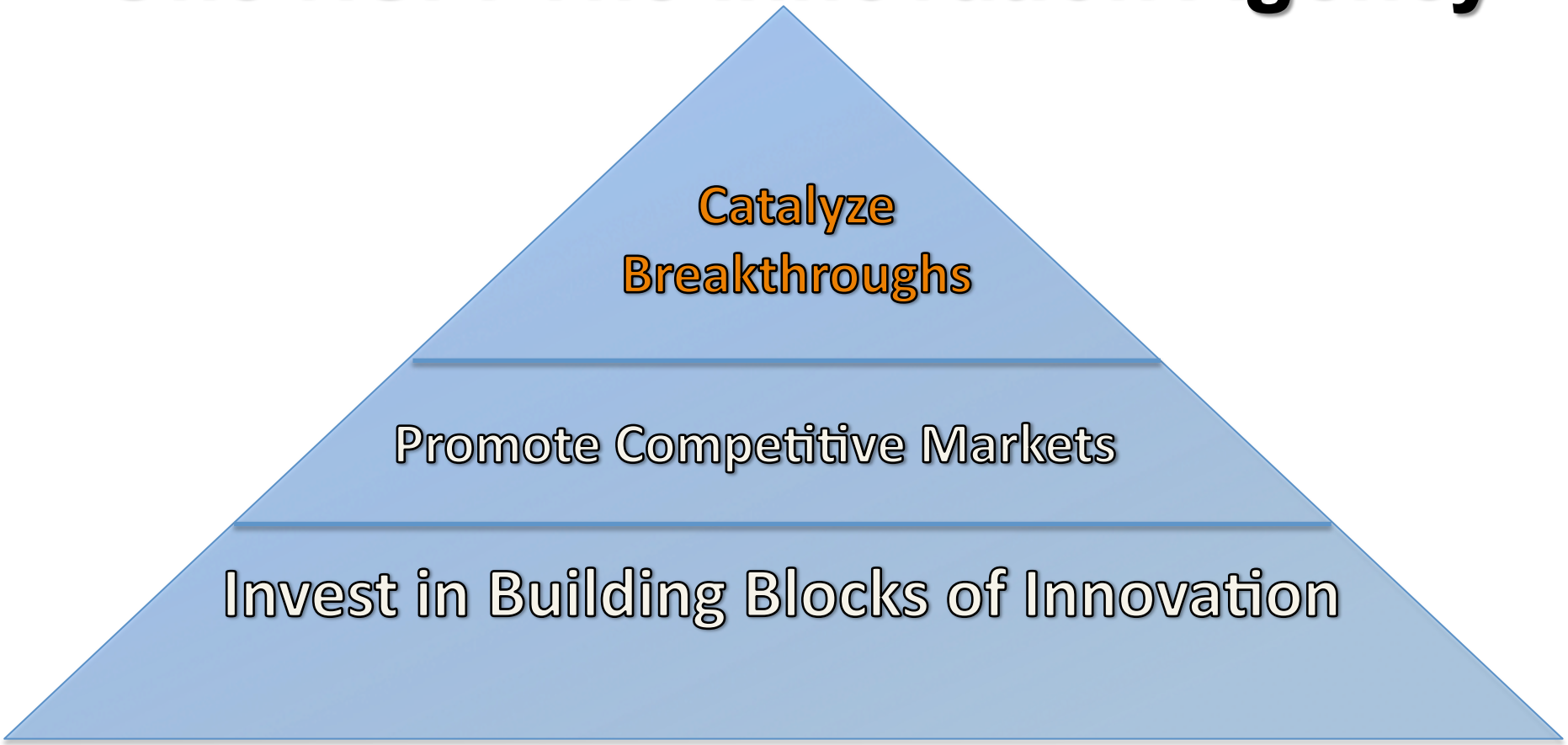
Promote Competitive Markets

- **Advanced Manufacturing**
- Wireless Innovation Fund (WIN)
- Engineering Research Centers (ERC)
- Industry/University Cooperative Research Centers (I/UCRC)
- Enhanced Access to the Radio Spectrum (EARS)
- SBIR/STTR

Advanced Manufacturing

- **BioMaPS**
- **National Nanotechnology Initiatives**
- FY 2012 Request: Total: $87M; BIO: $10M

One NSF: The Innovation Agency



Strategies for American Innovation

Catalyze Breakthroughs for National Priorities

- **Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21)**
- **Science, Engineering and Education for Sustainability (SEES)**
- **Clean Energy**
- **National Nanotechnology Initiatives (NNI)**
- National Robotics Initiative (NRI)

Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21)

- **Provide leadership and coordination**
  - New models of NSF wide engagement
  - Priorities science and engineering driven
  - Sustainable flow from research thru experiment to implementation with feedback loop
- **Focus on leading-edge CI capabilities to address complex problems**
- **Four major components**
  - Data-enabled science
  - New computational infrastructure
  - Community research networks
  - Access and connections to cyberinfrastructure facilities
- 2012 Request: Total $117M; BIO $6M

Science, Engineering, and Education for Sustainability (SEES)

- Goal: Generate discoveries and build capacity to achieve an environmentally and economically sustainable future

- FY 2012 priorities:
  - *Advance a clean energy future*
  - *Nurture the emerging SEES workforce*
  - *Expand research, education, and knowledge dissemination*
  - *Engage with global partners*

- NSF-wide effort addresses complex problems at the energy, economy, and environment nexus

- FY 2012 Request: Total: $998M; BIO $146M

Major Investments in BIO

(Dollars in Millions)

Area of Investment	FY 2010 Omnibus Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
SEES Portfolio	$121.00	$121.00	$146.00	$25.00	20.7%
Clean Energy	28.20	28.20	55.10	26.90	95.4%
CAREER	30.60	29.06	33.01	3.95	13.6%
BioMaPS	-	-	32.57	32.57	N/A
Advanced Manufacturing	-	-	10.00	10.00	N/A
CIF21	-	-	6.00	6.00	N/A

Major investments may have funding overlap, and thus should not be summed.

Ongoing BIO Activities to Enable Innovation

- Supporting the Disciplinary Knowledge Base
- Plant Genome Research Program (PGRP)
- Basic Research to Enable Agricultural Development (BREAD)
- Dimensions of Biodiversity
- Digitization of Research Collections
- NEON
- Experiments in Innovation

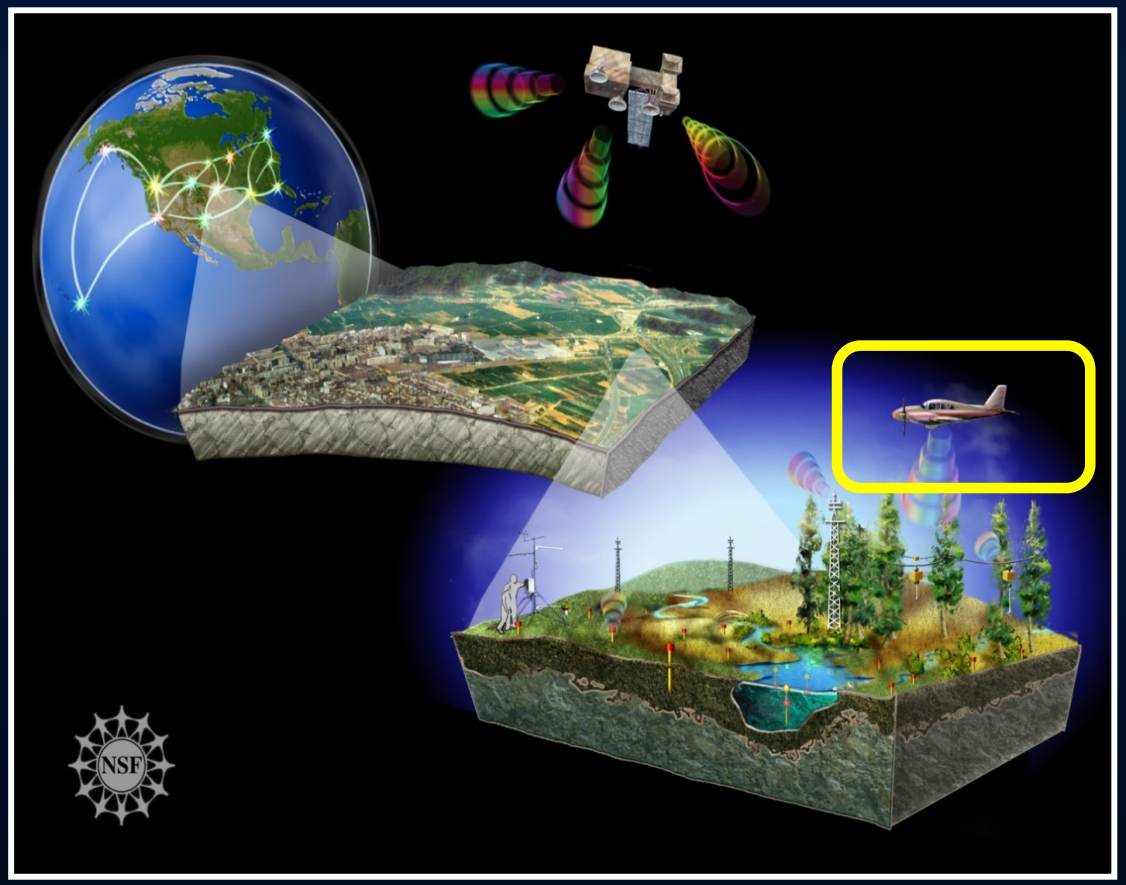
Digitization of Collections

- Community based strategic plan for the digitization of the U.S. natural history collections

- Solicitation: *Advancing Digitization of Biological Collections,* released on October 19, 2010

National Ecological Observatory Network (NEON)

Transformational research platform and experimental facility to understand the biosphere and predict changes resulting from climate change, landuse change, and invasive species on regional to continental scales.



- Multi-disciplinary sensor networks
- Multi-scale and experimental infrastructure
- Fixed, relocatable and mobile platforms
- Airborne Remote Sensing
- Technology renewed throughout program lifetime
- Cutting-edge cyberinfrastructure and data products
- Open data for all

National Ecological Observatory Network (NEON)

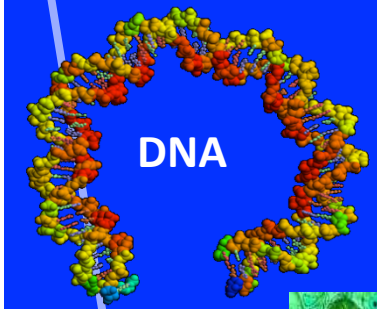
- MREFC $87.92M in FY 2012 Construction funding will support:
  - Civil and facility construction in 9 domains;
  - Procurement for 11 domains;
- R&RA $15.93M in FY 2012 will begin Operation:
  - First NEON Domain
  - Calibration and Validation Laboratory
  - Data Center

neon
National Ecological Observatory Network, Inc.

BIO Experiments in Innovation

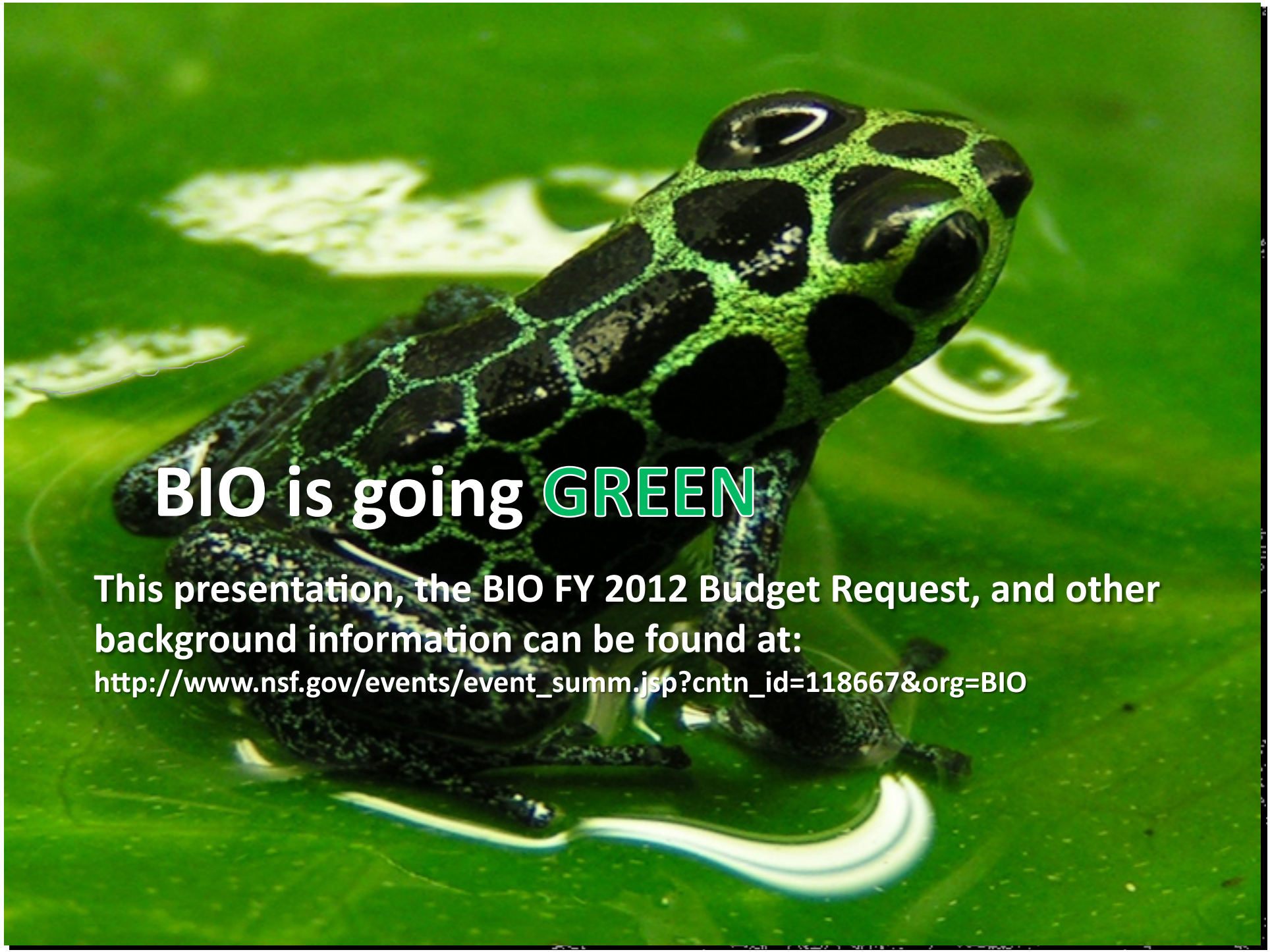
- **Ideas Lab**: novel/high risk research project development coupled with real-time peer review
- **Enabling Partnerships by Social Networking:** promoting new collaborations through a wiki site in response to a problem or challenge
- **"Big Pitch:"** review of short proposals that focus only on the main purpose and potential impacts of the proposed research
- **Grade-Free Merit Review**
- **Synthesis Centers**

One Biology for the 21st Century



A vision for our planet's future based on a comprehensive understanding of the living world across scales of size, time, and place:

"there is a grandeur in this view of life…"


BIO is going GREEN
This presentation, the BIO FY 2012 Budget Request, and other background information can be found at:
http://www.nsf.gov/events/event_summ.jsp?cntn_id=118667&org=BIO

Where discoveries begin