Emerging Challenges of Team Science: Funder Perspectives

Planning Meeting on Interdisciplinary Science Teams
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National Academy of Sciences

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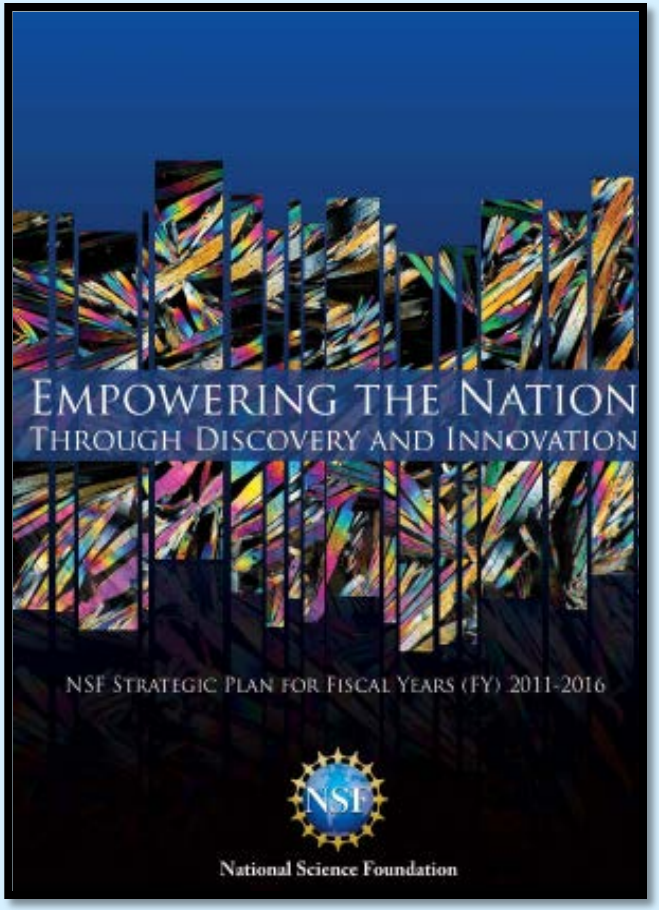
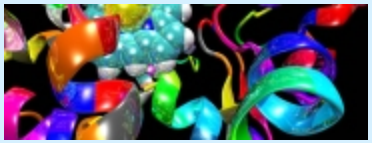
Challenges in the NSF Context



- TRANSFORM THE FRONTIERS—
  transformative interdisciplinarity
- INNOVATE FOR SOCIETY—
  underrepresentation
- PERFORMS AS A MODEL ORGANIZATION—
  mode of support

Transformative Interdisciplinarity



http://www.nsf.gov/od/oia/additional_resources/interdisciplinary_research/index.jsp

Valued

Visible

Visionary

"NSF's high-risk, potentially transformative investments will continue to lead the way for the important discoveries and cutting-edge technologies that will help keep our Nation globally competitive…"

FY 2012 NSF Budget Request to CongresS

Pioneering new fields of study that integrate research and education, build capacity and broaden participation

A Valued Paradigm

Crossing disciplinary boundaries to address complex problems

Collaboration Required

Integrating research at the intersections or interfaces of disciplines to generate new knowledge

Interdisciplinarity and Underrepresentation

"Interdisciplinary Science: A Continuum. **In the progression from (1) collaborating with scientists from other fields, to (2) using aspects of multiple disciplines in one's work, to (3) truly integrating disciplines into interdisciplinary science, study data suggest that IGERT and non-IGERT students may be equally capable of the first two, whereas IGERT students surpass non-IGERT students on the third."**

Source: *Bridging Disciplinary Divides: Developing an Interdisciplinary STEM Workforce, ABT Associate*

"Over the IGERT program's first nine years, women have composed 36 percent of IGERT graduates and underrepresented minorities (URM) have represented 7 percent of all IGERT graduates."

Source: Evaluation of the National Science Foundation's Integrative Graduate Education and Research Traineeship Program (IGERT): Follow-up Study of IGERT Graduates, ABT Associates, 2011

Research: Women in Interdisciplinary Science

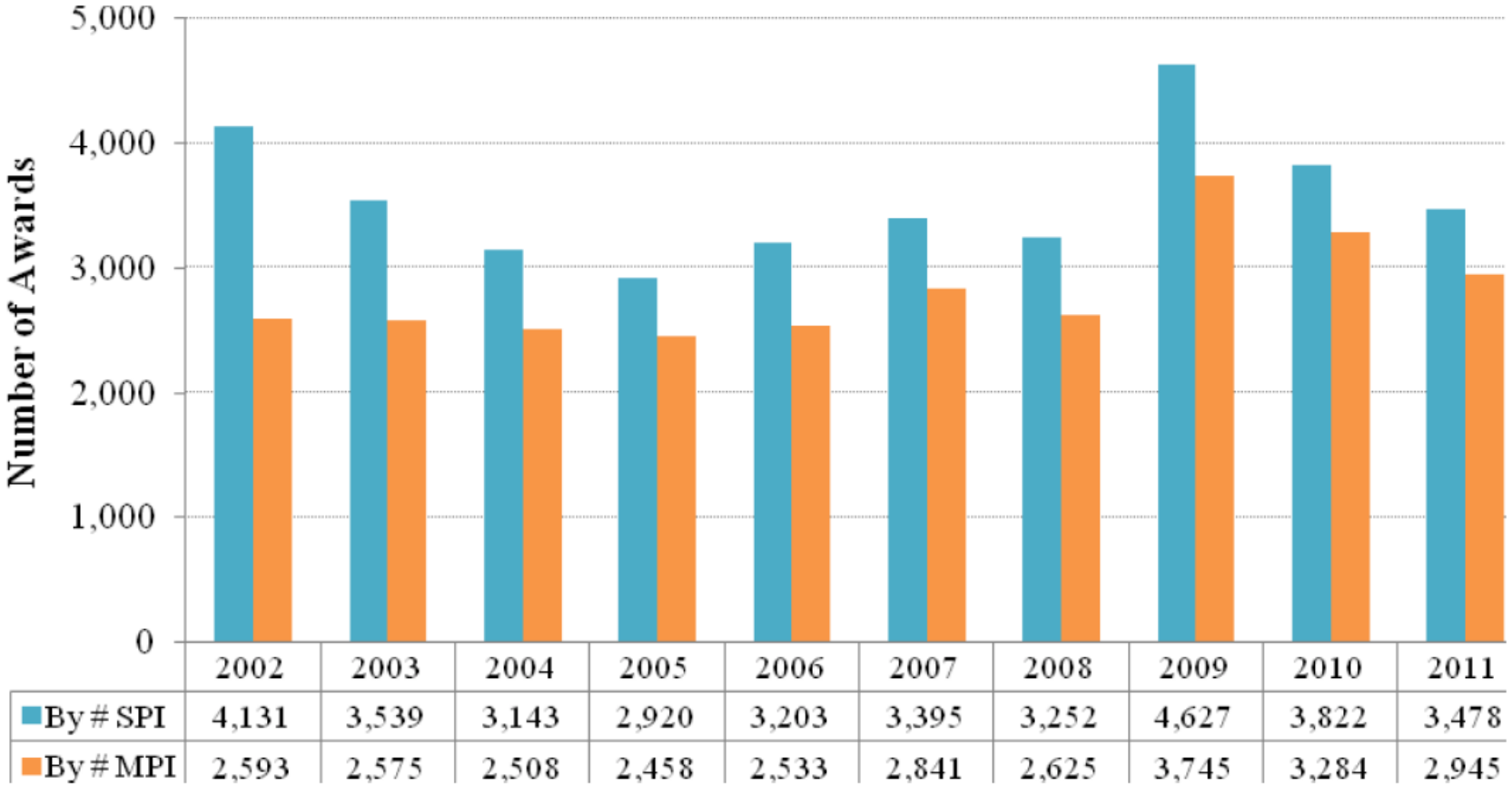
(Source Rhoten, D, & Pfirman, S.(2006). Women in Interdisciplinary Science: Exploring preferences and consequences. In: Research Policy 36(1): 56-75*)*

Careful Consideration for Promoting Diversity and Interdisciplinarity

Using interdisciplinarity to attract underrepresented groups to science is only ethical if it leads to stable and secure pathways through scientific and academic careers.

How does participation in interdisciplinary research affect individual options and institutional directions?	Does interdisciplinarity make it easier or harder, and at what stage of the career and for whom?	Should all junior scientists from underrepresented groups be advised to shy away from interdisciplinariy frames and practices, and problems or to perhaps wait until they have tenure?

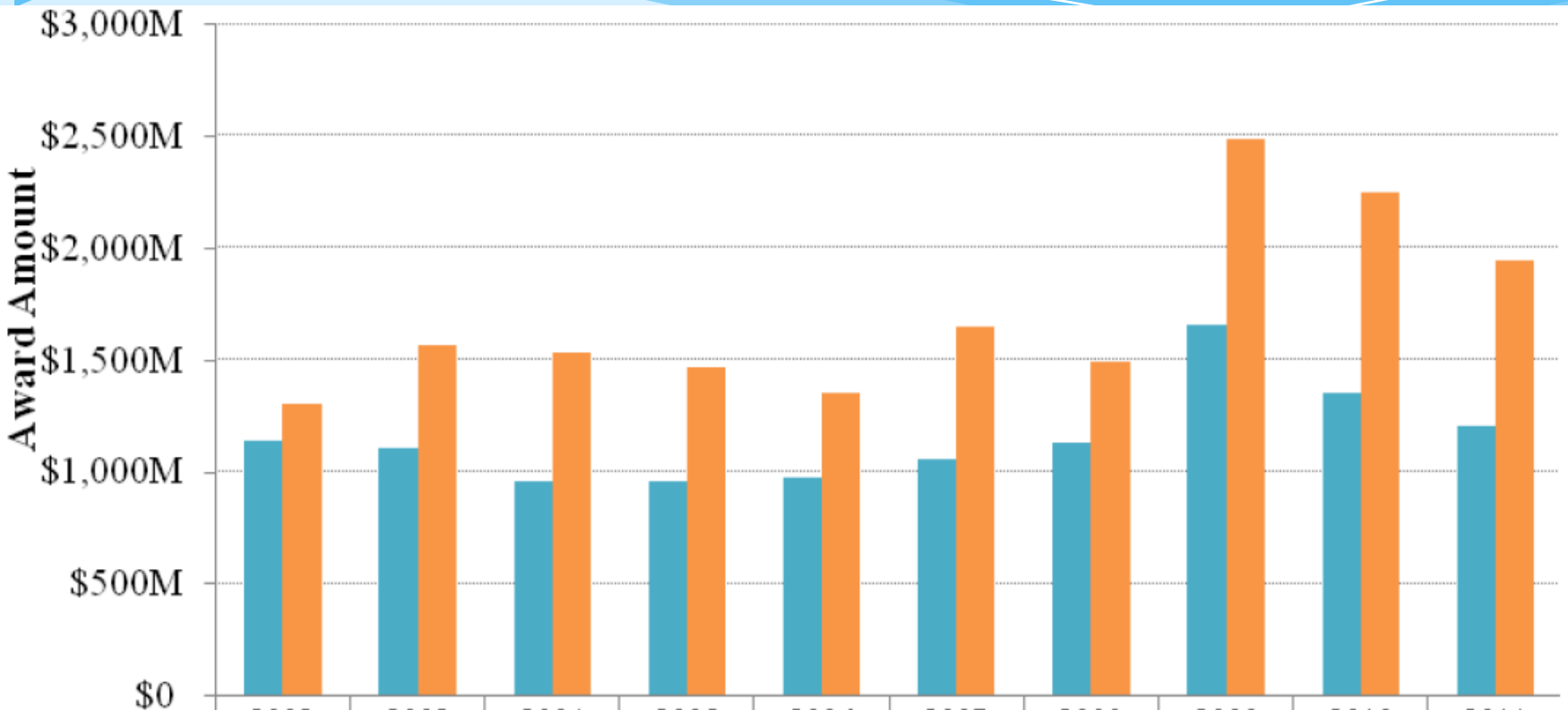
Research Grants for Single PIs (SPI) & Multiple PIs (MPI), by Number of Awards



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
By # SPI	4,131	3,539	3,143	2,920	3,203	3,395	3,252	4,627	3,822	3,478
By # MPI	2,593	2,575	2,508	2,458	2,533	2,841	2,625	3,745	3,284	2,945

Source: NSF Enterprise Information System 10/01/11

Research Grants for Single PIs (SPI) & Multiple PIs (MPI), by Dollar Amount



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
SPI in $M	$1,140M	$1,104M	$962M	$961M	$979M	$1,059M	$1,131M	$1,659M	$1,352M	$1,209M
MPI in $M	$1,305M	$1,567M	$1,537M	$1,465M	$1,352M	$1,645M	$1,489M	$2,490M	$2,247M	$1,947M

Source: NSF Enterprise Information System 10/01/2011

Mechanisms of Support

Solicited Interdisciplinary Programs

- Collaboration in Mathematical Geosciences (CMG)
- Dynamics of Coupled Natural Human Systems (DCNHS)

Areas of National Importance (Dear Colleague Letter)

- Science, Engineering, and Education for Sustainability (SEES)
- Cyberinfrastructure Framework for 21 Century Science and Engineering (CIF21)

Center Competitions

- Science and Technology Centers (STCs)
- Nanoscale Science and Engineering Centers (NSES)

Education and Training

- Integrative Graduate Education and Research Traineeship (IGERT) Program
- Fostering Interdisciplinary Research on Education (FIRE) activity

Unsolicited Interdisciplinary Research

- Co-Reviewing and Co-Funding
- CREATIV-Creative Research Awards for Transformative Interdisciplinary Ventures

Workshops, Conferences, and Symposiums

- NSF Innovation and Diversity Workshop: The Scientific Basis of Individual and Team innovation and Discovery, 2006
- NSF Workshop on Interdisciplinary Collaboration in Innovative Science and Engineering Fields, 2010

Newer Directions

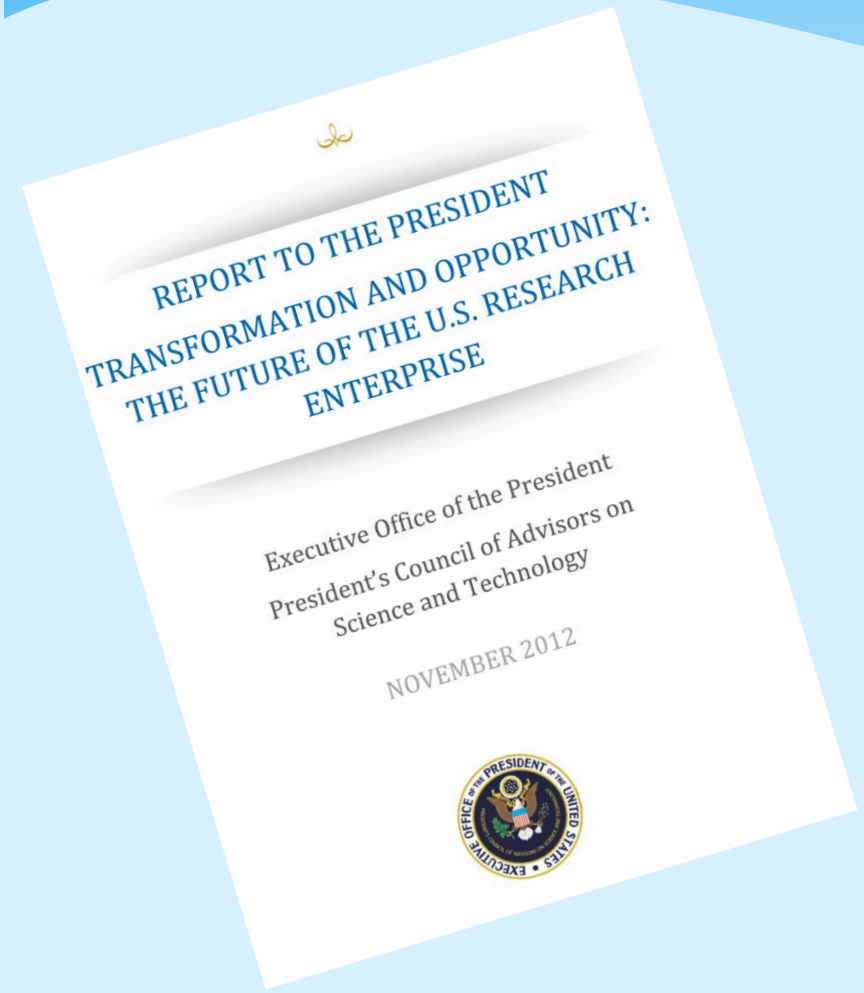
INSPIRE

- Strengthens NSF's support of interdisciplinary, potentially transformative research by complementing existing efforts with a suite of new, highly innovative Foundation-wide activities and funding opportunities

I-Corps

- Seeks to develop and nurture a national innovation ecosystem that builds upon research to guide the output of scientific discoveries closer to the development of technologies, products and processes that benefit society

Preserve the U.S. Innovation Advantage



Key Opportunity #3. Federal agencies have the opportunity to grow portfolios that more strategically support a mix of evolutionary vs. revolutionary research; disciplinary vs. interdisciplinary work; and project-based vs. people-based awards.