OneNSF INVESTMENTS
INTEGRATED NSF SUPPORT PROMOTING INTERDISCIPLINARY
RESEARCH AND EDUCATION
(INSPIRE)

OVERVIEW

INSPIRE was established to address some of the most complicated and pressing scientific problems that lie at the intersections of traditional disciplines and to advance the NSF's strategic goal of *Transform the Frontiers*.[1] INSPIRE will strengthen 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.

Background

INSPIRE was announced in February 2011 in the NSF FY 2012 Budget Request to Congress, which included funding of $12.35 million in the Integrative Activities (IA) budget for new funding opportunities, to be augmented by co-funding from directorates and offices. It responds to issues raised in a variety of external and internal publications, including a National Academies report[2] that identified barriers to interdisciplinary research (IDR), documents relating to the reauthorization of the America COMPETES Act, the report of the NSF Facilitating Transformative and Interdisciplinary Research (FacTIR) Working Group,[3] and to perceptions in the research community that NSF does not always provide good opportunities for comprehensive review and support of unsolicited IDR proposals that cross traditional boundaries. INSPIRE directly supports NSF's strategic goal of *Transform the Frontiers* and performance goal T-1 (make investments that lead to emerging new fields of science and engineering and shifts in existing fields).

Goals

Goal 1: NSF program officers will have the necessary tools and management support to empower cross-cutting collaboration and risk-taking in developing and managing their awards portfolio.

> INSPIRE seeks to empower program officers to encourage and support bold, interdisciplinary projects. Program officers report that a variety of factors create pressure toward funding of lower risk, more conventional disciplinary choices. INSPIRE will provide financial incentives through co-funding and establish an expectation that NSF management will promote a bolder interdisciplinary and potentially transformative vision. INSPIRE will identify changes to NSF systems and training practices to enable and facilitate interdisciplinary activities.

Goal 2: Researchers will submit and NSF will support a greater proportion of unusually novel, creative interdisciplinary proposals.

> Existing NSF programs support potentially transformative interdisciplinary research through the agency's highly-regarded merit review process. INSPIRE seeks to increase NSF's support of

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[1] Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016, www.nsf.gov/news/strategicplan/index.jsp (2011).
[2] Committee on Facilitating Interdisciplinary Research, Committee on Science, Engineering, and Public Policy (2004). *Facilitating interdisciplinary research.* National Academies. Washington: National Academy Press.
[3] Final Report, *Facilitating Transformative and Interdisciplinary Research (FacTIR),* www.inside.nsf.gov/od/factir/FacTIRFinalReport_091221.pdf (2009).

bold high-risk interdisciplinary projects that transcend typical programmatic scope, through novel funding and merit review mechanisms. These mechanisms are intended to increase the community's submissions of such proposals and will provide additional funding for their support.

Approach

Programmatic structure: INSPIRE will address its two goals through two programmatic tracks. Goal 1 will be addressed through Track 1, which focuses on how NSF supports science that may fall outside of the scope of existing NSF programs. In particular, Track 1 activities will encompass improvements in business practices, funding culture, training, and evaluation. Goal 2 will be addressed through Track 2, which will support the development of new funding opportunities and mechanisms that encourage the pursuit of novel, creative projects. New INSPIRE funding mechanisms will demonstrate to research communities the priority that NSF places on interdisciplinary and potentially transformative research.

Organizational structure: The NSF Office of Integrative Activities (OIA) will serve as the organizational lead for INSPIRE. The INSPIRE Working Group (IWG) has been established to guide INSPIRE's activities and is co-chaired by members from OIA and one of the research directorates. All research directorates and programmatic offices are represented. The IWG reports to the NSF Director through NSF's Senior Management Roundtable.

Scope: By design, the scope of INSPIRE is broad. For Track 1 activities, all research directorates and offices will be engaged. In addition, the Office of Information and Resource Management (OIRM) and the Office of Budget, Finance, and Award Management (BFA) will be called on to address issues, e.g., business systems, performance plans, and novel forms of evaluation. For Track 2, each research directorate and office will participate by providing co-funds to support research projects. OIA will also provide matching support. Program officers from every research directorate and office will be engaged in communicating the goals of INSPIRE to their communities and facilitating cross-Foundational partnering in the review and support of individual proposals. INSPIRE proposals can be in any field of science and engineering supported by NSF.

INVESTMENT FRAMEWORK

FY 2011-FY 2012

- **(Track 1)** Based on report recommendations, input from NSF advisory committees, and feedback from NSF scientists and the research community, a detailed implementation plan for INSPIRE will be developed. Also in this timeframe, baseline data on NSF-supported IDR will be gathered for use in subsequent evaluation of the impact of INSPIRE funding mechanisms. Adjustments to NSF's eBusiness systems will be made to enable principal investigators (PIs) to identify multiple NSF programs of interest and to enable program officers to more easily collaborate on review of proposals shared across programs. Tracking of co-funded proposals and training of program officers on IDR review processes will also be enhanced.
- **(Track 2)** In November 2011, Dear Colleague Letter NSF 12-011[4] announced the pilot CREATIV (<u>C</u>reative <u>R</u>esearch <u>A</u>wards for <u>T</u>ransformative <u>I</u>nterdisciplinary <u>V</u>entures) award mechanism, which will award the INSPIRE funds for FY 2012. CREATIV awards, with a maximum award size of $1.0 million, will generally be internally reviewed and will support bold high-risk IDR projects. In general terms, the new CREATIV funding mechanism will:

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[4] www.nsf.gov/pubs/2012/nsf12011/nsf12011.jsp

- Provide $12.35 million in FY 2012 in new centralized integrative activities (IA) funds, matched by directorates and offices, for approximately 30 new awards;
  - Target individuals and small groups of investigators;
  - Be open to potentially transformative ideas on any NSF-supported topic;
  - Use primarily internal NSF Program Officer merit review; and
  - Have aggressive outreach to the research community.
- **(Track 2)** Work will include planning and piloting an expansion of NSF INSPIRE to support awards up to the range of $2.5-$3.0 million for open, untargeted interdisciplinary research efforts that are larger in scale than CREATIV.
- **(Track 2)** Baseline data gathering for recipients and declined applicants of CREATIV awards and their institutions as part of INSPIRE evaluation will be initiated.

FY 2013 Request

- **(Track 1)** For the internal practices, systems, and evaluation, the INSPIRE IWG will continue to oversee implementation and gathering of data, with attendant AOAM budgetary needs, such as IT systems development and support, contract evaluations, and staffing.
- **(Track 2)** The INSPIRE activities will continue, supporting the second year of the CREATIV pilot and expanding to include larger "mid-scale" awards up to the range of $2.5-$3.0 million. Directorates and offices will co-fund INSPIRE awards funded through the integrated activities centralized funding source for a total INSPIRE FY 2013 budget of $63.0 million. In general, the new pilot INSPIRE "mid-scale" mechanism will be open to interdisciplinary proposals on any NSF-supported topic and use novel merit review mechanisms involving both internal and external review.

FY 2014 – FY 2016

The program will continue with the CREATIV and INSPIRE mid-scale award activities, and in FY 2014 will potentially introduce annual honorific Director's INSPIRE Awards. These are envisioned as highly prestigious awards for potentially transformative future research. Implementation of Track 1 activities will continue and broaden with time.

INSPIRE Funding

(Dollars in Millions)

Directorate/Office	FY 2011 Actuals	FY 2012 Estimate	FY 2013 Request
BIO	-	$2.00	$4.00
CISE	-	-	4.00
ENG	-	-	6.00
GEO	-	2.00	5.00
MPS	-	3.00	7.00
SBE	-	0.50	1.00
OCI	-	0.50	1.00
OISE	-	-	1.00
OPP	-	-	1.00
IA	-	12.35	31.00
EHR	-	-	2.00
Total, NSF	**-**	**$20.35**	**$63.00**

Totals may not add due to rounding.

EVALUATION FRAMEWORK

FY 2011-2012

The primary tasks for evaluation in these years are to:
- Develop a logic model for the INSPIRE funding mechanism, identify metrics, develop indices to estimate interdisciplinarity, and determine failure targets for high-risk research. Refresh the baseline of data that was collected in the 2007 Booz Allen Hamilton (BAH) proposer survey that was done as part of the IPAMM (Impact of Proposal and Award Management Mechanisms) study. [5] Conduct a feasibility study to do: (1) a short-term portfolio analysis, (2) a medium-term collection of data on outcomes from awards funded by INSPIRE and non-INSPIRE mechanisms, and (3) a long-term study plan for a possible impact study.

FY 2013

Baseline results from previous years will make it possible to:
- Analyze the INSPIRE portfolio of awards to determine whether the new mechanism is resulting in types of awards that were not being funded with previous mechanisms. Case studies and qualitative assessments of the review process for projects with transformative results are expected to provide helpful information.
- Analyze the results from program monitoring to determine whether results suggest that a rigorous impact evaluation is feasible.

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[5] www.nsf.gov/od/ipamm/ipamm_2007 survey.jsp