NSF INNOVATION CORPS (NSF I-CORPS™) $30,000,000
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Overview

Over the last few decades, NSF has been vigorously seeking to strengthen the national innovation ecosystem that builds upon fundamental science and engineering research to feed the development of technologies, products, and processes that benefit society. In FY 2011, NSF established the Innovation Corps (I-Corps™) program to meet such a purpose. I-Corps™ connects NSF-funded science and engineering research with the technological, entrepreneurial, and business communities, fostering a national innovation ecosystem that links scientific discovery with technology development, societal needs, and economic opportunities. The I-Corps™ program provides immersive, experiential entrepreneurial education to scientists and engineers by supporting I-Corps™ Teams and building a National Innovation Network (NIN) through I-Corps™ Nodes that are designed to provide learning environments for the I-Corps™ Teams. The I-Corps™ Nodes also support regional needs for innovation education, infrastructure, and research. NSF has also awarded multiple I-Corps™ Sites, which help those institutions with existing entrepreneurial activities to spawn additional Teams.

Total Funding for I-Corps™

(Dollars in Millions)

FY 2015 Actual	FY 2016 Estimate	FY 2017 Request
$26.19	$30.00	$30.00

Goals

The goals of the I-Corps™ program are to:

- Capitalize on NSF's investment in fundamental research;
- Offer academic researchers an opportunity to learn firsthand about technological innovation and entrepreneurship, and thereby fulfill the promise of their discoveries; and
- Prepare students for real-world experience through curricular enhancements, and provide them with opportunities to learn about and participate in the process of transforming scientific and engineering discoveries to meet societal needs.

Approach

The I-Corps™ program has three components: I-Corps™ Teams, Nodes, and Sites.

The I-Corps™ Team awards support NSF-funded researchers who, in Teams (an I-Corps™ Team includes the principal investigator, the entrepreneurial lead, and the I-Corps™ mentor), are interested in transitioning their research out of the lab. The Teams are selected based on the maturity of the effort (i.e., if the research is ready to leave the lab), strength of the team, and anticipated market value. The I-Corps™ Teams are given access to immersive experiential entrepreneurial education and additional support, in the form of mentoring and funding, to help determine the readiness to commercialize technology resulting from NSF-funded projects. Upon completion of the I-Corps™ curriculum, the Teams are expected to demonstrate: 1) a clear go/no-go decision regarding viability of products and services; 2) should the decision be to move the effort forward, a transition plan to do so; and 3) a technology demonstration for potential partners. As of June 2015, 534 Teams have completed the curriculum. Approximately 45 percent of these Teams have started their own companies, and two of these companies have been acquired. Many of these companies have also received Small Business Innovation Research (SBIR) or Small Business Technology Transfer (STTR) funds from various federal agencies, as well as investments from the private sector.

I-Corps™ Nodes and Sites aim to further build, utilize, and sustain a national innovation ecosystem that augments the development of technologies, products, and processes that benefit the Nation. The Nodes

provide training to I-Corps™ Teams; establish regional activities to cultivate the growth of innovation ecosystems; develop tools and resources that benefit the entire I-Corps™ program within a two- to three-year timeframe; and identify and pursue longer-term (five-plus years) research and development projects. I-Corps™ Sites are funded at academic institutions that have existing innovation or entrepreneurial units, to enable and support teams to transition their ideas and technologies into the marketplace.

NSF also established the National Innovation Network (NIN) that brings together the I-Corps™ community, including Node principal investigators (PIs), faculty from all Nodes, and representatives of Sites, for open sharing and learning to help improve outcomes for I-Corps™ Teams and further develop the I-Corps™ community.

NSF's Innovation Corps for Learning (I-Corps™ L) was established within the Directorate for Education and Human Resources (EHR) in FY 2013 to promote opportunities for widespread adoption, adaptation, and utilization of discoveries and promising practices stemming from education research and development. I-Corps™ L challenges NSF researchers to think beyond their research results and toward broader adoption of Science, Technology, Engineering, and Mathematics (STEM) education and learning innovations. I-Corps™ L supports the National Science and Technology Council (NSTC) strategic plan calling for broader implementation of effective instructional practices and advances in education.

The I-Corps™ program is managed within NSF by a core group of program officers comprising representatives from all directorates. The lead program officer is from the Directorate for Engineering. In addition to working closely with all subject matter experts within the directorates, the lead program officer and the I-Corps™ core group regularly meet with other federal agency representatives who have expressed interest in implementing similar programs within their own agencies. To date, NSF has signed Memoranda of Understanding (MOU) with the Advanced Research Projects Agency-Energy (ARPA-E), National Institutes of Health (NIH), Department of Energy/Office of Energy Efficiency and Renewable Energy (DOE/EERE), Department of Homeland Security (DHS), National Security Agency (NSA), Department of Defense (DOD), and Small Business Administration (SBA). In addition, NSF has signed an MOU with the Chancellor of the Ohio Board of Regents and the Bill & Melinda Gates Foundation.

Investment Framework

I-Corps™ Funding by Directorate

(Dollars in Millions)

	FY 2015 Actual	FY 2016 Estimate	FY 2017 Request
BIO	$0.85	$1.00	$1.00
CISE	11.02	11.65	11.65
EHR	0.55	1.55	1.55
ENG	11.05	13.00	13.00
GEO	0.92	0.60	0.60
MPS	1.30	1.70	1.70
SBE	0.50	0.50	0.50
TOTAL	**$26.19**	**$30.00**	**$30.00**

FY 2015 – FY 2016

The I-Corps™ program is a key element in a series of NSF-supported programs concentrating on the innovation ecosystem. NSF has a number of long-standing programs that support the innovation ecosystem,

such as Engineering Research Centers (ERC), Industry/University Cooperative Research Centers (I/UCRC), Partnerships for Innovation (PFI), Science and Technology Centers (STC), Grant Opportunities for Academic Liaison with Industry (GOALI), Centers for Chemical Innovation (CCI), and Materials Research Science and Engineering Centers (MRSEC).

In FY 2015, the I-Corps™ program supported 210 NSF Teams at $50,000 each, for up to six months. In FY 2016, about 220 NSF Teams are anticipated. Additionally, NSF has collaborated with multiple federal agencies to expand the I-Corps™ program and its impact. NSF and ARPA-E signed a MOU in FY 2013 for collaboration that is planned to continue through FY 2018. ARPA-E has so far funded eight Teams to go through the I-Corps program. In FY 2014, the NIH and NSF announced a collaboration to offer an I-Corps™ curriculum geared towards the life sciences for NIH SBIR grantees in FY 2015. The partnership is planned to continue through June 2017, and NIH has so far funded 19 Teams to go through the I-Corps™ program. NSF also signed an MOU with the Department of Homeland Security (DHS), and DHS has so far funded three Teams. The MOU with DHS has expired, but discussions are continuing. Additional MOUs that will be in place through at least FY 2017 include SBA, DOD, the U.S. Department of Agriculture, and the Gates Foundation.

Today, a hypothesis-driven approach to evaluating technical and market viability is offered to all I-Corps™ Teams through I-Corps™ Nodes. In both FY 2011 and 2012, two I-Corps™ Nodes were awarded. In FY 2013, NSF awarded three more Nodes. In FY 2014, NSF awarded two additional Nodes, bringing the total number of I-Corps™ Nodes to seven. In FY 2015, two of the seven Nodes were extended thus maintaining the total number of Nodes at seven. In FY 2016, NSF will fund between five and seven new Nodes or renewals of existing Nodes to bring the total number of active Nodes to eight or nine in FY 2016.

NSF also established the I-Corps™ Sites at academic institutions that already have existing innovation or entrepreneurial units, enabling them to nurture students and/or faculty who are engaged in science and engineering research projects with the potential for transition to the marketplace. The Site award size is up to $100,000 per year for three years. In FY 2013, four I-Corps™ Sites were funded. In FY 2014, NSF awarded 11 additional Sites. In FY 2015, NSF awarded 21 sites to increase the total number of active Sites to 36. NSF plans to support up to 57 active Sites in total in FY 2016.

The program reaches throughout NSF's entire portfolio, engaging PIs from every directorate previously or currently supported by NSF for their research and education activities. I-Corps™ connects the academic research community with experts in innovation and entrepreneurship, who can help mentor budding entrepreneurs and evaluate the commercial viability of their ideas. Through I-Corps™ Sites and Nodes, the program is tapping into existing entrepreneurial support within many universities and is spawning regional innovation centers. With the portfolio of I-Corps™ Teams, Sites, and Nodes, NSF is helping to build a national innovation ecosystem. Overall, the program has been very well received by student entrepreneurs wishing to start small businesses, has increased faculty awareness of potential connections between fundamental research and innovation that is positively impacting their own research and educational practices, and has raised the level of interest in NSF-supported research from private investors.

FY 2017 Request

Through leveraging existing entrepreneurial and innovation capacities in universities and tapping into federal, state, and regional resources, the I-Corps™ NIN, which is comprised of Nodes and Sites, holds significant potential to reach out to a large number of budding and existing innovators and entrepreneurs. In FY 2017, NSF will support up to 230 I-Corps™ Teams, including up to 20 I-Corps™ L Teams, and expects to support a portfolio of eight to nine I-Corps™ Nodes and up to 71 active I-Corps™ Sites. NSF also plans to invest approximately $1.0 million on I-Corps™ Evaluation & Assessment activities.

NSF will also continue to build partnerships with stakeholders who have access to innovators and entrepreneurs including federal agencies, state governments, universities, and non-profit organizations. NSF also envisions potential partnerships with states, such as that with Ohio, will lead to further expansion of the I-Corps™ model across the Nation.

FY 2018 – FY 2020

The I-Corps™ program is anticipated to be an integral part of NSF's investment portfolio going forward.

Evaluation Framework

I-Corps™ was one of NSF's three priority goals for FY 2013 - 2014. This priority goal was to increase the number of entrepreneurs emerging from university labs. Progress was monitored quarterly by agency senior management and was reported on the website of Performance.gov. Specifically, the priority goal stated that, by September 30, 2013, 80 percent of I-Corps™ Teams will have tested the commercial viability of their products or services. The I-Corps™ program exceeded that goal.

Regarding longitudinal monitoring of the outcomes achieved by the Teams, a logic model was developed and a data collection system to elicit quantifiable measures of both short-term outputs and outcomes and long-term outcomes was put in place in 2014. For example, successful completion of an I-Corps™ Team grant would be expected to contribute to one or more of the following:

- New start-ups;
- New licensing activities;
- SBIR/STTR proposals and awards;
- A business plan suitable for review by private investors;
- Students prepared to be entrepreneurially competitive; and
- New curriculum development or improvement focusing on entrepreneurship and innovation.

In FY 2014, NSF's Evaluation and Assessment Capability section in the Office of Integrative Activities commissioned a study of the feasibility of conducting a rigorous impact evaluation of I-Corps™ Teams. The feasibility study concluded that an evaluation of the I-Corps™ Teams program is feasible. Most of the elements needed for a summative or impact evaluation are available or there is a plan for collecting them on an ongoing basis.

Based on the feasibility study, NSF initiated a request for proposals to identify a contractor to perform a rigorous evaluation of the I-Corps™ Teams. A contractor was selected and engaged in FY 2015. The assessment is planned for completion in the summer of 2017. The evaluation will assess:

- The culture of innovation cultivated by the program;
- Entrepreneurial knowledge among academics;
- Commercialization outcomes attributable to the I-Corps™ intervention; and
- Other spillover effects of the Teams program.