

NSF INNOVATION CORPS (I-CORPS™)

\$30,000,000
+\$3,770,000 / 14.4%

Overview

Over the last few decades, the National Science Foundation (NSF) has been continuously seeking to further develop and nurture a national innovation ecosystem that builds upon fundamental research to accelerate the output of scientific research toward 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, and fosters 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. The program builds a National Innovation Network (NIN) through I-Corps™ Nodes that are designed to provide learning environments for I-Corps™ Teams, and support regional needs for innovation education, infrastructure, and research. More recently, NSF has also awarded multiple I-Corps™ Sites, which help those institutions with existing entrepreneurial activities to spawn additional Teams.

The I-Corps™ program supports NSF’s strategic goal to “Stimulate Innovation and Address Societal Needs through Research and Education.” Specifically, I-Corps™ contributes directly to the strategic objective, “Strengthen the links between fundamental research and societal needs through investments and partnerships.” Lab-to-Market, one of the Administration’s Cross-Agency Priority (CAP) Goals, emphasizes the development of human capital with expertise and experience to accelerate technology commercialization through experiential entrepreneurial education such as I-Corps™.

FY 2014 Actual	FY 2015 Estimate	FY 2016 Request
\$20.49	\$26.23	\$30.00

Goal

The goals of the I-Corps™ program are:

- to capitalize NSF’s investment in fundamental research;
- to offer academic researchers and students opportunities to learn first-hand about technological innovation and entrepreneurship, and thereby potentially realize the promises of their discoveries; and
- to 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 purpose of NSF I-Corps™ is to support NSF-funded researchers who, with teams, are interested in transitioning their research out of the lab. I-Corps™ awards are based on the maturity of the effort (i.e., whether the research is ready to leave the lab), strength of the team, and anticipated market value. The teams selected for I-Corps™ awards will receive additional support – in the form of mentoring and funding – to accelerate innovation that can attract subsequent third-party funding.

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

An I-Corps™ Team comprises a principal investigator, an entrepreneurial lead, and an innovation/entrepreneurial mentor. An I-Corps™ Team award provides the project team access to resources to help determine the readiness to commercialize technology developed by previously- or currently-funded NSF projects. The outcome of the I-Corps™ Team awards is threefold: 1) a clear go/no-go decision based on an assessment of the market viability of proposed 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.

I-Corps™ curricula include a strong educational component focusing on a hypothesis-driven approach to developing a methodology for evaluating both the technical merits and the market viability of the concept being proposed. The I-Corps™ program delivers the immersive curricula through I-Corps™ Nodes, wherein the curricula are developed and provided by the universities involved in these nodes. The experience to date indicated the Nodes provide not only an immersive learning environment but also significant "value added" to I-Corps™ Teams. NSF currently provides each I-Corps™ Node \$350,000 to \$1.25 million per year for up to three years, depending upon the number of institutions involved.

Recognizing some universities have existing institutional infrastructure and mechanisms to support entrepreneurship within their campuses, NSF established the I-Corps™ Sites program in order to contribute to a national innovation ecosystem. Sites are funded at academic institutions that already have existing innovation or entrepreneurial units, enabling them to nurture students and/or faculty who are engaged in projects having the potential to be transitioned into the marketplace. I-Corps™ Sites provide infrastructure, advice, resources, networking opportunities, training, and modest funding to enable groups to transition their work into the marketplace or to become I-Corps™ Team applicants.

I-Corps™ is managed within NSF by a core group of cognizant program officers comprised of representatives from all directorates and offices. The lead program officer is from the Directorate for Engineering, and co-lead program officers are from the Directorate for Computer and Information Science and Engineering (CISE) and the Directorate for Education and Human Resources (EHR). In addition to working closely with subject-matter experts within the directorates and offices, the lead program officers and the core group regularly meet with other federal agency representatives who are interested in implementing I-Corps™ within their own agencies.

Investment Framework

I-Corps™ Funding by Directorate

(Dollars in Millions)

Directorate/Office	FY 2014	FY 2015	FY 2016
	Actual	Estimate	Request
BIO	\$0.95	\$1.00	\$1.00
CISE	8.15	11.00	11.65
EHR	0.35	0.35	1.55
ENG	8.17	11.00	13.00
GEO	1.09	1.38	0.60
MPS	1.42	1.00	1.70
SBE	0.35	0.50	0.50
Total	\$20.49	\$26.23	\$30.00

Totals may not add due to rounding.

FY 2014 – FY 2015

The I-Corps™ program is a key element in a series of NSF-supported programs concentrating on the innovation ecosystem. I-Corps™ has its genesis in a number of long-standing programs within NSF that support the innovation ecosystem, such as Engineering Research Centers (ERC), Industry/University Cooperative Research Centers Program (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 2014, the I-Corps™ program supported 139 NSF and three U.S. Department of Energy (DOE)/Advanced Research Projects Agency-Energy (ARPA-E) Teams, at \$50,000 each, for up to six months. In FY 2015, about 190 NSF Teams will be supported. Additionally, NSF has collaborated with multiple federal agencies to expand the I-Corps™ program and its impact. NSF and ARPA-E signed a Memorandum of Understanding (MOU) in FY 2013 for collaboration that continued in FY 2014. In FY 2014, the National Institutes of Health (NIH) and NSF announced a collaboration to offer I-Corps™ curriculum geared towards the life sciences for NIH SBIR grantees in FY 2015. Additionally, NSF signed MOUs with the U.S. Department of Homeland Security (DHS) and the DOE Office of Energy Efficiency and Renewable Energy (EERE) in FY 2015 for collaboration through I-Corps™.

Today, a hypothesis-driven approach to evaluating technical and market viability is offered to all I-Corps™ Teams through I-Corps™ Nodes. In FY 2011 and 2012, two I-Corps™ Nodes were awarded. In FY 2013, NSF awarded another three Nodes. In FY 2014, NSF awarded two additional Nodes, bringing the total number of I-Corps™ Nodes to seven.

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 projects having the potential to be transitioned into 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, bringing the total number of active Sites to 15. NSF plans to support up to 20 active Sites in total in FY 2015.

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.

Garnering of resources and support from multiple stakeholders is essential to the ultimate goal of making I-Corps™ education available to all research teams that can benefit from it. In FY 2015, the program structure will be re-evaluated and possibly modified with the goal to more actively involve the regional/local innovation communities, stimulate even more dynamic engagement between Nodes and Teams, and set course for the long-term sustainability of I-Corps™ Nodes.

FY 2016 Request

In FY 2016, NSF will support up to 220 I-Corps™ Teams and expects to maintain a steady state of seven Nodes and up to 20 active I-Corps™ Sites moving forward. NSF envisions potential partnerships with states that lead to the expansion of the I-Corps™ model across the Nation. NSF also plans to invest approximately \$1.0 million on I-Corps™ Evaluation & Assessment activities.

FY 2017 – FY 2018

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

Evaluation Framework

I-Corps™ was the platform for one of NSF's three priority goals for FY 2013 - 2014. Progress towards priority goals was assessed quarterly by NSF senior management and was reported on the website of Performance.gov. The priority goal was to increase the number of entrepreneurs emerging from universities. Specifically, the priority goal states that by September 30, 2013, 80 percent of the Teams participating in the I-Corps™ program will have tested the commercial viability of their products or services. The I-Corps™ program exceeded that goal. The FY 2014 Strategic Review of NSF strategic objective – “Strengthen the links between fundamental research and societal needs through investments and partnerships” – also included data on I-Corps™ in its analysis.

Since the I-Corps™ program impact is long-term, it may take more than a one-year cycle to see substantive changes in these measures, and for this reason, quantifiable measures of short-term progress need to be used. I-Corps™ Teams act as a catalyst to commercialize NSF's investments in basic research, by accelerating the translation of their discoveries from the lab to market. Therefore, successful completion of the I-Corps™ Team grant would be expected to result in one or more of the following:

- New start-up businesses;
- Licensing;
- SBIR/STTR applications;
- 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 office commissioned a study of the feasibility of conducting rigorous impact evaluation of I-Corps™ Teams. The study, which concluded in October 2014, aimed at exploring methodological options for rigorous impact evaluation of the program. Beyond the data that is now collected for I-Corps™, this study discusses areas in which additional data could be collected. These data would be essential in identifying suitable comparison groups necessary for a quasi-experimental design. Additional outcome and output data to be collected from teams on a longitudinal basis was also identified. Meanwhile, the National College Inventors and Innovators Alliance (NCIIA) will initiate additional longitudinal data collection efforts informed by this study and the program logic model. In FY 2015, an evaluation study of the I-Corps™ Teams program will be initiated and coordinated by NSF’s Evaluation and Assessment Capability office with the data available at the time. The results of this evaluation are expected to inform future evaluations of the program, including Teams, Sites, and Nodes, which will likely be planned for FY 2017 and beyond.