National Science Foundation

Innovation Corps (I-Corps™)

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Spring 2019

A Message from the NSF Director

The National Science Foundation (NSF) is a U.S. federal agency with a global reputation for supporting groundbreaking research in science, engineering and learning. NSF has made it possible for U.S. researchers to make discoveries that deepen our understanding of the universe and transform our daily lives.

NSF envisions the United States as the global leader in both research and innovation. Our investments in science and engineering research and training foster innovation across a broad range of topics relevant to technological and economic competitiveness. Through its Innovation Corps (I-Corps™) program, NSF fosters a national innovation ecosystem by encouraging institutions, scientists, engineers, and entrepreneurs to identify and explore the innovation and commercial potential of their research.

NSF I-Corps is an integral part of the Foundation's efforts to stimulate innovation and benefit society through the translation of fundamental research results. A core contribution of the NSF I-Corps program is a robust innovation ecosystem with entrepreneurially trained scientists and engineers who can evaluate market opportunity. For those who have participated in the program, it has been truly transformational. After completing I-Corps, many participants have adopted an entrepreneurial mindset that makes them reassess how they teach and how their future research might positively impact society and the world as we know it.

As you will read in this report, the I-Corps program has made a significant impact on NSF and its community of researchers, and the program has spread across the federal government. We are excited to share the success of the program in this report and to continue to use I-Corps training to help our nation's best and brightest researchers realize the potential economic and societal benefits of their fundamental research.

France A. Córdova
Director of the National Science Foundation

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Executive Summary

The National Science Foundation's Innovation Corps (I-Corps) program prepares scientists and engineers to extend their focus beyond the university laboratory. Through I-Corps, NSF-funded researchers learn to identify valuable product opportunities that can emerge from academic research and gain practical skills in entrepreneurship. Ultimately, I-Corps accelerates the economic and societal benefits of NSF-funded fundamental research projects that are ready to move toward commercialization.

Since its 2011 inception, NSF I-Corps has trained **1,315** I-Corps teams with a total of **3,745** people. Following I-Corps training, I-Corps teams have raised **$301 million** in funding to support startup development and created **644** startups with potential societal impact.

To expand access to I-Corps, NSF collaborated with the National Institutes of Health (I-Corps at NIH) in 2014 and the Department of Energy (Energy I-Corps) in 2015.

I-Corps at NIH has trained **134** I-Corps Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) teams, which have raised **$101 million** in post-training funding to support bioscience startups.

Energy I-Corps has trained **79** I-Corps national laboratory research teams and created **six** startups which have raised **$22 million** in post-training funding to support energy-related startups. (For full data, see Appendix 1).

NSF I-Corps has collaborated with **eight** U.S. federal government agencies, one state government and one foreign country to provide access to the NSF I-Corps training more broadly.

NSF I-Corps continues to pilot new programs incorporating I-Corps training into other NSF programs for translational research and commercial applications, such as the Partnerships for Innovation (PFI) program and the SBIR/STTR program. NSF seeks to develop and nurture a national innovation ecosystem that builds upon fundamental research to facilitate the application of scientific discoveries closer to the development of technologies, products and processes that benefit society.

I-Corps Programs at a Glance

I-Corps™ Programs

	NSF I-CORPS NSF Innovation Corps	I-CORPS at NIH	ENERGY I-CORPS U.S. Department Of Energy
Mission	NSF I-Corps prepares NSF-funded researchers and other researchers to extend their focus beyond the laboratory and accelerates the economic and societal benefits of basic-research projects that are ready to move toward commercialization.	I-Corps at NIH accelerates the translation of biomedical research to the marketplace by providing innovation and entrepreneurship training to NIH- and CDC-funded SBIR and STTR grantees.	Energy I-Corps accelerates the translation of research to the marketplace by providing innovation and entrepreneur-ship training to National Laboratory staff scientists and researchers.
Year Started	**2012**	**2015**	**2016**
Pilot Launched	**Fall 2011**	**Fall 2014**	**Fall 2015**
Teams Trained	**1315**	**134**	**79**
Entrepreneurial Leads Trained	**1472**	**136**	**Data Not Available**
Startup Businesses Formed	**644**	**134**	**6**
Follow-on Funding Raised	**$ 301 M**	**$ 101 M**	**$ 22 M**

*Numbers reported above reflect total value since the inception of each program until the end of Fiscal Year 2018

Report Background

The American Innovation and Competitiveness Act (AICA), Sec. 601 (Public Law 114-329): "The Director shall submit to the appropriate committees of Congress a biennial report on I-Corps program efficacy, including metrics on the effectiveness of the program. Each federal science agency participating in the I-Corps program or that implements a similar program under paragraph (2)(A) shall contribute to the report."

What is NSF I-Corps?

Through the I-Corps program, NSF seeks to accelerate the development of new technologies, products and processes that arise from fundamental research. NSF I-Corps strategically strengthens the innovation ecosystem by addressing the challenges inherent in the early stages of the innovation process.

Why Did NSF Create I-Corps?

NSF created I-Corps to train faculty, students and other researchers in innovation and entrepreneurship skills, to encourage collaboration between academia and industry, and to stimulate the translation of fundamental research to the marketplace. NSF seeks to strengthen a national innovation ecosystem that helps foster innovation among faculty and students, promotes regional coordination and linkages, and develops networks to address pressing societal challenges and economic opportunities for the nation.

Technology translation research demonstrates the commercial potential of fundamental research discoveries and is achieved through proof-of-concept, prototyping, technology development and/or scale-up work.

Specifically, I-Corps has four primary objectives:

1. Leverage federal research investments by advancing commercialization of research outcomes;
2. Transform the culture at the nation's institutions of higher education by preparing scientists and engineers to extend their focus beyond the research laboratory;
3. Assist STEM (science, technology, engineering, math) researchers to translate laboratory discoveries into product technologies with benefits for the economy and society; and,
4. Increase the economic impact of federally funded research.

In addition, the American Innovation and Competitiveness Act (AICA), Public Law 114-329, mandates that I-Corps should continue to promote a strong innovation system by investing in and supporting female entrepreneurs through mentorship, education, and training because they are historically underrepresented in entrepreneurial fields. NSF has extended this mandate to include individuals from underrepresented groups (as stated in the AICA broader impacts review criterion #7)[1] who have also been underrepresented in entrepreneurial fields.

[1] **AICA broader impacts review criterion:** "**(1)** Increasing the economic competitiveness of the United States; **(2)** Advancing of the health and welfare of the American Public; **(3)** Supporting the national defense of the United States; **(4)** Enhancing partnerships between academia and industry in the United States; **(5)** Developing an American STEM workforce that is globally competitive through improved pre-kindergarten through grade 12 STEM education and teacher development and improved undergraduate STEM education and instruction; **(6)** Improving public scientific literacy and engagement with science and technology in the United States; and **(7)** Expanding participation of women and individuals from underrepresented groups in STEM."

People: Training Curriculum, Teams, Cohorts, and Instructors

The NSF I-Corps Teams program is an intensive, structured, curriculum-based, seven-week training program designed to educate academic researchers on business model development and the value of customer discovery.

NSF I-Corps is a unique, accelerated version of entrepreneur Steve Blank's Lean LaunchPad course. The training delivers entrepreneurship education adapted from Lean Startup methodologies and provides an immersive, experiential entrepreneurial education for scientists and engineers. Participants must "get out of the building" and interview potential customers, partners and other business stakeholders to understand if their technological innovation may form the basis for a sustainable business model. The acquired entrepreneurial mindset of evidence-based business decision making, targeting the question of commercial viability and startup launch opportunity, are primary outcomes of the training program.

As in business, the NSF I-Corps training program supports a team-based approach. NSF I-Corps Teams typically comprise three members:

- **Technical Lead**, typically a university faculty member, senior research scientist or postdoctoral scholar with deep and direct technical expertise in the actual core technology about which the I-Corps Team is exploring commercial potential;
- **Entrepreneurial Lead**, typically a postdoctoral researcher or graduate student committed to understanding the commercial applicability of the technology; and
- **I-Corps Teams Mentor**, typically an experienced entrepreneur with experience in transitioning technology out of academic labs and with contacts in the industry area(s) being explored.

The Teams participate in the NSF I-Corps training as a cohort, where peer-to-peer interactions and networking are highly encouraged.

NSF I-Corps cohorts are taught by three nationally approved NSF I-Corps faculty and three NSF I-Corps adjunct faculty.

The outcomes of I-Corps Teams projects are threefold: 1) a clear "go"/"no-go" decision based on an assessment of the viability of the overall business model; 2) substantial first-hand evidence for or against product-market fit, with a clear definition of the customer segments and corresponding value propositions; and 3) a narrative of a compelling technology demonstration for potential partners.

Infrastructure: I-Corps Nodes, I-Corps Sites, and National Innovation Network

To support the NSF I-Corps training program, NSF has developed the following infrastructure:

- **NSF I-Corps Nodes.** Nodes are typically large, multi-institutional collaborations that support STEM entrepreneurship regionally. Nodes deliver the NSF I-Corps Teams training curriculum as well as recruit and train the National I-Corps instructors.

  The Nodes support the development of regional innovation ecosystems by building collaborations of academic institutions to support regional needs for innovation education, infrastructure and research. Nodes develop and manage tailored regional programs with a variety of federal agency, university and industry partners.

  There were nine active Nodes in 2018.

- **NSF I-Corps Sites.** Sites are entrepreneurial centers located at individual colleges and universities to catalyze potential I-Corps teams within their local institutions. Sites provide infrastructure, advice, resources, networking opportunities, entrepreneurship training and modest funding to enable research groups to transition their technology into the marketplace directly or into becoming an NSF I-Corps Team applicant.

  With the support and mentorship of the Sites, the Teams trained at each Site learn first-hand about entrepreneurship and explore the transition of their ideas, devices, processes or other intellectual activities into the marketplace. The I-Corps Sites strengthen innovation locally and contribute to the National Innovation Network of mentors, researchers, entrepreneurs and investors.

  There were 99 active Sites in 2018.

- **NSF I-Corps National Innovation Network.** The NSF I-Corps National Innovation Network is the collection of NSF I-Corps Nodes and Sites that together with NSF implement the I-Corps program to grow and sustain the national innovation ecosystem. Through NSF activities and partnerships, NSF helps foster innovation among faculty and students, promote regional coordination and linkages, and develop broader networks.

Partnering to Expand Access to NSF I-Corps

Since 2011, NSF expanded access to the I-Corps program through different forms of collaborations with eight U.S. federal agencies, one U.S. state and one foreign country. (See Appendix 2 for a list of MOUs and associated information).

Federal Partners Who Send Teams to NSF I-Corps Cohorts

Five federal agencies support Teams to participate directly in the NSF I-Corps Teams training program operated and managed by NSF.

- **U.S. Department of Agriculture (USDA): I-FAST.** The aim of the USDA National Institute of Food and Agriculture (NIFA) I-FAST prize competition is to develop and implement the Innovations in Food and Agricultural Science and Technology (I-FAST) Program. NSF I-Corps collaborates with USDA to provide entrepreneurship training to USDA NIFA grantees under the I-FAST program. USDA sends teams of NIFA grantees under the I-FAST program to learn how to identify valuable product opportunities that can emerge from NIFA supported academic research.
- **Department of Defense (DoD): I-Corps@DoD.** The goals of I-Corps@DoD are to spur the translation of fundamental research with potential defense relevance to the marketplace, to encourage collaboration between academia and industry, and to train students, faculty, and other researchers to understand innovation and entrepreneurship.
- **Department of Energy (DOE), Advanced Research Projects Agency-Energy (ARPA-E): I-Corps@ARPA-E.** The goal of I-Corps@ARPA-E is to provide teams from ARPA-E-funded projects in universities or national laboratories an opportunity to participate in NSF I-Corps, where they can explore the commercialization potential of early-stage energy applications.
- **Department of Homeland Security (DHS).** The DHS Science and Technology Directorate SBIR program offers select SBIR companies an opportunity to participate in NSF I-Corps. The participant companies evaluate the market opportunity of their DHS-funded innovations to more successfully prepare for and increase the odds of successful commercialization.
- **National Aeronautics and Space Administration (NASA).** The NASA I-Corps program enables small businesses, including startups, to increase the odds of accelerating the process of developing their SBIR and STTR technologies into a repeatable and scalable business model.

Federal Partners Who Customized the NSF I-Corps Program

Two federal agencies, National Institutes of Health (NIH) and DOE, customized the NSF I-Corps training to include highly-focused, industry-specific programming to support the unique natures of the life sciences/biomedical and energy industry sectors, respectively.

What is I-Corps at NIH?

I-Corps at NIH accelerates the translation of biomedical research to the marketplace by teaching NIH- and CDC-funded SBIR/STTR grantees the value of customer discovery. The I-Corps at NIH teams participate in an entrepreneurial immersion course based on NSF I-Corps that teaches customer discovery to gain insights into the challenges associated the commercialization of biomedical and life sciences technologies. The program impacts the future direction of participants' careers, research and teaching, and improves commercial outcomes of NIH-funded small businesses.

What is Energy I-Corps?

The Energy I-Corps program is an entrepreneurial program based on NSF I-Corps that pairs teams of DOE National Laboratory researchers with industry mentors and instructors with experience in commercializing technology. Through the Energy I-Corps program, the DOE Office of Technology Transitions equips researchers and scientists across disciplines with skills and knowledge to engage industry, helps the labs attract, train, and retain talent, and accelerates the transfer of DOE technologies to the market. The program results in technology spin-outs, public-private partnerships, and a more entrepreneurial DOE workforce, in addition to providing valuable industry insight into the Department’s research portfolio.

Other Federal Partners

The Small Business Administration (SBA) trains Small Business Development Center personnel on the I-Corps program and how to better engage with NSF’s program. NSF also recruits and provides curriculum experts from the I-Corps network to assist SBA with a "Lean Main Street” curriculum to teach lean startup methodologies to small businesses which operate in traditional, common or longstanding sectors of the economy.

State Partners

The I-Corps@Ohio program incorporates NSF I-Corps training objectives to accelerate commercialization of technologies from Ohio universities, colleges and research institutions. The program expands the business acumen and networks of faculty and students across the state. The funding for this program comes from the State of Ohio that worked with NSF to train their instructors. The resulting startup companies will drive sustainable, technology-based economic development in Ohio. (I-Corps@Ohio metrics are not included in this report.)

Foreign Partners

Science Foundation Ireland (SFI) partnered with NSF to allow participation of SFI-funded researchers in the NSF I-Corps program. The SFI/NSF I-Corps@SFI Entrepreneurial Training Programme is intended to support SFI funded researchers to develop entrepreneurial skills that will enable them to realize new opportunities for their research that will lead to economic and societal impact. At the same time, U.S.-based NSF I-Corps Teams learn about European markets from Irish counterparts, and the NSF program explores opportunities for European mentors and additional collaborations.

The SFI/NSF I-Corps partnership builds on a long history of scientific collaboration between the two agencies, including the Engineering Research Center program collaboration, and extends the collaboration from fundamental research to translational and entrepreneurship activities. Since the partnership was signed in 2016, I-Corps@SFI has supported eight SFI teams in the NSF I-Corps Teams program.

Progress

NSF worked with its federal partner agencies, NIH and DOE, to establish a set of metrics around four themes—Program Structure, Teams Trained, Individuals Trained, and Economic Impact—to measure the effectiveness of the I-Corps program as well as to evaluate progress toward meeting the primary objectives of the I-Corps program, as modified by AICA.

Program Structure examines the expansion of the National Innovation Network over time as well as the magnitude of program funding.

For Teams Trained, the metrics track the participation of women and underrepresented groups at a team-level, and traces how these teams came into their respective I-Corps program.

Individuals Trained involves a more detailed tracking of the number of individuals as well as Entrepreneurial Leads trained that are women and/or from underrepresented groups.

The Economic Impact of the I-Corps program is assessed on three pecuniary and financial dimensions: Startup businesses formed by I-Corps teams, Follow-on Funding generated by these startups, and Merger & Acquisition events associated with these startups.

To provide a holistic view across all three I-Corps programs—NSF I-Corps, I-Corps at NIH, and Energy I-Corps—two key indicators were selected to emphasize each agency's efforts in encouraging broadening participation from female entrepreneurs (Figure 1) and empowering I-Corps entrepreneurs to seek and generate follow-on funding (Figures 2, 3).

These four domains serve as a starting point for evaluation of the effectiveness of the I-Corps program. As the I-Corps program continues to develop, it is anticipated that the methodology used to understand its impact will continue to evolve.

The full list of metrics for all three agencies, as well as a glossary/data dictionary to provide further explanation of each metric is located in Appendix I of this report.

Broadening Participation from Female Entrepreneurs

The I-Corps programs have been collecting data on the participation of women in I-Corps.

Team-Level Analysis. On average, 47 percent of Teams that completed I-Corps training between FY 2017 and 2018 had one or more women on the Team (Figure 1).

Each agency has demonstrated an improvement when comparing the numbers to the historical percentages. For NSF, there was a 5 percentage point increase from the overall percentage, 41 percent, to 46 percent of teams having at least one woman. Similarly, for I-Corps at NIH, there was a 6 percentage point increase from the overall percentage, 55 percent to 61 percent.

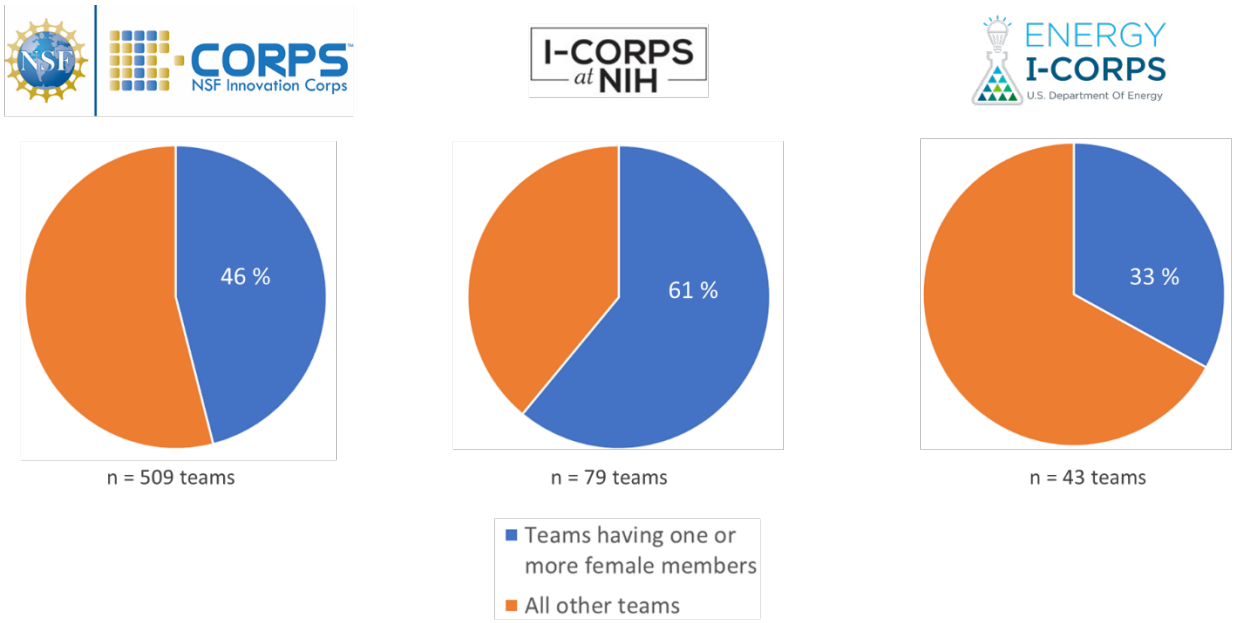

Figure 1. Distribution of teams having one or more female members by I-Corps program, FY 2017 and 2018.

Generating Follow-on Investments

The I-Corps programs have been collecting data on follow-on funding raised by I-Corps teams.

Program-level Analysis. Funding raised by Teams that have completed the I-Corps program between FY 2017 and FY 2018 were divided into two major categories: Public Funding and Private Funding.

There are three sub-categories within each category. Namely, SBIR/STTR funding, Other Federal Funding (non SBIR/STTR), and State Funding were grouped into the Public Funding category. Likewise, Venture Capital Investment, Angel or Individual Investment, and Private Industry, Corporate Funding, or Others were grouped into the Private Funding category. The breakdown for each agency by funding category is shown in Figure 2.

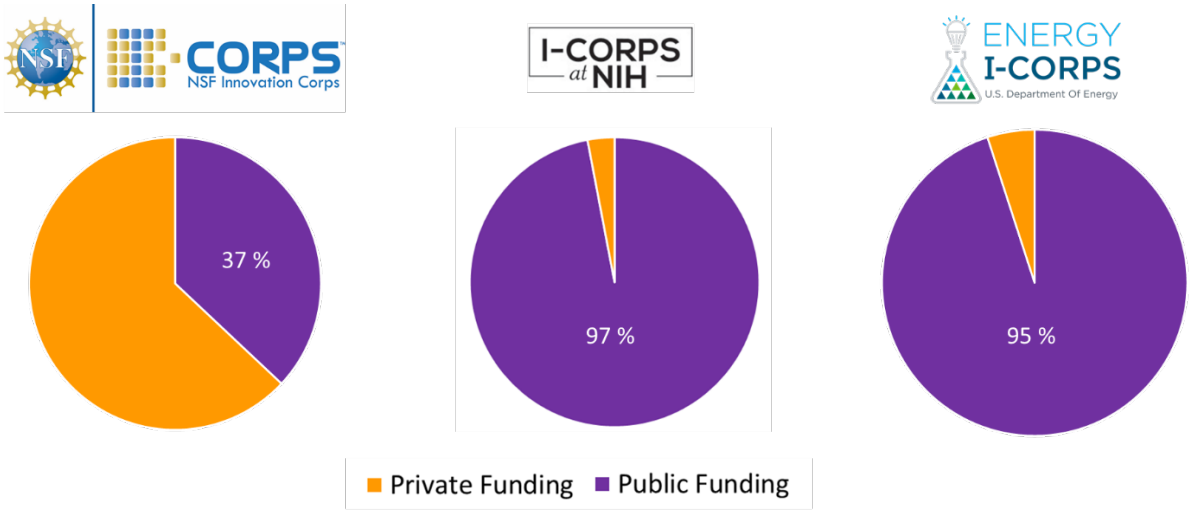

Figure 2. Distribution of Follow-on Funding, raised by teams that have participated in the I-Corps program between FY 2017 and 2018, by Funding Category.

Agency-level Analysis. Shown in Figure 3, Venture Capital Investment amounts to 58 percent of the Follow-on Funding for Teams that participated in the NSF I-Corps program, Other Federal Funding (non SBIR/STTR) constitutes 92 percent of Follow-on Funding for Teams that participated in the Energy I-Corps program, and SBIR/STTR contributes the most Follow-on Funding to Teams that participated in the I-Corps at NIH program.

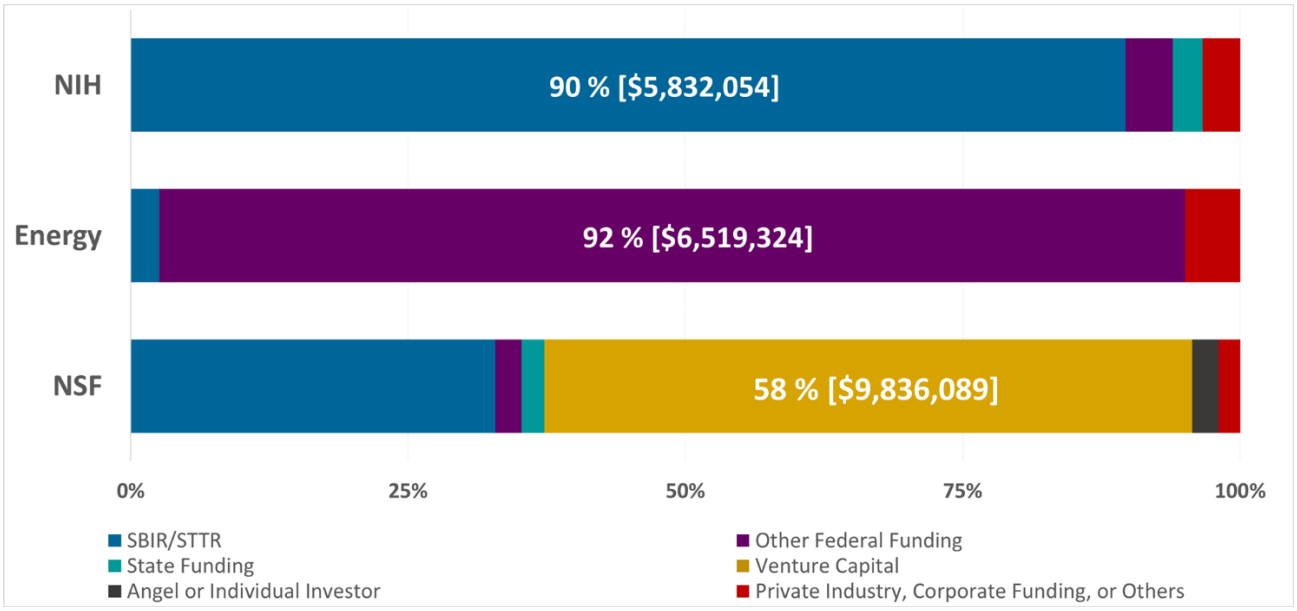

Figure 3. Distribution of Follow-on Funding, raised by teams that have participated in the I-Corps program between FY 2017 and 2018, by I-Corps program.

Future Directions

For the United States to maintain and enhance its national competitiveness in the world marketplace, we must continue to support science and engineering discoveries and the translation of those discoveries into technological innovations. NSF I-Corps and its companion programs at NIH and DOE have shown to be effective training programs for STEM researchers as a method for evaluating the potential commercial application of federally funded research and for inspiring researchers to think about market application as they develop future technologies.

As mandated by Public Law 114-329 Section 601, NSF I-Corps continues to evaluate expansion opportunities, including collaborations with additional U.S. federal and state agencies.

In addition, NSF I-Corps is currently piloting the following programs:

- **NSF Partnerships for Innovation:** Beginning in 2019 with NSF solicitation 19-506[2], the Partnerships for Innovation investment includes NSF I-Corps training for translational research and technology development focused on commercial applications.
- **I-Corps Phase Zero:** Beginning in 2017, selected NSF I-Corps Nodes were funded to support non-academic teams to help determine the commercial readiness of their technology concept and identify the key obstacles they must overcome to launch their product into the marketplace. This initiative is a collaboration between the NSF I-Corps and NSF SBIR/STTR programs.
- **NSF I-Corps GO:** Initiated as a pilot in 2017 and incorporating additional post-I-Corps training, NSF I-Corps Go addresses challenges specific to starting a small business including, but not limited to, entity incorporation, intellectual property licensing, recruiting and startup capitalization. This training is being piloted with Phase Zero I-Corps Teams to help them better prepare SBIR/STTR proposals.

[2] **NSF Partnerships for Innovation Program Solicitation:** https://www.nsf.gov/pubs/2019/nsf19506/nsf19506.htm

NSF I-Corps Team Highlights

Robotics, Artificial Intelligence, Healthcare

Team: Diligent Robotics (Formerly: Diligent Droids)

Origin: Texas

Participation: NSF I-Corps, 2015

Andrea Thomaz, Moxi, Vivian Chu, and Agata Rozga of Diligent Robotics. Photo Credit: Diligent Robotics

Diligent Robotics created "Moxi," a robot that supports clinical staff teams in acute care hospitals by executing logistical tasks so staff can focus on direct human care. Moxi safely and autonomously navigates the hospital and has an arm and gripper hand that allows it to pick up things like supplies and deliver them to other places such as outside patient rooms, providing a variety of support tasks for the clinical staff. Diligent Robotics cites statistics that indicate that 30 percent of nurses' time is spent on "non-value-added" logistical tasks like gathering supplies, resulting in burnout.

While at Georgia Tech in 2008, Diligent Robotics CEO Andrea Thomaz received an NSF research award to develop implementations and experiments on humanoid social robots. Two years later, Thomaz won an NSF CAREER award to research socially guided machine learning for robots. When her CAREER award finished, she signed up for the NSF I-Corps program in 2015.

After I-Corps, Diligent Robotics received an NSF SBIR Phase I award for $225,000 in 2016 and an NSF SBIR Phase II award for $500,000 in 2017. The company raised $2.1 million of seed funding in a round led by True Ventures in January 2018.

Andrea Thomaz, CEO of Diligent Robotics and Professor, University of Texas at Austin:

> *"We really have taken the NSF commercialization path, starting from being funded in the academic setting by NSF. We did the NSF I-Corps program, which really set up our commercialization plan for the NSF SBIR Phase I grant. Now we're in the SBIR Phase II and we spent six months working with three different hospitals in Austin and we built some of the core technology around the interactive machine learning that allows our robots to quickly be deployed to new settings and that led to some of our first patents and was really kind of the foundation of the company."*

NSF I-Corps Team Highlights

Artificial Intelligence, Healthcare

Team: Respira Labs

Origin: California

Participation: NSF I-Corps, 2018

Maria Artunduaga, founder and CEO of Respira Labs, a University of California, Berkeley spinout, developed a technology incorporating artificial intelligence that can predict chronic obstructive pulmonary disease (COPD) attacks. In November, Artunduaga received the "2018 Entrepreneur of the Year Award" for the inaugural "*Women in IT Awards*" in Silicon Valley.

Maria Artunduaga, founder and CEO of Respira Labs, wins the 2018 Entrepreneur of the Year Award. Photo Credit: Maria Artunduaga.

Maria Artunduaga, Founder and CEO of Respira Labs:

> *"Thank you very much for giving me the opportunity to complete the NSF I-Corps program last summer. Customer discovery has been key to my entrepreneurial success as a woman of color."*

NSF I-Corps Team Highlights

Chemical Technology

Team: Ecovia Renewables

Origin: Michigan

Participation: NSF I-Corps, 2013

Founded in 2014 by a faculty member and a Ph.D. graduate of the University of Michigan, Ecovia Renewables is creating bio-based, compostable alternatives to widely-used petrochemical-based superabsorbent polymers commonly found in a variety of products, including disposable diapers and other hygiene products, soil amendments for agriculture, and cosmetic formulations.

Ecovia's AzuraGel™ products are capable of absorbing hundreds of times their weight in liquids, as demonstrated by this comparison of dry AzuraGel™ powder vs. the same amount fully swollen. Image Credit: Andrew Hertig, Ecovia

At the University of Michigan in 2009, Xiaoxia "Nina" Lin, co-founder and scientific advisor at Ecovia Renewables, received an NSF award to research engineering synthetic microbial communities for next-generation biofuels. Lin then won an NSF CAREER award in 2011 to construct and optimize a community of bacteria and fungi to produce biofuels.

After participating in NSF I-Corps in 2013, Ecovia Renewables received an NSF STTR Phase I award in 2015 for $225,000, an NSF SBIR Phase II grant in 2017 for $750,000, and an NSF SBIR Phase IIB grant in 2018 for $500,000. It also received $100,000 in grant funding from USDA in 2015, and $225,000 from DOE in 2016. In April 2018, Ecovia Renewables raised $1 million of seed funding in connection with a commercial partnership with SEPPIC, a French company that designs and supplies specialty chemical products, in September 2018, it closed a second round of equity funding that included $500,000 from the University of Michigan's Michigan Invests in New Technology Startups (MINTS) program.

Xiaoxia "Nina" Lin, co-founder and scientific advisor at Ecovia Renewables:

> *"We learned a lot from this very intensive yet remarkably effective boot-camp style program; the eye-opening and highly stimulating process was instrumental in making us decide to launch Ecovia Renewables upon the completion of the program."*

NSF I-Corps Team Highlights

Software, Information Technology

Team: AppScale Systems

Origin: California

Participation: NSF I-Corps, 2013

AppScale Systems allows developers to migrate their apps between cloud systems without rewriting their code, saving them time and money. Companies can use the AppScale platform to deploy and scale games or software without being locked into a particular vendor, reducing both the costs and risks of cloud applications.

Developed in the Computer Science Department at University of California, Santa Barbara, AppScale is the culmination of NSF-funded research and engineering that began in the early 2000s. In 2004, Chandra Krintz, chief scientist at AppScale, received an NSF award to study automatic Linux customization and optimization. Krintz then won an NSF CAREER award in 2006 for vertically integrated virtualization, a system design technology for reducing the complexity of modern hardware, software systems, and applications. AppScale received an NSF SBIR Phase I award in 2014 for $180,000 and an NSF SBIR Phase II in 2015. In 2015, AppScale received $1M in angel funding from an undisclosed source.

Woody Rollins, CEO of AppScale:

> *"The NSF has been incredibly valuable to AppScale. We founded the company in 2013 with a couple of founders and a professor from the University of California, Santa Barbara. I-Corps was just a phenomenal program. It made us so smart about what we were doing and how we went about building our business. We got very smart about customer discovery and market validation and the value propositions, all of these things that sounds so esoteric but are so important when you're building a business. The NSF really fills that void. Now, we have customers in production. Our product is now ready for market. We're starting to see incremental and escalating sales growth. All of that was due to this early investment from the NSF."*

NSF I-Corps Team Highlights

Software, Information Technology

Team: Escher Reality

Origin: California

Participation: NSF I-Corps, 2017

Escher Reality's technology uses advanced computer vision and 3-D mapping to create an augmented reality (AR) experience that combines the digital and physical worlds. Video game developers can use Escher Reality's technology to create a "mixed reality" game that allows gamers to share their AR experience across devices in real time, allowing users to have a game experience that involves the world around them.

Escher Reality raised $3 million before being purchased in February 2018 by Niantic, the developers of Pokémon. The purchase price was not made public.

I-Corps at NIH Team Highlights

DNA Sequencing Technology

Team: Arima Genomics

Origin: California

Participation: NIH I-Corps, 2017

A snapshot of Arima's Product – a kit to perform HiC sample prep to preserve sequence and structural genetic information simultaneously prior to DNA sequencing. Image Credit: Arima Genomics Founder and CEO, Siddarth Selvaraj, PhD

Today's DNA sequencing technologies capture the sequence information in a linear dimension. A Ph.D student at the University of California, San Diego realized the immense value of the genome's 3D structure. Arima Genomics provides unique sample prep tools (kits) to preserve the sequence and structure information prior to DNA sequencing and provide Bioinformatics tools to reconstruct sequence and structure information post DNA sequencing.

Arima was awarded multiple Phase I and Phase II SBIR grants to support extensive project periods of research and kit development. Phase I funding was used to define the kit through scientific validation of approach. Phase II funding allowed Arima to improve protocols, source raw materials, and develop manufacturing capabilities and expertise.

Through their participation in NIH's I-Corps technical assistance program, the Arima Genomics team conducted extensive customer outreach, further helping to define the market for their technology.

Dr. Christie Canaria, Program Manager for I-Corps at NIH, remembers the team's entrance into the program in 2017:

> *"Throughout the 8-week course, the team learned that in order for Arima to inject value into the ecosystem, they needed to understand where Arima fit into the bigger process workflow. The team also came away with a strategy to Get-Keep-Grow customer relationships via publication and collaboration efforts." According to company founder and CEO, Dr. Siddarth Selvaraj, "SBIR funding allowed us to conduct real customer testing of the product, and I-Corps enabled Arima to uncover, define, and plan a product to optimize the customer experience; ultimately leading us to our kit-based distribution model."*

Appendices

APPENDIX I. PROGRAM METRICS
APPENDIX II. LIST OF NSF MEMORANDA OF UNDERSTANDING

This section contains two appendices. The first appendix reports metrics for each I-Corps program—NSF I-Corps, I-Corps at NIH, and Energy I-Corps. The metrics are built around four themes: Program Structure, Teams Trained, Individuals Trained, and Economic Impact. Since NSF I-Corps is the oldest program, 5-Year Economic Impacts on Teams trained in FY 2012 and FY 2013 were also reported. The second appendix reports a list of Memoranda of Understanding (MOUs) of the NSF I-Corps program.

		Reporting Metrics	End of FY 2018
Program Structure	National Innovation Network (NIN)	Number of active I-Corps Nodes*	9
		Number of universities in active I-Corps Nodes	28
		Number of active I-Corps Sites	99
		Number of universities in active I-Corps Sites	99
	Cohorts	Number of completed cohorts**	63
	Annual Program Funding	NSF Funding Level‡	
		FY 2017	**$29,848,028**
		FY 2018	**$32,817,459**
		Other federal agencies funding support	**$0**
		State funding support	**$0**
		Private funding support	**$0**

***** The 9 active I-Corps Nodes - Bay Area Regional I-Corps Node, DC/MD/VA Regional I-Corps Node, I-Corps South Node, Innovation Node -Los Angeles, Midwest I-Corps Node, New England Regional Innovation Node, New York City Regional Innovation Node, Southwest Innovation Corps, UNY I-Corps Node.

****** There were 4 cohorts in FY 2012; 6 in FY 2013; 6 in FY 2014; 8 in FY 2015; 14 in FY 2016; 12 in FY 2017; and 13 in FY 2018.

‡ Funding reflects actual obligations

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Teams Trained	**Characteristics of Teams**	Number of Teams trained‡	**1315**	**509**
		Number of Teams having one or more female members	**535** [41 %]	**236** [46 %]
		Number of Teams having one or more team members from under-represented groups	**640** [49 %]	**296** [58 %]
	Source of Teams [non-exclusive categories]	Number of Teams with prior NSF Research Lineage	953	241
		Number of Teams that came through:		
		Universities	1162	382
		I-Corps Nodes	221	168
		I-Corps Sites	137	99
		Other federal agencies	45	33
		Department of Defense (DoD)	17	17
		Department of Energy (DoE)	9	1
		Department of Homeland Security (DHS)	8	4
		Department of Agricultuure (USDA)	7	7
		National Aeronautics and Space Administration (NASA)	4	4
		Federal Laboratories	0	0
		Incubators/Accelerators	0	0
		SBIR/STTR Program*	12	8
		Partners through Memorandum of Understanding (MOU)**	53	41
		U.S. State Partnerships***	0	0
		International Partnerships**	8	8
		Others	0	0

* Teams from the SBIR program were sent from DHS, and teams from the STTR program NASA

** NSF has executed a total of 9 MOUs with 8 federal agencies. The MOUs are: ARPA-E (Part of DOE), Office of Energy Efficiency and Renewable Energy (EREE; Part of DOE), DoD, DHS, National Institute of Food and Agriculture (part of USDA), NASA, National Center for Advancing Translational Sciences (Part of NIH), National Security Agency (NSA), and Small Business Administration (SBA). The goal for each MOU varies; for example the EERE MOU was designed to use I-Corps to train scientists and engineers in the national energy labs to be able to recognize commercial potential of technologies being developed within the national labs. The goal of the ARPA-E MOU was to train researchers that are funded by ARPA-E. The goal of SBA was to train some of their Small Business Development Center people to understand I-Corps. It is important to note only 5 agencies listed in the table above sent teams to participate in the NSF I-Corps program. In addition, NSF also signed a MOU with the Science Foundation of Ireland (SFI), and SFI sent 8 teams to participate in the NSF I-Corps program during FY2017 - FY2018.

*** While no Teams were sent to participate in the NSF I-Corps program, NSF did engage in a partnership with the state of Ohio, in that NSF helped Ohio to set up its own I-Corps program, trained its instructors, and provided programmatic guidance.

‡ There were 97 teams participated in the NSF I-Corps program in FY 2012, 135 in FY 2013, 133 in FY 2014, 176 in FY 2015, 265 in FY 2016, 232 in FY 2017, and 277 in FY 2018.

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Individuals Trained	**Statistics**	Number of individuals trained*	**3745**	**1626**
		Number of individuals trained that are women**	695 [19 %]	338 [21 %]
		Number of individuals trained that are from under-represented groups***	875 [23 %]	453 [28 %]
		Number of Entrepreneurial Leads trained†	**1472**	**632**
		Number of Entrepreneurial Leads that are women	307 [21 %]	164 [26 %]
		Number of Entrepreneurial Leads that are from under-represented groups	380 [26 %]	208 [33 %]
	Status of the Entrepreneurial Lead at the time of training‡	Graduate Student	610 [52 %]	190 [49 %]
		Post-doctoral Researcher	193 [16 %]	53 [13 %]
		Undergraduate Student	35 [3 %]	16 [4 %]
		Others	347 [29 %]	132 [34 %]

***** Distinct count of program participants, based on name, affiliation, and biographical sketch submitted at the time of proposals

****** Individuals who self-identified as gender female

******* This report defines under-represented groups in science and engineering as individuals who identify as: 1) women, 2) race as Black or African American, American Indian, Alaska Native, and/or Native Hawaiian or Other Pacific Islander, 3) Hispanic origin of yes, and/or 4)disability status of yes

† There are some Teams that have more than one entrepreneurial lead.

‡ Only Teams with NSF awards (n = 1185, since program inception; n= 391, FY 2017 - FY 2018) were counted

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Economic Impact	**Businesses**	Number of Teams	**1315**	**509**
		Number of Teams linked to start-up businesses	635 [48 %]	213 [42 %]
		Number of startup businesses formed*	644	215
	Follow-on Funding**	Total funding obtained by start-ups [all sources]	$301,306,916	$16,846,858
		Total funding obtained by start-ups [validated sources†]	$185,597,292 [62 %]	$8,969,758 [53 %]
	Merger & Acquisition	Number of start-up businesses that were merged or acquired‡	6	1
	Source of Funding Obtained by Start-up Businesses***	Public Funding	**$139,818,329**	**$6,280,769**
		SBIR/STTR	$116,575,026	$5,532,169
		Other federal funding [non-SBIR/STTR]	$12,556,891	$400,000
		State funding	$10,686,412	$348,600
		Private Funding	**$161,488,587**	**$10,566,089**
		Venture capital	$134,791,526	$9,836,089
		Angel or individual investor	$22,315,539	$400,000
		Private industry, corporate funding, or others	$4,381,522	$330,000

***** There were several Teams that linked to more than one start-up business.

****** Follow-on Funding excludes financial support to the I-Corps program, and only considers funding raised during or after I-Corps participation

******* Based on funding obtained through all sources

† Funding data was collected by VentureWell using a combination of Pitchbook (third party market and venture capitalist data provider) data, government data, and self-reporting data. As such, not all financial deals or transactions can be verified. Validated sources referred to transactions that are published and/or stored in data repositories that are accessible to the public.

‡ Out of the 6 businesses that were merged or got acquired, 3 of them became an operating subsidiary after the M&A.

		Reporting Metrics	Teams participated in the FY 2012 cohorts*	Teams participated in the FY 2013 cohorts*
5-Year Economic Outcomes	**Businesses**	Number of Teams	**97**	**135**
		Number of teams linked to start-up businesses	68 [70 %]	86 [64 %]
		Number of start-up businesses formed**	69	89
	Patents	Number of patents granted or licensed	18***	10
	Follow-on Funding#	Total funding obtained by start-ups [all sources]	$80,579,312	$62,048,371
		Total funding obtained by start-ups [validated sources†]	$61,024,147 [76 %]	$29,286,864 [47 %]
	Merger & Acquisition	Number of start-up businesses that were merged or got acquired‡	3	2
	Source of Funding Obtained by Start-up Businesses‖	Public Funding	**$43,191,422**	**$31,683,143**
		SBIR/STTR	$37,927,976	$25,906,807
		Other federal funding [non-SBIR/STTR]	$1,242,317	$2,358,803
		State funding	$4,021,129	$3,417,533
		Private Funding	**$37,387,890**	**$30,365,228**
		Venture capital	$27,041,487	$21,722,476
		Angel or individual investor	$9,177,581	$8,260,752
		Private industry, corporate funding, or others	$1,168,822	$382,000

* There were 4 cohorts in FY2012, and 6 cohorts in FY2013. The pilot was launched on November 2011.

** There were Teams that linked to more than one start-up business.

*** There were 19 self-reported patents from Teams participated in the FY 2012 cohorts. Only 18 of them can be verified.

Follow-on Funding excludes financial support to the I-Corps program, and only considers funding raised during or after I-Corps participation

† Funding data was collected by VentureWell using a combination of Pitchbook (third party market and venture capitalist data provider) data, government data, and self-reporting data. As such, not all financial deals or transactions can be verified. Validated sources referred to transactions that are published and/or stored in data repositories that are accessible to the public.

‡ Two out of three businesses that were formed by teams that participated in the FY 2012 cohorts became an operating subsidiary after the mergers and acquisition. One of the two businesses formed by Teams that participated in the FY 2013 cohorts became an operating subsidiary.

‖ Based on funding obtained through all sources

		Reporting Metrics	At the end of FY 2018
Program Structure	**National Innovation Network (NIN)**	Number of active I-Corps nodes	Not Applicable*
		Number of universities in active I-Corps nodes	
		Number of active I-Corps sites	
		Number of universities in active I-Corps sites	
	Cohorts	Number of completed cohorts**	7
	Annual Program Funding	NIH Funding Level***	
		FY 2017	**$2,400,000**
		FY 2018	**$2,400,000**
		Other federal agencies funding support	**$0**
		State funding support	**$0**
		Private funding support	**$0**

***** I-Corps at NIH has no nodes or sites in the NIN.

****** This number included the pilot cohort.

******* Funding set aside for extramural awards to teams was the same for FY17 and FY18.

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Teams Trained	**Characteristics of Teams**	Number of Teams trained	**136**	**79**
		Number of Teams having one or more female members	**75** [55 %]	**48** [61 %]
		Number of Teams having one or more team members from under-represented groups	**83** [61 %]	**53** [67 %]
	Source of Teams [non-exclusive categories]	Number of Teams with prior NIH Research Lineage	131	79
		Number of Teams that came through:		
		Universities	23	1
		I-Corps Nodes	5	2
		I-Corps Sites	2	2
		Other Federal Agencies	9	4
		National Science Foundation	9	4
		Federal Laboratories	0	0
		Incubators/Accelerators	1	0
		SBIR/STTR Program	135	78
		Partners through Memorandum of Understanding (MOU)*	9	6
		U.S. State Partnerships	0	0
		International Partnerships	0	0
		Others	0	0

* MOU was in spirit, not in writing

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Individuals Trained	**Statistics**	Number of individuals trained*	**403****	**235****
		Number of individuals trained that are women***	106 [26 %]	68 [29 %]
		Number of individuals trained that are from under-represented groups	119 [30 %]	77 [33 %]
		Number of Entrepreneurial Leads trained‡	**136**	**79**
		Number of Entrepreneurial Leads that are women	33 [24 %]	24 [30 %]
		Number of Entrepreneurial Leads that are from under-represented groups	41 [30%]	29 [37 %]
	Status of the Entrepreneurial Lead at the time of training	Graduate Student	0	0
		Post-doctoral Researcher	0	0
		Undergraduate Student	0	0
		Others‡	136 [100 %]	79 [100 %]

* Distinct count of program participants

** There were a total of 408 enrollments since program inception, but 5 individuals participated twice, thus bring the distinct count down to 403. Similarly, there were a total of 237 enrollments that came through the program between FY 2017 and FY 2018 with 2 repeated individuals, thus brings the distinct count down to 235.

*** Individuals who self-identified as gender female

‡ All Entrepreneurial Leads are C-level executives (which are considered as employees of the company) in the I-Corps at NIH program.

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Economic Impact	**Businesses**	Number of Teams	**136**	**79**
		Number of Teams linked to start-up businesses	134*	78*
		Number of startup businesses formed	137**	78
	Follow-on Funding* **	Total funding obtained by start-ups [all sources]	$101,363,519	$6,504,718
	Merger & Acquisition	Number of startup businesses that were merged or got acquired	1	0
	Source of Funding Obtained by Start-up Businesses‡	Public Funding	**$44,237,927**	**$6,284,718**
		SBIR/STTR	$43,560,263	$5,832,054
		Other Federal Funding [non-SBIR/STTR]	$277,664	$277,664
		State Funding	$400,000	$175,000
		Private Funding	**$57,125,592**	**$220,000**
		Venture Capital	$2,215,000	$0
		Angel or Individual Investor	$323,200	$0
		Private Industry, Corporate Funding, or Others	$54,587,392	$220,000

* There were two companies sent in two teams at the time of the program participation, one of those teams participated during FY 2017-18. Otherwise, all the teams that got sent through the program had already established/linked to a start-up business.

** 134 businesses came through the program, and 3 spin-out companies were formed from that cohort.

*** Follow-on Funding excludes financial support to the I-Corps program, and only considers funding raised during or after I-Corps participation

‡ Based on funding obtained through all sources

		Reporting Metrics	At the end of FY 2018
Program Structure	**National Innovation Network (NIN)**	Number of active I-Corps nodes	1
		Number of universities in active I-Corps nodes	Not Applicable
		Number of active I-Corps sites	12
		Number of universities in active I-Corps sites	Not Applicable
	Cohorts	Number of completed cohorts*	7
	Annual Program Funding	DOE Funding Level	
		FY 2017†	**$2,725,000**
		FY 2018‡	**$1,950,000**
		Other federal agencies funding support	**$0**
		State funding support	**$0**
		Private funding support**	**$75,000**

***** The pilot (first cohort) was launched in October 2015.

† The overall budget for FY 2017 was an estimated $2,725,000; $700,000 for the program management "node" funding, and estimated $2,025,000 for the 27 lab teams that participated [average of $75,000 per team].

‡ The overall budget for FY 2018 was an estimated $1,950,000; $750,000 for the program management "node" funding, and estimated $1,200,000 for participated teams.

****** 1 privately-funded team, IP Group LLC from FY 2017

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Teams Trained	**Characteristics of Teams**	Number of Teams trained	**79**	**43**
		Number of Teams having one or more female members	Not Available	14 [33 %]
		Number of Teams having one or more team members from under-represented groups	Not Applicable	Not Applicable
	Source of Teams [non-exclusive categories]	Number of Teams with prior DOE Research Lineage*	79	43
		Number of Teams that came through:		
		Universities	0	0
		I-Corps Nodes	0	0
		I-Corps Sites	0	0
		Other Federal Agencies	0	0
		Federal Laboratories	79	43
		Incubators/Accelerators	0	0
		SBIR/STTR Program	0	0
		Partners through Memorandum of Understanding (MOU)	0	0
		U.S. State Partnerships	0	0
		International Partnerships	0	0
		Others	0	0

* All teams have received previous direct DoE funding, but not specifically through grants.

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Individuals Trained	**Statistics**	Number of individuals trained*	**290**	**92**
		Number of individuals trained that are women**	37 [13 %]	14 [15 %]
		Number of individuals trained that are from under-represented groups		Not Applicable
		Number of Entrepreneurial Leads trained	Not Available	**46**
		Number of Entrepreneurial Leads that are women	Not Available	8 [17 %]
		Number of Entrepreneurial Leads that are from under-represented groups		Not Applicable
	Status of the Entrepreneurial Lead at the time of training	Graduate Student	Not Available	0
		Post-doctoral Researcher		24 [26 %]
		Undergraduate Student		0
		Others***		68 [74 %]

* Distinct count of program participants

** Individuals who self-identified as gender female

*** Others consists of lab staff scientists and post-doc researchers

		Reporting Metrics	Since Program Inception	Reporting Period (FY 2017 - 2018)
Economic Impact	**Businesses**	Number of Teams	**79**	**43**
		Number of Teams linked to start-up businesses	6	1
		Number of startup businesses formed	6	1
	Follow-on Funding*	Total funding obtained by start-ups [sources: self-reporting]	**$22,290,725**	**$7,052,185**
	Merger & Acquisition	Number of start-up businesses that were merged or got acquired	0	0
	Source of Funding Obtained by Start-up Businesses**	Public Funding	Not Available	**$6,702,324**
		SBIR/STTR		$183,000
		Other Federal Funding [non-SBIR/STTR]		$6,519,324
		State Funding		$0
		Private Funding	Not Available	**$349,861**
		Venture Capital		$0
		Angel or Individual Investor		$0
		Private Industry, Corporate Funding, or Others		$349,861

* Follow-on Funding excludes financial support to the I-Corps program, and only considers funding raised during or after I-Corps participation

** Based on funding obtained through self-reported sources

Data Dictionary

Table	Metrics	Description
Program Structure	Number of active I-Corps nodes	Number of active I-Corps nodes at the end of FY 2018
	Number of universities in active I-Corps nodes	Number of universities in active I-Corps nodes at the end of FY 2018
	Number of active I-Corps sites	Number of active I-Corps sites at the end of FY 2018
	Number of universities in active I-Corps sites	Number of universities in active I-Corps sites at the end of FY 2018
	Number of completed cohorts	Number of cohorts completed at the end of FY 2018
	Agency Funding Level for FY 2017	Budget for the I-Corps program for FY 2017
	Agency Funding Level for FY 2018	Budget for the I-Corps program for FY 2018
	Other federal agencies funding support	External Funding from Other Federal Agencies for the Agency's I-Corps program between FY 2017 and FY 2018
	State funding support	External Funding from U.S. States for the Agency's I-Corps Program between FY 2017 and FY 2018
	Private funding support	External Funding from Private Sources (Foundation, Industry) for the Agency's I-Corps Program between FY 2017 and FY 2018

Data Dictionary

Table	Metrics	Description
Teams Trained	Number of Teams Trained	Total number of teams that have completed the Agency's I-Corps program, since program inception as well as between FY 2017 and FY 2018
	Number of Teams having one or more female members	Total number of teams who have one or more individuals who identify as gender female that have completed the Agency's I-Corps program, since program inception as well as between FY 2017 and FY 2018
	Number of Teams having one or more team members from underrepresented groups	Number of teams who have one or more individuals from under-represented groups that have completed the Agency's I-Corps program since program inception as well as between FY 2017 and FY 2018. This report defines under-represented groups as individuals who identify as: 1) women, 2) race as Black or African American, American Indian or Alaska Native, and/or Native Hawaiian or Other Pacific Islander, 3) Hispanic origin of yes, and/or 4) disability status of yes.
	Number of Teams with prior Agency Lineage	Number of teams that have previously received financial support from the agency sponsoring them to I-Corps
	Number of Teams that came through Universities	Number of teams entering the Agency's I-Corps program from Universities
	Number of Teams that came through I-Corps Nodes	Number of teams entering the Agency's I-Corps program from I-Corps Nodes
	Number of Teams that came through I-Corps Sites	Number of teams entering the Agency's I-Corps program from I-Corps Sites
	Number of Teams that came through Other Federal Agencies	Number of teams entering the Agency's I-Corps program that have previously received research support from other federal agencies and were sent to participate in the I-Corps program from those agencies
	Number of Teams that came through Federal Laboratories	Number of teams entering the Agency's I-Corps program from Federal Laboratories
	Number of Teams that came through Incubators/Accelerators	Number of teams entering the Agency's I-Corps program through Incubators/Accelerators
	Number of Teams that came through SBIR/STTR Program	Number of teams entering the I-Corps program through the SBIR/STTR program
	Number of Teams that came through Partners through MOU	Number of teams entering the Agency's I-Corps program through a Memorandum of Understanding (MOU)
	Number of Teams that came through U.S. State Partnerships	Number of teams entering the Agency's I-Corps program through U.S. State Partnership
	Number of Teams that came through International Partnerships	Number of teams entering the Agency's I-Corps program through International Partnership
	Number of Teams that came through Others	Number of teams entering the Agency's I-Corps program through other pathways not listed above

Data Dictionary

Table	Metrics	Description
Individuals Trained	Number of individuals trained	Total number of individuals that have completed the I-Corps program, since program inception and between FY 2017 and FY 2018
	Number of individuals trained that are women	Number of individuals that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018) who identify as gender female
	Number of individuals trained that are from under-represented groups	Number of individuals from under-represented groups that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018). This report defines under-represented groups as individuals who identify as: 1) women, 2) race as Black or African American, American Indian or Alaska Native, and/or Native Hawaiian or Other Pacific Islander, 3) Hispanic origin of yes, and/or 4) disability status of yes.
	Number of Entrepreneurial Leads trained	Total number of Entrepreneurial Leads trained
	Number of Entrepreneurial Leads trained that are women	Number of Entrepreneurial Leads trained who identify as gender female that have completed the I-Corps program
	Number of Entrepreneurial Leads trained that are from under-represented groups	Number of Entrepreneurial Leads from under-represented groups that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018). This report defines under-represented groups as individuals who identify as: 1) women, 2) race as Black or African American, American Indian or Alaska Native, and/or Native Hawaiian or Other Pacific Islander, 3) Hispanic origin of yes, and/or 4) disability status of yes.
	Graduate Student	Number of Entrepreneurial Leads who were a Graduate Student at the time of I-Corps Training
	Post-doctoral Researcher	Number of Entrepreneurial Leads who were a Post-doctoral Researcher at the time of I-Corps Training
	Undergraduate Student	Number of Entrepreneurial Leads who were an Undergraduate Student at the time of I-Corps Training
	Others	Number of Entrepreneurial Leads who were neither a Graduate Student, nor a Post-doctoral Researcher, nor an Undergraduate Student at the time of I-Corps Training

Data Dictionary

Table	Metrics	Description
Economic Impact	Number of Teams linked to a startup businesses	Total number of teams (distinct count) that formed startup businesses
	Number of start-up businesses formed	Total number of businesses formed (distinct count)
	Total funding obtained by start-ups	Total Amount, in USD, of public and private funding raised by teams during or after their participation of the I-Corps program (since program inception and between FY 2017 and FY 2018)
	Number of start-up businesses that were merged or got acquired	Number of businesses created by teams that have completed I-Corps program (since program inception and between FY 2017 and FY 2018) that have been acquired
	Source of Funding - SBIR/STTR	Total amount, in USD, of SBIR/STTR funding raised by teams that have completedthe I-Corps program (since program inception and between FY 2017 and FY 2018)
	Source of Funding - Other Federal Funding [non SBIR/STTR]	Total amount, in USD, of federal funding--excluding SBIR/STTR--raised by teams that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018)
	Source of Funding - State Funding	Total amount, in USD, of U.S. State funding (states in the U.S.) raised by teams that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018)
	Source of Funding - Venture Capital	Total amount, in USD, of venture capital and seed funding raised by teams that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018)
	Source of Funding - Angel or Individual Investor	Total amount, in USD, of angel (and/or individual) funding raised by teams that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018)
	Source of Funding - Private Industry, Corporate Funding, or Others	Total amount, in USD, of corporate funding, private industry funding, or other sources raised by teams that have completed the I-Corps program (since program inception and between FY 2017 and FY 2018)

Year of Initial Agreement/Renewal/Extension	Agency	Organization	Primary Objectives
2012-2013	Department of Energy	Advanced Research Projects Agency - Energy (ARPA-E)	ARPA-E: Pilot/implement NSF I-Corps curriculum with APRA-E technologies with commercial impact; NSF: gain experience with expansion of NSF I-Corps to another federal agency thereby broadening participation
2014	Department of Homeland Security (DHS)	Science and Technology Directorate	DHS: Pilot/implement NSF I-Corps curriculum with DHS technologies with commercial impact; NSF: gain experience with expansion of NSF I-Corps to another federal agency thereby broadening participation
2014/2015/2017	Department of Energy	Office of Energy Efficiency & Renewable Energy (EERE)	EERE: Pilot/implement NSF I-Corps curriculum for EERE technologies with commercial impact; NSF: NSF I-Corps network expansion and broadening participation
2015	Department of Defense (DoD)	Basic Research Office	DOD: Pilot/implement NSF I-Corps curriculum with BRO technologies with commercial impact; NSF: gain experience with expansion of NSF I-Corps to another federal agency thereby broadening participation
2015	National Security Agency (NSA)	Mission Capabilities Group	NSA: Pilot/implement NSF I-Corps curriculum with MCG technologies with commercial impact; NSF: gain experience with expansion of NSF I-Corps to another federal agency and broadening participation
2015	Small Business Administration (SBA)	Office of Entrepreneurial Development	SBA: Pilot NSF I-Corps curriculum for small business; NSF: gain experience with expansion of NSF I-Corps to another federal agency to broaden participation
2015	National Institutes of Health (NIH)	National Center for Advancing Translational Sciences	NIH: Pilot/implement NSF I-Corps Train the Trainer curriculum for NIH Clinical and Translational Science Awards (CTSA) researchers; NSF: NSF I-Corps network expansion and broadening participation
2015/2019 (anticipated)	The Chancellor of Ohio Board of Regents (COBR)		COBR: Pilot/implement NSF I-Corps curriculum with State of Ohio university technologies with commercial impact; NSF: gain experience with expansion of NSF I-Corps to State agency to broaden participation
2015	U.S. Department of Agriculture (USDA)	National Institute of Food and Agriculture	USDA: Pilot NSF I-Corps curriculum with USDA technologies with commercial impact; NSF: gain experience with expansion of NSF I-Corps to another federal agency thereby broadening participation
2016	National Aeronautics and Space Administration (NASA)		NASA: Pilot/implement NSF I-Corps curriculum for NASA SBIR/STTR awardees with commercial impact; NSF: NSF I-Corps network expansion and broadening participation
2016/2018	Science Foundation Ireland (SFI)		SFI: NSF I-Corps curriculum evaluation; NSF: explore international collaboration and access to European markets for U.S.-based NSF I-Corps Teams