U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION

HEARING CHARTER

Innovation Corps: A Review of a New National Science Foundation Program to Leverage Research Investments

Monday, July 16, 2012
10:00 a.m. – 12:00 p.m.
Lincoln Hall, Levy Mayer 104
Northwestern University School of Law
375 East Chicago Avenue
Chicago, Illinois

1. Purpose

On Monday, July 16, the Subcommittee on Research and Science Education of the House Committee on Science, Space, and Technology will hold a hearing to examine the new National Science Foundation Innovation Corps program and assess its value to the American taxpayer and its potential contribution to the Nation's future prosperity.

2. Witnesses

- **Dr. Thomas Peterson**, Assistant Director of the Directorate for Engineering, National Science Foundation
- **Mr. Steve Blank**, Lecturer, Stanford University and the University of California at Berkeley
- **Mr. Neil Kane,** President**,** Illinois Partners Executive Services, LLC
- **Dr. Gabriel Popescu**, Assistant Professor in the Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign
- **Dr. Andrew Mazar,** Director of the Program for Developmental Therapeutics and Entrepreneur-in-Residence, Innovation and New Ventures Office, Northwestern University

3. Overarching Questions

- What was the genesis of the Innovation Corps (I-Corps) program? What are the objectives of the program and how was it designed to achieve those objectives? In what ways is the I-Corps program a public-private partnership? What is the benefit of the I-Corps program to the American taxpayer?

- Is the I-Corps program an appropriate role for the federal government in general and for a basic research agency like the National Science Foundation (NSF) in particular? How is it distinct from the many innovation programs and activities at other federal agencies? Given the self-interest of both the private sector and research universities in commercializing university research, why is a federal program such as I-Corps necessary?

- What, if any, are the outcomes from the first round of I-Corps awards? What did the principal investigators and their students and/or post-docs learn and achieve through the program? What did the mentors learn and achieve through the program? What if any lessons did NSF learn and apply from the first round to the second and going forward? What are NSF's plans for the I-Corps program over the next few years, including any plans for continued expansion of the program?

4. The I-Corps Program

The National Science Foundation (NSF) is an independent federal agency created by Congress in 1950 "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense…" With a current annual budget of $7 billion, NSF is the primary source of federal funding for non-medical basic research, providing approximately 40 percent of all federal support, and serves as a catalyst for science, technology, engineering, and mathematics (STEM) education improvement at all levels of education. In addition, NSF is the funding source for over 20 percent of all federally supported basic research conducted by America's colleges and universities. It supports the fundamental investigations that ultimately serve as the foundation for progress in nationally significant areas such as national security, technology-driven economic growth, energy independence, health care, nanotechnology, and networking and information technology.

Through its new Innovation Corps (I-Corps) program, launched in 2011, NSF seeks to develop and nurture a national innovation ecosystem that builds upon the fundamental research it already supports. The goals of the I-Corps program are to spur translation of fundamental research, to encourage collaboration between academia and industry, and to train students to understand innovation and entrepreneurship. Only researchers who already receive NSF support are eligible to apply for the I-Corps program. The program is designed to provide additional support - in the form of mentoring and funding - to accelerate the translation of knowledge derived from fundamental research into emerging products and services that can attract subsequent third-party funding.

Specifically, the purpose of an NSF I-Corps grant is to give the project team access to resources to help determine the readiness to transition technology developed by previously-funded or currently-funded NSF projects. The outcome of the I-Corps projects will be threefold: 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. The go/no go decisions are made by the I-Corps team in consultation with the I-Corps Cognizant Program Directors.

An I-Corps award is for $50,000 and has a 6-month duration. Awards are made to teams of three individuals: a Principal Investigator (PI), an Entrepreneurial Lead, and an I-Corps Mentor. The Entrepreneurial Lead could be a Post-Doctoral scholar, graduate or other student with relevant knowledge of the technology and a deep commitment to investigate the commercial landscape surrounding the innovation. In rare circumstances, it also could be the PI. The Entrepreneurial Lead should also be capable and have the will to support the transition of the technology, should the I-Corps project demonstrate the potential for commercial viability. The I-Corps Mentor will typically be an experienced or emerging entrepreneur with proximity to the institution and experience in transitioning technology out of Academic labs. The I-Corps Mentor must be a third-party resource and may be recommended by the proposing institution or may be a member of the NSF-supported I-Corps network which is being put together at this time.

All teams must make a commitment to participate in a fixed curriculum. The curriculum is based on a course recently developed in the Engineering School at Stanford University, *Technology Entrepreneurship and Lean Startups*. The I-Corps curriculum is necessarily shorter, but also narrower in scope than the Stanford course. It is described in the NSF solicitation as a hypothesis-validation approach to identify and mitigate gaps in knowledge in the following seven areas: Value Proposition of the proposed product or service; Customer/User use-case and pain point; Demand Creation; Channel Development; Revenue Model; Partnership Strategy; and Resource Requirement. The I-Corps institute has just been expanded to two additional sites at the University of Michigan and Georgia Institute of Technology.

NSF made awards to 21 teams in September 2011 and an additional 25 teams in March 2012. The total anticipated funding level for I-Corps in fiscal year 2012 (FY12) is $5 million. The agency has requested $19 million for FY13. Among the witnesses for this hearing, **Neil Kane** is a mentor from the first cohort, **Gabriel Popescu** is a PI from the second cohort, and **Steve Blank** is the lead instructor for the I-Corps institute at Stanford and is helping the University of Michigan and Georgia Institute of Technology set up their own institutes.

5. Role of Universities and the Private Sector

Perhaps the two U.S. institutions best known for their entrepreneurial successes are the Massachusetts Institute of Technology (MIT) and Stanford University. In 2009 two professors at the MIT Sloan School of Management wrote a report on *Entrepreneurial Impact: The Role of MIT*[1]. They found that the 25,800 currently active companies founded by MIT alumni [as of 2003] employ about 3.3 million people and generate annual world sales of $2 trillion, producing the equivalent of the eleventh-largest economy in the world. In addition, they found that an estimated 6,900 MIT alumni companies with worldwide sales of approximately $164 billion are located in Massachusetts alone and represent 26 percent of the sales of all Massachusetts companies. MIT alumni-founded firms are also found in California, the Washington-Baltimore-Philadelphia belt, the Pacific Northwest, the Chicago area, southern Florida, Dallas and Houston in Texas, and the industrial cities of Ohio, Michigan, and Pennsylvania. In total, nearly 60 percent of the MIT alumni companies are located outside the Northeast. Stanford, in the heart

[1] http://www.kauffman.org/uploadedFiles/MIT_impact_brief_021709.pdf

of Silicon Valley, can tell a similar story. Among the thousands of companies founded by Stanford faculty and alumni are several Fortune-500 companies, including Cisco Systems, eBay, Google, and Nike.[2]

MIT faculty are able to take advantage of resources provided by the Deshpande Center, which operates something like an I-Corps program but for MIT faculty only.[3] Since 2002, the Deshpande Center, which is supported by private donors, has funded more than 90 projects with over $11 million in grants. The Stanford School of Engineering has the Stanford Technologies Ventures Program, which also brings in private support but is focused more on entrepreneurial education and training.[4] Stanford has many other entrepreneurial-focused groups and organizations on campus tied together by a formal network.[5] The Ewing Marion Kauffmann Foundation also supports entrepreneurial education and training activities at university campuses across the country, including the University of Illinois at Urbana-Champaign.[6] Many universities, such as Northwestern University, are using their own resources to broaden their outreach and entrepreneurial support for their faculty beyond the traditional legal role of university technology transfer offices.

The I-Corps program, itself a public-private partnership with some initial support from the Desphande Center and the Kauffman Foundation, is attempting to take some of the best practices at MIT, Stanford, and other very successful entrepreneurial research universities and build similar capacity at research universities of all sizes in regions across the country. Awards to date have been made to faculty at such diverse institutions as the University of North Texas, SUNY at Stony Brook, the University of Pennsylvania, and the University of Arkansas. Two-thirds of the awards made to-date have been made to PI's at public universities. Based on informal discussions with a number of I-Corps awardees, staff have learned of efforts by several awardees from the first and second cohorts to bring what they have learned from the I-Corps institute back to their own campuses. NSF officials and I-Corps awardees speak of this in terms of leveraging the $50,000 awards to build entrepreneurial capacity well beyond the teams themselves. This leveraging effect is part of NSF's long-term vision for the I-Corps program. Nevertheless, with private sector and university resources also supporting similar efforts, it remains a point of debate as to what the most appropriate and effective role is for each of the university, industry, and government partners.

[2] http://facts.stanford.edu/research.html
[3] http://web.mit.edu/deshpandecenter/index.html
[4] http://stvp.stanford.edu/about/
[5] https://sen.stanford.edu/
[6] http://www.kauffman.org/