In Support of Science and Manufacturing Programs under the Jurisdiction of the Commerce, Justice, and Science Subcommittee

Congressman Dan Lipinski (IL-03)

[Note to Subcommittee Staff: Congressman Lipinski requests that the Subcommittee fund the NSF's Innovation Corps at the level of $18.85 million and the NSF's Advanced Manufacturing program in the Engineering Directorate at $68.42 million, as found in the President's budget request.]

Chairman Wolf, Ranking Member Fattah, thank you for allowing me to speak before the Subcommittee today. I want to talk to you about ways that we can use the federal government's investment in science to create jobs, grow the US economy, and revitalize American manufacturing.

Chairman Wolf, I would first like to thank you for including report language in last year's final CJS appropriations bill requiring the Commerce Department to update its 2004 national manufacturing strategy. As you know, this is a topic that I have been working on for some time, and I appreciate your efforts to have the administration consider and update a comprehensive plan for supporting our nation's manufacturing sector.

While I support a number of science and manufacturing-related programs under the Commerce, Justice and Science Subcommittee's jurisdiction, I would like to highlight two programs at the National Science Foundation that deal with innovation and manufacturing. The first of these is the Innovation Corps, or "I-Corps", which is modeled after the best entrepreneurship class taught in Silicon Valley. This program to turn academic scientists who have received NSF grants into entrepreneurs has moved so fast it has gone from an idea on a whiteboard to a "lesson learned" in eight months. The total cost is small – only $7.5 million is being spent this year with $18.8 million requested for the upcoming year – but the potential value is enormous. Just consider that the founders of Google, whose early research was supported by the NSF, have created a company with almost $38 billion in revenue in 2011 alone.

America is home to the world's greatest universities and scientific researchers. Over the decades, their discoveries have made a massive contribution to economic growth and well-being. But given the size of the federal investment in research – $60 billion annually – the American people

should be getting even more new companies, jobs and industry-changing technologies for their money.

The problem is that academics often have no idea how to turn their groundbreaking work into a profitable company. When they try to leave the lab and build a business, they often flounder at the earliest stage, never translating their new technology into a product that meets a specific customer need and can yield a profit. Bridging the resulting commercialization gap that separates brilliant discoveries from the customer interest needed to attract investment has been a problem for decades.

This is where I-Corps comes in. I-Corps teaches academics pursuing NSF-funded research the "Lean LaunchPad" method to starting a business. Instead of raising a mountain of cash, building a product, launching it and hoping it finds buyers, a lean start-up focuses on talking to as many potential customers as possible, pivoting on a dime in response to the resulting insights, building low-cost prototypes to get customer feedback and constantly tweaking. It is a process designed to burn through flawed ideas – rather than hard-earned dollars – to create a thriving business.

The early results are promising: out of the first 21 teams to complete the course, 19 are pursuing commercialization of their technology. To give you an example, a professor from the University of Illinois, Yi Lu, is repurposing the glucose meters used by diabetics to monitor drug concentrations in patients. He aims to sell first to pharmaceutical companies performing clinical trials and then to expand to broader markets. Without I-Corps, he predicts it might have taken him two years to get to where he is today. Other teams are developing a robotic weed-killer for organic farms, a sensor that increases safety and efficiency for chlorine producers, technology that more efficiently cools electronic devices, and a better process for producing graphene, a new material whose pioneers recently won a Nobel Prize.

Of course, if experience teaches us anything, it is that most startups will fail. But history also teaches that proper nurturing can increase our success rate. And the projects that do succeed can provide an outsized return for the American people, more than justifying the very modest investment in I-Corps.

Some might ask why government should get involved in financing anything but basic research. If a business has potential, won't the private sector provide backing? No doubt that is true. But I-

Corps participants don't have a business yet. They only have a technology in search of a market. Private capital is happy to fund deployment and expansion. It is much less interested in funding the exploratory stage that comes first. The goal of I-Corps is to guide each team through that exploratory stage and into a position to attract private financing.

Consider also that I-Corps participants have already received government funding from NSF grants. If we are unable to provide researchers with the basic skills needed to commercialize their research, we will practically ensure that taxpayers receive a diminished return on their investment. Today, NSF is working to increase participation in I-Corps by expanding it to up to a dozen universities. Meanwhile, attendees are sharing what they learned with colleagues and students. And, encouragingly, other government agencies are looking to the program as a model.

The other program I'd like to highlight is the NSF's Advanced Manufacturing program within the Engineering Directorate. This program utilizes the basic research expertise of the National Science Foundation to overcome barriers to efficient manufacturing of high-tech products like nanomaterials and semiconductors. The president's budget request includes $68 million in the coming fiscal year for advanced manufacturing research in engineering. I have a special interest in this area because I wrote the section of the America COMPETES Act which authorized the program.

The program funds an engineering research center at the University of Illinois at Urbana-Champaign called the Center for Nanoscale Chemical-Electrical-Mechanical Manufacturing Systems. Researchers there are using new methods to create materials that are so small they can't be seen by the naked eye – only a few hundred atoms in width. Each piece needs to be created with a nearly identical shape, which can be a tremendous challenge. The center has formed partnerships with industry to get expertise from the business community, and also to teach businesses about research breakthroughs at the center.

The nanotech industry is growing by leaps and bounds, with worldwide revenues expected to exceed a trillion dollars a year within this decade. By assisting industry with the basic research needed for manufacturing breakthroughs, we can ensure that many of these jobs will be created in America and that American manufacturers get a leg-up on their international competitors. One example of a promising nanotech company in my district is Advanced Diamond Technologies, which has developed a way to capture the smoothness, hardness, and durability of diamonds in a thin film suitable for industrial applications.

These are the types of smart investments the federal government should be focused on in times of limited resources. By harnessing the full power of American ingenuity, we can help the private sector create new jobs which will grow our economy and bring down our budget deficit.

Mr. Chairman and Ranking Member Fattah, I thank you for the opportunity to speak before you today, and for your time and consideration of these important science and economic development programs.