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EXAMINING FEDERAL EFFORTS TO ENCOURAGE SMALL BUSINESS INNOVATION

FIELD HEARING

BEFORE THE

COMMITTEE ON SMALL BUSINESS AND ENTREPRENEURSHIP UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

FIRST SESSION

AUGUST 19, 2013

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C O N T E N T S

Opening Statements

Witnesses

Alphabetical Listing

EXAMINING FEDERAL EFFORTS TO ENCOURAGE SMALL BUSINESS INNOVATION

MONDAY, AUGUST 19, 2013

UNITED STATES SENATE,
COMMITTEE ON SMALL BUSINESS
AND ENTREPRENEURSHIP,
Manchester, NH.

The committee met, pursuant to notice, 1:17 p.m., in the Windermere Conference Room, 4th Floor, Southern New Hampshire University, College of Online and Continuing Education, 33 South Commercial Street, Manchester, NH, Hon. Jeanne Shaheen, presiding.

Present: Senators Shaheen and Ayotte.

OPENING STATEMENT OF HON. JEANNE SHAHEEN, A U.S. SENATOR FROM NEW HAMPSHIRE

Senator SHAHEEN. Good afternoon, everyone. You have to hit the gavel to make it official, you know.

[Laughter.]

I want to call this hearing of the U.S. Senate Committee on Small Business and Entrepreneurship to order, and I want to thank you all very much for coming. And I'm delighted to be joined today by Senator Ayotte.

We are here to discuss a topic that is very important to New Hampshire businesses, to the future competitiveness of this country, and that is how we can support innovation in our small businesses.

I am very pleased to be joined by Senator Ayotte to hold this hearing today, although she is not a member of the Small Business Committee. And some of you may have been here several years ago when we did a similar hearing when we were both members of the Small Business Committee. She, however, is now on the Commerce Committee, and they also have jurisdiction over many of the issues that we're going to be discussing today.

So it is very nice to be here with my co-Senator from New Hampshire. And as Dean Kamen said earlier this afternoon, we do work together in the interest of New Hampshire. So just to reassure everybody who thinks that none of us talk in Washington, the New Hampshire delegation actually does talk to each other.

I also want to thank everyone who has come today to New Hampshire to share your thoughts and your expertise, and thank Paul LeBlanc and Southern New Hampshire University for hosting us this afternoon. I think Paul is here somewhere. There he is.

Thank you very much for having us here and for all of your help in setting this hearing up.

I also want to recognize a few people who are in the audience. We have Seth Goodall, who is the new regional administrator for New England at the Small Business Administration. Seth, thank you for being here. Jeff Rose I think is here, although I have not seen him. He is the commissioner of the Department of Resources and Economic Development. So if he is not here yet, I think he will be here shortly. And, of course, Dean Kamen. It is always nice to have you join us, Dean.

I also want to point out that this is an official hearing of the Senate's Committee on Small Business and Entrepreneurship, so this hearing will be on the official record of the committee, and will help inform the committee's work going forward. We have an official reporter from the committee who is here. She is a staff member of the committee, and actually currently serves as the Small Business Committee's Ranking Member, Senator Jim Risch from Idaho—she is on his staff. So very nice to have you here, Meredith.

We also have staff from Senator Ayotte's office. I will let her introduce them so that I don't make any mistakes and miss anyone. And also am pleased to have staff from my office—Mike Vlacich who is my State director is here. And Scott Merrick and Chris Neary are also here, and they all worked very hard to help put together this hearing.

I wanted to begin by talking a little bit about how the process is going to work for the hearing this afternoon. Senator Ayotte and I will give opening statements. Then we would like to have each of our panelists give a statement of about two minutes to start off the discussion and give your perspectives on the topic. And we have a number of innovative New Hampshire companies from the software industry, to energy, to biomedical science here, so we are well represented. We also have our community college system represented, as well as venture capital, and members of the New Hampshire High Tech Council, and Federal agencies, including the Small Business Administration and the Department of Energy.

We have two of the major R&D agencies, the Department of Defense and the National Institutes of Health, who were invited but who were not able to be here this afternoon due to the budget challenges of sequestration. So we are especially excited to have Manny Oliver from the Department of Energy and—Edsel Brown from the SBA here. So thank you both for joining us.

We are looking forward to an open conversation where not only are we asking questions, but you all are also talking about the issues that you've seen and responding to each other as part of this roundtable. So it is going to be a little bit modified from the traditional committee hearing in that we will ask all of you to engage in the conversation.

If you have a point that you want to make, if you will just take your placard and put it on its side like this so that we can know to call on you. We will know who wants to weigh in at a particular time.

I also should note that this hearing will stay open for two weeks on the record, so anyone who would like to submit a statement or

any other comments, you will have the opportunity to do that, and it will be added to the record.

So as you all know, we are here to talk about innovation. It is a critical issue as we think about the future prosperity of this country. We need to continue to be a leader in science and technology. If we do not do that, it will be challenging for us to continue to compete because we are not going to compete with some of the developing world—India and China—in terms of low wage manufacturing jobs. That is not where we are going to be able to continue to be a strong country. We need to continue to innovate if we are going to create good jobs and remain competitive.

Our future is to be the global leader in science and technology. We make the best, most innovative products and services, and that ingenuity and excellence is our chief economic strength as a Nation.

Small businesses are the backbone of our economy, especially in New Hampshire, and they are often the drivers of innovation and new technologies. They employ nearly 40 percent of America's scientists and engineers, produce more than 14 times more patents than large businesses and universities, and they produce patents that are of higher quality and more than twice as likely to be cited according to the National Academy of Sciences.

Now, I understand that it is business and not government that creates good jobs. But I do think that Federal policies, as well as State and local, have a role to play in how we can help our small businesses create jobs. This is especially true in innovative and growing fields like biomedicine, energy, software, and other critical areas that will lay the foundation for our long-term economic growth as a Nation.

One of the very successful programs that has happened at the Federal level is the Small Business Innovation Research program. And we feel especially proud of this because Senator Warren Rudman is the senator who introduced the legislation. And it is not just a typical grant program. It helps small businesses compete for research and development that Federal agencies need to accomplish their missions.

Even though small businesses produce more patents than large businesses and universities, they receive only about four percent of Federal R&D dollars. Because of the SBIR program, small businesses that otherwise would not be able to compete for Federal R&D funding can win competitive awards that help them develop new products and customers, and create new jobs. SBIR leverages the entrepreneurial drive of small businesses to encourage the development of technologies and the commercial applications.

Now, for years the program operated on short-term extensions, which was bad policy both from the business perspective and from the Federal agency's perspective. Fortunately, two years ago the Small Business Committee was able to pass a six-year reauthorization that significantly increases the amount of R&D dollars going to small businesses, as well as provide some certainty that businesses need in order to plan. Both Senator Ayotte and I supported that because SBIR has proven to be such a highly successful public/private partnership.

And it is no surprise that New Hampshire businesses compete very well under the program, and we will hear from many of you this afternoon to talk a little about that.

So, we are looking forward to this discussion. We also want to hear from you about changes or ideas that you have for what we can do better in Washington. And when we did this hearing two years ago, Senator Ayotte and I took the information that we got from people testifying, and we went back to Washington, introduced legislation, and several of the provisions of that legislation have actually been voted on in the Senate. So, this is a real opportunity for us to look at what we can do to address the concerns that all of you have.

So, thank you very much. I will now turn to Senator Ayotte.

STATEMENT OF HON. KELLY AYOTTE, A U.S. SENATOR FROM NEW HAMPSHIRE

Senator AYOTTE. Thank you so much, Senator Shaheen. It is an honor to be here with you today and to work with you on these important issues that impact New Hampshire small businesses. And it is great to be together in another one of these hearings because as Senator Shaheen just said, we got great feedback from the last hearing we had, and were able to translate that into legislation to make sure that we were doing things more effectively with the Federal agencies that you interact with.

So I am honored to be here today with you, Senator Shaheen, and thank you so much for including me in this.

I also want to thank Southern New Hampshire University and Paul LeBlanc for hosting this. I think this is an appropriate setting to host this topic with the importance of education and, as Senator Shaheen has mentioned, particularly in the STEM fields where we see gaps that need to be filled to make sure that we continue to be the most innovative Nation in the world, which has driven our economy. And we are so proud of it.

I also want to thank very much the Federal agencies that are here, the SBA and the Department of Energy, all of you who are here today. I know so many entrepreneurs are here from New Hampshire, small business owners. This is a wonderful opportunity for us to hear from not only the public side, but particularly the private side, to get your viewpoints on how we can do better in Washington, as Senator Shaheen just said.

With me are two members of my staff, Tom DeRosa and Samantha Roberts. And so, obviously after this, if there are any particular issues that we can help you with or that you want to talk to us about, I would be honored to do that.

As Senator Shaheen mentioned, as members of the Senate Small Business Committee in 2011, we worked together, along with our Senate colleagues, to ensure that the Small Business Innovation Research and Small Business Technology Transfer programs were at long last given long-term reauthorization. So much of what happens in Washington is done on such a short-term basis right now, and one of the things we understand is that it is very difficult for you to plan with your business when we keep doing the short-term, whether it is a continuing resolution in terms of funding the government.

But an important program like this that, of course, Warren Rudman, who was just such a wonderful senator for New Hampshire, and unfortunately we lost this year, came up with this great idea. And we are going to hear about the impact of this here, not only in New Hampshire, but across the Nation, on entrepreneurship, on innovation, and the spinoffs in jobs that the private sector has created as a result of this important program.

Finally, I come from a small business family. I appreciate very much how difficult it is for many for you. In my family, we took our savings. We relied on credit to start a family business. And I know that many of you took significant risk to start your business and to be where you are today as successful business owners.

So we would like to hear also the obstacles and worries you have as small business owners, and how the Federal government can make sure that we create the best climate for you to innovate, to grow, because the foundation of the American economy is innovation and entrepreneurship. And if we do not continue to be a leader in innovation and entrepreneurship, we will not see the growth that we have seen. We will not see the wonderful technologies and products that this country has produced. And, most importantly, we will not be able to put the next generation to work.

And so, I very much want to hear from you today on any regulatory challenges that you face, anything that you think that we can do better as a government to make sure that we continue to be the most innovative country in the world.

So thank you so much for being here today. And I want to thank you again, Senator Shaheen, for all of the work that we have been able to do together and for inviting me to this hearing.

Senator SHAHEEN. Thank you very much. Let me just introduce our panelists this afternoon before I turn it over to you all to make your statements.

We have Dr. Bob Kline-Schoder, who is the president of Creare. Next, Jason Bundas, who is the manager of Infrared Systems for QmagiQ. Edsel Brown, who is the assistant administrator of the Office of Technology of the Small Business Administration. Thank you for joining us. Gray Chynoweth is the chief operating officer from Dyn. Thank you. Philip Ferneau, who is with Borealis Ventures, a venture capital business. And at this end, Dr. Nathan Torbick, who is from Applied GeoSolutions. Thank you for being here. Ross Gittell, who is the chancellor of the Community College System of New Hampshire. Very nice to have you here, Ross. And Manny Oliver, who is with the Small Business Innovation Research and Technology Business—the Small Business Technology Transfer programs with the U.S. Department of Energy. Nice to have you here. And Adam Rauwerdink, who is the business development manager from SustainX. And finally, Jake Reder, who is with Celdara Medical in Lebanon.

Thank you all very much for being here. I will ask, Dr. Torbick, if you would like to go first.

STATEMENT OF NATHAN TORBICK, Ph.D., APPLIED GEOSOLUTIONS, NEWMARKET, NH

Dr. TORBICK. Thanks for inviting me here. My name is Nathan Torbick. I am from Applied GeoSolutions. And also thanks to

Southern New Hampshire University. I just want to say I hear their soccer team is ranked seventh in the Nation, so I just want to make sure I got that on the record. And I will be very brief, very direct. We have a lot of people here, and I am sure we have many things to talk about. So I will not just reiterate my resume at this point.

The SBIR program has been instrumental in having the agency go from a pure R&D company to working with economic institutions, to truly commercializing that, to opening up new revenue streams. Our first SBIR was in 2005. We started in 2002 with basically one professor. We started consulting after we spun off from the University of New Hampshire. From that, NASA phase one and phase two awards in 2005 and 2008, to about 15 people today. We have had a threefold return on our investment from that original SBIR, so it does work. There are companies out there that move onto phase three and continue and continue.

And just at the top level, kind of the two or three main issues that I would like to emphasize is, one, just if there can be more uniformity across agencies—NASA, USDA, EPA. They all have their own hoops to jump through. My total office is 15 people. If I have to spend half my time kind of just doing different paperwork for different agencies, that really takes away from my time working on technologies, working on innovation.

Consistency, which I think you both mentioned. A continuing resolution makes it hard to plan. Phase ones are very short. I'm thinking can I hire somebody, can I not hire somebody? If I do not know what revenue streams are coming through the door, it makes it tricky for me to take that step and hire somebody new.

And then, just three, I think more connection between some of the program managers and some of the small businesses out there. If we can get them to our shop, to the field, if I can get in their rolodex more just to hear about what we are hearing, what they are doing. So better connection between some of the managers and some of the small businesses.

Thanks.

[The prepared statement of Dr. Torbick follows:]

Nathan Torbick, PhD
Senior Research Scientist
Applied GeoSolutions
www.appliedgeosolutions.com

Additional statement for the record:

Thank you for the opportunity to share insights on the SBIR program. The SBIR program has been instrumental in helping our small business grow. SBIR funding has allowed our company to take ideas and create commercial products and services while serving multiple government agencies. Since our first award in 2005 our company has grown threefold. Increasing the amount of SBIR funding by 2017 is a positive step for the SBIR program, and I hope the funding rate continues to increase as small businesses are the driver of the US economy.

Broadly, I would like to see more consistency in the program and uniformity across agencies. Each agency has their own set of standards and protocol which creates obstacles for small businesses. While there are specific missions for each agency that might require some flexibility, cross agency compatibility of application and reporting processes and a centralized database could improve efficiency For example, different agencies have varied standards for audited and accepted NICRA rates, approved security and data handling, and different submission systems. This would reduce the burden of ancillary expenses so the SBC can focus on developing innovative technology and applications. Additional consistency, such as reducing obstacles from Continuing Resolution gaps, helps SB plan for employees and allocate revenue streams.

Second, I would like to have more engagement between Programs, Program Managers, SBA, and SBCs. There can be disconnect between programs, SBCs, and opportunities. Making time to share details of innovations and programs will improve understanding and foster growth. Technology is a fast past environment so dialog and program sharing will ensure real time development and not stall out innovation.

Third, I would like more Public-Private Partnership (PPP) opportunities. Many opportunities available from Federal and State governments are not eligible to for-profit entities. Making a portion of these opportunities open to SBCs that have successful Phase 1 and Phase 2 technologies that are applicable to the opportunity / award will increase the return on investment made by the government and provide more support to SBCs to spur economic and technological growth.

Bio for Nathan Torbick:

Dr. Nathan Torbick came back to New Hampshire to join Applied Geosolutions after completing his PhD in Michigan in 2007. Applied Geosolutions is a small, high tech start up that centers on geospatial decision support tools for environmental applications. Nathan's research interests stretch across several disciplines and can be grouped into two broad categories. The first broad effort is related to watershed management and aquatic ecosystem assessment, for which he develops and applies satellite remote sensing and eco-epidemiological models to study aquatic health, impacts of stressors, and disease clusters. This work has been supported by a NIH SBIR. The second broad interest is agro-forestry applications to support carbon markets and food security. This work has been supported by NASA and USDA SBIR awards. He is proud to be a green technology developer and works regionally as well as around the world. Funding from SBIR awards has helped AGS grow technologies into commercial applications and grow revenue streams. Since our first SBIR award in 2005, AGS has tripled in size and support from SBIR has been instrumental in commercializing innovative technologies.

Senator SHAHEEN. Great. Thank you.
Dr. Gittell.

STATEMENT OF ROSS GITTELL, Ph.D., CHANCELLOR, COMMUNITY COLLEGE SYSTEM OF NEW HAMPSHIRE, CONCORD, NH

Dr. GITTELL. Yes. I am on this panel from a different perspective than the other panelists. I'm not a business person, but as chancellor of the community college system, I interact with businesses quite a bit. The community college system in New Hampshire is focused on aligning education and training programs with skills required by small businesses across the State of New Hampshire.

I would like an increase in the Federal government's focus on skills development, particularly for innovating companies. This could help create well paying jobs.

The reality when I talk to businesses across the State—innovating businesses—is that small businesses cannot innovate, nor compete effectively, without an appropriately skilled workforce. The skilled workforce for business innovation includes highly skilled engineers and scientists and Ph.D.s in the sciences and engineering. But it also includes so-called middle-skilled workers, those who have more than a high school degree, but less than a bachelor's degree.

A recent Brookings Institute study, released in June of this year, identified that over 50 percent of science, technology, engineering, and mathematics jobs—the STEM jobs—go to people with less than a bachelor's degree. This is the core workforce for many of our innovating companies. These workers, with the middle skills, require specific education and training in the effective application of technology at the workplace. And this is a focus area for the community college system of New Hampshire, and we are seeing a lot of opportunities to expand our programs in partnership with industry in this way.

The community college system includes seven regional colleges and three academic centers geographically dispersed across the State. This is very important because we cannot have innovative companies across the State of New Hampshire if we do not have an appropriately skilled workforce for those innovating companies. So whereas the SBIR program has been very successful, and, as Senator Shaheen mentioned, New Hampshire ranks very high in terms of SBIR awards in Phase I and Phase II. Awards concentrated around the greater Hanover-Lebanon area and close to UNH—they are not widely dispersed across the State of New Hampshire. And part of that is these companies have difficulty finding appropriately skilled workers throughout the State of New Hampshire.

So the community colleges across the State are focused on education and training programs in skills required by innovating businesses across the State of New Hampshire. And, by doing that, we hope to provide the workforce for these companies to grow, and also to launch the next generation of entrepreneurs across the State of New Hampshire across a variety of fields. We are focused on advanced manufacturing, we also have programs in computer programming, and other fields related to innovation.

An area where we see an opportunity for growth is with regards to the capability of community colleges to be involved in so-called tech transfer activities. We have highly-innovative companies in the State of New Hampshire, and some of the new technologies, some of the new technological processes that they are inventing could be applied across a broad range of industries in the State of New Hampshire, including many small businesses that then could enhance their competitive position.

I was fortunate to take a trip recently with Chris Way with the Department of Resources and Economic Development and others into Quebec. And Quebec has a very interesting model for tech transfers in their community college affiliates, where their 40 community colleges across the province provide tech transfer capabilities for businesses to come into the community colleges, work with community college faculty and students, and, transfer technology to the companies, and enable innovation to take place more readily.

So, I will end my testimony there. I think there are a lot of opportunities to expand what we do in the innovation base across the State of New Hampshire.

[The prepared statement of Dr. Gittell follows:]

Dr. Gittell Opening Statement:

Small businesses cannot innovate nor compete effectively without a skilled workforce. The skilled workforce for business innovation includes highly skilled engineers and scientists and it also includes *middle-skilled* workers, those with more than high school education and less than a baccalaureate degree. A recent (June 2013) study by the Brookings Institute identified that 50 percent of science, technology, engineering and mathematics jobs in the US do not require a bachelor's degree. Instead, they require specific education and training and the effective application of that training at the workplace. And this is a focus area for the Community College System of NH in partnership with businesses across New Hampshire.

CCSNH includes seven regional colleges and three academic centers, geographically dispersed across the state, positioned to deliver the training that our small businesses need, on a scale and timetable that fits their needs. CCSNH, like community colleges and community college systems across the nation, is engaged in the important work of educating and training those middle-skilled technicians, production staff, quality control specialists and administrative personnel required by innovating companies, small and large. And community colleges are helping to launch the careers of the next generation of entrepreneurs in advanced manufacturing, IT, green technology and other fields by introducing students – those just out of high school as well as older students involved in changing careers and upgrading skills – to new technology and innovative practices.

A priority of NH's community colleges is to broaden the innovation work of New Hampshire's small businesses. Through industry aligned programs, customized training, and curriculum developed in partnership with our regional employers, the community colleges create the skilled workforce that enables businesses to increase production and market share, develop new product lines, and apply their processes and output to new markets and industry sectors.

The Community College System of New Hampshire is involved in a US Department of Labor grant to ramp up training and education in advanced manufacturing throughout the state. We are also engaged with the University System of NH to increase the number of STEM graduates in New Hampshire. In each of these efforts we are partnering with small businesses across the state, companies like Costa Precision Manufacturing in Claremont; Tidland Corporation in Keene; Cross Machine in Berlin; Exacom in Concord; Rapid Machining in Nashua; and many more, with whom we partner in a variety of ways such as creating short course, stackable programs for employees, integrating software used in their businesses so students can move seamlessly into their employ with directly applicable skills; consulting on curriculum to ensure an appropriately-skilled workforce pipeline; and more. And the community colleges are engaged with software companies developing programing courses, with hospital and research university partners in the Upper Valley developing cybersecurity for healthcare offerings, and are working with biotech companies in the seacoast region to train workers for New Hampshire's biotech industry. These businesses are important employers in their communities and important economic engines for their regions and the state - companies engaged in manufacturing, healthcare, construction, machining, global communications, circuitry, and more.

An emerging role for community colleges in supporting small business innovation involves community colleges as sites for technology transfer of innovative practices and products to small businesses across a variety of fields like advanced manufacturing. The potential for us to increase these efforts was underscored to several of NH's community colleges leaders during a recent visit to colleges in Montreal and Quebec.

New Hampshire's small businesses have a partner and resource in the community colleges. Our focus is on working in alignment with NH employers to develop an appropriately skilled workforce for innovation-based companies across the state. NH's community colleges are uniquely positioned to educate and train the middle-skilled employees required by innovation companies, small and large.

COMMUNITY COLLEGE
system of New Hampshire

BIO: Chancellor Ross Gittell, Chancellor, Community College System of New Hampshire

Ross Gittell has served as chancellor of the Community College System of New Hampshire since February, 2012. Dr. Gittell is well-known in economic and policy circles as an authority in New Hampshire and the New England region for economic analysis and forecasting. With an extensive background in university teaching, strategic planning and management, Gittell's focus has been on applying economic, organizational and management theory to regional, state and community economic development issues. For many years, as a distinguished Professor at the University of New Hampshire's Whittemore School of Business and Economics, Gittell has frequently been a resource for government, non-profit and business decision makers in New Hampshire and nationally on such issues as economic policy, workforce development, job creation strategies, community development and the business climate. He is a board member of the New Hampshire Charitable Foundation and board member and forecast manager for the New England Economic Partnership and is the author of four books and over 100 articles.

Dr. Gittell received a Ph.D. in Public Policy from Harvard University, a Master's in Business Administration from the University of California, Berkeley, and a Bachelor's degree in economics from the University of Chicago. He holds the position as the James R. Carter Professor in the Department of Management at the Peter T Paul College at the University of New Hampshire. His teaching career in management and economics spans twenty years and includes, in addition to UNH, teaching at the Kennedy School of Government at Harvard University.

Senator SHAHEEN. Thank you.
Dr. Oliver.

STATEMENT OF MANNY OLIVER, Ph.D., DIRECTOR, SMALL BUSINESS INNOVATION RESEARCH AND SMALL BUSINESS TECHNOLOGY TRANSFER, U.S. DEPARTMENT OF ENERGY, WASHINGTON, DC

Dr. OLIVER. Senator Shaheen, Senator Ayotte, thank you for the opportunity to participate in this roundtable today. As Senator Shaheen mentioned, I am director of the Department of Energy's Small Business Innovation Research and Small Business Technology Transfer programs.

Senator SHAHEEN. Can I just ask you, do you have your mic on?

Dr. OLIVER. Can you hear me? Okay, sorry. Leveraging small business innovation is really the objective of the SBIR and STTR programs. They foster technological innovation in areas aligned with the DOE mission, which is clean energy, scientific leadership, and nuclear security. They also increase private sector commercialization of innovations derived from Federal R&D, thereby increasing competition, productivity, and economic growth. In Fiscal Year 2012 with a budget of $188 million, DoE issued five SBIR and STTR solicitations and made 257 Phase I awards and 110 Phase II awards.

We have worked aggressively to streamline and increase the transparency of these programs and to increase flexibility as provided by the recent National Defense Authorization Act of Fiscal Year 2012. Over the past two years we have decreased the time to review and select awardees from five and a half months to three months. We have also posted our solicitation schedules one year in advance, and we have made extensive use of webinars to educate small businesses about our topic areas and also the application process.

In addition, we have included tech transfer opportunities both from universities and DoE National Labs in our solicitations. And finally, we have—to eliminate the funding gap that occurs between Phase I and Phase II—implemented this past year a Fast-Track application process, which is essentially a combined Phase I and Phase II application.

Over the past two years we have also placed increased emphasis on commercialization outcomes, while at the same time preserving the emphasis on addressing high risk R&D opportunities aligned with the DoE mission. We have added a requirement for a brief Phase I commercialization plan. We have provided additional flexibility in our Phase II commercialization plan to accommodate longer time horizons for commercialization. And finally, we revamped our commercialization assistance program to be more accommodating to the wide variety of needs we have heard from small business.

I am happy to take feedback or questions about our programs, and look forward to contributing to this discussion.

[The prepared statement of Dr. Oliver follows:]

"Examining Federal Efforts to Encourage Small Business Innovation"
Senate Committee on Small Business and Entrepreneurship Roundtable
Monday, August 19, 2013
Manchester, NH

Introductory Statement
Manny Oliver
Director, SBIR/STTR Programs Office
U.S. Department of Energy

Senator Shaheen, Senator Ayotte, and other distinguished guests,

Thank you for the opportunity to participate in this roundtable discussion. I am Manny Oliver, Director of the Department of Energy's (DOE) Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Leveraging small business innovation is the objective of DOE's SBIR and STTR programs. These programs foster technological innovation in areas aligned with the DOE mission—clean energy, scientific leadership, and nuclear security--and increase private sector commercialization of innovations derived from Federal R&D, thereby increasing competition, productivity, and economic growth. In FY 2012, with a budget of $188 million, DOE issued five SBIR/STTR solicitations and made 257 Phase I awards and 110 Phase II awards.

DOE has worked aggressively to streamline and increase transparency of its SBIR and STTR programs and to increase flexibility as authorized in National Defense Authorization Act of Fiscal Year 2012 (Public Law 112-81). Over the past two years we have decreased the time to review and select awardees from 5 ½ months to less than 3 months. We have posted our solicitation schedules one year in advance and have made extensive use of webinars to educate small businesses about our topic areas and the application process. In addition, we have included technology transfer opportunities resulting from DOE-funded R&D at universities and

DOE National Labs in our SBIR/STTR solicitations. To eliminate the funding gap between Phases I and II we introduced Fast-Track applications (combined Phase I and II applications) in Fiscal Year 2013.

Over the past two years we have also placed increased emphasis on commercialization outcomes while at the same time preserving the emphasis on addressing high risk R&D opportunities aligned with the DOE mission. We have added a requirement for a brief Phase I commercialization plan, provided additional flexibility in the Phase II commercialization plan to capture longer time horizons to achieve commercialization, and revamped the DOE commercialization assistance program to be more accommodating to the differing needs of our small business awardees.

I am happy to take feedback and questions about the DOE SBIR & STTR programs and look forward to discussing how we can better encourage small business innovation.

Bio of Manny Oliver

Manny Oliver has been serving as the Director of the SBIR/STTR Programs Office within the Department of Energy since December 2010. Prior to joining DOE, Manny spent 16 years leading applied R&D and technology commercialization efforts at Motorola in Li ion polymer batteries, microfluidic biochips, haptics, and mobile surveillance. He has previously held positions as an Assistant Professor in the Department of Materials Science and Engineering at MIT and as a Member of Technical Staff at AT&T Bell Laboratories. He received both his B.S and Ph.D. degrees in Materials Science from MIT.

Senator SHAHEEN. Thank you.
Mr. Rauwerdink.

STATEMENT OF ADAM RAUWERDINK, BUSINESS DEVELOPMENT MANAGER, SUSTAINX, INC., SEABROOK, NH

Mr. RAUWERDINK. To the Senate Committee on Small Business and Entrepreneurship, good afternoon. I am Adam Rauwerdink, the manager of business development for SustainX, Inc. out of Seabrook, New Hampshire. And on behalf of SustainX, I would like to take a quick moment to thank you for your broad efforts in support of small businesses like us, and to share how the SBIR program, in particular, has played a critical role in our development.

Back in 2008, SustainX received both phase one and phase two SBIR awards. When we received the initial phase one award in 2008, that allowed us to hire our first full-time employee, to move into a 2,000 square foot facility in Lebanon, New Hampshire, and to quickly leverage $500,000 in additional private funding.

Today we are on the cusp of commissioning our first commercial-scale system. The initial technical validation that was made possible through the SBIR program enabled us to create nearly 40 high-quality, full-time jobs here in New Hampshire, to leverage over $30 million in additional funding from both the private and public sources, and to move to our current facility, which is a 40,000 square foot facility, in Seabrook, New Hampshire.

Likewise, I would also like to thank the State of New Hampshire through the Borealis Ventures' Granite Fund from Mr. Phil Ferneau, as well as the Green Launching Pad, which Ross was instrumental in, and also our members of Congress for their support.

Despite our rapid growth and our success, we are still a small business, and we can still benefit greatly from the programs made possible through the Small Business Administration. One recent change I would like to highlight in the recent changes is the clarity in the new SBIR size rules, which allows small businesses, like us and others, to continue their culture of innovation, even after initial venture capital funding.

I thank you once again for your efforts in support of small businesses like us, and ask for your continued support going forward. Thank you.

[The prepared statement of Mr. Rauwerdink follows:]

Statement of Adam Rauwerdink
SustainX, Inc.

Senate Committee on Small Business and Entrepreneurship,

Good morning. I am Adam Rauwerdink, the manager of business development for SustainX, Inc. of Seabrook, NH.

On behalf of SustainX, I'd like to take a moment to thank you for your broad efforts in support of small businesses like SustainX and to share how the SBIR program, in particular, played a critical role in SustainX's development.

SustainX received Phase I and II SBIR awards starting in 2008. The initial Phase I award enabled us to hire our first full time employee, to move operations to a 2,000 square foot facility in Lebanon, NH, and to quickly leverage $500,000 in private funding.

Today, we are on the cusp of commissioning our first commercial-scale product. The initial technical validation made possible through the SBIR program has enabled us to create nearly 40 high-quality, full-time jobs here in NH, to leverage over $30 million in additional funding from both private and public sources, and to move operations to our current 40,000 square foot facility in Seabrook, NH.

Likewise, we have received ongoing support from the State of NH, through Borealis Ventures' "Granite Fund" as well as the Green Launching Pad, and from our members of congress.

Despite our rapid growth and success, we remain a small business that can continue to benefit from the programs made possible by your committee. In particular, I would like to highlight the recent changes to the SBIR "size rules".

I thank you once again for your past efforts and ask you to continue your critical support of small businesses like SustainX.

Thank you

Bio of Adam Rauwerdink

Adam Rauwerdink is Manager of Business Development at SustainX, a developer of utility-scale storage solutions using compressed air. Adam manages the company's global go-to-market strategy and plays an active role in the broader strategic development of the company. Adam joined SutainX while pursuing a doctorate at Dartmouth's Thayer School of Engineering, from which he holds a Ph.D. in Engineering as the 2nd graduate of the Ph.D. Innovation Program.

Senator SHAHEEN. Thank you.
Dr. Reder.

STATEMENT OF JAKE REDER, Ph.D., CO-FOUNDER, DIRECTOR, AND CEO, CELDARA MEDICAL, LLC, LEBANON, NH

Dr. REDER. Good afternoon Senator Shaheen, Senator Ayotte, and members of the committee. My name is Jake Reder, and I am the Chief Executive Officer of Celdara Medical. Thank you for hosting this discussion and for seeking direct input from the small business community.

Celdara Medical is an independent biotechnology company located in Lebanon, New Hampshire. Michael Fanger and I co-founded the company in 2008 to address the challenge of translating academic innovations into products and services that can help patients. The SBIR program has helped us bring a diagnostic service to market, prepare a cancer therapy for the clinic, and advance four other therapies, all of which are at different stages of development.

Our thesis is that valuable medical innovation can be found at great universities across the country. However, in the absence of a local ecosystem of entrepreneurs and investors, the process of translating discoveries into products and services must be actively managed, and we manage this process.

We work in the life sciences sector where open innovation has been the rule for decades. Through licensing agreements, joint development agreements, joint ventures, financial investment, and a myriad of other contracts, companies now work within a highly interconnected value chain rather than relying solely upon internal staff. We are a link in this value chain.

The cost to bring a new drug to market is over a billion dollars. These costs start low, then rapidly escalate. Each step forward in the value chain is significantly more expensive than the previous. Each link in the value chain also relies upon different sources of funding.

Universities rely heavily upon Federal funding. Small businesses use a combination of Federal funding, angel or venture investment, and partnerships with large companies. The NIH budget is just over $30 billion, but the amount dedicated to small businesses is less than $0.7 billion, while the number of scientists and engineers working in small businesses is more than double the number working in the American university system.

Of course small businesses can access other sources of funding. Venture capital is an obvious one. Unfortunately this is an industry in severe contraction. Only 20 life sciences companies received venture capital funding for the first time in the first quarter of 2013, the fewest since 1995. Compare this to the 1,129 firms that received funding from the NIH SBIR program in Fiscal Year '12.

The SBIR program is outstanding and could be improved. The question is not how are we doing, but rather what could we do today to maximize our impact on the future? We greatly appreciate the opportunity to make the following recommendations:

First, significantly expand funding to the SBIR program. The dearth of alternative sources of capital has tightened a pre-existing bottleneck between academic discovery and the marketplace. Open-

ing the early development stage bottleneck will result in non-linear benefits not only to small business, but to the entire innovation value chain and American society at large. The pace of innovation is overwhelming the SBIR program.

Second, increase agency flexibility. SBIR firms participate in most sectors of the economy, and each sector has its own dynamic. The recent reauthorization has resulted in a rigid application of rules, including award size rules, across agencies. It is well appreciated that a technical proof-of-concept or, indeed, any technical milestone, has different costs in different sectors. Agencies should be allowed to exercise judgment regarding the appropriateness of award size. A one-size-fits-all approach is unsuitable.

Third and finally, continue to improve the efficiency of the innovation value chain itself. The open innovation model not only highlights the importance of Federal structures and laws, but also directly benefits from them. For instance, technology transfer offices, born of the Bayh-Dole Act, are one form of technology market, but one whose efficiency could be improved. We recommend that additional effort and focus be brought to bear on these aspects of the national system of innovation and the SBIR program, with a goal of significantly improving the efficiency of the entire innovation value chain.

Thank you for allowing Celdara Medical to participate in this roundtable. We appreciate the opportunity to share our perspectives with the committee, and I am glad to answer any questions you may have.

[The prepared statement of Dr. Reder follows:]

Celdara Medical

Celdara Medical, LLC
Centerra Resource Park, DRTC
16 Cavendish Ct.
Lebanon, NH 03766
USA

TESTIMONY OF JAKE M. REDER, PH.D.;
PRESIDENT AND CEO OF
CELDARA MEDICAL, LLC.

BEFORE THE
U.S. SENATE COMMITTEE ON
SMALL BUSINESS AND ENTREPRENEURSHIP

ROUNDTABLE DISCUSSION:
"EXAMINING FEDERAL EFFORTS TO ENCOURAGE SMALL BUSINESS INNOVATION"

Celdara Medical, LLC

AUGUST 19, 2013

Good afternoon Senator Shaheen, Senator Ayotte, and Members of the Committee. My name is Jake Reder, and I am the Chief Executive Officer of Celdara Medical, LLC. Thank you for hosting this discussion and for seeking direct input from the small business community.

Celdara Medical is an independent biotechnology company located in Lebanon, New Hampshire. Michael Fanger and I founded the company in 2008 to address the challenge of translating academic discoveries and innovations into products and services that can help patients. We currently employ 10 people, and have approximately 30 additional people working as consultants or contractors, or in various other capacities. To date we have brought a diagnostic service for systemic sclerosis to the market which helps doctors optimize treatments for their patients and drug developers optimize their clinical trials, we are preparing to enter the clinic with a promising cellular therapy for cancer, and we are advancing development programs in cardiovascular disease, atherosclerosis, severe sepsis, and oncology. We have signed partnerships with three public companies and expect to sign two more in the coming quarter. The Federal government has helped us to achieve each of these milestones. In 2011 we established an affiliate in Seattle, Washington, named Virtici Corporation. Our thesis is that valuable medical innovation can be found at great universities across the country, however, in the absence of a local ecosystem of entrepreneurs and investors (i.e. outside of Boston and San Francisco), the process of translating discoveries into products must be actively managed. We manage this process.

There are many challenges to early stage technology development. In the medical field, there is a high regulatory bar, which creates very long times to market (most biotech *companies* are sold before their first *product* is sold), and extremely high capital costs (the average cost to bring a new drug to market is over $1B). Further, biology is an incredibly complex discipline, which creates technical risk. These three attributes – long time to market, high capital requirements, and technical risk – make early stage biotech investment very difficult for venture capital investors, and harder still for angel investors. Of course financial investors don't fund academic research either – governments do, because to a society, the benefits of a vibrant science and engineering research base are clear, despite the lack of a simple way to measure *direct* economic returns. The Federal Government and many state governments have understood the challenge and extended public funding from *research* to *development* with programs like SBIR. These programs recognize the enormous benefits to society of entrepreneurial science and engineering companies, whether measured in terms of job creation, regional economic development, improvements in our quality of life enabled by new technologies, or in global competitiveness. Today I am thankful for the opportunity to describe our experience in the life science sector with these programs, and to share our perspective on how they might be improved.

Commercialization of life science innovation is accomplished through a sophisticated value chain of partnerships. A typical path for a first-in-class therapeutic is: 1) identification of a new biological target at a university, and creation of some proof-of-concept molecules; 2) development of lead compounds and preclinical development by a small business; 3) partnering for clinical development with either a multinational drug developer or a risk-capital investor (e.g. a venture capitalist); and 4) completion of late stage clinical trials and initiation of sales activities by a multinational corporation. Each player in the innovation value chain has a critical role, and efficiency is maximized when each player focuses on their respective role, i.e. the integrated company model has largely been replaced by integrated value chains with each link in the chain focused on their core competencies. Highly innovative labor pools are specialized by necessity. Open innovation[1] and the externalization of R&D at large companies improve efficiency of the entire chain. These strategies have been practiced by the pharmaceutical industry for decades. For example, McKinsey & Co. reported that in 2002, 38% of Phase III clinical assets were externally sourced which grew to 63% by 2007. Open innovation is now becoming mainstream in most technology-based sectors, *but the value of the entire innovation chain is limited by its weakest link.*

Each link in this life science development value chain relies upon different sources of R&D funding. Universities rely heavily on Federal funding. Small businesses use a combination of Federal funding, angel or venture investment, and partnerships with large companies. Large drug development companies use the public markets and sales of existing products. While the role of small business as a leader of step 2 (preclinical development) and a partner in step 3 (early clinical development) is no more nor less important than the roles of the other players in the value chain, funding sources for these activities are especially sparse. The NIH budget is just over $30B. The amount dedicated to small businesses is less than $0.7B, while the number of scientists and engineers working in small businesses is more than double the number working in the American university system (SBA and DOL statistics).

The problems with venture capital. Small businesses can certainly pursue non-governmental sources of funding, but the title of PricewaterhouseCooper's most recent MoneyTree™ report on life sciences venture investing says it all: "Capital crunch: First-quarter life sciences venture funding falls as investors turn to less capital-intensive industries". Venture dollars invested in the sector were down 14% year-over-year. The number of deals was down 16%. The venture industry itself continues to contract. The number of funds raised was down 34%, marking the slowest quarter for VC fundraising since Q3 of 2003. The situation is even worse for early stage biotechnology investment, with year-over-year investment dollars down 17% and the number of deals down 27% to just 53 deals nationwide in Q1 of 2013. Worse still, during Q1 of 2013, the life sciences sector experienced a dramatic drop in first-time funding, falling 52% from the previous quarter to just $98 million. This is the lowest quarterly amount since Q3 of 1996 and

[1] Open innovation is the antithesis of the monolithic corporation and recognizes the fact that "most smart people don't work here". According to Prof. Henry Chesbrough who coined the term, "Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology."

only the fourth time in survey history that the total fell below $100 million in a single quarter. **Only 20 life sciences companies received venture capital funding for the first time in Q1 of 2013, the fewest since Q2 of 1995. Compare this to the 1129 firms that received funding from the NIH SBIR program in FY12.**

Small businesses employ more scientists and engineers than large companies, universities, or the Federal Government, and alternative sources of funding are extremely limited and trending worse. *The Federal Government continues to be the key source of funding and provides essential stability for early stage life science innovation.*

The SBIR program is outstanding and could be improved. The SBIR program is an outstanding case study in how a government can encourage innovation, as both a significant and impressive track record and detailed data exist. The 2008 National Academy of Sciences Report on the SBIR program summarized, "Small businesses are a major driver of high-technology innovation and economic growth in the United States, generating significant employment, new markets, and high-growth industries." The pool of SBIR grantees can be viewed as a loose organization of scientists and engineers, and as such, it is one of the largest and most productive in the world, with over 100,000 granted patents, and over 700 public companies which have resulted from the program to date. World-changing companies such as Genzyme, Qualcomm, Amgen, Symantec, and Biogen Idec have all been started from this pool of SBIR-funded technologists. This huge entrepreneurial labor force is highly motivated, and works harder for less pay than industry norms because of the value of ownership (equity). Even a small improvement in the efficiency of such a formidable collection of resources can have - and indeed has had - enormous benefits to American society. *This is the opportunity.*

Through the boom and bust cycles of venture investment, the SBIR program has remained relatively stable, and has become an essential part of the American innovation machine. But the flow of innovation is limited by its narrowest point, or conversely, debottlenecking this early development stage improves outcomes across the entire system. The question is not, "how are we doing?" but rather, "what could we do today to maximize our impact on the future job market, the economy in general, and national competitiveness across the range of high tech industries?"

We greatly appreciate the opportunity to make the following recommendations, based upon our direct experience with Federal innovation programs:

When viewed from the perspective of the innovation value chain, and considering the relative costs and sources of capital, the need in the market, and the exceptional societal returns of the current program, our first recommendation is clear: **significantly expand funding to the SBIR program**. The dearth of alternative sources of capital has tightened a pre-existing bottleneck between academic discovery and the marketplace. Opening the early development stage bottleneck will result in non-linear benefits, not only to small business, but to the entire innovation value chain and American society at large. At some level of funding there will clearly be diminishing returns, but we are nowhere near that level - thousands of academic

innovations die on the vine each year due to a lack of early stage funding and expertise. I have first-hand experience serving on NIH study sections where highly meritorious applications are not funded due to the overly competitive nature of the program. Reviewers end up funding highly polished, low-risk, incremental applications rather than taking a chance on riskier, but potentially world-changing innovations. *The pace of innovation is overwhelming the SBIR program.*

Provide or at least allow costs from high quality service providers. When we start development work on a new therapy or diagnostic, the only tangible asset is the associated intellectual property (IP). Consequently, we spare no expense to ensure that the IP is as strong and as valuable as possible. But this is not an easy decision financially. Currently, fees paid to intellectual property attorneys are unallowable under SBIR rules. While we understand the rationale for this rule, it does not solve the problem: underfunding IP protection decreases asset value, decreases probability of success in partnering, decreases probability of success in attaining investment, decreases probability of success in the market, and decreases the overall impact of the SBIR program. Similarly, high quality regulatory expertise is expensive, and usually only affordable under a Phase II award. The NIH's National Heart, Lung, and Blood Institute recently hired a full-time regulatory expert who is available to counsel SBIR awardees. This type of initiative is greatly appreciated and should be lauded and expanded - one expert cannot serve the entire NHLBI community. Taking the concept a step further, the Federal Government could use its purchasing power to negotiate on behalf of SBIR awardees with the best private sector IP and regulatory service provider firms to create a reasonably-priced, high-quality virtual resource for SBIR awardees. There is no doubting the value of high quality service providers to early stage technology firms and to the technologies they're developing; *let's make the decision to use them easier.*

Increase agency flexibility. By allowing each agency and indeed individual institutes to respond to the realities of their specific sectors and organizational goals, best practices emerge. Prudent experimentation and optimization yield a continuously improving program. As stated in the NRC's 2008 assessment of the SBIR program, "A major strength of the SBIR program is its flexible adaptation to the diverse objectives, operations, and management practices at the different agencies." SBIR firms participate in most sectors of the economy, and each sector has its own dynamic. We also support the recommendation regarding award size from the NRC study: "It should be stressed that recommendations are intended as *guidance* for standard award size. The SBA should continue to provide the maximum flexibility possible with regard to award size and the agencies should continue to exercise their judgment in applying the program standard. Recognizing agencies' need for flexibility to meet new technical or mission challenges expeditiously—such as countermeasures for biological threats or Improvised Explosive Devices—strict limits on the minimum or maximum amount for awards should be avoided." The recent reauthorization has resulted in a rigid application of award size rules across agencies. It is well appreciated that a technical proof-of-concept or indeed any technical milestone has different costs in different sectors. *Agencies should be allowed to exercise judgment regarding appropriateness of award size. A one-size-fits-all approach is unsuitable.*

Celdara Medical, LLC

Continue to improve the efficiency of the innovation value chain. The benefits of open innovation have been thoroughly studied from the perspective of individual firms, and some studies have detailed the benefits to "national systems of innovation" globally. Interestingly, the open innovation model not only highlights the importance of Federal structures and laws, but also directly benefits from them. Specifically, governments' creation of efficient technology marketplaces, facilitation of collaboration between links in the value chain, investments in education, training, and R&D, and protection of intellectual property rights have been shown to yield valuable synergies as economies move toward open innovation. For instance, technology transfer offices, born of the Bayh-Dole Act (Pub. L. 96-517, December 12, 1980) are one form of technology market, but one whose efficiency could be improved. Contract and IP law are additional examples of the importance of governmental involvement in open innovation. In the absence of strong contract and intellectual property law, collaborative discussions between companies become high risk and less likely. The SBIR program itself has always been more than a source of funding. SBIR has been involved in education and training, facilitation of collaboration, and even the creation of technology marketplaces. We recommend that additional effort and focus be brought to bear on these aspects of the national system of innovation and the SBIR program, with a goal of *significantly improving the efficiency of the entire innovation value chain.*

Due in large part to *the translation of* NIH research *to the market*, our nation has gained about one year of longevity every six years since 1990. A child born today can look forward to an average lifespan of nearly 79 years – nearly three decades longer than a baby born in 1900. People are living longer and their quality of life is improving: in the last 25 years, the proportion of older people with chronic disabilities has dropped by almost one-third.

The Federal Government's support of entrepreneurship and small business is one of the things that make this country great. This support enables American innovation and encourages immigration of the best and brightest from around the world. The SBIR program is an outstanding example of this support. It is an outstanding program, so let's improve it. We find ourselves at a time when an expansion and optimization of this program could be transformative.

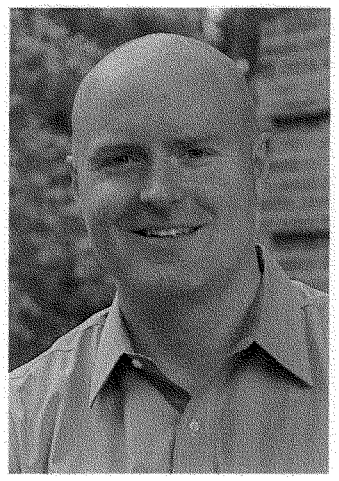
Thank you for allowing Celdara Medical to participate in this roundtable. We appreciate the opportunity to share our perspectives with the Committee. I am glad to answer any questions you may have.

Jake Reder, Ph.D.
Cofounder, Director, & Chief Executive Officer
Celdara Medical, LLC

Jake cofounded Celdara Medical, LLC (CM) in 2008 with Dr. Michael Fanger as a way to bridge academic innovation and the marketplace. CM has subsequently employed a unique, highly capital-efficient business model to grow to encompass five funded Programs and a large pipeline, including a CLIA certified diagnostic service which is in the market and being reimbursed, and a cellular therapy that will enter the clinic this year.

Jake had previously founded the New Ventures Office at Dartmouth Medical School and still serves as its first Director. Previously Jake led new business platforms and projects, external innovation, and knowledge management initiatives at Cabot Corporation. He started up Cabot's Printed Electronics Business and Optical Composites Platform, and was a member of Cabot's Research Council, Technology Board, and Nanotechnology EHS Council. Jake joined Cabot's New Business Development team from PolyTechnos Venture-Partners, a Munich-based venture capital firm where he conducted due diligence and advised on early stage technology investments.

Jake has studied, worked, and taught in Canada, Germany, and the United States. He has served on the Boards of the Center for Biological and Environmental Nanotechnology at Rice University, TechConnect, Everybody Wins! Metro Boston, the Cabot Boston Credit Union, and the Billerica Partners for Education. He is a cofounder and Director of Knowmata GmbH and Whooc, LLC/Ltd, a Director of Virtici Corp. and Stemsynergy Therapeutics, Inc, an Advisory Board Member of NIH's TREAT Program and the New Hampshire High Technology Council Bio/Medical Forum, and a Consultant to the University of Vermont's SPARK Program. Jake earned a B.Sc. with First Class Honours from the University of Waterloo, and a Ph.D. (Chemistry) as a Brown-Wetherill Fellow at Purdue University and Ludwig Maximilians Universität.



Senator SHAHEEN. Thank you.
Dr. Ferneau.

STATEMENT OF PHILIP FERNEAU, BOREALIS VENTURES, HANOVER, NH

Mr. FERNEAU. Unfortunately, I am not a doctor.
Senator SHAHEEN. Mister.
Mr. FERNEAU. Senator Ayotte, Senator Shaheen, I appreciate the opportunity to be here to share in this discussion and highlight these important issues that you have tabled for today.

I echo many of the comments that have been made about the SBIR program, but I want to highlight another aspect of access to capital that is important to many of our emerging companies.

By way of background, I am a managing director of Borealis Ventures, a venture capital firm based in New Hampshire that I co-founded in 2001. Working from offices in Hanover and Portsmouth, New Hampshire, my two partners and I have invested in over 30 emerging companies over the past decade, and half of those have been based in New Hampshire, covering sectors like software, life sciences, mobile, and digital media industries. My particular investment focus has been commercializing technologies out of Dartmouth and other research institutions, particularly in the life sciences.

Besides my work at Borealis as an investor, I am an adjunct professor at Dartmouth's Tuck School of Business, where I have taught venture capital courses and entrepreneurship topics since 1999. I also was the co-founder and executive director of the Center for Private Equity and Entrepreneurship. And I am also a trustee of Dartmouth's local incubator, the Dartmouth Regional Technology Center, a non-profit business incubator in Lebanon.

While there are a number of ways in which the Federal government has successfully encouraged small business innovation, and should continue to do so, I wish to focus just now on one of these: increasing access to early stage capital.

My partners and I established Borealis Ventures because we believed that New Hampshire's entrepreneurial potential was being held back by its dependence on out-of-state investors. To put that into perspective, at the time before we started, less than one percent of all venture capital invested in New Hampshire came from in-state sources.

Over the past decade, we have been the most, or one of the most, active venture investors in the State, and we have demonstrated that investing in New Hampshire's entrepreneurs can produce attractive financial returns. But even with this successful track record, it remains a challenge to convince investors from outside of the State to allocate capital to a New Hampshire-based firm.

So, New Hampshire's innovative emerging businesses are still lacking adequate access to local sources of early-stage capital. That one percent figure that I quoted earlier of—coming from New Hampshire-based sources of capital—still persists, even with all that we try to do at Borealis.

Fortunately, one initiative that I want to highlight, the State Small Business Credit Initiative, which is part of the Small Busi-

ness Jobs Act of 2010, is helping to address the situation. Senator Shaheen, we thank you for your efforts on that initiative.

The SSBCI provided Federal funding to strengthen State programs for small business financing. While the SSBCI emphasizes lending programs, the State of New Hampshire worked with the Treasury Department to use SSBCI funds to promote venture investment in the State. This innovation was administered by the New Hampshire Business Finance Authority, and they really took a leadership role, along with the State legislature, to make that possible.

Borealis Ventures partnered with the BFA under this program to establish the Borealis Granite Fund, which is the first and only venture capital fund that has been solely committed to building New Hampshire's emerging technology companies. Since we launched late last year, around Thanksgiving, we have already invested in five entrepreneurial companies. Actually, we have invested in seven companies, but two of these investments have not been announced yet by the companies themselves. Two of our portfolio companies are participating in today's roundtable: SustainX and DYN. Our other investments include two life science start-ups (one focusing on molecular diagnostics and the other, a bio processing company) which we have been involved in helping to get launched, as well as an early-stage cloud-based software firm.

We expect that we will continue to invest at this active pace, thanks to the Granite Fund's support. We have a great pipeline of promising opportunities going forward, and overall we expect that the Granite Fund will be able to invest in at least 20 New Hampshire-based technology companies in the years ahead.

We think these companies will have a meaningful impact on the State's economy, through not just the skilled jobs that they will create, but also the innovations they will bring to market and the downstream "cluster effect" that we can create in the State as well. While we invest locally, these are companies that have a global impact, and we have seen that broader impact consistently.

I hope that the Granite Fund's example will encourage addition Federal initiatives to increase access to early stage capital, particularly outside of the traditional venture capital markets. New Hampshire historically—and we can talk about the statistics later—is somewhere between 25th to 35th out of 50 States in terms of venture investment, but we still have the smallest share of in-state capital. And I think we can all appreciate that things are different when you have a local partner than when you have a distant partner.

In the interest of time, I only will highlight three other things that are important to small business innovation. One is, as we have heard, the importance of SBIR/STTR programs. Many of the companies in which we have invested have taken advantage of these programs. At the same time, I think those companies all would find that there are opportunities to make the program more effective, and particularly more accessible for the earliest stage companies.

A second point to highlight is infrastructure investment for entrepreneurial ecosystems. The Commerce Department's EDA was instrumental in helping us get the Dartmouth Regional Technology

Center established. And, again, Senator Shaheen, we appreciate the effort that you and your staff put into getting that off the ground. The DRTC has been very important in building an ecosystem around the center—biotech companies in particular for the Upper Valley.

And third I would just highlight that immigration reform is an example where we do not need to spend more money. We just need to adjust Federal programs to allow human capital to rise to the entrepreneurial potential that we have. Also, the JOBS Act has been important in a number of ways downstream for making IPOs more accessible to growing companies, and also opening up the universe of people who can invest to provide additional access to capital for emerging companies.

In closing, I want to thank the committee. I want to thank Senator Shaheen and Senator Ayotte and your staffs for making this roundtable possible. This is a really valuable opportunity to highlight the important role the Federal government does have in advancing our Nation's innovation economy and our entrepreneurial ecosystems. Thank you.

[The prepared statement of Mr. Ferneau follows:]

Statement of Philip J. Ferneau
Managing Director and Co-Founder
Borealis Ventures

Roundtable in Manchester, NH on
"Examining Federal Efforts to Encourage Small Business Innovation"
Committee on Small Business and Entrepreneurship
United States Senate
August 19, 2013

Senator Shaheen, other members of the Committee, and Senator Ayotte, my name is Phil Ferneau and I am pleased to participate in today's roundtable on Federal efforts to encourage small business innovation. I am a Managing Director of Borealis Ventures, a venture capital firm based in New Hampshire that I co-founded in 2001. Working from offices in Hanover and Portsmouth, my two Borealis partners and I have invested in over 30 emerging technology companies (half based in New Hampshire), primarily in the software, life sciences, mobile, and digital media industries. My particular investment focus is commercializing innovations (mostly in the life sciences) developed at Dartmouth College and other research institutions in New Hampshire and beyond.

Besides my work as a venture investor at Borealis, I am an adjunct professor at Dartmouth College's Tuck School of Business, where I have taught venture capital and entrepreneurship topics since 1999 and previously served as the founding Executive Director of the Center for Private Equity and Entrepreneurship. I am also a trustee of the Dartmouth-Regional Technology Center, a not-for-profit business incubator in Lebanon, NH.

Based on my experience, I believe there are a number of way in which the Federal government has successfully encouraged small business innovation and should continue to do so. In the interest of time, I will focus my remarks on just one of these -- increasing access to capital – and then touch only briefly on several others.

Expanding Access to Early Stage Capital

Federal programs to expand access to early-stage capital have played an important, and often unrecognized, role in our nation's innovation economy. Break-through technologies develop in universities and communities across the U.S., but entrepreneurs in many parts of the country are unable to access early-stage funding to pursue those opportunities because venture capital firms are concentrated in a small number of metropolitan areas. In fact, we originally founded Borealis Ventures because we believed that New Hampshire's entrepreneurial potential was being held back by its dependence on out-of-state sources of early-stage capital. To put that dependence in perspective, before we started Borealis, less than 1% of venture capital invested in New Hampshire came from in-state sources.

The Federal government has long recognized this national market underinvestment problem and sought to address it by partnering with private investors to establish new sources of early-stage capital across the country, with the SBIC program as its flagship effort. Unfortunately, the SBIC program has changed over time to emphasize debt financing for more established, non-technology businesses. As a result, emerging technology companies in many regions still lack adequate access to local sources of early-stage capital.

The SBIC program is not the only Federal initiative to expand access to early-stage capital, however. The State Small Business Credit Initiative (""SSBCI") of the Small Business Jobs Act of 2010 provided Federal funding to strengthen state programs for small business financing. While the SSBCI focuses on lending programs, the State of New Hampshire worked with the Treasury Department to use SSBCI funds to promote investment in venture capital firms serving the early-stage equity needs of NH businesses. This new innovation business job growth program is administered by the NH Business Finance Authority.

Borealis Ventures has partnered with the BFA under this program to establish the Borealis Granite Fund, which is the first and only venture capital fund solely committed to building New

Hampshire's next generation of high-growth technology companies. Since launching late last year, the Borealis Granite Fund has already invested in five entrepreneurial companies, including two of the companies participating in today's roundtable, DYN and SustainX, as well as two life science start-ups and an early-stage cloud-based software firm. We expect to complete two additional investments this quarter, and are actively considering a large and growing pipeline of additional promising investment opportunities looking ahead. Overall, we expect the Granite Fund will invest in more than 20 emerging companies in New Hampshire, and are confident those businesses will have a meaningful impact in the state's economy and beyond through the skilled jobs they create and the innovations they bring to market.

The Granite Fund and its positive impact on NH's innovation economy are possible because of the Federal SSBCI support and its implementation through the NH BFA program. I would like to thank Senator Shaheen for her strong support of the SSBCI program, and express appreciation for the Treasury Department's flexibility and effort in working with the NH Business Finance Authority to implement NH's program. The BFA's executive director, Jack Donovan, deserves special recognition for his vision and committed effort in collaborating with the state legislature and Treasury Department to establish and administer this innovative approach to increasing access to early-stage capital.

I hope the Granite Fund's example will encourage additional Federal initiatives to increase access to early-stage capital, particularly outside of traditional venture capital markets. This could be accomplished either through similar state-level programs under an extension of the SSBCI program or by revising the SBA's SBIC program to allow for the sort of participating security structure that worked previously.

Other Federal Efforts

With regard to other forms of Federal support for entrepreneurial innovation, I would like to touch briefly on three of these: grants for technology commercialization; funding infrastructure for entrepreneurial ecosystems; and immigration reforms.

Non-dilutive grant funding under Federal SBIR, STTR and similar programs helps emerging companies develop and commercialize their innovations.[1] I believe that expanding and modifying these programs would further strengthen our nation's innovation economy. Specifically, I recommend: an increase in total SBIR/STTR funding by raising the agency allocation percentages; making more of the total funding available to the most qualified applicants regardless of the extent to which they have raised outside venture capital; and modifying the SBIR/STTR programs to improve their accessibility for qualified applicants that have not been awarded SBIR/STTR funding previously (*e.g.*, expanding "Phase 0" programs and higher caps on individual awards).

Besides programs to increase early-stage capital and commercialization grants to individual companies, the Federal government can also play an important role in helping to fund infrastructure and programs to foster the entrepreneurial ecosystems critical to new venture formation and success. One example of this is the EDA funding that helped to construct the Dartmouth Technology Center, a non-profit business incubator in Lebanon, NH. The DRTC has housed and helped nurture dozens of early-stage technology companies, particularly life sciences start-ups commercializing research from Dartmouth College and the Dartmouth-Hitchcock Medical Center. EDA support helped fund both the original construction and a significant expansion of the building, and has allowed the DRTC top operate without the debt burden that has crippled other incubators. The recent expansion provided more space not only for start-ups, but also for a world-class operation of Merck & Co., whose presence adds to the DRTC's intellectual vibrancy and helps anchor the region's bioengineering cluster. I want to thank Senator Shaheen for her early support of the DRTC and recognize the dedicated efforts of EDA Regional Director Willie Taylor.

[1] According to economic researchers at Dartmouth College and UNC-Greensboro, The data show that firms receiving SBIR funding are able to overcome the initial technology-based hurdles that small, entrepreneurial firms frequently face, thus facilitating a more permanent and possibly longer-term employment growth." Albert N. Link and John T. Scott, "How the Small Business Innovation Research (SBIR) Program Matters" (June 2012 Working Paper), p.2. Available online at http://bae.uncg.edu/assets/research/econwp/2012/12-07.pdf.

The last form of Federal impact that I wish to highlight does not involve funding, but rather immigration reforms. I believe there are relatively simple immigration reforms that would drive innovation in the U.S. and promote its entrepreneurial economy, such as establishing an "INVEST Visa" to allow talented foreign-born entrepreneurs build their new ventures in the U.S., expanding the H-1B program for skilled workers, and expediting green cards for foreign nationals graduating from U.S. universities with advanced degrees in STEM fields. Thank you, Senators Shaheen and Ayotte, for your past support of such measures.

In closing, I want to thank the Committee, particularly Senator Shaheen and her staff, for organizing this roundtable discussion. It is a valuable opportunity to highlight the Federal government's important role in advancing our nation's innovation ecosystem and entrepreneurial economy. Finally, on behalf of Borealis Ventures and the emerging companies with whom we work, I would like to express our appreciation for the many efforts over the years by Senators Shaheen and Ayotte and their staffs in support of New Hampshire's entrepreneurs and their continued opportunity to help drive U.S. competitiveness.

Senator SHAHEEN. Thank you.
Mr. Chynoweth.

STATEMENT OF GRAHAM CHYNOWETH, CHIEF OPERATION OFFICER, DYN, INC., MANCHESTER, NH

Mr. CHYNOWETH. Good Afternoon. Thank you very much for having me, Senators. My name is Gray Chynoweth, and I am the Chief Operating Officer at Dyn, which is an internet infrastructure technology company. Through traffic management, message management, and performance assurance, Dyn is connecting people through the Internet and ensuring that information gets where it needs to go faster and more reliably than ever before. The crossroads of consumer behavior and enterprise performance is where Dyn delivers.

We started in Worcester and came back here because a number of the leadership of the company were based in New Hampshire. So with that preface, I would just get to kind of the things that we see sitting as a company that has never received Federal funding and participates in the New Hampshire ecosystem aggressively because we see it as in our corporate interests to have a vibrant innovation ecosystem in New Hampshire.

And I think the first thing that I will kind of key in on is talent. There are three pillars—talent, capital, and community—that we believe engage and enliven an entrepreneurial ecosystem and an innovation ecosystem.

So the first one is higher education. And if I had a recommendation or an encouragement, it would be to enact things that encourage universities and community colleges to have institutional flexibility to meet the needs of business. You know, much is—you know, long has been the discussion about the kind of ivory tower. And I think as you see innovation—the pace of innovation increasing, what that means is that educational institutions become more and more and more out of touch with, especially information technology, with what the needs are of businesses.

So encouraging them to think about how do we get classes—you know, how do we get degrees in classes that are suited to today's business out more quickly? How do we ensure that we have flexibility as an institution to allow that to happen?

The second thing on talent would be immigration reform. You know, we do not view ourselves as competing with Boston. We are competing with Bangalore. We are competing with Brussels. So it will in the long run serve the United States' economy and all of our citizens if we allow the most talented people to come here. We have had our own challenges and have had to wind the path through immigration to get some of the most talented people we have, and those people have brought in lots of money to the company and have created lots of jobs. So they are creating jobs for us in America.

Capital. I could not emphasize more Phil's comments. You know, that really—the Granite Fund is incredibly important. Getting that release stage capital happening in New Hampshire is really important and has really not been a very successful place for early stage investing. And that is a big part of making that happen.

On community, I guess kind of two points. One, I think the exact type of thing that you did with the DTRC, it would be worthwhile if we could figure out how to do it in other parts of the State, because when you have people that are specifically dedicated to fomenting that type of entrepreneurial activity, it breeds lots of excitement and activity, and you need to kind of bring people the innovation life cycle.

Most people are not risk takers initially. You have to encourage people to have the ideas. You have got to bring them through different stages of entrepreneurship to that moment when they feel comfortable to quit their job, and go off and start something new. That is not something that just—most people just wake up and do. Some people do, but a lot of people need to be brought through the process to a place where they can feel confident in doing that.

The last thing that I would say in addition to kind of community is, you know, welcoming this. This is the perfect example of focusing—of using your platform to focus the community on entrepreneurship.

And the last thing would be cost. I think, you know, there is a lot of discussion about taxes in Washington and taxes in New Hampshire. And I think our position is that assuming that we can get the same services from government, we would always like to pay less for them. But if it is the case that, you know, you take the tax dollars and you put them to good use, I think that most businesses would agree that that is an important part of enabling us to grow. So whether that is, you know, infrastructure like rail to Boston, or whether it is ensuring that we have internet all over the State, those type of basic level services that are enabled by government investment certainly make it easier for us to succeed as a business.

So, thank you very much for your time, and I look forward to the discussion.

[The prepared statement of Mr. Chynoweth follows:]

WRITTEN STATEMENT

To: Small Business Committee – United States Senate
From: Graham Chynoweth, COO, Dynamic Network Services, Inc.
Date: August 19, 2013

Good Afternoon, I serve as the Chief Operating Officer for Dynamic Network Services, Inc. ("Dyn"). Dyn solutions are at the core of Internet performance. Through traffic management, message management and performance assurance, Dyn is connecting people through the Internet and ensuring information gets where it needs to go, faster and more reliably than ever before. The crossroads of consumer behavior and enterprise performance is where Dyn Delivers.

Dyn was incorporated in 2001 in Worcester, Massachusetts while its co-founders were in college. When they looked to move their company upon graduation they were encouraged to go to a more established tech ecosystem like Silicon Valley or Cambridge. However, they believed they could create a thriving company in their native New Hampshire.

Flash forward to today and Dyn provides Internet performance solutions for more than four million active users worldwide, has additional offices in San Francisco and the UK and, in 2012, received a $38 million Series A. Despite this success, Dyn knows it has not achieved this in a vacuum and that to continue to grow a healthy innovation economy needs to exist both nationally and in New Hampshire.

A healthy innovation economy exists when a healthy innovation ecosystem is in place. The pillars of an Innovation Ecosystem are Talent, Capital and Community. These areas of emphasis are not new, however the ways in which individuals and institutions in the talent, capital and community arenas interact with them are changing. State government needs to adjust its approach and focus its efforts to help where it can and stay out of the way when a lighter touch is required. A copy of the 2CT map that calls out individuals and institutions that are driving the innovation ecosystem in the state is included as an attachment to this memorandum.

New England and New Hampshire are high cost areas to do business when looked at from a national and global perspective. Government cannot change this fact; larger economic forces are too powerful. However, government should focus effort on taking actions that help reduce healthcare and energy costs. With respect to taxes, it should be noted that, assuming businesses would receive the same services from state government, all businesses would favor lower taxes. With that said, no business would trade lower taxes for a poor workforce or poor transportation or communication infrastructure. The current State tax environment favors employees and businesses where much of the profit goes to owners in the form of reasonable compensation. When thinking about taxes, government

should focus on ensuring the tax climate is predictable and that the taxes that are collected from businesses drive the delivery of services that help the economy succeed (infrastructure, education, etc.)

We view three areas as key areas of focus when thinking about how to enable the growth of the innovation economy: Talent, Community & Capital.

Talent

- Increase mobility of talent base by developing a **passenger rail.** In New Hampshire that would mean connecting Concord, Manchester and Nashua to Massachusetts.
- Focus governmental and non-governmental attention and efforts on **recruiting and retaining young workers.** In New Hampshire, this takes the form of efforts such as those undertaken by StayWorkPlay.
- Recommit the state to providing **financial support to higher education**, tying that support both to ensuring greater accessibility to students and increasing institutional flexibility so they can be more responsive to the changing talent needs of the state's business community, specifically STEM graduates.
- **Pass comprehensive immigration reform** to ensure that, locally and nationally, technology companies can more easily combat existing talent shortages and attract the best talent in the world to help grow the American economy.

Community

- Government should **visibly collaborate** with and **vocally support** the **non-governmental organizations** (e.g., in New Hampshire, the ABI Hub, ICC, Green Launching Pad, NHHTC) that foster and mentor growth businesses.
- Government should focus **more** on supporting the **creation** of growth companies in the state and **building capacity** of businesses to grow and **less** on **business relocation** as a tool for economic development.
- Of specific relevance to NH, support marketing efforts that spread the story that NH is not only a tourist destination but also a great place to start a business or a career.
- Support regional collaborations that focus on innovation ecosystems.
- Appreciate Brad Feld's four rules for spurring Innovation Ecosystems:
    - The startup community has to be led by entrepreneurs
    - Take a very long term view of success; a twenty year view at least
    - Ensure that the ecosystem is inclusive, not exclusive
    - Create activities that engage the "entire stack" of entrepreneurs (latent, emerging, active, experienced).

Capital

- Politicians should **visibly collaborate** with and **vocally support** angel and venture capital investment nationally and in New Hampshire. Traditional banking models underserve the innovation economy. This makes angel and venture investment an essential ingredient to ensuring growth companies start in New Hampshire.
- Government should continue to support venture and angel investment as it did with the passage of **House Bill 605** in 2011 (sponsored by Rep. Marilinda Garcia, R-Salem, and Sen. Nancy Stiles, R-Concord, among others).
- Support marketing efforts that spread the story that the US and NH are great places to invest in growth companies.

Gray Chynoweth, Chief Operating Officer, Dyn Inc. Gray Chynoweth has proven to be a dedicated leader not only in his industry but also his community. He has 8+ years experience in the law industry, specializing in corporate law and public policy. In 2007, Gray joined Dyn's senior management team, where he currently serves as COO, responsible for the overall operations leading the company's talent/HR, legal/policy, corporate IT and facilities functions.

Along with working at Dyn, Gray serves on various board of directors here in NH, as well as holding a gubernatorial appointment to Co-Chair the NH Task Force on the Recruitment and Retention of Young Workers, where he founded NH's first young professionals organization (MYPN.org)

Prior to joining Dyn Inc., Gray practiced law as a corporate attorney at Sheehan Phinney Bass & Green. He has a JD from Duke University School of Law, an MA in Public Policy from Duke University and a BA in political science from the University of California, Berkeley, where he graduated magna cum laude.

Senator SHAHEEN. Thank you very much. And if I could just ask everybody to get close to their mics so that people throughout the room can hear.

STATEMENT OF EDSEL M. BROWN, JR., ESQUIRE, ASSISTANT ADMINISTRATOR, OFFICE OF TECHNOLOGY, U.S. SMALL BUSINESS ADMINISTRATION, WASHINGTON, DC

Mr. BROWN. Hi. My name is Edsel Brown and I am the Assistant Administrator in the Office of Technology at the Small Business Administration. I want to take this opportunity to thank Senators Shaheen and Ayotte and other distinguished members of the committee who are not here for the invitation to participate today.

I have submitted a statement, but I am just going to shoot from the cuff and give an overview.

I have been involved in the SBIR program for approximately 10 years now, and I have gone from a period where I struggled to understand what the acronym meant to 10 years later. And I will suffice that to let it speak for itself.

I went through the period before the reauthorization, some of the major issues that came up during the reauthorization, like venture capital, going directly to phase two, and other issues, which we are all familiar with here, access to capital, et cetera. Needless to say, we have grown by leaps and bounds over the last 10 years and, of course, even further than that over the course of both programs, SBIR in 1982 and STTR in 1992.

From where I sit, the question is, where do we go from here? We had the reauthorization in place, and on behalf of the administrator of SBA, Karen Mills, I would like to thank you all for your leadership in getting that through. But we are in the process of implementing that. We have been working very closely with small business, but even more closely with program managers, such as Manny across the aisle here, to fine tune the reauthorization legislation and try to get out of it what you all have set forth when you established the reauthorization.

The National Academy of Sciences found that the program is successful with their last evaluation, and, of course, they are in the middle of starting another evaluation as we speak. But again, where do we go from here, and how do we fine tune what we have now?

My major emphasis this morning or this afternoon is listening to the concerns of the small businesses that are here where the rubber meets the road. I mean, I could almost quote you line and verse of the reauthorization, the SOP, the policy directive. But again, it is good to hear what issues that the small businesses have out there in the field when they are trying to apply for SBIR, or they are trying to find out where the opportunities are.

Let me point out, before I forget, that I am very proud that we have one award winner here. We have awards program with SBIR for those of you who may not be familiar. We have the Tibbetts Awards, and also the SBIR Hall of Fame. Creare, if I have not mispronounced the name, was a 2002 Tibbetts Award winner, and I am sure there are two other company names that will be familiar with you, Symantec and QualComm. They are two members of our Hall of Fame. So the successes of our programs speak for them-

selves, but again, what can we do here, even in this brief time today, to move the envelope forward?

In closing, the one area that I am looking at that I have a lot of emphasis on in terms of interaction with small businesses is phase three, and what happens with a firm when they come in and they believe that an agency is giving the award to a firm other than a firm that developed the technology. And I think whatever we can do to fine tune that section of the reauthorization, and I do not know what can be done at this point in time. But again, that is a major issue, phase three appeals.

Thank you.

[The prepared statement of Mr. Brown follows:]

U.S. SMALL BUSINESS ADMINISTRATION
WASHINGTON, DC 20416

Statement of

Edsel M. Brown Jr.
U.S. Small Business Administration

Before the

U. S. Senate Committee on Small Business and Entrepreneurship

August 19, 2013

Senators Shaheen, Ayotte, and distinguished members of the Committee, thank you for the opportunity to participate in today's roundtable examining federal efforts to encourage small business innovation.

My name is Edsel Brown and I am the Assistant Administrator in the Office of Technology at the U.S. Small Business Administration (SBA). The Federal Government does indeed play a pivotal role in encouraging small business innovation. As part of that effort, SBA provides oversight and policy guidance to the Small Business Innovation Research (SBIR) program, as well as its sister program, the Small Business Technology Transfer (STTR) program. A highly competitive award program, SBIR allocates a portion of 11 Federal agencies' external Research and Development (R&D) spending to small businesses. Since its inception in 1982, the SBIR program has awarded more than $30 billion to small firms. And last year alone, SBIR and STTR put over $2.5 billion directly in the hands of small businesses.

The SBIR program was designed to "strengthen the role of innovative small business concerns in federally-funded research/research and development, and to utilize federal research and development (R&D) as a base for technological innovation to meet agency needs and to contribute to the growth and strength of the Nation's economy." It has successfully contributed to small business innovation and commercialization since its inception. In fact, a comprehensive National Academies of Science (NAS) review of SBIR concludes that the program is sound in concept and effective in practice, meets its major Congressional objectives, and is a driver of innovation and commercialization for small businesses. Now authorized until 2017, the program will continue to fulfill its vital mission for years to come.

On behalf of SBA Administrator Karen Mills, I would like to thank both of you for your strong leadership and support in passing a long term, comprehensive reauthorization for the SBIR and STTR programs. As you know, this reauthorization provided essential

stability to the programs and also made a number of improvements that will allow them to grow and prosper over the coming years. At SBA, we have been working diligently with our sister agencies to implement the law, which has already benefited countless small businesses.

While SBIR is known as a "small business" program, research conducted under it has led to numerous cutting edge technologies. Over 50,000 patents have been awarded to SBIR companies over the life of the program. Small businesses participating in the program not only assist agencies in meeting strategic R&D objectives, but also provide employment and economic development to local and state economies.

Each year, the successes of the program are highlighted through two awards ceremonies: The Tibbetts Awards, which honor current innovative technologies, and the SBIR Hall of Fame, which recognizes long term innovative success and includes such inductees as Symantec and Qualcomm. I am happy to note that Creare, Inc., represented on the panel today by Dr. Bob Kline-Schoder, is a 2002 Tibbetts Awardee for engineering research excellence.

In addition to providing oversight to the SBIR and STTR programs, SBA has been involved with other initiatives to foster and encourage small business innovation including: (1) connecting developing small businesses with operational support through Small Business Development Centers (SBDCs), (2) fostering startup ecosystems for universities through Startup America, (3) holding a Demo Day for accelerators to provide funding to developing small businesses, and (4) the SBA Regional Cluster Initiative, in which SBA works to develop and grow regional economies around the country.

At SBA, we are committed to ensuring that innovative small businesses have the tools and resources they need to start, grow, and create jobs. I want to thank you both again for your ongoing support of these efforts and I look forward to the discussion.

Senator SHAHEEN. Thank you.
Mr. Bundas.

STATEMENT OF JASON BUNDAS, MANAGER, INFRARED SYSTEMS, QMAGIQ, LLC, NASHUA, NJ

Mr. BUNDAS. Thank you, Senator Shaheen and Ayotte, members of the committee, for inviting me here today to speak and to join in this discussion.

QmagiQ is a small business for sure. We have six founding members plus two employees. We are based in Nashua, New Hampshire. And actually Labor Day weekend will mark our 10-year anniversary. Our core expertise is in designing and manufacturing focal plane arrays for infrared applications, mainly thermal imaging.

We have grown the company over the years from starting in 2003 to current annual revenues that are a little over $4 million. Roughly half of that is from commercial sales, primarily focal plane arrays to camera manufacturers who then build systems, typically for military or other paramilitary applications, some industrial use as well. The other half of the revenue today is primarily from SBIR funding that we use to continue to advance our technology to stay at the forefront of infrared technology in general.

2013 specifically has been a landmark year and an interesting one for us. As of February this year, we have our first devices in space aboard the LANDSAT 8 satellite. We have also had successful field tests of prototype camera systems by the Army for aiding pilots to fly helicopters in degraded visual environments, basically when they are flying over dry, dusty soil and coming into land.

One other note is that we have advanced our new detector technology to a point where I would say we have officially commercialized it, marked by issuing firm fixed price quotes and receiving purchase orders, which we are filling today. And that is really what we view the SBIR program as a means to do. Additionally, it has helped us temper fluctuations in commercial sales, which has happened over the years.

Since about 2005, which is when we submitted our first phase one proposal, we have continued to submit for more phase ones. As we perform well on phase ones, and subsequently phase twos, we have built relationships with various agencies that enjoy the results that they get from a relatively small amount of funding to a small business in a high tech arena that is generally dominated by the large defense houses.

So we provide an opportunity for various government agencies to play in the sandbox, if you will, for a modest amount of money to try out a new idea with a phase one project. As a small business, we can actually make hardware and sometimes deliver hardware on a phase one proposal, and then move the project into a phase two where we further the technology development and/or deliver full systems. So the value that the government can get through SBIRs working with small business, especially on cutting edge technology, is phenomenal, in my opinion.

Another area that we make use of government support is in the facilities that we use. Fabricating and developing these devices, especially doing the R&D, requires access to tools that are incredibly

expensive to both purchase and to maintain. They need to be housed in facilities that are very high class cleanrooms, which are also expensive to construct and maintain. We do have our own cleanroom facility, a relatively small one, down in Nashua for doing unique aspects of our fabrication process.

The National Science Foundation has started the National Nanotechnology Infrastructure Network, which has spread to a little over a dozen universities nationwide. These technology centers of excellence include fabrication centers and laboratories where taxpayer money has been used to set up state-of-the-art facilities. This is great for the universities, but along with this funding comes the charter that it is the university's job to go out into industry and find people who will pay for access to come use these facilities.

That works out perfectly for us and for other small businesses, where the prospect of capitalizing the equipment to do this is just cost prohibitive. I mean, you are talking tens of millions of dollars, and there is just not a business case, at least on our level, to support doing that ourselves.

So with these facilities that are out there, our own engineers can go in as needed and use the equipment to do the development in order to stay at the forefront of our technology. So specifically, there is one at Harvard that we use and another one in Santa Barbara.

Access to those facilities has been absolutely instrumental in really getting QmagiQ off the ground and maintaining it at the forefront of the technology class that we operate in today. Additionally, the funding provided by SBIRs has kept the development wheels turning, so that has also kept us right at the forefront of this infrared technology space where we are playing in the same field as NASA's jet propulsion laboratory, Raytheon, other similar groups where these are all the large houses that are generally expensive to do development with. So, being a small business in this area is unique, and the agencies that we work with on our SBIRs, I think, appreciate that and try to leverage our talent as much as possible to get the most value that they can out of their SBIR dollars.

So in a nutshell, that is QmagiQ's story. I am happy to be here today. Thank you again. I look forward to the discussion.

[The prepared statement of Mr. Bundas follows:]

Statement of Jason Bundas,
Manager of Infrared Systems at
QmagiQ, LLC

Before The U.S. Senate Committee on
Small Business & Entrepreneurship

"Examining Federal Efforts to Encourage Small Business Innovation"

Good Morning Chairwoman Landrieu, Ranking Member Risch, and members of the committee. Thank you for hosting this roundtable today and for inviting me to participate in the discussion.

My name is Jason Bundas and I am one of the founding partners of QmagiQ, LLC, a Nashua, NH based company that was started almost exactly 10 years ago in September of 2003. The core expertise of the QmagiQ team is in developing and manufacturing high-sensitivity cooled infrared sensors primarily for thermal imaging applications. To date, QmagiQ has supplied over 2000 imaging sensors and over a dozen custom camera systems that are being used by the military, scientific, and industrial communities around the globe. Through the years, we have grown the company to a crew of eight with annual revenues of approximately $4M.

2013 has marked a year of many QmagiQ milestones including our first sensors arriving in orbit aboard NASA's LANDSAT 8 satellite, successful Army helicopter flight testing of specialized prototype cameras for pilot assistance in degraded visual environment (DVE) situations, and the commercialization of sensors using the latest strained layer superlattice (SLS) detector technology. All of these achievements would not have been possible without research and development funding from various government agencies, mainly in the form of SBIR projects.

Since 2004, QmagiQ has been awarded SBIR funding from the Army, Navy, Missile Defense Agency, and NASA, all totaling in excess of $10M which has allowed us to remain on the cutting edge of infrared detector technology, a place that has classically only been held in the arena of the large defense contracting houses. Advancing technology in the small business sector not only helps stimulate economic growth but also provides government agencies and private businesses with access to cost effective sources of advanced hardware and further technological development. By their nature, small businesses generally have lower overhead and higher flexibility, allowing them to quickly and easily adapt to changing markets and customer requirements. The SBIR program allows government agencies to leverage the vast knowledge base of the entire community and explore new technologies and applications in a cost-effective and time-sensitive manner. QmagiQ often delivers actual hardware under SBIR phase 1 contracts and executes these initial development projects along time lines measured in weeks and months, a feat which is difficult to accomplish outside of the small business realm.

In today's day and age, not only is it important to continue advancing technology at a pace that maintains this country as a world leader but it must be done in an efficient manner that provides value to the taxpayer. Time and resources are not unlimited. The competitive structure of the SBIR program allows modest amounts of government funding to be used where one can quickly determine which new technologies are viable and which aren't, identify what new approaches show promise and warrant further investment, and then advance those projects to a maturity level that provides real material benefit to the larger objectives of government agencies and the overall commercial marketplace. It is that last point that we at QmagiQ always examine as we decide whether to respond to any specific SBIR solicitation. Does this development project align with the larger objective of ultimately growing our business in the commercial sense of expanding product offerings, increasing sales volume, and driving down costs? If the answer is likely yes, then a proposal goes in.

It is this interesting aspect of small business support by government that I believe sometimes gets lost in murk. Most new technologies are expensive both to develop and to produce. The need for such advanced technology may only initially exist in the realm of national security, for instance, and the resources required to advance the technology may only reside at the government level. Getting over the initial development hump is the difficult part. Once a new technology is proven and further explored, the costs eventually come down to the point where it becomes available to private industry and ultimately to the personal consumer. Think of microwave ovens, cell phones, and GPS-based navigation systems. The list is endless, but every one of them started as an idea somewhere, an idea that may not have necessarily been able to find private investment to get off the ground. There is social benefit to the existence of these technologies beyond that of simply growing businesses for strictly economic purposes. Not only does the SBIR program help to advance everyone's favorite economic indicators, but it is also instrumental in the existence of many of the products used today throughout the world.

I thank you for inviting QmagiQ to participate in this discussion today. As a small business that has been heavily involved in the SBIR program for most of its existence, we provide a fine example of the success that this type of government support can help achieve. I am happy to further share details of our experience and to discuss the future of government support of small businesses in general.

Bio for Jason Bundas – 8/15/13

Jason Bundas is the Manager of Infrared Systems at QmagiQ, LLC, a New Hampsire based company developing and manufacturing advanced infrared imaging sensor and cameras.

He has over 12 year of experience in infrared sensor technology at QmagiQ and Lockheed-Martin.

Jason Bundas co-founded QmagiQ in September 2003 to commercialize quantum well infrared photodetector (QWIP) technology. Today, QmagiQ is the world's leading supplier of QWIP and strained layer superlattice (SLS) focal plane arrays, used primarily for imaging applications in the midwave and longwave infrared.

Prior to founding QmagiQ, he was an Opto-Electronics test engineer at TeraConnect, a spin-out company from Sanders, a Lockheed Martin company, which was focused on developing high-bandwidth (> 150 Gbps) VCSEL-based modules for short-reach optical data communications.

Before the TeraConnect venture, he was an electrical engineer with the Advanced Systems and Technology group at Sanders working on various infrared emission, detection, and modulation devices.

His expertise is in optoelectronic system design, fabrication, and test. He has a Masters Degree in Electrical Engineering from the University of Massachusetts, Lowell (2002).

Senator SHAHEEN. Thank you.
Dr. Kline-Schoder.

STATEMENT OF BOB KLINE-SCHODER, Ph.D., CREARE, INC., HANOVER, NH

Dr. KLINE-SCHODER. Good afternoon Senator Shaheen and Senator Ayotte. Thank you tremendously for asking me to be here. It is a real honor to partake in this discussion of New Hampshire's small businesses and the effect that the Small Business Innovation program, as well as other programs, have had on our business.

Senator SHAHEEN. Thank you. Can I just get you to pull your mic closer?

Dr. KLINE-SCHODER. Okay, thanks. I remembered to turn it on at least.

[Laughter.]

Senator SHAHEEN. Yes, good. All these soft-spoken panelists.

[Laughter.]

Dr. KLINE-SCHODER. As you may know, Creare has had a long relationship with the SBIR program, actually starting before it even began. Our President at the time in 1982 actually worked with Senator Rudman on the original legislation that helped establish the SBIR program. Since then, the program has played a key role in our business and in the local economy up the Hanover area. SBIR has helped Creare to establish successful spinoff companies, develop new products for government missions of national importance, and license SBIR-funded technologies to existing product firms so that they could go commercialize and enhance their products that they have already in the marketplace.

I appreciate this opportunity to discuss the functioning of the current program, how it is working since reauthorization, as well as to provide a few comments on the future of the program.

Since reauthorization, the program continues to behave and act much as it has since its beginning. It is a very efficient contracting mechanism for small business to help support the U.S. government in Federal contracting in research and development, as well as in product development.

The increased award sizes, coupled with the increase in the set-aside in the reauthorization has truly strengthened the program by expanding the scope of work that can be performed for a given award, while maintaining the number and breadth of awards and technologies that can be supported. In addition, the flexibility provided in the reauthorization to allow multiple phase two projects to result from a single phase I across agencies so that you are not stuck if you have a phase one in the Navy. Now the Air Force can actually pick up the phase two if they are interested in the technology as well. And we have seen that happen in the last number of years.

In our opinion, the areas for improvement in the program include, and you have heard some of these before, so I am sorry if I am repeating myself. But the first one is actually, even though it has been two years, 2017 is coming up pretty fast, as we all know, and reauthorization—doing that before it expires would be really very helpful for the small business community for the reasons that people around this table have already mentioned, the

consistency and the reassurance to the small businesses, as well as to the clients in the government.

The other thing that we find is very important and we think is a real key to the program is that it is a competitive, completely open, non-political program where you submit—many companies are allowed to submit their great ideas. There are folks who vet those ideas, try to determine which are the best ones and the most likely to succeed. And then those programs are supported. And that competitive nature and very open nature is very important to the functioning of the program, and, I think, one of the reasons why it has been so successful over the long term.

And finally, continuing to increase the set-aside, consistent with inflationary pressures, as well as the award sizes, so that—I think it had been 10 or 15 years before that step had been taken, and continuing to do that as is currently in the current legislation and the reauthorization, continuing that forward would be very helpful.

On behalf of our employees, I would like to thank you for your efforts to reauthorize the SBIR program in the past and your continuing work to preserve and enhance the participation of small businesses in Federal research and development. As a result of the program, through every economic downturn of the past 30 years, Creare has remained strong and continued to develop technologies and create jobs, due in large part to this program.

Thank you for allowing me to participate, and I look forward to the discussion.

[The prepared statement of Dr. Kline-Schoder follows:]

Creare

Engineering Research and Development

STATEMENT OF ROBERT KLINE-SCHODER; PRESIDENT & PRINCIPAL ENGINEER OF CREARE INC.

BEFORE MEMBERS OF THE U.S. SENATE COMMITTEE ON SMALL BUSINESS AND ENTREPRENEURSHIP

ROUNDTABLE DISCUSSION:

"EXAMINING FEDERAL EFFORTS TO ENCOURAGE SMALL BUSINESS INNOVATION"

AUGUST 19, 2013

Good afternoon Senator Shaheen and Senator Ayotte. My name is Robert Kline-Schoder, and I am the President of Creare Inc. Thank you for hosting this discussion and for seeking direct input from the Small Business Community.

Creare has had a long relationship with the Small Business Innovation Program (SBIR) program, starting before the program began. In 1982, our President at the time worked with Senator Warren Rudman on the legislation that originally established the SBIR program. Since then, the program has played a key role in our business and in the local economy. SBIR helped Creare establish successful spinoff companies; develop new products for DoD, NASA, and NIH; and license SBIR-funded technologies to existing product firms. I appreciate this opportunity to discuss the benefits of the SBIR program, how the program is operating under its current authorization, and ways to strengthen it going forward.

Located in Hanover, New Hampshire, Creare Inc. is a small, independent engineering research and development business. Creare has had a major impact on the economic development of the Upper Valley region of New Hampshire and Vermont. Founded in 1961 to solve the most challenging problems for government and industrial clients, Creare has played a key role helping to resolve numerous engineering problems of national importance using the SBIR program – such as developing the world's smallest vacuum pumps that are operating on board NASA's Curiosity rover on Mars; a purchase cable swaging machine being readied for aircraft carrier deployment that will greatly reduce sailor workload and improve fleet readiness and shipboard safety; and cryogenic machining technology that is being used to machine titanium parts faster and improve the affordability of the Joint Strike Fighter. In addition, innovations from Creare have led to the establishment of several spin-off product businesses that are now world leaders in their technologies. These spin-off companies presently employ over 2,000

people, many as a direct result of the SBIR program. While Creare remains a small business, employing 120 researchers and staff, the SBIR program continues to foster new growth. Creare recently established Edare Inc., a sister company whose goal is to manufacture and transition technologies developed at Creare with SBIR funding.

Since reauthorization, the program continues much as it has since its beginning – it is an efficient contracting mechanism for small businesses to meet the research and development needs of the federal government while fostering the development of new products for the commercial marketplace. The program provides entrepreneurs access to seed capital to start businesses and experiment with early-stage ideas. The increased award sizes coupled with the increase in the set-aside in the reauthorization has strengthened the program by expanding the scope of work that can be performed for a given award while maintaining the number and breadth of awards and technologies that can be supported. In addition, the flexibility provided in the reauthorization to easily shift

Phase II awards to different agencies from the Phase I provides greater opportunity to accelerate the infusion of new technology into programs most in need of that technology.

In our opinion, areas for improvement in the program include: reauthorizing the program before it expires in 2017 to provide continuity and reassurance to both the small business community and federal agencies that have come to rely on the program's achievements; continuation of the competitive, non-political, nature of the program and requiring Phase I projects, which provide independent vetting and ensure that only the best ideas are supported through Phase II; continuing to increase the award amounts and set-aside, consistent with general inflationary pressures; continuing to support transition and commercialization of technologies through funded assistance programs; and streamlining contracting which, while still faster and more efficient than most government procurements, is beginning to slow down due to inefficiencies that have crept into the processes.

As a representative of a small business and on behalf of our employees, we at Creare would like to thank you for your efforts to reauthorize the SBIR program and your continuing work to preserve and enhance the participation of small businesses in Federal research and development endeavors. Through every economic downturn of the past 30 years, Creare has remained strong and continued to develop technologies and create jobs due in large part to the SBIR program.

Thank you for allowing Creare to participate in this roundtable. We greatly appreciate you allowing us to share our experiences and views.

Creare

Robert J. Kline-Schoder, Ph.D.
President and Principal Engineer

Dr. Kline-Schoder received his B.S. degree from the Massachusetts Institute of Technology and M.S. and Ph.D. degrees from Stanford University, all in Mechanical Engineering. His academic research focused on electromechanical system design as applied to tethered satellite attitude control and automated tungsten inert gas welding processes.

Upon graduation, Dr. Kline-Schoder worked at the Lockheed Palo Alto Research Lab for 2 years where he designed controllers for precision fast steering mirrors, flexible space structures, a redundant robot, and a precision positioning system for photolithography. He then joined a start-up company, Redwood Microsystems, where he designed analog and digital control systems for a unique, silicon, micromachined valve and pressure and flow regulators incorporating the valve. For the last 19 years, Dr. Kline-Schoder has worked at Creare where he has been Principal Investigator for projects ranging from: miniature turbomolecular pumps that are part of the NASA Curiosity Mars rover, robot control, compact electronics and software system development for measurement of hearing in remote locations, active noise control for aviation headsets, and innovative fabrication techniques for medical ultrasonic transducers. He has been a Principal of Creare since 1999, its Vice President and Commercialization Director starting in 2001, and President beginning in 2013.

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Senator SHAHEEN. Thank you. Thank you all very much for your statements. Now the fun begins because we will begin—I will throw out a question, and then I will ask Senator Ayotte to do that, and hopefully that will generate some conversation.

I want to go back to an issue that Dr. Torbick brought up when he talked about the importance of more uniformity across agencies in terms of how the application process works, and ask Dr. Oliver and Mr. Brown if this is something that you have heard before, I assume, from businesses, and whether there has been an effort to address that concern, and what might be the impediments to doing that, and whether you think there is an opportunity to provide for more uniformity. And maybe I will ask you also to talk about the flexibility piece, too, because several people raised that in their comments.

So Dr. Oliver, do you want to go to first?

Dr. OLIVER. Yes. With regard to the consistency, I think first I would divide the agencies into those who do contracting versus those who do grants, because we handle those very differently. And so, among the granting agencies, we do use the central application process of grants.gov. And so, for example, the Department of Energy, which issues grants, the National Institutes of Health, the Department of Agriculture, and the part of the Department of Education that uses grants, all apply through grants.gov. We use the same set of forms, and those are actually controlled quite a bit to keep them from changing too much year to year and to provide some simplification.

When you move on the contracting side, things are very different. And I do not have as much exposure to that, so I cannot really comment. But for those mission agencies who do contracting, those rules are different than the financial assistance for grants. And I cannot really address, not knowing the contracting side, what we can do to kind of merge those, but I believe there is quite a bit of statutory guidance in place which limits how much flexibility we have there.

Senator SHAHEEN. Mr. Brown, do you want to add?

Mr. BROWN. I think Manny hit the ball right on the head. One thing I will point out, though, and I was speaking with Dr. Torbick earlier before our session on this exact topic. Believe it or not, this is a priority for us, and we have been working with the other agencies to try to figure something out. But I would be less than honest if I said that we have really come up with a formal answer to the problem.

But before this reauthorization came out, we had something called SBIR 2.0, and we divided several topical areas that we could make inroads on before the reauthorization even came about. And this was one of those topical areas, how can we streamline and expedite the process that it will be less burdensome on small business?

Now, you know, since the reauthorization, we have been busy trying to implement the reauthorization, but we are still trying to make inroads on this issue. But we are not there yet, to be perfectly honest.

Senator SHAHEEN. So any businesses who are recipients who want to weigh in on ways in which you think they could provide some more flexibility? Yes, Dr. Reder?

Dr. REDER. Yes. So the balance between uniformity across agencies and flexibility within agencies is a tough one. From our perspective, uniformity in administrative aspects—what the forms look like, what are the necessary components, et cetera—should not be an impediment to the any of the agencies.

However, the required flexibility is really key. This gets back to my point in the brief. Every sector is different. It costs different amounts of money to do different types of science. It takes different amounts of time. And so, putting a one-size-fits-all rule over top of all the agencies is nonsensical.

The realities of each sector have to be reflected, and the needs of each agency have to be reflected in what the actual policies are. That says nothing about what the administrative process needs to look like. But NIH is a great example—the study that the NRC did on this said over and over again that flexibility, flexibility, flexibility is what is making this program so successful.

The agency personnel and the program officers themselves are really smart people. They are constantly looking at their portfolios and thinking, "Well, what can we do to improve this to achieve our mission?" The NIH's mission, of course, is to increase knowledge and improve human health. They have been able to respond to those challenges over the years by significantly altering the way NIH administers their SBIR program versus the way many of the other agencies do. That is to the benefit of the program and to the American people.

Senator SHAHEEN. Great. We can actually make the NRC study part of the record, which would be helpful.

[The study referenced, "An Assessment of the SBIR Program," can be found at *http://www.nap.edu/openbook.php?record_id=11989.]*

Senator SHAHEEN. Mr. Bundas, and then I am going to turn it over to Senator Ayotte.

Mr. BUNDAS. Yeah. We have specific difficulty in this area being a small company that primarily deals with DoD agencies. So you can imagine the paperwork above and beyond just simple government accounting that is involved there. Fortunately I am not directly involved with the accounting side of things, but I hear about it nonetheless.

Every time that we seek an SBIR—sometimes phase ones are pretty straightforward, but the goal of a phase one is to get to a phase two. And when you start working with a new agency that you have not worked with before, you almost have to start all over again and start working with whomever the accountants are on the other side, and explain how we as a small business run our accounting system, and how that is different from the defense contractors that they are used to.

Eventually, we can come to some sort of system that works, that is not so cumbersome on the small business side that it keeps us from being agile and efficient, but it gets all of the information that the agencies need on their end. But if there was a central—you know, once you have made it into the SBIR realm in general, even

if you have not worked with a certain agency before, if they can go through the SBA office and know, okay, this is how QmagiQ does their accounting, this is an approved method, and just streamline that whole process, it would save a lot of headache on our end in both time and effort.

I do not know for sure if we ever declined an SBIR award just because the accounting was too cumbersome for us, but we have had at least one instance where the recommendation was to hire a full-time person just to do the accounting. I mean, we are eight people. We are all technical, right? We have different hats that we wear to cover our own administrative parameters, and to do something like that is just not a viable option for us.

So, yeah, this is definitely an area that I would love to see some improvement. It would help us a lot. Thank you.

Senator SHAHEEN. Thank you.

Senator Ayotte.

Senator AYOTTE. As a follow-up to that prior discussion, I noticed in your written testimony, Dr. Kline-Schoder, that you had said, and obviously Creare has a long history with the SBIR program, that we need to streamline contracting, which, while still faster and more efficient than most government procurements, is beginning to slow down due to inefficiencies that have crept into the process.

So, if you can help us with your thoughts on what inefficiencies are in the process so that we—I think it dovetails to the discussion we just had. I wanted to get your thoughts on that to see if we can really try to cut through this for all of you.

Dr. KLINE-SCHODER. Sure, Senator Ayotte. Thanks for bringing that up.

Yes, in the last couple of years, and part of this may have been due to some of the extraneous things happening in Washington with budgets not getting reauthorized and so on. But we have seen in this year in particular a lengthening of the time between when we are told that we have received an award and when the contract is actually signed.

And, you know, every instance probably has a slightly different story, but they range from things like having to have, similar to what my colleague had to say about audited rates taken care of. So you might go to one agency and the DoD does a good job of auditing our rates for the DoD. But then if you get an award at NIH, they do not take the DoD's audits, and so, they have to do a separate audit for themselves. And even sometimes within the DoD they do not accept the DCMA, the Defense Contracting Management Agency's, audited rates, and they will do their own local review of our rates.

And so, they start on that path. And then what has happened in the past during this past year is three months go by, and then the contracting officer changes. And so, then they have to go back and start from scratch again. So some of that uniformity that we have been talking about here and that we have heard about here actually extends into the contracting realm, and causes difficulty there and causes things to slow down.

Senator SHAHEEN. Can I just interrupt for a minute and ask you about the auditing piece? So when one agency within DoD does not

like the audit that has been done by another agency, do they give you an explanation for what they did not like about the audit? So what do they say is missing that they would like to see?

Dr. KLINE-SCHODER. Right. Well, so the interesting thing is, audits actually are not—do not allow you to get approved rates. They will accept your rates. And so, it sounds like semantics, but in the contracting world, apparently if the DCMA does not approve your rates and they are not willing to approve your rates, they are willing to accept your rates, the contracting—the local buyers need what they would consider approved rates. And so, they will send a letter to DCMA saying do you have approve—does Creare have approved rates, for instance? And they will say, well, we have reviewed their rates, and we accept them.

In some instances, that is not good enough for the local group because, you know, and I do not know why certain DoD groups might accept them and others will not. I can speculate that there maybe are some people at certain places that just have rules that they have instituted that they require something. And if it is not exactly what they require, then they need to go back and do that analysis themselves.

Senator SHAHEEN. Thanks.

Senator AYOTTE. I also wanted to follow up on—I know that several of you mentioned immigration reform, which is another whole topic. But it gets to the topic of workforce and making sure that, particularly in the STEM fields, that we have the best and the brightest to be able to start these companies, grow them, extend them.

So, I wanted to get—I guess I would start with you, Philip, and Gray as well, just to get your thoughts on how the immigration system is working, how important is it that we expand, for example, the H–1B visa quotas, which I know now are around 66,000, and the bill that Senator Shaheen and I both supported would dramatically expand those caps.

But how is the system working now, and how would you like it to work?

Senator AYOTTE. And why is this important for our economy? I think sometimes there is a discussion as to, you know, why—how does this work in terms of us growing our economy?

Mr. FERNEAU. Thank you, Senator. With regard to immigration reforms, I have had the opportunity to work with Senator Shaheen's staff on this topic previously, and appreciate the support from both of you for some of the initiatives that were included within the Senate legislation recently.

I think there are two pieces to it. One is increasing the number of H–1B visas for highly skilled STEM workers, you know, students and other bright people who are coming out of our universities. They come to the U.S. from around the world, the best and the brightest. They get a great education. And then, they have a challenge actually staying in the U.S. to work at the DYNS of the world and other emerging companies.

I have seen that challenge with some of our companies. I have also seen that situation through my role at Dartmouth on the faculty where in the engineering school and the business school you

have highly skilled students who find it difficult to remain in the U.S. and take the positions they would like to.

The other piece of the solution is something like the Invest Visa, where you can actually enable a talented entrepreneur from elsewhere who wants to come to the U.S. and create jobs, create a company, high-growth business. Finding a means to allow that person to come and create an entrepreneurial company in our economy is important.

That initiative is about creating jobs. That is not stealing jobs. By definition, that should be a good thing for us, and it is unfortunate that these sorts of important real value-creating initiatives within our immigration policy have been held captive to other immigration-related issues.

Mr. CHYNOWETH. Yeah, thank you. So, I would, I guess, just a kind of color story that I could give on a person we hired, H–1B, out of college, with us for 10 months, discovered another way for us to kind of deal with one of the technology pieces we were doing, and two months later started producing about $400,000 in revenue for us.

So, I think you can see—now, you could say someone else could have done that. You could say that it could have come from anywhere. But that is a very tangible example of how we are able to grow, you know, about $5 million a year in revenue off of one person's idea. So, that allowed us to hire a lot of other people who are not—you know, who are, native, you know, Americans.

And I think it is just an example of how much leverage we can get on technology with talent, you know. And if we are not bringing those people into this country and allowing them to stay here and help grow our companies, then they are going to go elsewhere and grow other companies. And that is what we certainly view this as.

And even more interestingly, to the extent that you think that hiring someone who is born in another country here displaces an American job, with the increased availability of telecommunications, I do not have to have that person here in order for them to work for my company.

So, you know, we got one. He came and joined the company, and we were able to navigate the H–1B process. But let us say that you wanted to reserve that for a person that was born in the United States. What we might have very easily done is, you know, what a lot of companies do is they simply employ the person, and he would have gone back to India where he was from, and we would have employed him there. So it is not like you would have saved the job for an American person, you know.

And so, you know, what we are losing out on is the economic productivity that those people bring, you know. He is buying a house. He is getting married. He is, you know, having kids. All these things are driving certainly our company forward, and we think driving the American economy forward.

So, you know, to view—it is almost anachronistic to think about the talent environment as having a lot of lines. And, you know, they could go elsewhere and start companies, and we want to keep them here.

The other thing that I would say that is kind of connected to this is, it is not just—on the STEM fields, it is not just that we have—

that there is a shortage like in New Hampshire or in California. It is a global shortage of this talent. There is no possible way that even if we had all the workers and everyone re-trained in America to do these—to work in these fields that we would actually be able to satiate the opportunities that we have. So we need to kind of keep pace with innovation, and as we—it is kind of a both/and solution, you know.

We need to be re-training folks who are—you know, get into the middle skills and are, you know, changing careers. But in order to really capture that fast-moving dynamic, economic opportunity, we have got to be able to get the people trained right now today. And those are the people that are graduating, and those are the people that are here on H–1Bs. So hopefully that provides more context.

Senator SHAHEEN. Dr. Gittell.

Dr. GITTELL. The comments really highlight the need to have a two-pronged strategy. And I think the Federal Government has been supportive through the H–1B programs that it funds, which then get recycled into workforce training here in the New Hampshire community college system.

And New Hampshire has benefitted from the Trade Adjustment Assistance Community College and Career Training (TAACCCT) Act. Specifically, we have taken advantage of the TAACCCT in the community colleges, including a nearly $20 million fund to upgrade our advanced manufacturing training across the State where we are training the next generation of manufacturing workers across the State of New Hampshire in machining and precision manufacturing, which is critical.

We have to address the current workplace needs, but also we spend a lot of attention on our primary and secondary schools, to build that pipeline for the next generation of skilled workers and entrepreneurs in the State of New Hampshire.

I do not think you can do one without the other. Federal programs that link some immigration policy to funding for training and re-training in STEM education in New Hampshire would be very beneficial.

Senator SHAHEEN. Well, I am sure you are all probably aware that the immigration reform bill that passed the Senate included funding for STEM programs, which was a great benefit that I think if we could pass the bill—I would encourage all of you to talk to the House members, which is where the bill is held up. But that could have some real benefits for us in the future, not only in New Hampshire, but across the country.

Senator AYOTTE. Which I will also say, by the way, with the bill, because of the economic growth that comes from the bill, a huge deficit savings over not only the 10-year window, but the 20-year window. So on—if you look at it as an economic in terms of driving the fiscal challenges we face in the country as well, that is a very important component to it.

And the STEM programs are funded, as Senator Shaheen mentioned, through the parts of the fees for the new extension of the H–1B. So, it is a great example of how another area where we could, if we can get this done, very much be an infusion not only of talent, but help us create more jobs here, all of you, give you more opportunities to create jobs.

Senator SHAHEEN. One of the questions that we got from somebody in the audience—we are not sure who—relates to an issue that a number of you raised, and that is access to capital. And I know, Mr. Ferneau, you talked about that in terms of how much more we need in New Hampshire.

But one of the major issues when we reauthorized the SBIR program had to do with the role of venture capital firms in the program. And I just wondered, we may not be far enough along to have a sense of whether the changes that were made have been helpful and are helping to address that concern. And I did not know if any of you have any views on how the program was changed to accommodate venture, and whether you think that has been a good thing or not. Anybody, any thoughts about that?

Mr. FERNEAU. I cannot say that we have encountered any examples yet of the expansion or the carve-out with regard to venture capital backed companies specifically. It has been too soon for that.

What I can tell you is that when I put the question of SBIR effectiveness out in advance of appearing today at the roundtable to a whole range of companies, some of which we have invested in, as well as technology transfer officers with whom I have worked, the highlight issue for all of them was that at the earliest stage, companies are still being frustrated—they are finding the SBIR program increasingly a less useful source of funding for their innovative research.

Senator SHAHEEN. Say that again. I am not sure I——

Mr. FERNEAU. The success rate of their SBIR applications has become sufficiently low, 15 percent for Phase I for many of these, that applicants no longer view the program as a viable path to think about how to get something started.

It is one thing if you are a more established company and you have been successful—you are already in the market with some product—to use SBIR funding to introduce new products, and extensions of a product or a new technology. You can build that into your budgeting in a predictable way now that the SBIR program has reauthorization. If you are a first-time principal investigator with a new idea to be the basis for your company, the yield on your application effort now is so low that you cannot think about using that as the predicate for getting your business funded or even started.

And then, the timetable is too slow, even if you do succeed with your application—even with the fast track where you put Phase I and Phase II together, it is still such a long span of time and there is still uncertainty, that you cannot really think about that as the way that you will get off the ground.

I think what is happening is that the SBIR program initially had multiple objectives. One was to advance innovative research. The other one was to help small businesses. I think there is a subset of small businesses for whom the SBIR program is not reaching effectively. I know that we have had many life science companies that historically would have started with SBIR programs to get out the lab. Now, they say we just cannot depend on that, and so we are wholly dependent on other sources of capital, which exacerbates the access to capital issue that I flagged earlier.

What I will say is that to the extent the SBIR program ever restricts the number of SBIR programs or dollars that are available to any potential companies by looking at their ownership or source of funding (where it is venture-backed—majority venture-backed funded) you are further reducing the value of the program to some of our highest growth or highest opportunity companies where the private sector has already indicated these are valuable high potential businesses.

And in some companies, the development requirements for their technology is so high, in the life sciences in particular, it is not uncommon that over time, you will find that outside investors have invested more than half of the company's equity. To arbitrarily restrict those companies from access to the program seems self-defeating to me.

Senator SHAHEEN. Thank you.

Dr. Reder.

Dr. REDER. I will take a slightly different view and tell you about a few tactics that I have actually seen used in the market and the life sciences industry, one of which is some investment firms will just hire a full-time grant writer. If you look at the return on that investment, it can actually be quite good.

What is wrong with that? Well, if the idea and the concept is not mission critical enough or important enough to the company to go out and do this themselves, but this is a bit of icing that their investor is providing, there is a real question of impact. Just how much impact are those dollars going to have, or is it just some padding that is going to help this particular portfolio?

The other very disturbing trend that I have seen, again, in the life sciences industry, is what are referred to as walking dead companies. These are companies, some of which have had over $100 million in venture money put into them. They did not make it, and now they are down to a handful of staff just trying to keep the lights on, while the majority owner investors are trying to find someone to buy this from them so they can recoup some of their investment.

At that point, your operations are really not functioning, and you have a few people around with an enormous number of patents and other assets that can write grants. And so, then the question is, if you have put $100 million into this particular firm, what is the value of adding a $150,000 Phase I SBIR? What kind of impact are you going to get for that? Well, you are going to keep the lights on for another six months while the investors try to recoup their capital. The impact for my tax dollars is going to be zero.

And so, there needs to be some way so that when you have a 51 percent owned company that is really on that up curve and is really doing well, and expanding and building their first pilot plans, that they are still eligible. But you have got to avoid these types of games that investors will play, because their goal as an investor is to provide a maximum return for their shareholders. They do not have any sort of altruistic goals associated.

So, the ultimate question I think is how to maintain the impact of the program without simply diluting the field with very talented, very smart, but ultimately non-productive applicants.

Senator SHAHEEN. Mr. Rauwerdink.

Mr. RAUWERDINK. And I will continue on the previous two comments. And I can speak as a company that has been fortunate enough to secure SBIR funding, and that was, as I stated, critical in our formation, but also been successful and then leveraging additional private capital.

And though we have grown substantially and are very strongly on the up curve, there are two conditions that are very, very similar to when we first got the SBIR award. We are still a very strong culture of innovation, and that has not changed, and that continues. And we are still, despite having more capital and more access to capital, are still restricted in our ability to really chase new angles and new innovations that come about.

And that is where some of the new size rules that have come about for the SBIR have allowed us to turn a new eye on the SBIR and not have to look elsewhere to some of the other programs, but to take new innovations that come about and pursue them, and have the route to grow bandwidth, grow new personnel, to grow new expertise, and pursue those angles.

Senator SHAHEEN. Would you just explain to everybody what you mean by "the new size rules?"

Mr. RAUWERDINK. Yeah. I am not going to go into detail. They are on the record. But it has to do with how ownership is viewed from companies that have received venture capital funding. We have received it from a number of sources.

And so, one of our—one of the investors, for instance, is General Electric, a portion of it. Are we considered X hundreds of thousands of employees, or are we still a 40-employee small business? So that is where some of the clarity can help and define where we are positioned, how we are viewed.

Senator SHAHEEN. Thank you. Can I just ask Mr. Brown, and this probably does not apply to you, Dr. Oliver, because, as you said, you are not doing contracts. But what kind of a screen do you look at to address some of the issues that Dr. Reder raised? Well, how do you look for whether the company has had $100 million invested, and now they are—you called it the walking dead—a walking dead company. That is pretty descriptive.

How do you screen for that kind of a company that may not be the best candidate for an SBIR award?

Mr. BROWN. Well, what we usually do is if there is a complex case that has multi tiers of ownership and, you know, VC ownership, et cetera, what we will do is we will ask them—we will get as much information as we can. We will have a conversation, and we will get them to send something written in terms of their ownership structure.

And we will go back and forth, and we will just break it down, and dig down, and drill down until we are satisfied that we understand the nature of the structure. And then we will give them feedback on it.

Senator AYOTTE. I wanted to follow up with that, Mr. Brown, based on something that Dr. Torbick said, which you talked about establishing a better connection between the small businesses and the managers.

So when you talk about sort of more of a paper correspondence between the two, how do you then know what is really happening

in the company? So as I understood what you were saying is you want the interactions so that they can see very much what you are doing and the productivity that you are bringing to this by your award.

So how much do you actually visit or make that connection, because I think some of that actual connection piece would probably bring to light the walking dead. So, I wanted to get your thoughts on that, Mr. Brown.

Mr. BROWN. Well, to be perfectly honest, you know, as I outlined earlier, that is one of the major benefits that I personally am getting from this session today. That is why you see me taking copious notes is it is good to hear what is happening where the rubber meets the road.

I mean, as you well know, we have the reauthorization legislation, and, you know, SBA as well as all 11 participating agencies have a great deal of responsibility in getting the framework out there, let alone start making inroads on some of the major provisions, like venture capital participation, of which NIH is the only agency that has signed on from that vantage point.

But in terms of drilling down with a company, such as my colleague here, I mean, that is very rare, unless, as I said, we get that interaction from them either directly, or frequently a program manager will contact us. We have this issue; could you please contact Mr. Torbick, and we will work it out between us.

Senator AYOTTE. Dr. Oliver.

Dr. OLIVER. Yes. I just wanted to echo Nathan's comments. We view that it is very important to have onsite visits between program managers and the small businesses. One of the challenges we have had is, as you are aware, the fiscal pressures on travel budgets. Generally, the agencies' travel budgets have come down as a result of that.

So, we actually are thankful for reauthorization, the administrative funds that we are able to use. And we have set a small amount of those administrative funds just for the site visits to make sure that that is not sacrificed as we move forward.

Senator AYOTTE. Thank you. You know, one other thought I had, how much do you leverage—I know the Department of Resources and Economic Development are here from the State level. And is there is a connection between the State government piece, because they are out in the field quite a bit. For example, in our State, and I am sure in other States. And is there a leveraging between reaching out to the State agencies and saying, what do you know about this company, have you visited it recently, just to also get that input?

Dr. OLIVER. I will comment. In terms of the application process, we currently do not do that level of digging. Again, the current process is for the companies to certify to their eligibility, so that it is a self-certification process. That takes place if they have an award. Given the timelines we are under today, we rely on that as the initial check in moving forward with applicants to know if they are eligible or not.

If there is any question about ownership or that would compromise their eligibility, I think we, like most agencies, defer to

SBA. So we would send the company to SBA to get a ruling as to their eligibility.

Senator AYOTTE. It just occurred to me that there are a lot of great State resources, too. For example, I know how involved our DRED is with local business, that they may even be good avenues just to establish those relationships and connections in terms of what are good candidates, and encouraging using the DRED as another way to leverage what the Federal government does. It was just a thought I had. I was just curious how much interaction there was.

Dr. OLIVER. Yes. So, at least with our agency, we have to base the review of the application on what was submitted. So all of the information must come in with the application. We are not at liberty to go out and get additional information to make someone's application look stronger or weaker from that point of view. So we do not have the flexibility right now to do what you are describing.

I would add that we do work with the small business development centers throughout the country in terms of identifying new potential applicants. But that is, I think, very different from what you are saying.

Senator AYOTTE. Yeah. Thanks.

Senator SHAHEEN. Dr. Kline-Schoder, did you have a comment on that?

Dr. KLINE-SCHODER. This was on the previous comment——

Senator SHAHEEN. Okay.

Dr. KLINE-SCHODER [continuing]. Related to—I just wanted to echo what Nathan had said, that our experience is when a program manager is actively involved, those are the most successful projects.

Senator SHAHEEN. Let me ask you, because Dr. Oliver referred, and I referred in my opening statement, referred to the fact that we also invited NIH and the Department of Defense to participate today, and both of them were forced to decline because of the travel restrictions on their budgets due to sequestration.

Have any of you gotten concerns as you are looking at the potential for the program down the road—I assume Mr. Brown and Dr. Oliver might comment directly. But the businesses who are represented here, are you hearing concerns that sequestration, those automatic cuts, are having an impact either now or concern about the future? I assume, Mr. Bundas, that you were going to comment on another issue.

Mr. BUNDAS. I was going to comment on an earlier topic, but I can move onto this topic.

What I have heard from some of our SBIR contacts and the folks that I work with at the Department of Defense is that they have discussed things that they can and cannot do because of uncertainty in the budget and potential sequestration coming up. But I have also seen on the small business side where that set-aside funding for small businesses is more protected.

Senator SHAHEEN. Right.

Mr. BUNDAS. And it gives the agencies that may have their larger budgets pulled back due to overall budget issues the ability to still use this pot of SBIR money as a way to potentially support some of their larger objectives and main programs.

And for us, I think if anything, it may have helped a little bit. Given the type of devices that we can develop, manufacture, and deliver, and the level of support that we can offer directly into these larger programs, then when agencies do not necessarily have the money to work with somebody else because of the main budget line item reduction, they can leverage the SBIR funds with the small business, and potentially accomplish the same objective.

Senator SHAHEEN. Good. Dr. Torbick? Either on that issue or, yeah, I assume you wanted to respond to the other issue.

Dr. TORBICK. Yeah, I will try to link a few and be brief. Just in terms of the travel restrictions, you know, webinars, going to meetings, you can easily get around some of those types of restrictions just getting an hour a month.

And just that communication, I want to emphasize also sometimes some of these solicitation topics get a little stale because you are just kind of doing this paperwork through this administration process. But by having that continued dialogue with those managers, I think you are going to kind of keep up with the speed of some of these technologies and innovations.

What I am doing now was kind of old six months ago, so if I have to wait a whole other cycle just to have a chat with a program manager, I might as well—it is not worth my time frankly.

And then one quick comment about the walking dead companies. As a small—you know, a very small business—I do not know if Jason has similar feelings—I do not have time to fight phase three appeals. I do not have time to kind of explore if or compete with a VC if they are really just a walking dead VC. So that is a concern.

I do not know exactly how that is all going to play out yet, but one day I might be fixing a printer. I could be taking phone calls. I could be on the phone making sales. I do not have time to kind of discover whether or not a company is a walking dead company. So, anything to reduce that would be greatly appreciated.

Senator SHAHEEN. Well, hopefully it is not you who is worrying about those walking dead companies. It is the Federal agencies who are providing the—yes. Did you want——

Senator AYOTTE. One of the things—one of the topics I think when I heard—when we were talking about the issue of venture capitalism and capital to start new businesses, and you talked about this walking dead issue, you know, with so many entrepreneurs here, and particularly with the Small Business Administration here and I know others in the audience, how do you view the regulatory climate, and what is the regulatory climate's impact?

In other words, the Federal regulatory climate overall, how does that impact your ability to thrive and grow? And what thoughts do you have for us on the impact of Federal regulations and how we can help that, because obviously it is something that I know that both of us hear about quite commonly, and I am sure Mr. Brown hears about it, too. But I think with so many entrepreneurs here, it would be very helpful to hear your feedback.

Senator SHAHEEN. Gray?

Mr. CHYNOWETH. Yeah. So, a couple of things, just one data point. I know the JOBS Act had some things relating to IPOs and

the ability to privately register. And I think interestingly that it has not actually—it has not really changed the experience that much for IPO track companies. So I think there was a lot of hope that that would enable people to get on track and file earlier.

But actually, I think that it has not really—the experience, at least from when I talked to counsel—to those companies and ibankers about it—that it has not really changed the track for the companies. So you are still going to be essentially on the same path that you would have otherwise before. But that is just an example where it has not actually changed the experience for folks, although that could certainly be just the perspective of the folks that I have talked to.

The second one would be just to give you kind of our—so we, you know, as an internet services company provider, we have thought a lot about, you know, do we want to go after, you know, government contracts. And I think that, you know, while it just always seems for us at least that it has been dramatically easier to figure out how to get money from customers than money from the government. And, you know, that is not to say that it is not really important, and this, I think, goes to the flexibility that Dr. Reder was talking about, you know. It is very easy to figure out how to stand up a website and do some of these information technology services, you know.

But I think, you know, that is just our experience, and I am not sure you actually ever even could compete. I would hope it would never be as easy to get money from the government as it is to get it from customers, you know. And so, that has just been our experience, and I think it highlights why in some fields it is even more important to get it right, like in health sciences, where there is significant capital investments. And other places are more suited for, you know, kind of turn and burn, and you would spend six months on an idea, and one person can bring something, you know, bring a concept to market.

So it really is a wide variety, and if you think about them, you know, they are all in the same space, but if you tried to put them—categorize them, I think you are going to—it is going to be under inclusive and over inclusive, so.

Dr. REDER. FDA defines the entire life sciences industry. That regulatory path is the source of the billion-dollar plus cost in order to get a product to market.

FDA has, I believe, been improving significantly over the last few years. Everyone has a horror story but there have been a number of new initiatives at FDA, for example, breakthrough designation for new therapies that are truly first in class and have the ability to really help. It has been a wonderful thing.

Regulatory expertise is the flip side of that, and as a firm with 10 people, we do not have the bandwidth or the ability to keep in-house regulatory experts, and so, we need to use consultants and contractors. One initiative that I have seen recently at the National Heart, Lung, and Blood Institute has been very encouraging. They have hired a full-time regulatory expert, someone with, I believe, about 30 years of experience doing this. They are available to SBIR awardees, and that is just a wonderful thing.

Now, of course, one person cannot serve the whole community, but it is a pilot program. I would love to see more of this in any of the highly-regulated industries where you could, for a very small amount of money, serve the entire SBIR community with regulatory expertise. You could even think about extending this into areas like intellectual property. There are certain service providers that are absolutely critical to our success that are also very, very expensive to us. If the Federal government, either through programs like that or through its purchasing power, can help, that would be wonderful.

Senator SHAHEEN. That is great.

Mr. FERNEAU. I would echo the importance of creating that kind of infrastructure, making those resources available to people, to applicants. Borealis Ventures itself has just three partners. We are a very small business ourselves.

Security regulations have become more complicated and now apply to our business. And unfortunately, we often are treated the same as Wall Street firms, billion-dollar firms. The regulatory requirements that I personally have to undertake on behalf of our company are significant. They may not seem significant to Morgan Stanley, or to SAC, or other huge multi-billion hedge funds. But they require days of my time on a regular basis whenever we have to file a report.

The significance of that burden relative to what we are talking about today with small businesses more generally, is simply that I think it is always a challenge for the officials who have the difficult task of trying to administer billion dollar programs in Washington that span the entire economy to fully appreciate the order of magnitude difference—multiple orders of magnitude difference—in scale of a person managing one, two, three, or 10 people, dealing with a hundred thousand dollar kind of mind frame, or just tens of thousands of dollars even. And then you have other officials who are dealing with hundreds of millions and billions of dollars, or trillions of dollars, in the budget at the Federal level.

You can never do enough to work hard to reduce the regulatory barriers to the smallest companies participating. I know this is really hard if you are an administrator and you have to handle hundreds of thousands of applicants. But things like the Phase Zero program of the SBIR where you actually try to push some of the decision making on the application to the local level, or providing easier access to small amounts of capital to help improve Phase I application approval rates, can be very useful where you basically push resources out to the field.

To your point, Senator Ayotte, where you involve partners in the State at the local level who are involved with these applicants, that could be very useful. It could be very cost-effective. It can also increase efficiency. And it also hopes to address the reality of first-time principle investigators applying who do not already have SBIR expertise. He does not have the means to hire the kind of expert that Dr. Reder just referred to, much less the institutional experience that Creare has.

And so, I think if you can find ways not just to reduce the regulatory barriers, but also to partner applicants with other sources of expertise, whether those resources are going to be funded by the

agencies themselves or supported through partnerships in the communities, that would be helpful.

Senator SHAHEEN. It is now 3:00, which is the time that we had promised to end this hearing. I am going to ask Mr. Bundas and then Dr. Gittell, if you would like to go ahead and respond since you both had indicated you would like to. And then closing thoughts before we wind up the discussion.

Mr. BUNDAS. Sure, I can be quick. One area of regulation that we run into often is that of export licensing and export control specifically for dealing with the types of devices that we are making. I mean, it is thermal imagery. It is night vision. Tactical advantage is important. National security is important.

But a lot of the technology that we started the company with has been around for a while, yet it is still classified under DoD or Department of Commerce as a dual-use item. I get a call from a guy in China every six months, hey, has there been any movement on this.

I mean, it is a huge market of potential industrial applications, at least that is what he tells me he wants this for. I run into people all the time at trade shows from Europe or from India or from Asia, and I just say, "You know what? It is not going to happen."

I have made a call here and there, but, again, we are a small business, and I do not have the time or the resources to chase down trying to get approval for every potential market that is out there only to find out that it gets denied, and I have wasted a couple of months of my time.

So if there is a way to potentially streamline that process, especially with the small business in mind where the resources are not available on our end opening up these markets, I think it could be potentially huge because it is a global market nowadays. For the advanced technologies that are being developed here in the U.S., we have got to open that up.

Senator SHAHEEN. Yes, and the reason you saw Senator Ayotte and I smiling is because we have heard this before from a lot of companies in New Hampshire. And there is actually a reform under way to address the whole export control system that is making some progress. There is a lot more that still has to be done. But there is an effort to simplify it in a way that certainly is going to help small businesses, because it is—as you point out, it is very important.

Dr. GITTELL. I just wanted to follow up quickly on the points that Philip and others have made about the difficulty for small entities at times to interact effectively with Federal agencies and regulators. I think that applies to public entities in the State of New Hampshire, as I am sure you are aware of, and to quasi-public agencies, like the community college system of New Hampshire.

We at times have difficulty competing effectively for Federal Department of Labor and Department of Education grants because the expectations are that we have a similar bureaucracy of larger states such as New York and California and Florida. We need the recognition that smaller States, that are less bureaucratic and smaller in scale, have difficulty administratively competing effectively for Federal grant money. Maybe a program to look at which has been effective is the EPSCoR program for competitive research

that the NSF has, that recognizes that some States have been funded relatively low on a per capita basis. And there is a special effort made to make those programs and services available to smaller States.

Senator SHAHEEN. I think that is a really good point. And the whole issue, which could be the subject of another hearing, is procurement that several people have raised, and the challenges of trying to figure out how to navigate the Federal procurement system in a way that can help small businesses take advantage of some of those Federal contracts. So that is certainly a topic that I think is worth future conversation.

Any final thoughts from any of you as we close out the hearing?

Dr. REDER. I think we have heard many times about this early stage gap in capital, and in the life sciences industry it is acute. The venture capitalists are moving to later stage, and they are also moving out of venture capital altogether. That whole industry is contracting significantly. To say that there were only 20 first-time deals done in the first quarter of 2013 across the country is astounding. It was a total of $98 million.

This is the seed corn that eventually grows into new therapies and new businesses. Whatever the Federal government can do to help to address that problem will pay dividends.

In the absence of early stage funding, we are putting $30 billion a year into NIH research, which will not get developed.

Mr. CHYNOWETH. The last comment I would make would just be to kind of underscore the theme of the community when I talked initially about town, capital, and community. Senator Ayotte, your comment about, you know, using this DRED to kind of facilitate that local conversation, provide information. That is one example, but there are also others, like New Hampshire Technology Council, ABI, ICC. All of these things really do capacity building at the community level.

And by far, the best way to—that we experience, you know, trying to navigate complex systems, like the government or like, you know, raising money for VCs, is to have an entrepreneur that is next to you or that is one person removed from you that you can talk to about that experience.

And so, the things that you can do, whether it is small grants, like the DRTC, or supporting these type of community organizations, really goes a long way to spreading that knowledge. And, you know, I think is even more effective over the long run than hiring—maybe even than hiring a dedicated staff person to be, you know, part of DRED. Just getting it out into the community and letting that kind of take the message forward.

Senator SHAHEEN. Mr. Brown.

Mr. BROWN. Yeah. My closing comments in listening to what everybody has had to say today would be I encourage you to reach out to SBA and to the other agencies, and I would say especially SBA, because we meet regularly with Manny, as he well knows, and the other program managers. We have, you know, rather vigorous discussions on all types of issues.

But, you know, in a lot of the cases, those discussions are driven by the agendas that we have in terms of the regulatory environment in Washington as opposed to the issues that I am hearing

today. It is not to say we do not get calls from time to time, but it is good hearing it from the entrepreneur, you know, yourselves in terms of exactly the issues that you are having.

And again, with this reauthorization still being put in place and many of the provisions being fine-tuned and oiled, I mean, anything that you see that may need to be tinkered, you know. We are still updating the policy directives, et cetera. So I just encourage you to bring your issues to our attention.

Senator SHAHEEN. Thank you. I would also point out that Mary Collins from the SBDC is here, as is Greta Johansson, who is the SBA director here in New Hampshire. So if you do not know them, you should.

Other final thoughts from anyone on the panel? Yes?

Mr. FERNEAU. Just real quickly. One of the strengths of New Hampshire you will appreciate, Senator Shaheen and Senator Ayotte, is that while we may be small and have these pockets of expertise throughout the State, we now increasingly are working together very effectively, and that is a great strength.

And part of that effectiveness that I just want to call out is how responsive you and your staffs have been when our companies or communities have needed help getting the DRTC started or addressing various regulatory issues. And that is the strength of New Hampshire. Part of our New Hampshire advantage is that our community is relatively small and connected. The ability to bring us together today in this roundtable format to highlight these issues, I think bodes well for the future.

We have come a long way in the decade since when we started Borealis. Based on what we have seen across the State, it is exciting looking forward. The Federal government has been important along the way, but it can do even more, I think. We are not asking for a lot, but I think there are high impact opportunities for the Federal government to support the continued growth of the economy here.

Senator SHAHEEN. Thank you. Senator Ayotte, closing thoughts?

Senator AYOTTE. I wanted to thank you so much again for holding this hearing. I thought it was great to hear from all the panelists today. And I know that there are also many business owners in the audience.

And we will take this back to Washington. And, you know, I really took to heart some of the ideas that you brought up on the uniformity across agencies, for SBIR, the better connections between the program managers and the businesses, the importance of the skilled workforce and making sure that we are obviously educating the next generation, particularly in the STEM fields, and streamlining regulations to make sure that we can make it more effective and efficient for you to be able to grow jobs to start your business.

And it worries me when I hear about the lack of capital, that if we do not have that seed corn for the next generation of businesses and entrepreneurs, then we are going to have difficulty really starting the new great ideas that I know many of you probably have in this room. And I think that we can do better in the Federal government because I do hear so many stories from businesses about regulations that are holding back entrepreneurship. And so, that is

something that I want to continue to work on, along with Senator Shaheen. So thank you all for being here today.

And finally, I would just say that my office, I know as well as Senator Shaheen's, are here to serve you. And sometimes unfortunately when you do run into some of that red tape in Washington that we want to cut through and eliminate, we can help cut through it more quickly. And we would be honored to do that. So thank you for being here.

And thank you again, Senator Shaheen, for holding this important hearing.

Senator SHAHEEN. Well, thank you for joining me, and thank you very much to all of our panelists. It has been a very helpful discussion, I think. And as we think about the challenges, particularly today, as we are still recovering from the recession that hit us, and we think about the potential for our small businesses to grow and to create the jobs that are going to take us out of the recession, the more we can do to be helpful to ensure that if we are passing legislation in Washington, that is in response to concerns that we have heard here at home, and that we are not hurting small businesses, but we are helping them is very important.

So thank you all very much. Thank you for everybody who came from far away today, to Mr. Brown, and Dr. Oliver, and for everyone who has traveled from far parts of New Hampshire to be with us as well.

And I would just like to echo what Senator Ayotte said about the importance of our offices and being able to help you address both concerns you may have about how agencies or departments are operating, and also in terms of cutting through red tape. We are really here to try and be a resource for the people of New Hampshire, for the businesses of New Hampshire, as you look at the challenges you face. So we may not always be able to help you, but we certainly want to try. So make sure you identify Senator Ayotte's staff and my staff, and know that you can talk to them. And we will try and help you in every way we can.

So again, thank you very much. I would just remind you the record will stay open for two weeks before we submit it to the Small Business Committee.

Senator SHAHEEN. Good afternoon.

[Whereupon, at 3:09 p.m., the hearing was adjourned.]

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