

OVERSIGHT OF THE SMALL BUSINESS  
INNOVATION RESEARCH AND SMALL BUSINESS  
TECHNOLOGY TRANSFER PROGRAMS

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HEARING

BEFORE THE

COMMITTEE ON SMALL BUSINESS

UNITED STATES

HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

SECOND SESSION

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**WEDNESDAY, MAY 21, 2014**

HOUSE OF REPRESENTATIVES,  
COMMITTEE ON SMALL BUSINESS,  
*Washington, DC.*

The Committee met, pursuant to call, at 1 p.m., in Room 2360, Rayburn House Office Building, Hon. Sam Graves [chairman of the Committee] presiding.

Present: Representatives Graves, Chabot, Hanna, Schweikert, Collins, Velázquez, Schrader and Payne.

Chairman GRAVES. Good afternoon, everyone, and the hearing will come to order. I want to thank you all for being here, and I would especially like to express my gratitude to each of our witnesses who have taken time out of their busy schedules to be with us today. Thank you very much.

Today we are holding the first of two oversight hearings to examine the programmatic changes made in the National Defense Authorization Act for fiscal year 2012 to both the Small Business Innovation Research, or SBIR, and the Small Business Technology Transfer, STTR, programs. This hearing will focus on private-sector impressions of the programs and the real-world effect of the changes that were made 2 years ago to SBIR and STTR programs.

Small businesses are a major driver of high-technology innovation and economic growth in the United States, generating new jobs, initiating new markets, supporting high-growth industries, and in this era of globalization, optimizing the ability of small businesses to develop and commercialize new, highly innovative products is essential for U.S. competitiveness and the national security. This is why programs like SBIR and STTR are so important. Created in 1982, the SBIR program was designed to increase the participation of small high-tech firms in the Federal R&D endeavor. The driving force behind its creation was the belief that while technology-based companies under 500 employees tended to be very highly innovative, and innovation being essential to the economic well-being of the United States, these businesses were underrepresented in the government R&D activities.

By including qualified small businesses in the Nation's R&D effort, SBIR awards stimulate innovative new technologies to help Federal agencies meet their needs in a wide variety of areas including health, energy, and defense.

Although smaller, the STTR program is also an important program that expands R&D funding opportunities for small firms and promotes public-private sector partnerships, including joint venture opportunities for small businesses and the Nation's network of non-profit research institutions.

Numerous programmatic changes were made to both the SBIR and STTR programs in the 2012 reauthorization. This hearing represents an opportunity for Members to learn more about these programs and gain perspective from private-sector witnesses about how they are functioning, and determine if Federal agencies are complying with the various aspects of the laws itself.

The primary goals when crafting this reauthorization legislation were to increase commercialization of SBIR-funded research, to promote greater participation from a wider array of small businesses, and to increase the end use of the technology developed through the SBIR program by Federal agencies. This is especially critical in the Department of Defense where technologies developed are often warfighter focused and lack specific markets in the private sector.

I look forward to hearing the testimony today, and again I want to thank all of you for being here with us. And I will now turn to Ms. Velázquez for her opening statement.

Ms. VELÁZQUEZ. Thank you, Mr. Chairman, and thank you for holding this important hearing.

Since they were established, the SBIR and STTR programs have helped launch tens of thousands of successful research projects. Through their history, more than 146,000 awards have been made for over \$37 billion, making these initiatives a major source of funding for small businesses. As a result of this funding, these programs have led to breakthroughs in a wide range of sectors, from agriculture to energy, to health care. In turn, these discoveries have generated economic growth and the job opportunities that come with it.

In 2011, Congress enacted a reauthorization of these programs. One of the primary outcomes of the legislation was a greater focus on commercialization. Such a focus is necessary if we are to ensure that the programs remain a catalyst for innovation as it was designed to be, rather than an annual source of income for government contractors.

During today's hearing I am especially interested in understanding how the reauthorization's various commercialization initiatives have played out, and if they are, in fact, resulting in more successful endeavors. In a similar context, the legislation required agencies to track those companies that continually win Phase I awards without progressing to Phase II. I look forward to reviewing this data.

Among the most notable changes were significant increases in permissible award sizes. In theory this should provide agencies with more flexibility to make larger awards to the most promising innovations; however, it could also reduce the overall number of awards. While not necessarily a bad outcome, such developments are worth monitoring by this committee.

Higher set-aside percentages have also gone into effect. These gradual increases, however, may actually be upset by sharp budget

cuts to federal extramural R&D budgets. So even though set-aside percentages are increasing, overall program size is decreasing. In fact, based on official data, last year's total SBIR and STTR award amounts were the lowest since 2003. Given the fiscal environment we are in, this is not a surprising outcome.

Finally, there are two perpetual issues that continue to raise concerns. The programs remain concentrated in California and Massachusetts, who together receive 35 percent of the total funds from these programs. Altogether the top 10 states receive 70 percent which results in programs largely serving just a handful of states, while others receive very little benefit at all.

Similarly, the participation of women-owned or minority-owned firms have been declining. Women-owned firms' share of SBIR awards decreased 30 percent in the last 17 years, while in the same period awards for minority firms fell by 63 percent. Overall last year, women-owned firms won 6.3 percent of SBIR awards, while minority-owned firms won just 2.5 percent.

When it comes to geography and demographics, it is important that the SBIR and STTR are serving the entire country and are not becoming a regular source of revenue for the same companies over and over.

The purpose of these programs is innovation, and for innovation to take root, we cannot just serve a fortunate few year after year. We have to ensure that all regions of our country are able to participate as well as promote this program as a means for women and minority entrepreneurs to grow.

During today's hearing I hope that we shed light on many of these issues and can begin to evaluate how the changes included in the 2011 reauthorization are performing, because before we know it, we will be considering the next extension of these important programs.

Since their inception, SBIR and STTR have played a vital role in fostering innovation. While they continue to do so today, it is important that we continue to oversee these programs regularly, and for that reason I thank all the witnesses for being here today and the chairman for calling this hearing.

Thank you, Mr. Chairman. I yield back.

Chairman GRAVES. Thank you.

Our first witness is going to be Mr. John Clanton. He is the CEO of Lynntech, Incorporated, which is located in College Station, Texas. Lynntech is a technology development company supporting research and development requirements of both government and industry. Key Lynntech products or projects include high-performance fuel cells for the military, enhanced search-and-rescue components for the Coast Guard, and cost-effective biohazard detectors for Homeland Security. Lynntech employs 100 scientists, engineers, and support staff, and has participated in the SBIR program since 1988.

Thanks for being here.

Mr. Clanton.

**STATEMENTS OF JOHN CLANTON, CEO, LYNNTECH, INC., COLLEGE STATION, TEXAS; CARTIER ESHAM, EXECUTIVE VICE PRESIDENT, EMERGING COMPANIES, BIOTECHNOLOGY INDUSTRY ORGANIZATION, WASHINGTON, D.C.; DAVID H. FINIFTER, PROFESSOR OF ECONOMICS, EMERITUS, RESEARCH PROFESSOR OF PUBLIC POLICY, THE COLLEGE OF WILLIAM AND MARY, WILLIAMSBURG, VIRGINIA; AND ROBERT SCHMIDT, CHAIRMAN, CLEVELAND MEDICAL DEVICES, INC., CLEVELAND, OHIO, TESTIFYING ON BEHALF OF THE SMALL BUSINESS TECHNOLOGY COUNCIL**

**STATEMENT OF JOHN CLANTON**

Mr. CLANTON. Thank you, Chairman Graves, Ranking Member Velázquez, and members of the Committee. It is an honor and a privilege to appear before you today to provide the views of Lynntech on the implementation of the SBIR reauthorization provisions contained in the 2012 Defense Authorization Act.

My name is John Clanton. I am the chief executive officer of Lynntech, which is a small business based in College Station. As the chairman said, we have 100 employees, 29 of which are Ph.D.s. Lynntech's parent company, Astin Partners, of which I am also CEO, has interests in real estate, data centers, and airport operations. This gives Lynntech the benefit of a broadly diversified ownership structure capable of providing strong financial support for the high-risk endeavor of technology development.

Since I purchased the company in 2007, Lynntech has received five post-Phase II contracts from DHS and DOD, two of which hold the promise of being very successful commercial market opportunities.

SBIR reauthorization provided for modernization of a number of SBIR policies, all of which Lynntech broadly supported. It was clear that the SBIR program was sustained by a broad bipartisan coalition of members that saw the value in technological innovations developed by small business.

Lynntech strongly supports the changes included in the reauthorization; however, there are two areas that I would like to comment on today.

First, we support the inclusion of VC-funded firms in the SBIR program; however, we do have an industry concern that the Committee may find helpful. We believe that the allowance of a certain percentage of awards to VC-funded firms should not be interpreted as a target level of awards to VC-funded firms.

In the Department of Defense, we are concerned that using the allowable level of awards as a target will create a noncompetitive market. The participation level of VC-financed firms which specialize in the defense market is limited as compared to bio. The valuation multiples and the economic fundamentals are simply not there. Small numbers of highly specialized products do not generate the returns that high-risk capital is looking to achieve. As a result, Lynntech believes that if the implementation of policy effectively creates target VC award levels out of what was understood to be allowable VC award levels, it will reduce the effectiveness of the competitive process within DOD and lead to diminished success in the SBIR program. Forcing the DOD to compete up to 15 percent

of the SBIR awards to only those firms owned by venture capital will diminish the competitive pool.

The second area I would like to address today is the renewed emphasis on technology transition. We applaud the initiative of this Committee to pioneer and incorporate these methods of joint accountability from both the small business and the agency. We believe that holding companies accountable for using Federal dollars effectively and requiring agency participation in commercialization was one of the most important parts of the legislation.

Unfortunately, as it relates to DOD, the transition support that the Committee was attempting to achieve has been slowed by the failure of the Department of Defense to ensure that its processes for technology insertion are improved, and modernized and harmonized with the reauthorization. To date we have seen nothing that would suggest that an effective Department-wide initiative to implement the statute has taken place.

Too often our personnel find themselves dealing with DOD personnel who have not been trained or are even aware of the new procedures put in place by the statute. We still see DOD personnel who complain about having to execute small business welfare programs, as well as personnel who do not realize that they cannot deny submission of a Phase II proposal from any of the Phase I awardees.

The Air Force still has too many people who cannot articulate what the Phase II proposal process will look like in an era where there are no longer any Phase II invitations.

Another real-life example is Army SBIR personnel who do not understand that it is possible to make multiple Phase II awards where an acquisition program manager is, indeed, interested in further development. Even the Navy, which Lynntech has publicly praised for its effective leadership in the SBIR program, has too many people in the R&D community who actively work to kill technology being developed not because of technical merit, but because of personal biases or because of SBIR data rights. There is growing concern that some SBIR technologies have been transitioned without regard to the small business rights of data ownership.

All of these comments indicate that the transition effort requires more than just a motivated SBIR company. It requires an informed and motivated agency presence as well as leadership from senior acquisition executives to ensure that all acquisition program managers are utilizing the full range of technologies that the Federal Government has already paid for.

I thank you all for your work in support of this very important program, and I appreciate the opportunity to share our point of view with you today.

Chairman GRAVES. Thank you, Mr. Clanton.

Our next witness is Dr. Cartier Esham, executive vice president for emerging companies at the Biotechnology Industry Organization. In this role Dr. Esham manages and directs the policy development, advocacy, research, and educational initiatives for BIO's emerging companies, which comprise approximately 90 percent of their membership. She works on capital formation policy and health policy impacting emerging companies, as well as supporting NIH funding and initiatives such as the SBIR program.

Thank you for being here, Dr. Esham.

#### **STATEMENT OF CARTIER ESHAM**

Ms. ESHAM. Good afternoon, Chairman Graves, Ranking Member Velázquez, and members of the Committee. As stated, my name is Cartier Esham, and I am the executive vice president of BIO's emerging companies. BIO's small member companies are developing medical products and technologies to treat patients afflicted with serious diseases, to delay the onset of these diseases, or to prevent them in the first place.

The vast majority of BIO members are prerevenue companies whose research is still in the lab or the clinic. These small businesses spend more than a decade conducting R&D, during which time they do not have any products to sell. Revenue does not fund the biotech development process, which can cost upwards of \$1 billion. Instead, emerging biotech companies rely on outside sources for innovation capital.

The SBIR program provides biotech companies an opportunity to compete for early-stage research projects in order to advance their R&D to the point that it can attract the hundreds of millions of private-sector dollars necessary to develop the initial project into a publicly available new medicine. Programs like SBIR are important in difficult fundraising environments for companies that generally depend on venture investment to finance early-stage research. Early-stage venture deals are currently on the decline, meaning that breakthrough innovation is receiving less funding, and the next generation of promising cures could be left on the laboratory shelf.

The mission of the SBIR program is to support scientific excellence and technological innovation through the investment of Federal research funds in critical American priorities. In 2012, Congress passed the SBIR-STTR Reauthorization Act to ensure that agencies have the most competitive pool of applicants, and that grants will be awarded based on the projects that show the most promise in bringing breakthrough and lifesaving therapies to the public.

The SBIR reauthorization made two vital reforms to the program. First, it allowed majority venture-backed companies to once again compete in the SBIR program. Second, it modified affiliation rules so that SBIR applicants will not be affiliated with their investors' portfolio companies simply on the basis of a common investor. BIO strongly supported these which allow many biotech companies to once again compete.

The restoration of eligibility to venture-backed companies will be vital to the success of the overall program, especially in the biomedical field. Virtually all biotechs depend on venture financing at some point in their development cycle, and, again, allowing them to compete will ensure they have the ability to access early-stage research dollars that can be used as leverage to attract further private-sector investment.

Similarly, the new affiliation rules ensure that growing businesses will not be deemed affiliated simply on the basis of a common investor. There are a limited number of VC firms that invest in the biotech space, and those companies often share investors,

but the companies themselves do not share business concerns or goals. These clear bright-line tests put forth by the SBA reflect these realities.

The SBIR's final rule implementing the reauthorization went into effect early last year. NIH reissued its SBIR omnibus grant solicitation last spring, and the closing date for those applications was this January. We do not yet have data on how many venture-backed companies applied for or were awarded SBIR grants under the new rules as they are still under review; and according to the SBA policy directive, NIH has up to 12 months to provide notice for recommendation of an award and up to 15 months to give the actual award. But we are optimistic that the expanded pool of eligible companies will lead to increased funding for breakthrough innovation.

We will continue to work with our member companies and this Committee to monitor implementation to ensure that the program provides access to majority venture-backed and all small innovative companies, access to these critical funds. Again, as stated, the SBIR plays a critical role in supporting small biotech companies and funding for their early-stage research as they navigate the "valley of death," a critical time when scientific concepts have shown promise, but the development is not far enough along to attract further investment by the private sector. BIO applauds Congress for making key reforms to this program to ensure eligibility for all innovative small businesses, and we look forward to continue to support this vital program.

Thank you for your time, and I look forward to answering any questions.

Ms. VELÁZQUEZ. It is my pleasure to introduce Dr. David Finifter, professor of economics emeritus and a research professor of public policy at the College of William and Mary. He has nearly 20 years of SBIR program evaluation experience, including authoring portions of the landmark National Academy of Sciences assessment of the program. He has also worked on specific evaluations related to the Department of Defense, Department of Energy, National Science Foundation, NASA, SBIR programs. Formerly he was the dean of research and graduate studies at the College of William and Mary, and also the founding director of the Thomas Jefferson Program in Public Policy. Welcome.

#### **STATEMENT OF DAVID H. FINIFTER**

Mr. FINIFTER. Thank you, Ranking Member Velázquez, and Chairman Graves, and members of the Committee. I am honored to have this opportunity to offer comments on the SBIR program. As Ranking Member Velázquez mentioned, in addition to being a faculty member for nearly 40 years at William and Mary, I have been working as an economist on SBIR for around 20 years in various ways. I won't go into that now.

I am going to speak today not as a representative of the National Academy of Sciences, or the College of William and Mary, or NASA, or DOD, any of those that I work for. I am speaking as an independent economist. I will likely be perceived as President Truman's nemesis, the two-handed economist, but I do this as a policy

educator who recognizes that most, if not all, decisions involve trade-offs, and that is why I title my remarks that way.

I am going to offer brief comments on seven areas, observations that I have. It is a little early to determine whether the reauthorization is doing what we hope it will do, the data are not in yet, but I wanted to talk about these issues one by one.

First, the overall health of the SBIR program. The SBIR program, being in existence since 1982, is—in my view and from all the extensive research, the program is working to achieve its goals. While it is challenging the measured outcomes, the studies have attempted to do it in terms of sales and commercialization infusion into Federal agencies and to some extent achieving participation in the program by women and minorities. All of these have shown to be positive, although all of them have issues attached. There is clearly room for improvement. I have to admit I am a fan of the program even though I try to look at it objectively.

Number two, the program goals should be remembered when debating policy issues and consider implicit trade-offs. When debating issues involving SBIR, it is important to consider implicit trade-offs. For example, a stronger emphasis on commercialization could mean less emphasis on serving agency needs or possibly in recruiting economically disadvantaged applicants and awardees. Also, an increase in participation by small businesses serving R&D needs of Federal agencies could lead to a somewhat less strong performance in commercialization.

In addition, it is important to remember that there are 11 Federal agencies involved in the SBIR program, and they have different needs and different approaches. Therefore, flexibility is an important consideration in implementing the program.

And finally, the inclusion of venture capital into the SBIR arena should be perceived as leading to a deviation from the original intent of the program. I will have more to say about that in just a moment.

Number three, the so-called proposal mills. I wanted to say that while there are multiple award winners, studies indicate that they are not the stereotype of get a Phase I, and then get another Phase I and another Phase I. Many, or probably most, of these multiple award winners have succeeded in commercializing; and, in fact, one-third of the applicants in any given year are first-time applicants.

Number four is the issue surrounding venture capital. In a recent report by the National Academies of Science, they looked at venture capital and the NIH and essentially biotech area, and I encourage you to look at that report. It came out before the reauthorization act, I believe, but it does recognize trade-offs. The new venture capital approach is a start to resolving some of the trade-offs.

If you think about what is going on with venture capital, how does that differ from a firm being run by someone who has large amounts of personal capital? Essentially we don't talk about need when we talk about SBIR, and I think we need to separate that from that discussion.

Number five, and I am running out of time, number five, the geographic dispersion, I can address that in Q&A perhaps, but there is some question about while everything seems to come from Cali-

ifornia and Massachusetts, is it desirable to spread it out across the country? What are the pros and cons of that?

If there are questions about participation of minorities and women, I have some thoughts on that as well.

And, finally, as an academic, of course I say there is always a need for continued research and evaluation, and that is only a little bit self-serving.

Thank you for allowing me to make these comments.

Chairman GRAVES. Up next is Mr. Robert Schmidt, a participant in the SBIR program since 1991. He is the a founder and CEO of several northern Ohio technology businesses, including Cleveland Medical Devices, Incorporated, and Orbital Research, Incorporated. Mr. Schmidt's company conducts a wide array of research and development initiatives with new innovations being found in home sleep testing technology, fluid aerodynamics, and just about everything in between. He is testifying today on behalf of the Small Business Technology Council.

We appreciate your participation. Thank you.

#### **STATEMENT OF ROBERT SCHMIDT**

Mr. SCHMIDT. Thank you. I am primarily here because of the SBTC. The SBIR program has allowed my companies, though, to be able to develop products in medical and aerospace markets. We sell on all seven continents, something I am kind of proud of, for seven continents. Examples of our products are CleveMed's SleepView, which this month will provide about 1,300 home sleep apnea tests, making us one of the largest sleep apnea testing services in the world. We are growing at 10 to 15 percent per month, tripling our sales every year for the last 3 years. With adequate capital, this one product could save Medicare or Medicaid hundreds of millions of dollars a year.

The HomeView allows Parkinson's disease patients to improve the titration of drugs in tuning the deep-brain stimulators to lead more productive lives. Other products do brain monitoring for anesthesia control, and seizure detection and mild TBI detection; dry electrodes to be able to chronically monitor the heart; and oxygen sensors for hypoxia monitoring on the F-22 Raptor; low-cost steering systems for advanced munitions; and little tubes that we grow human brain cells in for drug discovery. My companies employ about 75 people, about 13 Ph.D.s, and we train about a dozen students a year.

The last 5 years have been most difficult for SBIR companies. The number of SBIR awards has dropped by 36 percent in the last decade, and the dollar amount awarded has dropped 25 percent in the last 3 years. Entrepreneurism is at a 30-year low. Since 2008, bank lending to small businesses has declined by 18 percent, by \$126 billion. The problem is compounded because the largest banks that receive the most TARP funding have reduced small business lending the most. Small businesses like mine who have never missed a payment suddenly found their notes are called by their bank. The banking lesson is if you invest in your business and create jobs and have even a small loss, you will have your bank credit line cancelled.

The climate for small business, and especially our SBIR technology companies, growth and job creation is not good. However, despite the funding declines, the SBIR program is still the most important funding source for small, growing high-tech businesses. In the first quarter there were only 41 seed start-up deals by VCs for only \$125 million. Angel groups reject 99 percent of their requests. SEC regulations are squashing the JOBS Act and crowdfunding, and the Federal Government has not made its procurement goals for small business purchases. These changes have occurred at the same time the regulatory burdens by Federal and State government have been increasing. The patent reform bills are also hurting company valuations and reducing available capital.

Our frustration is that for over two decades, DOD Under Secretaries for Acquisition and Technology under both Democrats and Republicans have come to the conclusion that SBIR is the answer to getting the best technology to the warfighter faster and at lower cost, as well as creating jobs and improving the economy.

In early 1998, Jack Gansler, Under Secretary of Defense under Clinton, called for Phase III goals and metrics. Again, a decade later, James Finley, Deputy Under Secretary of Defense under Bush directed sole-source SBIR Phase III contracting attracting. Finally, 3-1/2 years ago, Congress legislated the same; however, Phase III priority continues to be ignored by the agencies.

It is time for more teeth in the law. While DOD has taken some steps after 30 months, they have not revised the FAR; nor have they produced new manuals or performed training, set goals, developed incentives, all as required by the law. Most importantly, they are not tracking their progress.

The agency culture that is adverse to small business must be changed. Regulations and procedures should be immediately updated to reflect the law and personnel trained in its implementation. Full SBIR data and intellectual property rights must be accorded to SBIR contractors in Phase III funding as required by Congress. Agencies, and particularly DOD, have not been protecting SBIR IP rights. As required by law, the government employees and prime contractors must be provided to encourage this cultural shift.

For small businesses, the government needs to meet small business procurement goals, provide funding for R&D and SBIRs so that America does not lose its technological edge to China, provide an environment that makes credit and equity available to grow small businesses, maintain strong intellectual property protection. The law is clear: SBIR Phase III awards should be used to the greatest extent practicable, and this should be tracked in realtime.

Thank you for this opportunity to speak.

Chairman GRAVES. Thank you all, and we will start questions with Mr. Collins.

Mr. COLLINS. Thank you, Mr. Chairman. I thank the witnesses as well.

I think some of these, the STTR, SBIR, aren't fully understood. I am curious, Dr. Esham, in the biotech area, do you see universities and then with their small business partners using STTR and then moving forward into SBIR? Do you see them both utilized one after the other?

Ms. ESHAM. I believe universities are interested, you know, sort of those universities are interested in STTR. I will be frank; I am not entirely familiar with the use of STTR. For the most part, biotech companies focus on the SBIR funding opportunities.

Mr. COLLINS. Even though a lot of that will come out of a university setting.

Ms. ESHAM. I personally—in my shop we personally don't have any data. Again, we have mainly focused on the SBIR program.

Mr. COLLINS. I am also curious. In the DOD, which is a major, maybe, again funder on the STTR, there is only five agencies. While it also may be speaking to your biotech, do you see funding of any substance coming out of the DOD, or is it mostly the NIH on—

Ms. ESHAM. Our membership, I would say most of our member companies would be—the vast majority would be applying to NIH. We are also interested in the Department of Energy. We have a lot of renewable small companies that we think would benefit from participating in the SBIR program as well.

Mr. COLLINS. So back in the anthrax days when the military was very worried, you didn't see much, if anything, coming out of the DOD on the anthrax front?

Ms. ESHAM. I would have to go back and look at that historical data. I don't know that off the top of my head. I apologize.

Mr. COLLINS. Yeah. Okay.

Mr. Clanton, I wonder if you see a link between STTR, SBIR, if you've got any experience in that.

Mr. CLANTON. We do. We have seen some successful transitions for things that started out as STTR-funded projects. We are located in College Station, which is where Texas A&M University is located. We are fortunate to have that resource there and have had a number of STTRs that have started there. And some of those have been successful and then become spin-outs, and we have seen that as a good avenue.

Mr. COLLINS. Have you seen any—because of budget constraints—we have all got budget constraints—have you seen any shifts at the university level with the STTRs moving into SBIRs?

Mr. CLANTON. We have seen much more interest on the part of university professors to participate in the STTR program. They see that as another funding source, obviously, and because of the other funding sources that they have being constrained with budget constraints, then we see a lot more openness and a more entrepreneurial viewpoint from some of the professors at the universities.

Mr. COLLINS. The idea—you know, I am familiar with one or two companies who do live on grants. They have never commercialized their product. I just wonder, it is a worry when you see a company go after whether it is SBIR or other—I have seen it especially in the energy world—grant after grant after grant. I have seen a lot of it in the ceramics area. Do any of you have any comment about at what point should the government step in and say after you have had 14 grants, it is time to call that to an end? Understanding each one is supposed to stand on its own, but really, you know, after somebody has got 14 of them, you have to wonder.

Mr. SCHMIDT. Thank you for asking that question because it really goes to culture. And so the question is should we shut down Boe-

ing, Lockheed, General Dynamics? Should we shut down Johns Hopkins? They have had so many grants, it is time to cut them off altogether. And so why would small businesses, where, on 2.5 percent of the budget, you have got 25 percent of America's R&D awards were 10 times more effective than large business and universities. And that goes for just about any job creation, number of patents, anything you can do, because I can tell you there is one thing, when your house is on the line, when you know your family is going to be living in a cardboard box if you don't produce, there is a great deal of focus in being able to make sure you meet deadlines.

It is not that I have tenure and I can—oh, it is 5:01, my goodness, I am late, I need to leave right away. You know, you are there. I have slept on my office floor many a day, and there is just this huge focus to be able to produce, and that is the reason why we give 10 times bang to the buck.

So I think that is the wrong question. I think the question is how can the Federal Government provide enough incentive to be able to help get these small companies up the curve, you know, around that point of inflection to be able to get them up to be able to truly commercialize? Because when 76 percent of the VC money goes to just five States, when you are in one of the fly-over States, like Ohio is and just about every other State, you know, this means you are not going to get any other funding. You have got to live on your own and be able to produce your product and get it. And that would be a huge incentive and help to be able to help create jobs by giving these people that, you know, have devoted their lives to being able to produce this stuff a little more incentive for testing and evaluation.

Mr. COLLINS. I agree with you on 98 percent of companies, but there are those 2 percent who live on grants, and I know those are the outliers, and I know my time is expired, but just suggesting at some point, and, again, I have seen it in the ceramics world, you have got to call an end to it. But I agree with you for 98 percent of them. Thank you.

I yield back, Mr. Chairman.

Chairman GRAVES. Ms. Velázquez.

Ms. VELÁZQUEZ. Thank you.

Dr. Finifter, California and Massachusetts, as I mentioned in my opening statement, together win 35 percent of awards through the SBIR program. States like Oregon, New Hampshire, Arizona receive less than 2 percent. This is supposed to be a national program, but it is far from it, given the fact that the top 10 states receive almost 70 percent of the awards.

What can we do to change this and channel more the taxpayer R&D to all 50 States? Or why is it that only California and Massachusetts receive the bulk of those awards?

Mr. FINIFTER. Thank you for the question. I think my view is that SBIR, while it is a national program, the aspect of the national program that I think we should look at is that it develops technologies for the United States. In doing that, it tends to generate economic growth for the United States. And if we look at it in terms of regional equality, we are barking up the wrong tree. In my little write-up I talk about Kansas, Nebraska, and Iowa. I

apologize if anyone here is from there. We give them various assistance in farming, and that means we don't give it to—

Ms. VELÁZQUEZ. What about places like Oregon?

Mr. FINIFTER. Well, in terms—you mean in terms of agriculture?

Ms. VELÁZQUEZ. No, in terms of technology.

Mr. FINIFTER. The best answer to your question would be that we ought to look for other clusters. It seems to be there are corridors or clusters where this happens, and California and Massachusetts are most notable. If Oregon is another one, then we ought to encourage that. The agencies ought to go out and recruit folks there. If they are not bidding, if they are not applying, then that is a problem, and then the agencies ought to encourage that. Oregon is one, but to aim it for 50 States or for half of the States is forcing—probably moving away from the best of the projects that are not winning. I don't think there is a bias.

Ms. VELÁZQUEZ. Well, how do we know that they are the best of the projects? It could be the one in Oregon or some of the other states where we have clusters of technology start-ups, and yet for whatever reason they are not participating in the program.

Mr. FINIFTER. Well, I think collectively the program ought to be thinking about how we can promote other regions, but I also think it is up to the agencies to prove to an oversight committee that they don't have a regional bias, that it is just the outcome of the process.

Ms. VELÁZQUEZ. Thank you. I am talking about oversight in the agencies.

Mr. Clanton, you mentioned something that really caught my attention, and that is, the fact that places like DOD are slow to adopt some of these changes for either lack of training or information given to them. Do you think that it is worth bringing the agencies before the committee to testify to see what are they doing to make sure the provisions and changes that were included the last reauthorization are in place?

Mr. CLANTON. I think that is an excellent idea. I don't pretend to know how or what the process is for all of this information to flow all the way down to the SBIR program managers, but I suspect that there is something in place that it isn't happening. And I think having accountability is the cornerstone of the reauthorization act, both on the part of the small business as well as on the part of the agency.

Ms. VELÁZQUEZ. Thank you.

Mr. Clanton, the reauthorization ensured that federal agencies can continue to award multiple Phase II grants. While this may reduce the number of awards, it may increase commercialization. Is this a trade-off you are willing to make?

Mr. CLANTON. I think so. I think the way that it is structured, those projects that have a value either to the Navy or to whatever agency, there is an opportunity now for that agency to use their resources on those projects which have a specific need or solve a specific problem and have the technological promise to achieve that, and I think it is a fair trade-off for everybody involved to say that one of the downsides is there may not be as many awards.

Ms. VELÁZQUEZ. Thank you.

Mr. Schmidt, in your testimony you note a concern that the SBA approved a blanket waiver for the NIH to exceed the caps and award amounts in violation of the law. What concerns you about these large awards?

Mr. SCHMIDT. Well, the law set clear caps, as you know, so when the NIH gives a \$10 million contract, that means it is eliminating nine other SBIR Phase IIs. So it is clearly, you know, how are you going to spend your money, or what are you going to do? And the intent of the law was to be able to grow new businesses.

So we have to remember that start-ups are to an economy what births are to a population, and small businesses are to the economy what children are to the population. But we don't treat, you know, these small businesses the way we treat children to be able to help grow them, and that is the important thing. And this Committee has helped enormously over the years and hopefully will continue to help out.

Ms. VELÁZQUEZ. You said before, right, that one of the things for the program is to increase more small business participation?

Mr. SCHMIDT. Right.

Ms. VELÁZQUEZ. But isn't that inconsistent with what you said to Mr. Collins?

Mr. SCHMIDT. The problem is that you have so much money, and so what our feeling is is that if the agency truly wants this—you know, oh, we are going to cure cancer is always the line—well, then put up your own money. You have got 97 percent. We are talking about the 3 percent to be able to make sure that we are growing our economy with these new small businesses.

Ms. VELÁZQUEZ. So you think that large awards goes against the statute?

Mr. SCHMIDT. I do.

Ms. VELÁZQUEZ. One of your companies, Great Lakes Neurotechnologies, actually won six SBIR Phase II awards—

Mr. SCHMIDT. That is correct.

Ms. VELÁZQUEZ.—from NIH that exceeded the \$1 million limit, and four exceeded the—

Mr. SCHMIDT. That was before the law changed, though.

Ms. VELÁZQUEZ. That was before the law.

Mr. SCHMIDT. Right.

Ms. VELÁZQUEZ. But it is exceeding, even before the law.

Mr. SCHMIDT. I am sorry?

Ms. VELÁZQUEZ. It is exceeding the limit.

Mr. SCHMIDT. No. Well, there was no limit before the law. There was a guideline, and that is the reason why the law was changed.

Ms. VELÁZQUEZ. Well, there was a guideline, but you exceeded it. So my question is how do you explain your opposition to these large awards at NIH when your company is actually benefiting from it?

Mr. SCHMIDT. Well, certainly we benefited. We followed the law every time.

Ms. VELÁZQUEZ. Okay. Thank you, Mr. Chairman.

Chairman GRAVES. Mr. Hanna?

Mr. HANNA. Thank you.

Dr. Esham, could you talk a little bit about how these two programs, SBIR and STTR, impact your industry in terms of global

competitiveness and how they help? Go ahead, though. A question for Mr. Clanton.

Ms. ESHAM. I will attempt to answer that question. I think the STTR program, again, plays a critical role in the early-stage projects of these companies, so often a typical biotech company again is prerevenue, often dependent on venture or other sorts of private-sector capital to advance their research projects through ultimately the human clinical trial phases and FDA, hopefully, review and approval.

But a lot of the venture dollars are tied specifically to projects, so where it is difficult to raise money are for additional projects, even if they show promise. So SBIR can play a very critical role in helping companies derisk, validate, do a proof of concept study that then becomes very attractive for additional venture capital to advance that project even further, and then usually that project will move on to, you know, being funded completely by venture capital or other financing mechanisms. So it really allows these companies to get more shots on goal.

This is a high-risk, high-reward business, and the more projects, the stronger the pipeline that we can ensure in these small companies, the stronger the industry, and the more potential beneficial outcomes for the public.

Mr. HANNA. Thank you.

Mr. Clanton, you talked about—and correct me because I am not sure I have this exactly right—but target levels and non-competitiveness. Do you want to elaborate on that, the mistake of target levels—

Mr. CLANTON. Yes, I would be glad to.

Mr. HANNA.—or some other kind of way of going about it?

Mr. CLANTON. We believe, and it is possible that it is not absolutely the case, but we believe based on discussions with some folks in DOD that there is an interpretation of the allowance for a certain percentage of awards to go to VC-funded companies to be viewed as that that is a target amount that they should shoot for. In other words, effectively a—

Mr. HANNA. What I am driving at, though, and I think you are, too, is how does that corrupt, if that is the right word—how does that corrupt the system, and what does it encourage or discourage?

Mr. CLANTON. The reason that I am opposed to it is it is my belief that the number of VC-funded firms that participate in DOD and in military funding is significantly smaller than the number of VCs that participate in BIO, for instance; and that since that population is so small, that the number of awards that might be made would be limited to a much smaller competitive base in that it would keep the funding from being available for small business firms that are not VC-funded.

Mr. HANNA. How would you change that? How would you improve it?

Mr. CLANTON. I believe that the intent of the Committee is clear to us in that it was intended to be an allowable number to reach, but it was not an attempt to create a set-aside for VCs.

Mr. HANNA. You think that is the way it is being treated with—

Mr. CLANTON. I think that there may be some people in DOD who are seeing it otherwise.

Mr. HANNA. And you have seen kind of anecdotal evidence of that? So that is kind of a sign of some misappropriations or waste or loss of opportunity.

Mr. CLANTON. I think it is just another symptom of a lack of thorough understanding on the part of DOD as to the elements of the reauthorization.

Mr. HANNA. Mr. Schmidt, would you like to comment on that? I am guessing you have an opinion on it.

Mr. SCHMIDT. Yes, we do.

You know, we are looking to be able to institutionalize this, so the Small Business Technology Council, as I said, has been working on this for 20 years. So 14 years ago—16 years ago under the Clinton administration, we had somebody in DOD that said, Jack Gansler, you know, you have got to do this; you have got to be able to incorporate this. Unfortunately it takes them so long to be able to fully understand the program and what the best courses of action are that by the time they finally come to that conclusion, you know, another year, year and a half they are out of office because their boss gets voted out of office. And the same thing happened with Finley when he was under the Bush administration.

So finally the law has been institutionalized now, and you have written it into the law, and I thank all of you for that. It is a big deal. But what hasn't happened is we haven't changed the FAR. We haven't written the regulations. We haven't gone out and trained the contracting officers, the program officers, the contract specialists, the contracting officers' representatives.

You know, everybody that deals with contractors, they have got to understand what the law is, and they don't. So that needs to be a major effort in DOD to be able to have them understand that, A, they want to get products to the warfighter better, faster, cheaper, through SBIR; and they want to be able to help grow jobs and keep them in America.

Mr. HANNA. My time is expired. Thank you. I saw at least three heads nodding to that. So thank you very much.

Chairman GRAVES. Mr. Payne.

Mr. PAYNE. Thank you, Mr. Chairman, and to the ranking member.

Dr. Finifter, in your testimony you mentioned that what we can expect in the coming years from the Small Business Innovation Research Program and Small Business Technology Transfer Program. With the program authorization expiring 2017, if there was one addition or one change that you could recommend for the Small Business Innovation Research Program, what would it be?

Mr. FINIFTER. It is always hard to come up with one, but I think a major point I have is that flexibility across SBIR is important. We need to realize that we have 11 different agencies, and DOD and NIH and NSF are apples, oranges and bananas. We ought to be setting requirements—we ought to let agencies do what they do well and deal with their missions.

So I think recognizing that, for example, the VC, venture capital question, clearly there is some merit in the NIH biotech world because of the high cost of start-ups. That wouldn't be true nec-

essarily in the NSF SBIR program. So flexibility, tailoring it to the needs of each agency, I think, would increase the performance tremendously.

Mr. PAYNE. Thank you.

Dr. Esham, same question.

Ms. ESHAM. I agree with the concepts set forth about ensuring agency flexibility, and I think there are some safeguards in the law that passed regarding allowing agencies to opt in to particularly the VC proposal.

One issue, and I hesitate to say this with my friends at NIH, who, frankly, I know do have some budgetary constraints, and that is something that we as an organization would like to see reversed, but it is a fact that it does take a long time for SBIR applicants to know if they got an award in, again, 12 to 15 months, and if there was a way to wave a magic wand, I think that is something we would look to. But, again, I say that with the caveat I understand the budgetary constraints that our friends are facing.

Mr. PAYNE. Thank you.

Mr. Clanton.

Mr. CLANTON. Thank you.

I will echo Dr. Esham. I think the time between submission and award so that progress can be made would be a great addition. I wouldn't be doing my part if I weren't here to say that as a great custodian of the taxpayers' money through the SBIR program, it may be examining how much of the set-aside is appropriate, and whether that can be increased going forward is something I would certainly like to see happen.

Mr. PAYNE. Mr. Schmidt?

Mr. SCHMIDT. Well, there is two things. From the agency standpoint, we need to start tracking this data in realtime. We are getting percentages where the agencies are saying they are meeting their goals of 2.5 percent, but then they take out huge chunks of money and say, oh, well, that is not included in the base, even though it is clearly within the law of external R&D. So it is like me going to the tax people and saying, well, you can't tax me on that; that money was for my boat, you know, or my airplane or something. That is not my general income. So that has got to get changed.

On the congressional level, it is the downward trend in R&D, and we are losing it to China, and unless we do something as a Nation to be able to change that—right now the latest Brookings report came out and said in 2 more years China is going to have a bigger GDP, using the purchasing parity index to be able to outgrow us, and we need to start changing that. We need to invest in our future.

Mr. PAYNE. And just a quick yes or no. Do you know the SBIR and the STTR reauthorization required the SBA to develop and implement policy and guidance for a large number of new provisions? Do you believe that the lack of additional funding for these new responsibilities plays a significant factor in the lack of implementing the regulations, each of you? Yes or no, do you? Very quickly.

[2 p.m.]

Mr. SCHMIDT. In one word, yes. They need more money to be able to help support all of this.

Mr. PAYNE. Okay. Doctor?

Mr. FINIFTER. I would say yes as well, because it is very short-sighted not to do that. We have to invest in R&D more so than we are doing for our economic growth.

Mr. PAYNE. Thank you.

Ms. ESHAM. Yes.

Mr. PAYNE. Thank you.

Mr. CLANTON. I will say yes as well, but also caveat that I believe there is a cultural shift as it relates to DOD as to really understanding how valuable the SBIR program is and what a return it makes on the taxpayers' dollar.

Mr. PAYNE. Thank you.

Mr. Chair, I yield back.

Chairman GRAVES. Mr. Schweikert?

Mr. Schrader?

Mr. SCHRADER. Thanks, Mr. Chairman. I appreciate it.

I guess I would ask Dr. Esham about the Phase II funding, how that is working in your opinion. Is that adequately meeting our needs, and the rules and regulations rolled out to where SBIR folks and companies can take advantage of it?

Ms. ESHAM. Again, I am going to speak somewhat hypothetically because we are sort of waiting for the data from the new rule, if you will. But I will say that the ability to do sequential Phase II is something that I think we strongly support in the sense that if you put in money to a project, and it needs more money to reach systems, the critical milestone in our industry to attract more venture capital, I think that is an important aspect that was maintained.

Secondly, another key factor that was in the new law is the "straight to Phase II," which and I understand NIH has just recently announced that they are launching their pilot project where applicants can apply for Phase II without having have done a Phase I through the agency. So in other words, they may have funded it themselves through other means, and I think that may have very positive aspects to helping, again, ensure the—meet the goals of the program; that is, to advance medical innovation.

Mr. SCHRADER. It is alarming to the members of Committee that it has taken such a long time to get these rules up and going, frankly. Want to make sure that hopefully now that they are up and going, the next time you all come back, you will be able to report that this is actually working.

Ms. ESHAM. It is our hope as well. And again, as I mentioned, you know, even though the solicitation closed in January 2014, it may be another 12 months before we really understand how things are being implemented, and the pilot project, it is also known it takes a long time for the agency to review and award these grants.

Mr. SCHRADER. Perhaps we will have you back at that time.

Mr. Schmidt, your testimony talked a little bit about the lack of metric implementation despite clear intent of Congress and stuff. Are we making any headway at this point finally, or what can the Committee do to give better direction, shall we say, to some of our agency partners.

Mr. SCHMIDT. Sure, it is always carrots and sticks, isn't it? I am a big believer in carrots. I think that is always a helpful thing. You

know, we have got a lot of good people in the Federal Government, and they are doing good work and, you know, working hard to be able to make things happen. And several of us have talked about culture, and it is that change in the culture of, you know, SBIR is a tax, and we don't like any of this.

And so by providing incentives of bonus plans for the program officers and the prime contractors to be able to start using this technology, for a very small amount of money I think we can change the culture, which will help the economy.

And so how do we create jobs? You know, we keep waiting and waiting for jobs, and we are slowly, slowly growing, but this could give us a big boost as a Nation to be able to say we are going to invest in these guys that give us 10-to-1 bang for the buck: small business. And that is where we want to invest our money, and I think that will be a huge help.

And, you know, part of this is the metrics because they can't get their bonus unless they meet their metrics, so you have got to have that. And that encourages them to keep track of it as well.

Mr. SCHRADER. We like the metrics, obviously, too, to make sure that the programs are working as intended and listening to you all to figure out if it is actually what we want.

To you also, Mr. Schmidt, with regard to the venture capitalists, I mean, government can't afford to do everything. We do rely on venture capitalists. The recession took a lot of steam out of the venture capital group, if you will. And I wondered if there was a way that the SBIR is working with venture capitalists to leverage maximum opportunity of funds across the—

Mr. SCHMIDT. Well, it would be nice if we worked together better. You know, I have been trying for over 20 years to get, you know, some kind of other funding, venture funding. But being with Ohio companies, we are one of those fly-over States, you know? So we are somewhere between Wall Street and Sand Hill, you know, and we are neither of those places. So that is what I mentioned 45 States have to fight for 24 percent of the money for venture capital.

So, you know, in order to be able to help provide that, the VCs in general, as I said, only 41 deals in the first quarter of this year in seed and start-up funding. So their focus is not on new, small companies, or even the smallest companies, you know? They are looking for home runs in big, growing companies, and particularly now private equity in the same way.

So certainly one of the big things is to allow people with the changes in the tax laws that we have had—that the capital gains went from 15 to 20 percent plus all of the healthcare funding, so it is almost 24 percent is what we are paying now—to be able to have a tax change that allows people to invest that money if they—you know, so they get a credit on their 24 percent back if they put it into a new, small, growing businesses. That would be a huge help. And to be able to provide other tax incentives for the venture capitalists. And particularly if you want to say, okay, it is only for these other 45 States; you know, we want you to diversify, and that the part solves—addresses your question. I am not sure that it is best for your State, but it certainly addresses your question of how do we spread some of this around. That would be hugely helpful.

Mr. SCHRADER. Thank you. I yield back.

Chairman GRAVES. A couple of questions, and the first one is for Mr. Schmidt and Mr. Clanton. Last November we had a witness that came and testified that the SBIR program was very beneficial to her when it came to the early-stage growth, but what she found was it wasn't necessarily that good when it came to developing products. And what she talked about was the process of going from Phase I to Phase II, then Phase II to Phase III. It was too long, and the fact of the matter is that the technology was developing so rapidly, it was easier for her just to develop it, you know, outside of those programs.

And I am just interested in if you all have experienced anything where the program was holding you back or where you know of any examples. Mr. Clanton?

Mr. CLANTON. We are living one of those examples right now. We have a very promising technology that is currently in a Phase III, and it has real-world application with the Coast Guard to improve search and rescue results.

And if you ask a businessman should it be faster, then the answer is always yes. I understand the constraints of contracting, and the constraints of the government, and the funding and all of those other things, but to the extent we could do this, you know, in a 2- to 3-year period as opposed to a 5-year period, it would be immediate results. And I think there is probably an argument to be made that the total cost would be less if you could complete a project in a shorter period of time as opposed to starting, stopping, starting, and stopping.

Chairman GRAVES. Mr. Schmidt?

Mr. SCHMIDT. My very first program in 1991 was called Micro-Actuator Arrays for Adaptable Control Surfaces. So this was a device to be able to steer munitions in flight. And here we are 24 years later, and, you know, you get \$100,000 one year and maybe half a million the next year if you are lucky, and this is the kind of thing that Lockheed goes and gets a \$100 million for. And just it is happening very slowly. We are showing that we have done this. We have shown it continually each and every step. But it is this culture that needs to be changed to be able to say, this is good technology; let us put some money in it.

And we could do it two ways, one through a new program of a Phase II testing and evaluation, which gets you out of TRL 4 up to TRL 6, because it is TRL 6 that is critical for any of the primes to start to look at you. So testing in an actual environment.

And then a second thing is the Phase III, which uses the agency's money, and by providing the bonuses and the incentives for the agencies to say this is a good thing, that that will help change this culture. Because otherwise it is like no one likes you, we don't care about it, you know, you are not a big boy, you know, why are you here at the baseball field?

Chairman GRAVES. All right. Dr. Esham, could you talk just a little bit about National Institutes of Health and what they are doing to attract VC-backed companies? We don't have a whole lot of hard data, but it seems to appear that participation rates are much lower than was anticipated. And I didn't know if you had any ideas or thoughts on those problems or improving them, whatever the case may be.

Ms. ESHAM. It was actually our intention to reach out to NIH, having seen that data. We as an organization also feel a personal responsibility to try to make sure we are getting out the word to our industry. So, you know, we have State-affiliated organizations in all 50 States, and we have been—in the past we have done Webinars, and it is our intention maybe to do some more to again ensure that these small companies in all 50 States are aware of the opportunities of the program generally and also of the changes made in case they may not be aware that there have been changes.

So we will reach out to NIH and see if there are ways to partner, but, again, I think we as an organization also take responsibility for trying to find out if it is a communication issue. But there also was—there may be fewer companies than there were 6 years ago. I think we looked at the public markets, and those numbers were just now kind of getting back to 2008 numbers, so sort of pre-fiscal crisis. So there were a lot of companies that, when that fiscal crisis hit, disappeared. We still have over 2,000, I think, U.S. biotech companies, but that could be a factor as well that is still catching up, if you will, to previous numbers.

Chairman GRAVES. Anyone else have any other questions?

With that, again I would like to thank all of our witnesses for participating today. Small businesses renew and grow the economy, and they do that by introducing new products and finding lower-cost ways of doing business. And they do play—you all play a key role in introducing new technologies to the market, often responding quickly to market opportunities.

But we want the Federal Government and the taxpayers to benefit from the contributions that you offer, and the development of the SBIR and the STTR programs are critical to both the national economy and to the unique needs of each of the participating agencies.

So with that I would ask unanimous consent that Members have 5 legislative days to submit statements and supporting materials for the record, and, without objection, that is so ordered.

And with that, the hearing is adjourned. Thank you.

[Whereupon, at 1:10 p.m., the Committee was adjourned.]

**A P P E N D I X****STATEMENT OF JOHN CLANTON****CHIEF EXECUTIVE OFFICER****LYNNTECH, INC.****Before The****HOUSE SMALL BUSINESS COMMITTEE****WASHINGTON, D.C.****21 MAY 2014**

Chairman Graves, Ranking Member Velazquez and Members of the Committee, it is an honor and privilege to appear before you today to provide the views of Lynntech, Inc. on the implementation of the SBIR Reauthorization Provisions as contained in the FY 2012 Defense Authorization Act. My name is John Clanton and I am the Chief Executive Officer of Lynntech, Inc., a small business based in College Station, TX. Lynntech was founded in 1987 and I purchased the company in 2007 for the express purpose of commercializing the technologies that had been developed by Lynntech personnel. Lynntech currently has 90 employees, 29 of which are PhD's. Lynntech's parent company, Astin Partners of which I am also CEO, has interests in real estate, data centers, and airport operations, which gives Lynntech the benefit of a broadly diversified ownership structure capable of providing strong financial support for the high risk endeavor of technology development. Currently, Lynntech has about 70% of its SBIR contracts from DOD and the remainder largely from NIH. Since I purchased the company, Lynntech has received 5 post-phase II contracts from DHS and DOD, two of which hold the promise of being very successful commercial market opportunities.

Among other things, SBIR reauthorization provided for modernization of a number of SBIR policies that Lynntech broadly supported. It was clear that the SBIR program was sustained by a broad bi-partisan coalition of members that saw the value in technological innovations developed by small businesses.

In Lynntech's view, there were four initiatives that were propelling the desire for modernization forward.

First, there was a belief that venture capital owned firms should be afforded an opportunity to participate in the program. While Lynntech had no strong views in regard to majority venture capital owned firms participating in the program, we did recognize that denying access to VC owned firms could potentially deny small business with an alternative financing technique as a technology reached maturity.

Second, there was a strong desire to encourage small businesses to transition their technologies to commercial and government markets. The legislation made it clear that both small businesses and the Government should focus on the transition of these technologies. For the companies, it has been anticipated, and was seen in January 2014, rules that would mandate standards for transition success from Phase I to II and beyond. In addition, the legislation mandated that the Government agencies should focus on ensuring that SBIR-funded technologies should be given preference for inclusion in Government funded acquisition. This was particularly the case for the Defense Department, and it is this subject that is the core of my testimony today.

Third, there was a belief that SBIR policymakers needed more tools to support the development goals for any given technology. Thus, SBIR program managers and policymakers could award multiple Phase II contracts for technologies which are not quite ready for Phase III funding. In addition, agencies were prohibited from inviting Phase II proposals from Phase I awardees. This provides an opportunity for all technology developers who have already completed the competitive process, to propose further development of their proof of concept.

Finally, in recognition that Agencies did not have the quantitative tools to properly understand the impact of the SBIR program, the Committee asked for a substantial increase in reporting and data base management.

Let me address each of these initiatives in turn and provide my assessment as a long-time SBIR contractor.

First, Lynntech has taken the position since 2008 that we do not care who owns what company. We are happy to compete against any other small business for any particular technology. We believe it is the small business element, not the funding source, that feeds the creative approach to solutions.

While we see no threat to SBIR competition, we do have an industry view that the Committee may find helpful. We believe that the allowance of a certain percentage of awards to VC funded firms should not be interpreted as a target level of awards to FC funded firms.

We note that the NIH is preparing to follow the legislative requirements that allow for a certain portion of the SBIR program to be awarded to majority-owned venture capitalists small businesses. Given the size of the biotech sector owned by VCs, we believe that this should continue to allow for effective competition for NIH projects.

In the Department of Defense, we are concerned that using the allowable level of awards as a target will create a non-competitive market. The participation level of VC financing in technology development firms which specialize in the Defense market is limited. The valuation multiples and the economic fundamentals are simply not there. Small numbers of highly specialized products do not generate the returns that high-risk capital is looking to achieve.

As a result, Lynntech believes that if the implementation of policy effectively creates target VC award levels out of what was allowable VC award levels, it will reduce the effectiveness of the competitive process and lead to diminished success in the SBIR program. Forcing the DOD to compete up to 15% of the SBIR awards to only those firms owned by majority VC firms will diminish the competitive pool.

The second major thrust of the legislation was to enhance the technology transition effort through holding SBIR firms to transition success thresholds, as well as holding agencies responsible for achieving commercialization objectives. We applaud the initiative of this Committee to pioneer and incorporate these methods of joint accountability from both the small business and the agency. We believe that holding companies accountable for using Federal dollars effectively, and requiring agency participation in commercialization was one of the most important parts of the legislation.

Unfortunately, as it relates to the DoD, the transition support that the Committee was attempting to achieve has been slowed by the failure of the Defense Department to ensure that its processes for technology insertion in major acquisitions are improved and modernized. To date, we have seen nothing that would suggest that an effective, Department wide initiative to implement the statute has taken place.

Too often, Lynntech personnel find themselves dealing with SBIR personnel that have not been trained at all on the new procedures put in place by the statute. We still have DOD personnel who complain about having to execute a “small business welfare program”; personnel who do not realize that they do not have the authority to deny submission of Phase II proposals from any of the Phase I awardees; and where the process for implementing the new rules has not been clearly articulated.

For example, the Air Force still has too many people who do not understand that they need to clearly articulate what the Phase II proposal process will look like in an era where there are no invitations. Another “real life example” is Army SBIR personnel who do not understand that it is possible to make multiple Phase II awards, where an Acquisition Program Manager is indeed interested in further development. What is more worrisome is when the program TPOC goes looking for assistance from the Army SBIR office, there is none to be found or the guidance is not clear.

Even the Navy, which Lynntech has publicly praised for its effective leadership in the SBIR program, has too many people in the Research and Development community who actively work to kill the technology being developed, not because of technical merit, but because of personal biases or the SBIR technology is a threat to their preferred technical approach.

In fact, Lynntech has been told that SBIR technologies are not desired because of SBIR data rights. There is growing concern that some SBIR technologies have been transitioned without regard to the small business rights to data ownership.

All of these comments indicate that the transition effort requires more than just a motivated SBIR company, it requires an informed and motivated agency presence as well as leadership from Senior Acquisition Executives to ensure that all APMs are utilizing the full range of technologies that the Federal Government has already paid for.

The third major thrust of the legislation was to give the SBIR policy makers additional tools in order to ensure that sufficient funding exists to fully develop nascent technologies. I have touched on some aspects of that issue already but I will go on to note that while the Congress has provided the tools; not all agencies have availed themselves of those tools. Lynntech continues to be concerned that SBIR officials in the field are either unaware of the tools or they have chosen to ignore them.

Finally, the last major thrust of the legislation was to provide for enhanced information gathering and the perfecting of existing databases. It is incumbent on Government to ensure that the databases used to score performance are accurate, particularly where decisions may lead to termination of an individual company from participation in the SBIR program. Such termination decisions can be a life or death determination for the SBIR firm. The Agencies have complained about the extent of reporting requirements but if the goals of the Reauthorization language are to be achieved, then the data bases and the information they provide must be the best that we can achieve.

In summary, Lynntech believes that the Reauthorization legislation achieved much of what it was looking to achieve. But Congressional oversight still needs to be provided so that the Committee can ensure that there is Agency compliance with the intent of Congress. Hopefully, good Agency compliance with the statute will mean that the next round of Reauthorization scheduled for FY 2017 will require less tinkering and more positive reporting on the success of SBIR transition.



**Cartier Esham, Ph.D.**

**Executive Vice President, Emerging Companies  
Biotechnology Industry Organization**

United States House of Representatives Committee on Small Business

*Oversight of the Small Business Innovation Research and  
Small Business Technology Transfer Programs*

May 21, 2014

### **Executive Summary**

- The Biotechnology Industry Organization (BIO) represents over 1,100 innovative biotechnology companies, academic institutions, state biotechnology centers, and related organizations in all 50 states.
- The vast majority of BIO's members, about 90%, are pre-revenue companies whose research is still in the lab or the clinic. Product sales do not fund their groundbreaking research; instead, small biotechs rely on outside sources for innovation capital.
- The SBIR program provides biotech companies an opportunity to obtain funding for early-stage research projects in order to advance their research and development to the point that it can attract the hundreds of millions of dollars from the private sector necessary to develop the initial project into a publicly available new medicine.
- SBIR plays a critical role in supporting small U.S. biotech companies and funding their early-stage research as they navigate the "valley of death," a critical time when the scientific concepts have shown promise but the development is not far enough along to attract later-stage investors that could fund expensive clinical trials.
- BIO strongly supported the SBIR/STTR Reauthorization Act of 2012, which made two vital reforms to the SBIR program:
  - It allowed majority venture-backed companies to once again be able to participate in the SBIR program; and
  - It modified affiliation rules so that SBIR applicants will not be affiliated with their investors' portfolio companies simply on the basis of shared investors.
- The restoration of SBIR eligibility to venture-based companies will be vital for the success of the program in the biotech industry. Virtually all biotechs depends on venture financing at some point in their development cycle.
- BIO applauds the SBA for issuing eligibility and affiliation rules that implement clear, bright-line tests that will not unduly ensnare growing companies.

**Testimony of Cartier Esham, Ph.D.**

Good afternoon Chairman Graves, Ranking Member Velázquez, Members of the Committee, ladies, and gentlemen. My name is Cartier Esham, and I am the Executive Vice President of Emerging Companies at the Biotechnology Industry Organization (BIO). BIO represents more than 1,000 innovative biotech companies, academic institutions, state biotechnology centers, and related organizations across the United States and in more than 30 other nations. BIO's members develop medical products and technologies to treat patients afflicted with serious diseases, to delay the onset of these diseases, or to prevent them in the first place.

The vast majority of BIO's member companies, about 90%, are pre-revenue companies whose research is still in the lab or the clinic. These small businesses—virtually all of which employ fewer than 100 workers—spend more than a decade conducting R&D in their search for groundbreaking medicines and life-saving treatments. During this years-long process of research and clinical tests, biotechs do not have any products to sell. Revenue does not fund the biotech development process, which can cost upwards of \$1 billion. Instead, emerging biotech companies rely on outside sources for innovation capital. From early-stage angel investors and government grants to later-stage venture capitalists and public financing, biotechs are constantly searching for the capital to support their research.

The Small Business Innovation Research (SBIR) program provides biotech companies an opportunity to obtain funding for early-stage research projects in order to advance their research and development to the point that it can attract the hundreds of millions of dollars from the private sector necessary to develop the initial project into a publicly available new medicine.

Programs like SBIR are particularly important in a difficult fundraising environment for companies that generally depend on venture capital investment to finance early-stage research. In 2013, first-round venture financings (which support the earliest stages of breakthrough research) were down 35% compared to 2008 and in 2012 they were at a 15-year low.<sup>1</sup> Further, the first round's share of the total venture market is decreasing each year. As a result, breakthrough, early-stage biotech innovation is receiving less funding, meaning that the next generation of promising cures could be left on the laboratory shelf.

The importance of supporting biomedical research and innovation and the development of new treatments and therapies in the United States cannot be overstated, especially in a time where we are driving towards building a 21st century economy while simultaneously facing increased competition from around the globe to sustain our world leadership in biomedical innovation. We must focus on creating and delivering new solutions to our nation's most critical and costly public health issues and work towards continuing to

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<sup>1</sup> PricewaterhouseCoopers, National Venture Capital Association. "MoneyTree Report." <https://www.pwcmoneytree.com/MTPublic/ns/index.jsp>.

improve the quality of life for patients and their families. For example, by 2030, almost one out of every five Americans—some 72 million people—will be 65 years or older.<sup>2</sup> Every year, American taxpayers spend \$203 billion on Medicare and Medicaid expenses related to Alzheimer’s, and this cost is projected to reach \$1.1 trillion by 2050.<sup>3</sup> As almost 84 cents of every health care dollar spent is for taking care of individuals suffering from a chronic disease,<sup>4</sup> it could not be more clear that we have a national imperative to find new solutions to how we treat patients and diseases.

We are also facing unprecedented competition from around the globe to be the leader in biomedical research. In 2008, China pledged to invest \$12 billion in drug development, and in 2011, the Chinese government named biotech one of seven industries that will receive \$1.7 trillion in government funding.<sup>5</sup> Further, the European Union’s Innovative Medicines Initiative is pumping \$2.65 billion into Europe’s biopharmaceutical industry.<sup>6</sup> While America has developed more cures and breakthrough medicines than any other country and is home to over 2,500 biotech companies, this is not a position that will be sustained without continued investment and policies focused on supporting and incentivizing the next generation of biomedical discoveries, treatments, and cures.

Additionally, the U.S. biotech industry is an economic driver, directly employing over 1.6 million workers and supporting an additional 3.4 million jobs.<sup>7</sup> Small companies are the heart of the industry, and SBIR plays a critical role in ensuring that these companies are able to succeed and provide the next-generation of medicines to the public.

### **SBIR/STTR Reauthorization Act of 2012**

The mission of the SBIR program is to support scientific excellence and technological innovation through the investment of federal research funds in critical American priorities to build a strong national economy. In 2012, Congress passed the SBIR/STTR Reauthorization Act to ensure that agencies have the most competitive pool of applicants and that grants awarded will be based on the projects that show the most promise in bringing breakthrough and life-saving therapies to the public.

The SBIR/STTR Reauthorization Act of 2012 made two vital reforms to the SBIR program:

- It allowed majority venture-backed companies to once again be able to participate in the SBIR program; and

<sup>2</sup> Alzheimer’s Association. “2014 Alzheimer’s Disease Facts and Figures.” *Alzheimer’s & Dementia*, Volume 10, Issue 2 (2014). [http://www.alz.org/downloads/Facts\\_Figures\\_2014.pdf](http://www.alz.org/downloads/Facts_Figures_2014.pdf).

<sup>3</sup> Alzheimer’s Association. “2014 Alzheimer’s Disease Facts and Figures.” *Alzheimer’s & Dementia*, Volume 10, Issue 2 (2014). [http://www.alz.org/downloads/Facts\\_Figures\\_2014.pdf](http://www.alz.org/downloads/Facts_Figures_2014.pdf).

<sup>4</sup> Anderson, Gerard. “Chronic Care: Making the Case for Ongoing Care.” Robert Wood Johnson Foundation 2010. [www.rwjf.org/content/dam/farm/reports/reports/2010/rwjf54583](http://www.rwjf.org/content/dam/farm/reports/reports/2010/rwjf54583).

<sup>5</sup> Buckley, Chris. “China to invest US \$1.7 trillion over 5 years in ‘strategic sectors’: US official.” *The China Post* 23 November 2011. <http://www.chinapost.com.tw/business/asia-china/2011/11/23/323724/China-to.htm>.

<sup>6</sup> Hodgson, John. “C2 billion IMI launched with European pharma.” *Nature Biotechnology* 26, 717–718 (2008).

<sup>7</sup> Battelle Technology Partnership Practice. “Battelle/BIO State Bioscience Industry Development 2012.” June 2012. [http://www.bio.org/sites/default/files/v3battelle-bio\\_2012\\_industry\\_development.pdf](http://www.bio.org/sites/default/files/v3battelle-bio_2012_industry_development.pdf)

- It modified affiliation rules so that SBIR applicants will not be affiliated with their investors' portfolio companies simply on the basis of shared investors.

BIO strongly supported these important changes, which allow many small biotech companies to once again participate in the SBIR program and fund early-stage research that will lead to groundbreaking medical advances. Small businesses that are majority-owned by multiple venture capital companies, private equity firms, or hedge funds are now able to compete for 25% of SBIR funding at the National Institutes of Health (NIH), Department of Energy (DOE), and National Science Foundation (NSF), and 15% of SBIR funding at all other participating agencies. Similarly, SBA rule changes directed by the law also created a commonsense approach to affiliation that ensures companies are no longer affiliated with unrelated businesses simply on the basis of having common venture capital investors.

Under the new rules, a small business must meet one of the following ownership requirements at the time of award of an SBIR Phase I or Phase II funding agreement:

- Be more than 50% directly owned and controlled by one or more individuals (who are citizens or permanent resident aliens of the U.S.), other business concerns (each of which is more than 50% directly owned and controlled by individuals who are citizens or permanent resident aliens of the U.S.), or any combination of these;
- Be more than 50% owned by multiple venture capital operating companies (VCOCs), hedge funds, or private equity firms, or any combination of these (but no single VCOC, hedge fund, or private equity firm may hold a majority stake in the small business); or
- Be a joint venture in which each entity to the joint venture must meet the requirements above.

The restoration of SBIR eligibility to venture-backed companies will be vital for the success of the program in the biotech industry. A 2009 National Research Council study conducted stated, "Restricting access to SBIR funding for firms that benefit from venture investments would thus appear to disproportionately affect some of the most commercially promising small innovative firms."<sup>8</sup> The study specifically touched on the lost potential for life-saving research, noting that the VC restriction had "the potential to diminish the positive impact of the nation's investments in research and development in the biomedical area."<sup>9</sup>

BIO applauds Congress for restoring SBIR eligibility to venture-backed companies. Because of this change, innovative biotechs across the country will benefit from early-stage funding for the next generation of cures and treatments.

<sup>8</sup>National Research Council (US) Committee for Capitalizing on Science, Technology, and Innovation, "An Assessment of the Small Business Innovation Research Program." National Academies Press (2009).

<sup>9</sup>National Research Council (US) Committee for Capitalizing on Science, Technology, and Innovation, "An Assessment of the Small Business Innovation Research Program." National Academies Press (2009).

### **Affiliation Rules**

The SBA’s general principles of affiliation state that “affiliation exists when one business controls or has the power to control another or when a third party (or parties) controls or has the power to control both businesses.”<sup>10</sup> These specific affiliation rules are important because they determine whether a company or individual should be considered “affiliated” and therefore which businesses’ employees should be added to the SBIR applicant’s employee count to determine if the company falls below the 500 employee threshold for SBIR eligibility.

A limited number of venture capital firms invest in the biotech space, and thus many companies share investors—but the individual biotech companies do not have shared business goals or risks. Before the 2012 SBIR reauthorization, many biotech companies were deemed ineligible because they had multiple investors who owned 10–20% of the SBIR applicant, which was considered large compared to other investors’ ownership. Not only were these investors deemed affiliated, but all of their portfolio companies where they owned 10–20% of a company (and their ownership was considered large compared to other owners) were also affiliated to the SBIR applicant.

The SBIR/STTR Reauthorization Act of 2012 explicitly states that affiliation should not be determined solely on the basis of one or more shared investor, a provision that BIO strongly supported. The new rules put in place appropriately focus on determining if indeed the SBIR applicant has shared business goals and risks. Further, the new tests are clear, concise, and consistent so that small companies can more easily determine their eligibility.

Specifically, under the new rules, an SBIR applicant is affiliated to any individual, business, or entity that owns or has the power to control more than 50% of the applicant’s voting stock. The rule provides a clear, bright-line affiliation test for companies whose stock is widely held. When determining affiliation based on equity ownership:

- An SBIR applicant is an affiliate of an individual, business, or entity that owns or has the power to control more than 50% of the SBIR applicant’s voting equity.
- The SBA *may* deem affiliated an individual, business, or entity that owns or has the power to control 40% or more of the voting equity of the SBIR applicant *based on the totality of circumstances*.
- If no individual, business, or entity is found to control the SBIR applicant, the SBA will deem the Board of Directors to be in control of the SBIR applicant.

BIO strongly supports this rule, and applauds the SBA for implementing clear, bright-line tests that will not unduly ensnare growing companies. In the biotech industry, there are a finite number of investors, which often have investments in the same biotech

<sup>10</sup>U.S. Small Business Administration, “Small Business Compliance Guide Size and Affiliation.” March 2014. [http://www.sba.gov/sites/default/files/affiliation\\_ver\\_03.pdf](http://www.sba.gov/sites/default/files/affiliation_ver_03.pdf)

small businesses—but they remain individual investments for each venture capital firm. Emerging biotechs are generally a collection of research projects with one lead product and an average of five other therapies or candidates in early-state/pre-clinical research. It is the goal of each investor to succeed in developing and commercializing each individual research project they have funded. The success of each investment is based on scientific outcomes, which are not influenced by the progress of other companies' research within the same portfolio. The new affiliation rules reflect this reality by only determining affiliation if an SBIR applicant is truly controlled by another entity.

### **Measuring the Success of the 2012 SBIR Reauthorization**

On May 15, 2012, SBA published a proposed rule for determining ownership, affiliation, and size standards. On December 27, 2012, SBA published the final rule, which went into effect on January 28, 2013. In May 2013, NIH reissued its SBIR Omnibus Grant Solicitation announcement, and stated that small businesses majority-owned by multiple venture capital operating companies were eligible to apply for those SBIR grants and any other NIH SBIR funding opportunities announced after January 28, 2013. We do not yet have data on how many majority venture-backed companies applied for or were awarded SBIR grants under this new rule as the closing date for applications was January 2014 and many of these applications are still being reviewed.

The SBIR/STTR Reauthorization Act also provides authority for three participating agencies to give Phase II awards to a small businesses concern that did not receive a Phase I award for that research/R&D. This allows companies that may have funded their own Phase I-type research to apply for Phase II funding. In February 2014, NIH announced its SBIR Direct Phase II pilot program. BIO strongly supported this provision in the reauthorization process and will be monitoring NIH's pilot program to determine success.

Lastly, BIO did have some concerns regarding the numerous reporting requirements for companies that are majority backed by venture capital. We will be monitoring our members to determine whether these requirements are effective or unduly burdensome to small companies. We will also be working to encourage other SBIR participating agencies to 'opt-in' and allow all U.S. *small* businesses the opportunity to compete for SBIR grants.

### **Conclusion**

The extended biotech development timeline, driven by the complicated nature of scientific advancement, means that it can cost more than \$1 billion to bring a single life-saving therapy to market. This entire process is undertaken without the benefit of product revenue—instead of using the sale of one product to finance the development of another, growing innovators turn to external sources to fund their breakthrough R&D.

SBIR plays a critical role in supporting small biotech companies and funding their early-stage research as they navigate the “valley

of death,” a critical time when the scientific concepts have shown promise but the development is not far enough along to attract later-stage investors that could fund expensive clinical trials. Biotech innovators and entrepreneurs use these funds to speed the delivery of the next generation of medical breakthroughs—and, one day, cures—to patients who need them. BIO applauds Congress for making key reforms to the SBIR program to ensure eligibility for innovative small businesses in the biotech industry, and we look forward to continuing to support this vital program.

## **Comments on the SBIR/STTR Program: Always Trade-offs**

### **Introduction:**

Thank you Ranking Member Velazquez, Chairman Graves, and Members of the Committee. I am honored to have this opportunity to offer comments on the SBIR program. As Ranking Member Velazquez mentioned, in addition to being a faculty member for nearly 40 years at The College of William and Mary, I have been working as an economist and program evaluator for the SBIR program for nearly 20 years. As an economist from academia, my comments will not be advocating a particular point of view or perspective of any organization, but will be based on my research, my objective conclusions, and the research of others in the public, private, and academic sectors. I will likely be perceived as President Truman's nemesis—the two-handed economist, but I do this as a public policy educator who recognizes that most, if not all, decisions involve trade-offs.

That said, I am admittedly a fan of the SBIR approach to Federal government support for achieving several important goals including encouraging hi-tech research from small businesses, encouraging commercialization and infusion (into Federal agencies) of the technologies generated, and encouraging women and minorities to participate in this important sector. It is widely accepted that small business is an important source of productivity and employment growth and that technological advances are a pre-condition for long-term economic growth and international competitiveness.

The original design of the SBIR program in 1982 identified 4 main goals:

1. Stimulation of technological innovation;
2. Use of small businesses to help meet the R&D needs of the Federal government;
3. The fostering and encouragement of participation by minorities and women in the innovations; and
4. The increase in private sector commercialization emanating from Federal R&D.

While the program has evolved over time (including the creation in 1992 of the STTR program), in 2011 the Congress passed and the President signed the National Defense Authorization Act of FY 2012.

My comments today will address what we might expect in the post-reauthorization period in terms of the process and outcomes of the SBIR program. However, it is important to note at the outset that the time since the passage of the reauthorization is relatively short. I am a firm believer in Congressional oversight and program evaluation more generally. However, it is important to identify what can be observed at various points in time. From what I have been able to determine, the various SBIR sponsoring agencies have been working to reorient their operations, goals, and metrics to adapt to the reauthorized program. They are at various points in that adaptation. Therefore, my comments will be based on what we

can expect from the various elements of the revised program over the next few years, including possible unintended consequences.

I would like to offer some brief comments and observations on the following 7 issues.

1. Overall Health of the SBIR Program
2. Program Goals Should be Remembered When Debating Policy Issues and Consider Implicit Trade-offs
3. The So-called Proposal Mills
4. Dimensions of the VC Issue
5. Geographical Dispersion of Awards
6. Participation by Minorities and Women in the Program
7. Need for Continued Research and Evaluation

### **Seven Issues for Consideration**

#### **Overall Health of the SBIR Program**

The SBIR program has been in existence since 1982. In my view and based on nearly all the extant research (including the various reports by the National Academies as well as my own reports), the program is working to achieve its goals. While it is challenging to measure outcomes, the studies that have attempted it, indicate that program outcomes of sales and commercialization, infusion into Federal agencies, and to some extent achieving participation in the program by women and minorities have all shown to be positive. But there is clearly room for improvement on all these dimensions. I would posit that the program itself is well-conceived.

In what follows, I display a convenient summary from the SBA website of the key changes in the program as a result of the reauthorization:

#### ***Funding:***

Set-aside percentages are increased. For FY 2012, SBA has issued guidelines to the agencies that the set-aside share is increased to 2.6%, prior to the new Policy Directives being issued. The share will increase by 0.1 percentage point each fiscal year until it reaches 3.2% for fiscal year 2017. It will remain at that level after that. For STTR, the set-aside percent was increased to 0.35% for 2012 and 2013, and will increase to 0.4% for 2014 and 2015, and to 0.45% for 2016 and thereafter. Note that agencies may exceed these minimum percentages.

Award sizes. STTR award sizes (guideline amounts) are increased to match SBIR amounts: \$150,000 for Phase I and \$1 million for Phase II. Awards may not exceed guideline amounts by more than 50% (\$225,000 for Phase I and \$1.5 million for Phase II). Agencies must report all awards exceeding the guideline amounts and must receive a special waiver from SBA to exceed the guideline amounts by more than 50%.

Administrative funding pilot. A new pilot program permitting agencies to use 3% of their SBIR funds for administration of SBIR and STTR programs.

Technical assistance. The amount of SBIR funds permitted to be used for technical assistance is raised from \$4000 to \$5000 per award per year.

***Eligibility:***

VC-owned firms. The biggest change in eligibility required by the reauthorization legislation will be allowing firms that are majority-owned by multiple venture capital operating companies (VCOs), hedge funds and/or private equity firms to receive SBIR and STTR awards.

Company Registry. All applicants will be required to register with the Company Registry Database at [www.sbir.gov](http://www.sbir.gov) at the time of application.

Cross-program awards. Agencies have the option to allow STTR Phase I awardee to receive SBIR Phase II award and SBIR Phase I awardee to receive STTR Phase II award. Implementation is at agency discretion.

Cross-agency awards. Clarifies that a Phase I awardee may receive a Phase II award from an agency other than the one that awarded the related Phase I. Reporting to SBA by both agencies is required.

Direct to Phase II pilot. For fiscal years 2012–2017, the NIH, DoD, and Department of Education may issue Phase II SBIR awards to firms to pursue Phase I solicitation topics without requiring the applicant to have received a Phase I award for related work. Implementation is at agency discretion.

Open Phase II competition. Beginning 10/1/2012, agencies must allow all Phase I awardees to apply for a follow-on Phase II award. Issuing Phase II awards via invitation only will not be permitted. Agencies will need to include information on the Phase II application process in all Phase I solicitations released on or after 10/1/2012 and notify their Phase I awardees of this change in practice.

Second Phase II. Agencies may award a second, sequential, Phase II to continue a Phase II project.

***Streamlining the award process:***

The Reauthorization Act requires changes aimed at reducing gaps in time between close of the solicitation and notification of award. Agencies are to implement these measures as soon as is practicable. In addition, the Policy Directives include new reporting requirements for the participating agencies to develop data needed to monitor and analyze these time lags.

***Data & Reporting:***

Central data system. An improved program-wide data system will be developed to facilitate administrative reporting and program evaluation. The system will enable applicants and agencies to provide the required information into the Tech-Net database ([www.SBIR.gov](http://www.SBIR.gov)).

***New measures to guard against fraud, waste, abuse:***

Company certification. Awardee firms must certify they are meeting program requirements not only at the time of award, but also at points during the lifecycle of the award.

Information systems. Agencies must: include of their website, and in each solicitation, a telephone hotline number or web-based method for reporting fraud, waste and abuse; include on the agency's website successful prosecutions of fraud, waste and abuse in the SBIR Program; designate at least one individual to serve as liaison for the SBIR/STTR Program to the Office of Inspector General (OIG) and the agency's Suspension and Debarment Official (SDO); and maintain procedures to enforce accountability (e.g., creating templates for referrals to the OIG or SDO).

***Increased support for commercialization:***

Technical assistance. Amounts increased to \$5000, flexibility on use, applies to STTR as well.

Commercialization Readiness Program. DoD Commercialization Readiness Pilot is made permanent and includes the STTR program; Commercialization Readiness Pilot programs for civilian agencies are authorized allowing agencies to use up to 10% of SBIR/STTR funds to support commercialization and Phase III efforts.

Phase III preference. Agencies directed to support SBIR/STTR awardees in their efforts to commercialize SBIR/STTR work through, among other things, Phase III sole-source contracts.

**Program Goals should be Remembered When Debating Policy Issues and Consider Implicit Trade-offs**

When debating the issues involved in the SBIR program, it is important to consider the implicit trade-offs. For example, a stronger emphasis on commercialization could mean less emphasis on serving agency needs or possibly on emphasis on recruitment of economically disadvantaged applicants and awardees. Also, increasing the participation of small business in serving the R&D needs of Federal agencies could lead to somewhat less commercialization. In addition, it is important to remember that there are 11 Federal agencies involved in the SBIR/STTR program, and they have different needs and approaches. Therefore, flexibility is an important consideration in implementing the program. Finally, the inclusion of VCs into the SBIR arena could be perceived as leading to a deviation from the original intent of the program (see below for more on this issue).

**The So-called Proposal Mills**

The concept of "SBIR Mills" or "Proposal Mills" has been discussed for several years. This is the notion that a relatively small number of small firms have figured out how to win SBIR awards

and have become basically SBIR contract research companies. A look at the data tells us that there is some degree of multiple award winners. If they were firms that win Phase I awards and go no further, it could easily be argued that something drastic should be done about this. However, based on various studies (NAS and my own), more of the multiple award winners are also successful in commercialization, receiving additional investment dollars from other sources, and/or successful in having their technologies infused into Federal agencies. Overall, this is an issue to watch, but I think it would likely be counter-productive to restrict number of proposals for an SBC without considering the trade-offs. The notion that these multiple award winners generally become dependent on SBIR awards (without other outcomes occurring) or that these firms will no longer need early start-up funding is, in my view, a limited way of thinking about such firms. In some ways, many of these firms could be the most successful, depending on how and when success is measured. One final point is that there are approximately  $\frac{1}{3}$  first-time applicants in SBIR (program-wide) every year.

### **Dimensions of the VC Issue**

The recent report by the National Academies on venture capital and the SBIR program notes that during the first 20 years of the program, there were some majority venture-funded companies participating in the program, and received SBIR awards along with the outside equity funding. Over that period, participation of majority venture-funded firms was not raised as an issue and there seemed to be no adverse effects on the program. Following a rule change by the SBA, there was much debate about the issue. The reauthorization led to a new provision regarding an option by and SBIR agency to permit allow participation by firms that are majority-owned by multiple venture capital operating companies, private equity firms or hedge funds.

The new VC approach is a start to resolving the trade-offs but will need to be monitored. It appears that so far it has not had much of an impact.

### **Geographical Dispersion**

It is true that the top 10 states make up 68 percent of awards, with California and Massachusetts making up the lion's share. The issue of geographic dispersion is complicated and can be taken to extreme. What if agriculture assistance programs were thought to be biased if corn or wheat oriented assistance went more to Kansas, Nebraska, and Iowa and was not disperse across a wider variety of states. There is seems obvious to most people that the nature of the subsidy is going to be fairly regionally concentrated. Efforts to make the assistance more disperse would likely lead to a misallocation of resources and not achieve what the program is intending to achieve. Furthermore, one could argue that the benefits of a regionally focused program would redound to the entire nation in the form of lower and/or more stable food prices.

The existence of geographical concentration of SBIR awards is subject to similar reasoning. Certainly, SBIR could have been designed with regional quotas in mind in the name of some sort of equity. But it wasn't and for good reason. The SBIR program has several goals including increasing the level of technology investments (and their payoff) and targeting the small business sector (at least partly on equity grounds but also because of the notion that small business producing innovation will be beneficial to the extent that large businesses may have size and bureaucratic barriers to producing innovative R&D). If every state in the U.S. had the same share of science and technology human capital and related infrastructure, then it would likely be efficient to have a program such as SBIR be very geographically diverse. But, while every state/region has significant scientific/technology human and infrastructure (including strong educational institutions), there seems to be a certain amount of regional clustering in R&D activities. This pattern long preceded the creation of the SBIR program. Therefore, if the SBIR program is to achieve its maximum return to taxpayer investment, it will be necessary for the program awards to mirror those regional cluster patterns and take advantage of them. While that is perhaps not the best political answer in terms of Members of Congress "bringing home the bacon" of SBIR awards to their district, it could be argued analogously to the wheat and corn example, that the nation as a whole benefits from most from putting the scarce SBIR dollars where they can have their highest return. It would not be completely out of the question to mandate that Federal agencies ensure a less geographically concentrated award pattern. However, in mandating such a pattern, the SBIR program would yield a lower national return on investment. Therein lay the political tradeoff. That said, monitoring of the SBIR programs at the agency level could be feasible by requiring each agency to explain how they have ensured that their award allocation does not take geography into account at all.

#### **Increasing Participation in Awards to Minority and Women:**

It is well known that there is low (and declining) levels of minority and women involvement. The low and declining levels of participation in SBIR by minorities and women is a somewhat different concern than the regional dispersion issue. This concern is built directly into the legislation. One could use similar arguments about efficient allocation of human resources given the relatively lower availability of scientific and technological. But that could be seen as a static view of the way we produce science and technology in the U.S. With demographic and labor force composition patterns changing dramatically, it is essential to ensure that women and minorities have opportunities to participate fully in the technology field. This would include targeting educational and opportunities such as SBIR awards. Therefore, both in terms of long-term research allocation and economic growth of the U.S. and the explicit legislative intent, it makes sense to encourage increased women and minorities for awards.

#### **Need for Continued Research and Evaluation**

As is evident from the discussion above, there is continuing need for data and analysis of the complex SBIR program. This should be done by the agencies themselves, the Congress, and independent researchers and evaluators.



Testimony of

**Robert Schmidt**

*National Co-Chair, Small Business Technology Council*

*Founder, CEO, and Chairman  
Cleveland Medical Devices Inc.  
Orbital Research Inc.  
NeuroWave Systems Inc.  
Great Lakes NeuroTechnologies Inc.  
Flocel Inc.  
Cleveland, Ohio*

**BEFORE THE COMMITTEE ON SMALL BUSINESS  
UNITED STATES HOUSE OF REPRESENTATIVES**

**Washington, D.C.**

**Regarding  
Improvements to the Small Business Innovation Research Programs  
and  
"Unleashing American Innovation"**

**21 May 2014**

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*SBTC, the nation's largest association of small, technology-based companies in diverse fields, is proud to serve as the technology council of the National Small Business Association, the nation's oldest nonprofit advocacy organization for small business, serving more than 150,000 small companies throughout the United States.*

## Introduction

Chairman Graves, Ranking Member Velazquez, members of the Subcommittee, good afternoon. Thank you for inviting me to appear here today. I am Bob Schmidt, Co-Chair of the Small Business Technology Council, and Founder, Chairman, and CEO of five SBIR companies. The SBIR/STTR programs have allowed us to develop products in the medical and aerospace markets. We sell on all seven continents. Examples of our products are: (a) CleveMed's SleepView® providing over 1,000 home sleep apnea tests per month, making us one of the largest sleep apnea testing services in the world. We have tripled our sleep sales every year for the last three years. (b) Great Lakes NeuroTechnologies HomeView® allows Parkinson's disease patients to improve the titration of drugs and tuning of deep brain stimulators to live more productive lives. (c) NeuroWave Systems monitors consciousness levels of anesthetized patients and is developing new systems for the military to automate closed-loop anesthesia/analgesia delivery, identify silent seizures, and quickly check injuries for mild TBI. Orbital Research makes dry electrodes for cardiac monitoring and oxygen sensors for hypoxia monitoring on the F-22 Raptor, as well as low-cost steering systems for advanced munitions. Flocel makes systems to grow human blood brain barrier cells for drug discovery. My companies employ about 75 people and we train about a dozen students each year.

Harvard University and *Inc.* Magazine, among others, have recognized the companies' growth, and we have received three Tibbetts Awards, which are given annually to outstanding companies in the SBIR Program.

I am primarily here today on behalf of the Small Business Technology Council, the nation's largest organization of small, technology-based companies in diverse fields. Our mission is to protect the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs to help grow the American economy, create jobs, and facilitate the public/private partnerships to develop the next generation of new technologies. SBTC is the largest organization representing SBIR/STTR award winners working across government agencies.

SBTC serves as the Technology Council of the National Small Business Association, and I am appearing here today on NSBA's behalf as well. NSBA is a nonprofit small business organization that serves over 150,000 companies. For over 75 years, NSBA has provided small business advocacy, and was the founder of the "small business movement" in the United States.

For simplicity, I am combining my comments on the SBIR and STTR programs, and simply referring to SBIR instead of both.

## Summary of Testimony

The climate for small business and especially SBIR and technology companies' growth and job creation is not good and extremely challenging. Bank lending to small business is severely depressed. Since 2008 lending to small business has declined by \$126 Billion. The problem is compounded because many of the extremely large banks that received TARP funding from the federal government have pulled out of small business. Small businesses like mine who had never missed a payment suddenly found their notes are called by their bank.<sup>1</sup> Unfortunately this pattern has continued. Venture capital has also continued to make few investments in seed and start up enterprises. The majority of these investments have been in software and IT industries with the vast majority of these seed and start up deals being made in the Silicon Valley. In the first quarter of 2014 there were only 41 of these startup/seed deals totaling \$125 million.<sup>2</sup> The Federal government has not made its procurement goals for small business purchases. The decline of home values has even reduced home equity as a source of funds to grow small business. These changes have occurred at the same time that regulatory burdens by the state and federal government have been increasing.

Given these circumstances, it is easy to see why small business hasn't been able to lead the country out of the recession as it has always done in the past.

Small business technology companies have had experience all of these problems. The only bright spot for technology companies is the SBIR program. With reauthorization 30 months ago SBIR companies expected to see help and support provided in the law to transition their SBIR technology. Despite strong direction by congress and the requirement for reporting, goals and incentives to help transition their technology, there has been little progress. Today, 30 months later, there are no implementing regulations, no goals, no incentives and no leadership. As a recent DOD IG report found, there are still no reporting requirements for prime contractors or the governments on how many technologies are being transitioned.

We are pleased that the DOD in its FAR regulations did recognize the need to set goals for transitioning SBIR/STTR technology. The DFAR 5000.2 instructions require all program managers to set goals for themselves. We also recognize that DoD has taken steps to improve SBIR Phase III, much more needs to be done quickly.

1. The culture that is currently adverse to small business in the agencies must be changed. Regulations and procedures should be updated to reflect the law, and personnel trained in its implementation. Incentives should be provided to encourage this cultural shift. The law is clear; SBIR phase III awards should be used "to the greatest extent practicable." To implement this, SBTC recommends:

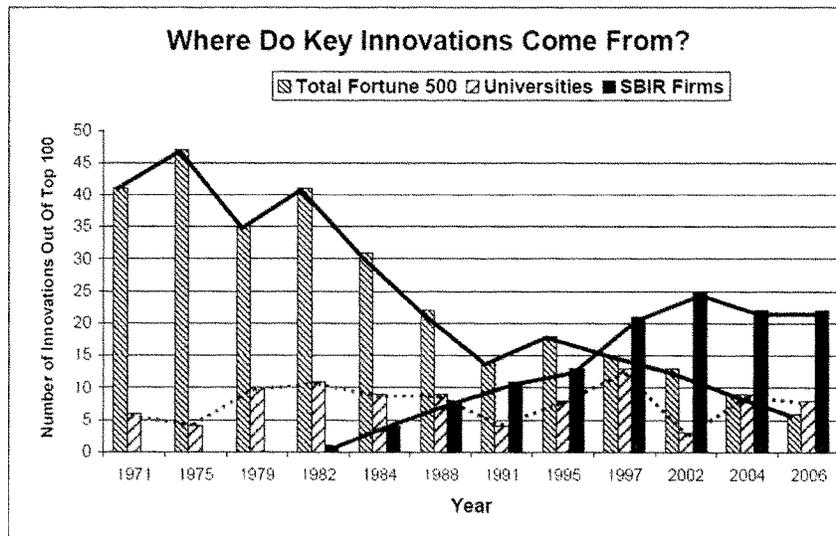
- a. Agencies should be required to timely update the Federal Acquisition Regulations (FAR) the individual agency's procurement regulations and contracting manuals to incorporate the law. After two and a half years, this has not yet been done.
  - b. Agency Contracting Officers, Contract Specialists, Contracting Officers Representatives, Program Officers, and other technical personnel dealing with contracts must be trained in the SBIR laws.
  - c. Phase III contracting requirements should be included ("flow-down") to prime contractors and other subcontractors.<sup>3</sup> We recommend adding to all solicitations a proposal evaluation factor for prime contractors to include SBIR Phase III subcontracts in their subcontracting plan. [If SB companies are identified as named subcontractors, under new legislation no "bait and switch" can occur without COs approval]
  - d. As we pointed out in our comment to the SBA, the last sentence in FAR 19.502(b)(2) has been changed to allow contracting officers to ignore the requirements in the Reauthorization law that they use SBIR technology to the "greatest extent practicable" and instead use "best scientific and technical approach."<sup>4</sup>
2. The SBA is not timely reporting information to Congress.
  3. The DoD has not set goals and incentives as required by the law.
  4. SBIR number of awards and dollar amounts has continued to decline.
  5. SBIR Phase III awards tracking is sporadic, and must be tracked and reported.
  6. Phase III Full SBIR data and intellectual property rights must be accorded to SBIR contractors in Phase III funding, and
  7. The SBA approved a blanket waiver for the NIH to exceed the caps on award amounts in violation of the law.
  8. Agencies, and particularly DoD, have not been protecting SBIR Intellectual Property (IP) rights.
  9. Improve the banking environment for small businesses.
  10. Keep a strong patent system, protecting small business technology.

### **Importance of SBIR/STTR to the Economy**

The SBIR/STTR programs are the most successful R&D programs in the world. 25% of the key innovations (see **Figure 1**) come from this small (2½-3%) percentage of federal extramural R&D expenditures. The SBIR/STTR programs have been copied in over a dozen countries. Historically their purpose is to involve small businesses in the R&D effort of the Federal Government, maximizing the government's investment in innovations by American small businesses, emphasis on "American" and on "small businesses".

The SBIR program also has an outstanding record of commercializing its technology compared with other government programs. But it needs more help and support to create the new industries and new jobs to compete

against China and the rest of the world. Universities receive well over 10 times more federal R&D dollars than the SBIR/STTR programs every year. SBIR/STTR companies receive 3% of Federal extramural R&D funding while universities receive between 32-36%. Simply stated, SBIR/STTR companies produce 58% more patents, more than three times as many key innovations, and have a far better record of commercialization, on about 12% of the federal funding that universities receive. While we certainly recognize the contribution of universities to knowledge and basic scientific research, and encourage strong support of universities we believe that SBIR is better able to create commercialization and jobs.



**Figure 1:** For the last decade, SBIR firms have received 3.45 times as many R&D 100 awards as Universities, on about 1/8 of the budget.

### ECONOMIC BACKGROUND – RECENT SHIFTS

The climate for small business and especially SBIR and technology companies' growth and job creation is not good (or extremely challenging). Bank lending to small business is severely depressed. Since 2008 lending to small business has declined by \$126 Billion.<sup>5</sup> The problem is compounded because many of the extremely large banks that received TARP funding from the federal government have pulled out of small business. Small businesses who had never missed a payment suddenly found their notes are called by their bank. Unfortunately this pattern has continued. Venture capital has also been making fewer investments in seed and start up enterprises. The

majority of these investments have been in software and IT industries with the majority of these seed and start up deals being made in the Silicon Valley. The Federal government has not made its procurement goals for small business purchases. The decline of home values has even reduced home equity as a source of funds to grow small business. These changes have occurred at the same time that regulatory burdens by the state and federal government have been increasing.

Given these circumstances, it is easy to see why small business hasn't been able to lead the country out of the recession as it has always done in the past.

Small business technology companies have experienced all of these problems. The only bright spot for technology companies is the SBIR program. With reauthorization 30 months ago SBIR companies expected to see the help and support signed into the law to transition their SBIR technology. Despite strong direction by Congress and the requirement for reporting, goals and incentives to help transition their technology, there has been little progress. Today, 30 months later, there are no implementing regulations, no goals, no incentives and no leadership. As a recent DOD IG report found, there are still no reporting requirements for prime contractors or the Government Agencies on how many technologies are being transitioned.

<b>Table 1. US Exports vs. Other Leading Export Countries</b>	
High Technology Exports <sup>6</sup>	Billions of US Dollars
China	505.6
US	148.7 = 29.4% of China
Germany	183.4
Japan	123,4
Korea	121.3
France	108.3

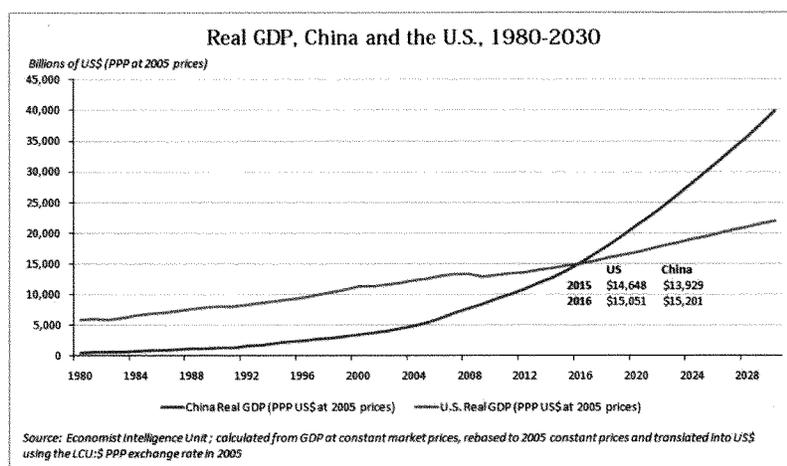
There have been fundamental shifts in the American economy over the last decades that make Congressional action all the more important to reverse the slide that is destroying our dominant position in the world economy. As shown in **Table 1**, High-tech exports continue to decline relative to the rest of the world.<sup>7</sup> In fact, America exports less than 30% of the dollar value of China's high-tech exports. Thus, we continue to fall behind in producing and exporting value added technology products. Let's look at the US-China comparison.

**China**

Everyone understands the movement of large corporate America's manufacturing base to China, and the impact it had on job destruction and the American economy. So that will not be discussed here.

However, the World Bank and its International Comparison Program has just produced a report that provides some data that shows China's economy will outgrow the US in 2016.<sup>8,9</sup> (See **Figure 2**.) At 27 percent, China now has the

largest share of the world's expenditure for investment (gross fixed capital formation); followed by the United States at 13 percent.<sup>10</sup> Thus, China is out investing us, more than 2:1. If America desires to continue to claim "Exceptionalism", it will need to start taking action to make sure we can legitimately claim that. This will require increasing investment in those tangible attributes that make us exceptional, like R&D, infrastructure, and education.



**Figure 2.** China will outgrow the US economy in less than two years using the Purchasing Power Parity (PPP) Exchange Rate.

### Investment

Various groups have shown that the US current budget projections are not investing in a sustainable way.<sup>11</sup> Almost all of the growth in the budget will be used to support Social Security, Medicare, Medicaid, and interest on the debt.

As a scientist and engineer, I am a major believer in biomimicry, designing products based on nature's designs. It is hard to out-design three billion years of evolution, so if one wants to make the best creations, follow nature. Nature has taught us that one invests in the young, not on the old. Nature stops investing in biological organisms once they reach puberty.<sup>12</sup> We are not doing this for our children, and we are not doing it for our infrastructure or R&D. Excessive spending on the old at the expense of investing in the young is not sustainable.

The National Small Business Association has long called for the reduction of the Federal Debt.<sup>13, 14</sup> However, reducing entitlement and debt spending is part of the solution, but not sufficient. In order to promote growth, which is a very important component of any long term solution, we need to invest in

more R&D and the development of new technologies to foster continued economic expansion. SBIR should be a significant portion of this R&D investment.

However, the least painful way to raise new revenues is to grow the economy, which takes investment. Investment in R&D is one of the most productive ways to grow the economy.

"[T]here is a strong positive relationship between innovation (patent stock) and per capita GDP."<sup>15</sup> Technological change is an important determinant of long-run productivity growth and therefore of increases in living standards over time. "Advances in technology arise from innovation, which is the process of inventing new products, improving existing products, and reducing the cost of producing existing goods and services."<sup>16</sup>

*SBIR Firms produce  
25% of America's most  
valuable patents on  
just 2.5% of the  
Federal R&D, a 10:1  
Bang for the Buck*

### **Small Business and the Economy**

According to the Brookings Institution, the American economy is less entrepreneurial now than at any point in the last three decades.<sup>17, 18</sup> They evaluated the rates of new business creation and destruction since 1978. It was found that during the period 2009-2011, for the first time ever, businesses were collapsing faster than they were being formed. Overall, new businesses creation (measured as the share of all businesses less than one year old) declined by about half from 1978 to 2011. The authors state that if the decline persists, "it implies a continuation of slow growth for the indefinite future." As these new businesses are one of the biggest job creators, it is no wonder America is having a job creation problem as the annual job growth rates remain below 2 percent for the duration of the recovery.

Small businesses account for 48.5% of all private-sector American jobs, and small business creates 63% of all new private sector jobs.<sup>19</sup> So, nurturing and fostering those small companies that create those jobs is perhaps the most important thing that Congress can do to ensure that the American economy grows and prospers.

In fact, it is the technology company subset of those small businesses that create the most new jobs.<sup>20</sup> It is those inventing companies that are commercializing their new products that are the ones that Congress needs to focus on and assist most.

We must remember that:

- Startups are to an economy what births are to a population; and
- Small businesses are to an economy what children are to a population.

Phase I SBIRs work as a midwife to give birth to new technology startups. Phase II programs get the companies into kindergarten. What we now must do is create the programs that help get these high-tech companies through high school, college, and provide the environment to get them their post doc work and being highly productive members of the economy.

Over the last 32 years, SBIR has fostered more than 21,400 companies. These companies are arguably the largest single concentration of technical talent in the world, with over 500,000 advanced degreed engineers & scientists. SBIR involved firms have been issued almost 100,000 patents, making this collection of firms one of the largest creators of intellectual wealth in the nation. They produce 10-12 USPTO issued patents per day.<sup>21</sup> These firms produce 25% of America's R&D 100 Awards, on an historical 2.5% of the Federal R&D budget, providing a 10 to 1 "Bang for the Buck".<sup>22</sup> With regard to wealth creation, SBIR firms have been involved in 1,713 M&A transactions, 7.8% of all awardees. The most acquirers are large corporations, many of whom have acquired multiple SBIR firms. The median value of these sales is \$42 million, with an average price of \$365 million. In addition, 1978 major/mid-sized corporations have working relationships and/or business transactions and relationships with SBIR-involved firms.<sup>23</sup>

Furthermore, SBIR meets its goal of promoting women and minority businesses. Over 9% of the firms are women owned and almost 45 are minority owned.<sup>24</sup>

### **Job creation**

According to the Kauffman Foundation, new, young, high-tech businesses—as opposed to small businesses generally—play an outsized role in net job creation in the United States.<sup>25</sup> This is because the substantial majority of nascent entrepreneurs do not intend to grow their businesses significantly or innovate, and many more never do. Differentiating growth-oriented "startups" from the rest of young businesses is an important distinction that has been underrepresented in research on business dynamics and in small business policy.

It is the innovative high-tech sector—defined as the group of industries with very high shares of employees in the STEM fields of science, technology, engineering, and math that are the important contributors to entrepreneurship in the U.S. economy. These are the companies that make up the SBIR community. Thus, technology innovation is the key to competitiveness in leading today's global economy. In the last 25 years, the percentage of U.S. scientists and engineers employed by small business has grown by over 500% from 6% to 38% of the nation's technical talent as a whole. The Federal government spends approximately \$135 Billion in R&D, yet less than 5% has been directed to small business and has remained constant over many years, even with the inclusion of the 2.5% for the Small Business Innovation Research (SBIR) program. The Federal government

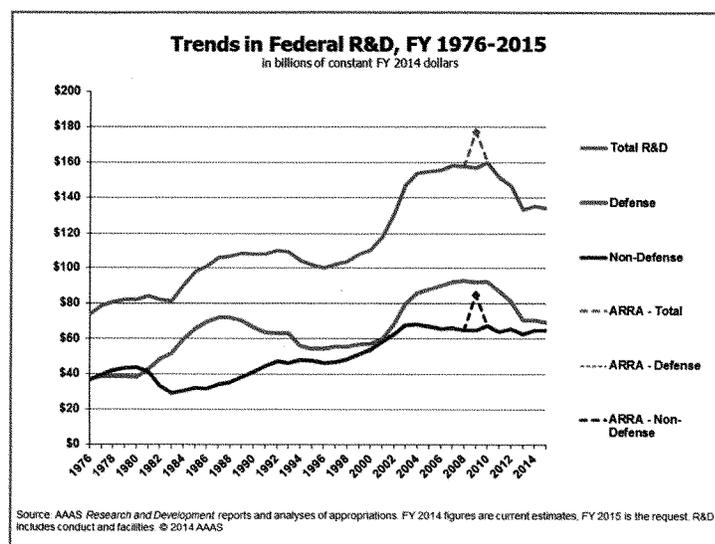
needs to more effectively utilize the small business sector to develop and commercialize innovations that lead to job creation and economic growth.

The Small Business Innovation Research (SBIR) Program has a proven track record of producing technological innovation and job growth. But more must be done to bring these innovations to the marketplace.

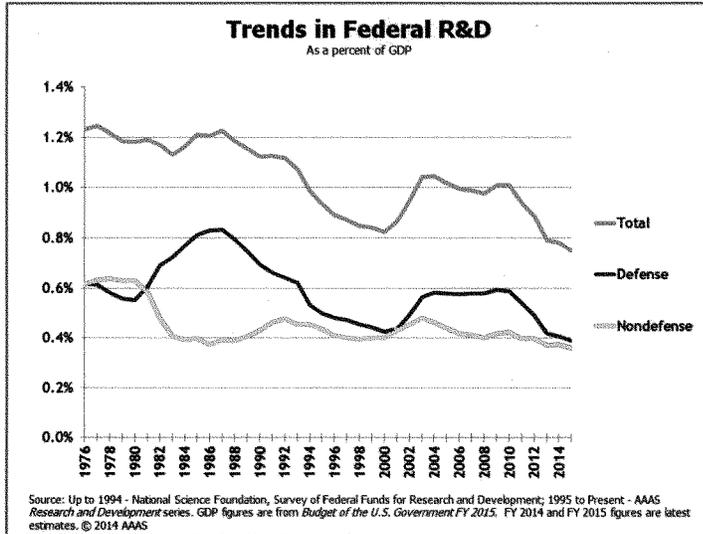
Thus, it is companies like the SBIR community which create the most jobs. However, due to cutbacks in R&D funding, and due to the reduced numbers of grants being awarded, the number of SBIR firms has shrunk 17% to 5,009 firms<sup>26, 27</sup> over the last seven years due to the funding cutbacks in R&D and the agencies failing to meet their goals.<sup>28</sup>

### Cutbacks in R&D Funding

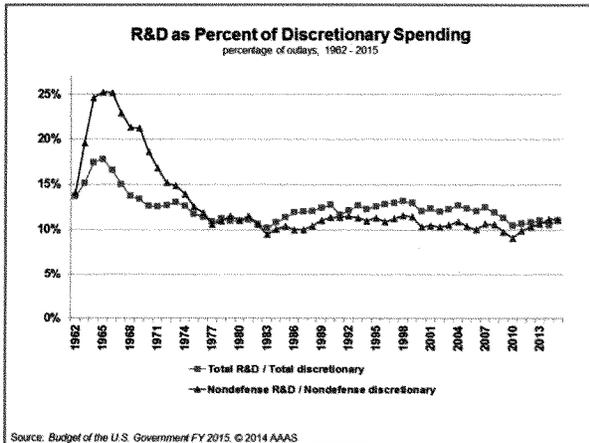
The budget has continually reduced R&D funding. The following charts can be found at: <http://www.aaas.org/page/historical-trends-federal-rd>. **Figure 3** shows the trend in R&D spending, falling about 25% in the last 5 years. **Figure 4** plots R&D funding as a percentage of GDP, showing the decline of 40% over the last four decades. **Figure 5** shows Non-Defense R&D as a percent of discretionary spending has fallen about 56% over the last five decades. Finally, **Figure 6** shows Federal R&D spending has fallen about 70% as a percentage of the Federal budget in the last 50 years.



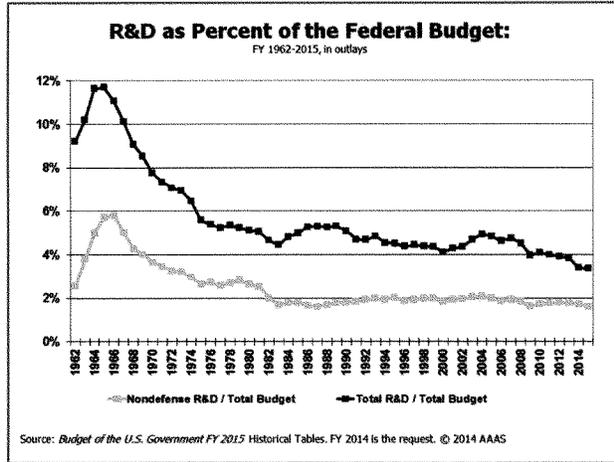
**Figure 3:** R&D spending has fallen 25% in the last 5 years.



**Figure 4:** R&D funding as a percentage of GDP has fallen 40% over the last four decades.

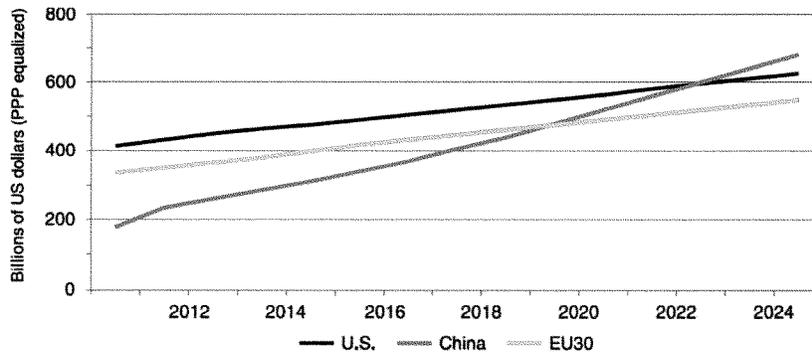


**Figure 5:** Non-Defense R&D as a percent of discretionary spending has fallen about 56% over the last five decades.



**Figure 6:** Federal R&D spending has fallen about 70% as a percentage of the Federal budget.

Let’s compare and contrast America’s R&D investment to China’s. China’s total R&D funding is expected to surpass that of the U.S. by about 2022, according to the 2014 Global R&D Funding Forecast, prepared by Battelle, a research and technology development organization, and *R&D Magazine*.<sup>29</sup> Last year, America’s total R&D grew at 1.4%, while China’s grew at 11.6%. **Figure 7** shows the result of slower R&D growth in America versus China. Even more importantly, since the Federal Government’s share is primarily in earlier stage research than America as a whole, and since the Federal R&D is declining, this bodes even worse for America’s long term prospect.



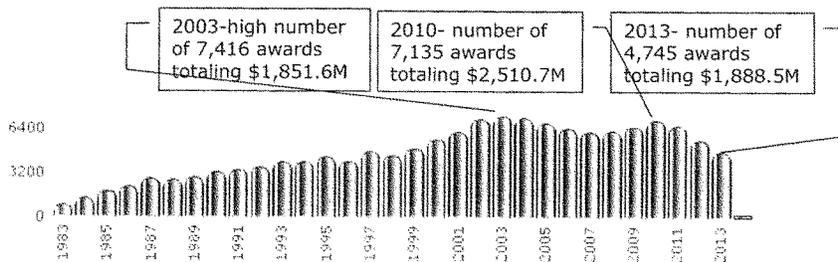
**Figure 7:** China’s rapidly growing R&D will surpass the US in about 2022.

**Cutbacks in SBIR Funding**

Although the SBIR spending is tied to the overall Federal External R&D funding, “GAO found that 8 of the 11 agencies participating in the Small Business Innovation Research (SBIR) program and 4 of the 5 agencies participating in the Small Business Technology Transfer (STTR) program did not consistently comply with spending requirements for fiscal years 2006 to 2011. In calculating their annual spending requirements for these programs, some agencies made improper exclusions from their extramural research and development budgets.”

SBA is required to submit annual reports to Congress on the SBIR program. The GAO found: “SBA has not submitted an annual report on these programs for fiscal years 2009 to 2011 but plans to submit the reports to Congress later in 2013—making the data available to Congress on the programs 2 to 4 years late.” To my knowledge, no SBIR report has been submitted by the SBA since the GAO report was issued in September 2013, making these reports that were 2-4 years late, an additional eight (8) months late. It is difficult for Congress to provide proper legislative oversight when the Agencies untimely withhold information.

Both number of awards for the SBIR program and the dollar amount of the awards continue to decline.<sup>30</sup> See **Figure 8**.



**Figure 8:** The number of SBIR Awards has dropped by 36 percent in the last decade; and the dollar amount awarded has dropped by 25% in the last three years.<sup>31</sup>

### **Commercialization successes**

The National Academy of Science findings paint a remarkably positive portrait of the Program. The studies and even the summaries are extremely rich and detailed, and worth careful consideration. Commercial success includes sales, license revenues, R&D investment, research contracts and the sale of equity. The average sales per Phase II project were \$2.4 million and the average investment for Phase II was \$1.5 million. Given the inherent technical risks involved, "the fact that a high proportion of the projects reach the market place in some form is significant, even impressive."

"On average, SBIR projects received almost \$800,000 from non-SBIR sources, with over half of respondents (51.6 percent) reporting some additional funds for the project from a non-SBIR source."<sup>32</sup>

SBIR has a stellar list of "graduates," including

- **Qualcomm**
- **Symantec**
- **Amgen**
- **Biogen**
- **Genzyme**
- **Chiron**
- **Titan**
- **Nanosys**
- **American Biophysics**
- **Luna Innovations**
- **JDS Uniphase**
- **iRobot, and**
- **Armorworks**

to name but a few.

## **Other Concerns**

### **Patents and Wealth Creation**

#### **The America Invents Act of 2011 and its effect on Small Business Inventors**

In October 2013, when the first reports of the effects of the America Invents Act (AIA) became available, Federal Circuit Chief Judge Rader described the AIA's Patent Trial and Appeal Board ("PTAB") as "*death squads killing property rights*". By March 2014, more numbers emerged showing the effectiveness of the PTAB post issuance procedures.<sup>33</sup> More than 80% of the patent claims challenged are instituted for trial. Once instituted for trial, the PTAB is canceling 95.2% of all claims.<sup>34</sup> This means the vast majority of asserted patents now face getting invalidated. In light of the March PTAB numbers, Rader noted that his "*death squad*" comments may be more accurate than originally thought.<sup>35</sup>

So, for inventors, after having paid about \$75,000 for a patent, they now are in the position of a homeowner who finds that their house title is worthless. After spending years inventing, testing, and obtaining their patent, the inventor is now told all of their efforts were in vain.

Most significantly, these property rights are being extinguished by a non-Article III court. To invalidate a patent in a court requires a showing of clear and convincing evidence with the burden of proof on the challenger.<sup>36,37</sup> The PTAB procedures require only the lowest evidentiary standards<sup>38</sup> to open the door to a PTAB procedure. Then the burden of proof is switched to the patent holder, and the procedure is structured to require validation of the patentability tests a second time, like re-applying as if the first grant was moot and in dramatic contrast to the settled judicial procedure previously required to invalidate the patent.

Some argue that in the end it is still fair because the patent holder can appeal to the Federal Circuit. However, the Federal Circuit is not a trial court and therefore does not control evidence, witnesses or other submissions, it is not the finder of fact, and the burden of proof again is on the patent holder. The cost of a PTAB review to the patent holder can exceed \$250,000 and burn a year and a half of the patents already limited term. In sum, the patent holder has little recourse as the fight is almost always over when the PTAB invalidates.

Statutory law applies the settled, 200 year old precedent demanding the presumption of validity which was defined by the Supreme Court to require clear and convincing evidence with the burden of proof on the challenger in a process structured to invalidate the patent. This result was blocked in the back rooms of the United States Patent and Trademark Office by implementing the new PTAB procedures.

The effects of the AIA are just now coming to light and those effects are proving themselves to be devastating to small patent-based businesses and independent inventors. **It is not surprising that during the first two months of 2014 the number of new patent cases dropped 25% over 2013.**<sup>39</sup> The number is likely to fall even further as more and more inventors realize the risk.

The consequences will spread across our economy causing grave damage to investment in patents. In 2010, America's most IP-intensive industries accounted for \$5.06 trillion in value, or 34.8 percent of U.S. gross domestic product and IP-intensive industries generated 27.7 percent of all jobs in the U.S. economy.<sup>40</sup>

The AmiCOUR IP Group's brief of Amicus Curiae in the high profile case *Microsoft v i4i* heard by the United States Supreme Court analyzed similar effects of a proposed lowering of the bar to invalidate a patent. AmiCOUR wrote, "*Publicly held corporations will have to report any material devaluation to shareholders and the Securities and Exchange Commission (SEC), resulting in a devastating impact on patent centric companies. Hardest hit will be the high tech and biotech firms, which contribute significantly to U.S.*

*economic growth, particularly through job creation and whose innovations are primarily responsible for the United States' edge over global competitors."*

This drop in IP value is in large part due to the ease at which a patent can be invalidated, and in part due to current legislative efforts to further diminish the value of granted patents. As noted previously, 80% of patents are admitted into a PTAB procedure and 95% of those admitted are invalidated. Using simple math, a patent has a 76% chance of invalidation. This high likelihood of invalidation is substantially decreasing the values of patent assets across the board.

Aside from the chilling effects on innovation as there is no certainty that capital invested can ever be recovered, Sarbanes-Oxley require that this substantial change in patent asset values be written down on the books of thousands of companies. In the United States, patent assets are valued at \$5.06 trillion so this write down could conceivably be as large at \$3.84 trillion. Also under Sarbanes-Oxley, failure to do so is criminal and could land the CEO and CFO in jail. A write down this large would no doubt cascade negatively across our economy and will likely cause severe disruption in capital markets. The simple economics of lower business valuation in response to the measurably diminished ability to exclude competition would, in fact, be very real.

The patent system is dead for all except large corporations thanks to the AIA. While the write-down may be unavoidable at this point, if we pass the current patent reform legislation thus expanding PTAB procedures, we will bury the patent system altogether along with the economic future of our nation. Instead, we need to go the other direction and strengthen patent rights.

We can still save what is left of the patent system and avert economic disaster. To do this, we must first reject the current round of patent reform altogether and assess the full degree of damage caused by the AIA.

**This is extremely important to SBIR firms as they have received about 100,000 patents. This devaluation of patents is hurting the small high-tech, job-creating SBIR businesses, and thus the economy.**

#### **The Innovation Act of 2013, HR 3309.**

The recent "Patent Reform" bills have an insidious effect on small businesses. The proposed legislation ensures small inventors will never be able to get the best inventions to market by imposing: Fee Shifting "Joinder", Loser Pays, Pay to Play, Covered Business Methods (CBM), Elimination of Post Grant Review Estoppel, Disclosure of All Plaintiff Interested Parties, Enhanced Pleadings and Limiting Discovery, and Customer Stay provisions that are so onerous, only large corporations will be able to commercialize inventions. The provisions will make small inventing companies "Toxic Assets" to investors. Small inventors will likely need at least \$5 million in the

bank, not for their own use, but to cover the infringers' costs. The details of these legislative "potholes" were described in my five part series in IP WatchDog. (See References <sup>41, 42, 43, 44, 45</sup>)

### Regulations

In his testimony to the Senate Committee on Small Business & Entrepreneurship last year Dr. Irwin Jacobs, founder and CEO of Qualcomm stated that SBIR Program helped Qualcomm get started but cautiously noted:

"It sounds as if there has been some requirement creep over the years, because I remember it as being a very straight forward, a very simple process to get a proposal in and very quickly get an answer back, and it sounds like that has changed dramatically." Congress and the Administration need to eliminate much of the regulatory burden they have added to the SBIR program.

In an SBTC White Paper we delivered to DoD and SBA almost two years ago.<sup>46</sup> As you will note, 30 months after the law was passed, we still don't have a system in place to report on commercialization of SBIR technology, and no rules or regulations on goals or incentives have been promulgated. While DoD and SBA have been working on implementation of the law, key elements have not yet been implemented. We are pleased that progress is being made and the DOD in its FAR regulation instructions did recognize the need to set goals for transitioning SBIR/STTR technology. (The DFAR 5000.2 Instructions require all program managers to set goals for themselves.) Programs like the Rapid Innovation Program are working and we thank Congress for the Rapid Innovation Program. However, we are dismayed by the fact that, in our biased opinion, it appears that **regulations adding new burdens to small business are imposed quickly, while the regulations that help small business are very slow in coming. For an example, see reference <sup>47</sup> on Q&A on Phase III Contracting. This was produced by SBTC due to the lack of promulgated regulations and procedures.**

### Transfer Act

Others are proposing to take the limited funds provided for small business in the STTR law and divert them to their non-small business priority. First, the venture capitalists took 25% of the SBIR programs for majority owned by VC firms. Now universities and others want to take 22% of the STTR program. HR 2981, the proposed "TRANSFER Act", would transfer \$80 million per year from the STTR program into a new tech transfer program run exclusively for universities. The SBIR program, with only 3% of the extra-mural Federal R&D funding, creates 25% of all key innovations in America. Large firms account for fewer than **5%** of key awards, even though they receive **half** the extramural R&D funding. SBTC believes that much more can and should be

done to commercialize SBIR technology by the Government. Today SBIR companies file more patents than all universities combined. SBIR companies commercialize one half of Phase II awards while universities total licensing income is only \$2.6 Billion dollars while receiving over \$40 Billion Federal dollars. Despite SBIR firms' outstanding record of commercialization, the TRANSFER Act would take \$80 million dollars each year, or 22% of the STTR program, and transfer it to an untested, unproven program to have universities study how to commercialize technology. The STTR program has been doing what the Transfer Act can only hope to accomplish. More money should be added to the STTR program not taken from it. SBTC strongly opposes the Transfer Act.

### **Non-Government Sources of Funding**

Traditional non-Government funding sources include Bank financing, Venture Capital, Angel financing, and Crowd Funding. Together, these sources are currently insufficient to provide enough capital to expand the American economy to provide the required job growth.

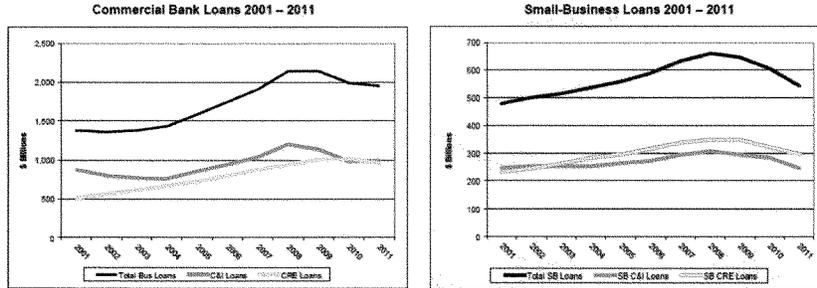
Additionally, regional variations make a huge difference in availability of funding, particularly for Venture Capital. We will look at each of these sources of capital so that we can further understand how critical SBIR funding expansion has become.

#### **Improve the Banking Environment for Small Business.**

SBTC's companies are experiencing a significant negative impact of the banking and the regulatory environment on funding, making it much more difficult to grow and create jobs. Some national examples are shown at <sup>48, 49, 50, 51, 52, 53, 54, 55</sup>.

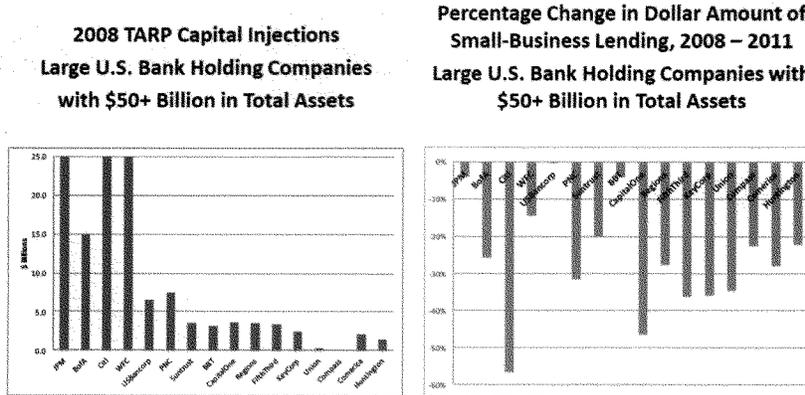
A start-up company in Pittsburgh with rapid growth received seed money from Consol Energy's Foundation for more than 20% of its equity. It was successful; but due to SBA Loan Guarantee eligibility regulations, any party with more than 20% ownership must personally guarantee the loan. This is simply not reasonable for a company the size of Consol, funding through its foundation. The result – the start-up company cannot secure bank funding. Thus, becoming "bankable" or "credit worthy" is unattainable for this innovative company and funding therefore for growth, therefore, remains out of reach.

The new regulations make it very difficult for small companies to grow rapidly. A personal example is for one of my companies, which has been growing by 10-15% per month for the last three years. Because we decided to invest in ourselves and our growth, we had a loss for a year. This caused our bank line of credit to be cancelled, which is not only jeopardizing our growth, but the company as well. Thus, we see the fallout of Dodd-Frank and bank regulations hindering job growth for small businesses.



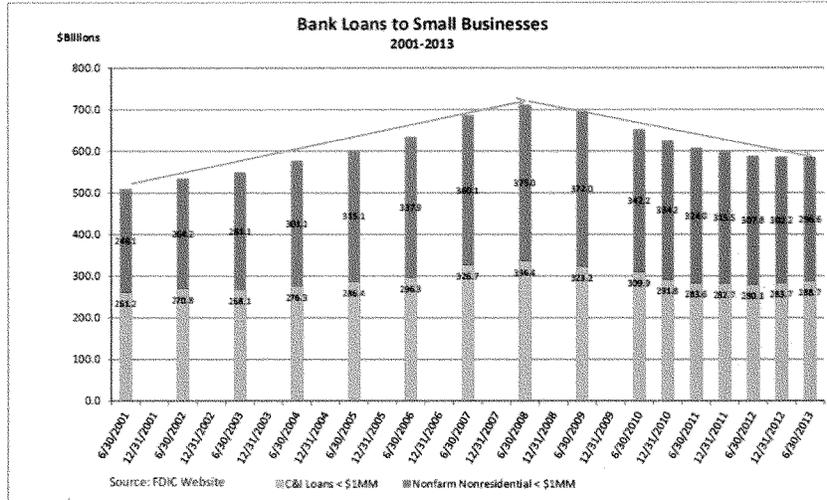
**Figure 9:** Commercial loans have recovered, however small business loans are still depressed which is suppressing job growth.

Small business lending is still down and hasn't bounced back. As shown in **Figure 9**, the data supports the anecdotal evidence provided above. A significant part of this problem is that the large banks who received billions of dollars of TARP money are the very banks that have decrease their lending to small businesses by 10% or more, in one case by more than 50%. See **Figure 10**.



**Figure 10:** The very banks who received the most TARP money are the ones who are killing small businesses.

Although the community investment banks are much better than the large national and regional banks (as one would expect), the overall lending to small businesses is still down, by \$126.1 Billion, as is shown in **Figure 11**.



**Figure 11.** Small business loans have continued to decline since the recession.

Most recently, Thomson Reuters/PayNet Small Business Lending Index, which measures the volume of financing to small companies, fell to 110.5 in February from a reading of 116.5 in January, PayNet said on Tuesday. That was the lowest level since last September.<sup>56</sup> U.S. small businesses borrowing hit a five month low in February, in the latest indication of slower economic growth in the first quarter.

### Venture Capital

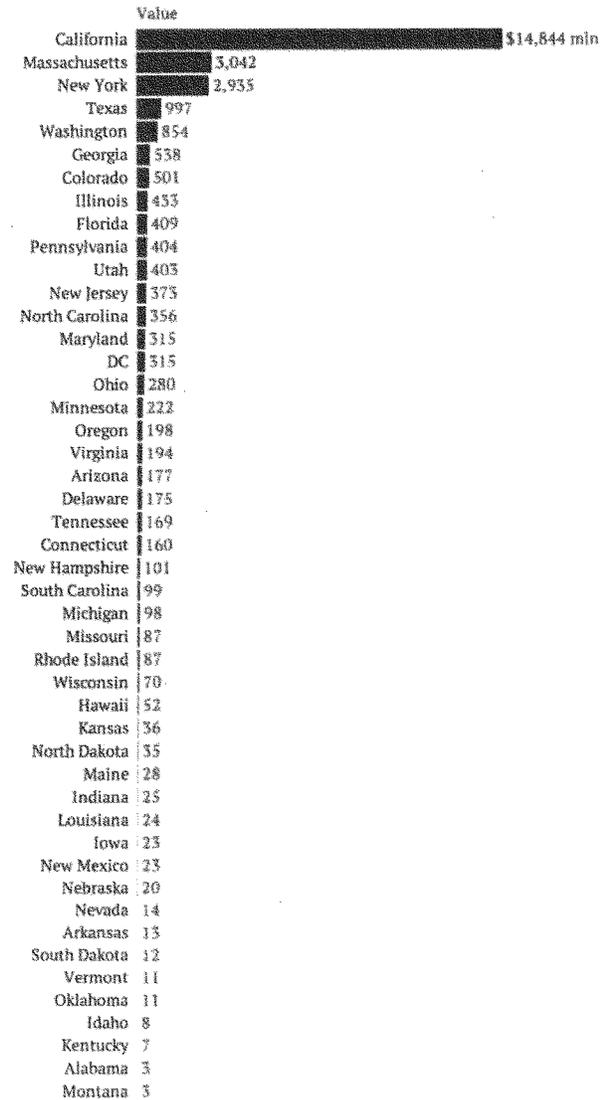
Venture Capital (VC) funding has decreased from \$105.1B in 2000 to \$29.5B in 2013, or by about 72% over the last 13 years. This funded only 3,995 deals, about 16% fewer deals than the number of SBIR awards made last year. This reduction in dollars and deals has been very problematic for companies who are trying to raise money. It is even more of a problem for companies not located in Silicon Valley or Massachusetts.

American venture capital deals across the country are skewed, with Silicon Valley being the dominant location for investment.<sup>57</sup> (See **Figures 12 & 13.**) However, the "sheer degree of inequality of 2013's tech investments was nonetheless striking."<sup>58</sup> California receives over half the funding.



**Figure 12:** Just three states receive over 70% of all VC funding.

Venture capital deals in 2013, by US state



Quartz: qz.com

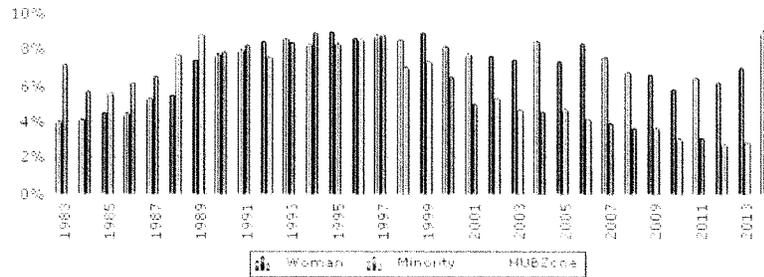
Data: CB Insights

**Figure 13:** Just five states receive over 76% of the funding, leaving the other 45 states competing over less than a quarter of all VC funding.

One of the former focus areas of VC investing has been the biosciences. However, US venture capital funding for the life sciences sector, which includes biotechnology and medical devices, declined by 1% in value and 3% in volume during 2013, according to the MoneyTree™ Report from PricewaterhouseCoopers (PwC) LLP and the National Venture Capital Association (NVCA).<sup>59</sup> Now, the majority of the funding is going into internet applications and IT software.

Venture capital has also continued to make few investments in seed and start up enterprises. The majority of these investments have been in software and IT industries with the vast majority of these seed and start up deals being made in the Silicon Valley. In the first quarter of 2014 there were only 41 of these startup/seed deals totaling \$125 million.<sup>60</sup> The most critical need for capital is at the early stage of technology development. The absence of such funding at the early stages makes the SBIR program even more critical.

Further, the gender and racial makeup of venture-backed companies is wildly inconsistent with the demographics of the country as a whole, in particular U.S. consumers. The U.S. population is 37%-minority today according but less than 1% of founders receiving VC funding were African-American.<sup>61</sup> Women receiving VC funding were less than 2% of the total. This compares to about 9% for SBIR. The SBIR record for women and minorities can be seen in **Figure 14**.



**Figure 14** Percentage of SBIR Awards to Woman/Minority/HubZone-Owned SBC's<sup>62</sup>

VC funding is even more difficult to obtain for early stage deals. Even though a record number of seed deals were funded in 2013, there were still only 843 Seed Deals funded by VCs.<sup>63</sup> This is less than 18% of the 4,745 SBIRs awarded in the same period.

### **Angel Funding and Crowd Funding**

There are more than 225 angel investor groups throughout the United States and Canada.<sup>64</sup> The largest organization is the Angel Capital Association.<sup>65</sup> The ACA represents 170 member angel groups in 48 states, and 20 affiliated organizations, with over 8,000 accredited investors. These angel groups fund about 800 new companies a year, with over 5,000 companies in their portfolios. However, the demand for their services is over 75,000 companies per year, so 99% of the need is unfulfilled.<sup>66</sup> The 800 companies funded are about 1/6<sup>th</sup> the 4,745 SBIRs awarded in the same period. This is the reason the SBIR program is so critical.

Angel funding is increasing but certainly doesn't meet the demand for capital for developing new technology. Angel funding is focused on limited number of industries and is largest in California and New England (like the VCs). This leaves many companies outside of those areas without early stage funding.

Crowd funding may be helpful, but again the implementing regulations at over 500 pages seem to be insurmountable for small startup businesses. The crowd market is years from being able to solve the capital shortage problem for technology companies.

In a survey for [Palo Alto Software](#), 45 percent of startups said their struggle to find financing is hampering growth. According to the survey, securing investors is one of the top three goals of startups in 2014, and more than half are seeking at least \$100,000 in funding.<sup>67</sup>

### **Conclusion**

Universities receive well over 10 times more federal R&D dollars than the SBIR/STTR programs every year. SBIR/STTR companies receive 3% of Federal extramural R&D funding while universities receive between 32-36%. Simple stated, SBIR/STTR companies produce 58% more patents; three and a half time as many key innovations, and have a far better record of commercialization, on 10% of the federal funding that universities receive.

The normal business model for funding development is that the funding increases from basic research to applied research to advanced development. However, under the current Federal model, we see less funding when we move to applied research and advanced development. We are not arguing for less funding for universities; in fact, we argue the opposite as basic research is very important. However, due to the lack of alternative funding with angels, VCs, and banks, we believe that the Federal Government has an opportunity to expand the economy, and invest in our future where the product development curve starts to rise, the "sweet spot" for SBIR. Funding the testing and development of new products that lower health care costs, improve the performance of our military, produce low cost energy, and help the economy is one of the best investments that Congress can make in America's future.

**If jobs are desired, SBIR is the best place to invest R&D dollars.**

We recognize that the SBIR program alone cannot solve all of the country's problems. The nation will still face challenges with competition from China and the rest of the world. SBIR and technology growth will not solve the nation's unemployment problems alone. The SBIR program has helped create American jobs and even new industries. Compared to all other programs it is the best government program for turning inventions and research and development into innovations and jobs. I know of no other program that even comes close. Compared to other government programs, the SBIR program has an outstanding record of commercializing its technology. But it needs more help and support to create the new industries and new jobs to compete against China and the rest of the world.

SBA and DOD's delay in fully implementing critical portions of the law is slowing the economy and delaying job growth.

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- <sup>61</sup> [http://www.craigslist.com/apps/pbcs.dll/section?category=framelink&link=www.forbes.com%2fsites%2fdavidteten%2f2014%2f04%2f29%2fwhy-are-venture-capitalists-ignoring-the-future-the-emerging-domestic-economy%2f&oas=www.forbes.com\\_sites\\_davidteten\\_2014\\_04\\_29\\_why-are-venture-capitalists-ignoring-the-future-the-emerging-domestic-economy](http://www.craigslist.com/apps/pbcs.dll/section?category=framelink&link=www.forbes.com%2fsites%2fdavidteten%2f2014%2f04%2f29%2fwhy-are-venture-capitalists-ignoring-the-future-the-emerging-domestic-economy%2f&oas=www.forbes.com_sites_davidteten_2014_04_29_why-are-venture-capitalists-ignoring-the-future-the-emerging-domestic-economy)
- <sup>62</sup> <https://www.sbir.gov/past-awards>
- <sup>63</sup> <http://www.cbinsights.com/blog/trends/venture-capital-report-2013>
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- <sup>65</sup> <http://www.angelcapitalassociation.org/>

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<sup>66</sup>

<http://www.angelcapitalassociation.org/data/Documents/Resources/ACAandAngelGroupBackground09-12.pdf>

<sup>67</sup> <http://www.allvoices.com/contributed-news/16904287-survey-funding-struggles-hinder-nearly-half-of-startups>

Chairman Graves, Ranking Member Velazquez, I want to thank you for allowing America's SBDC to submit written testimony for the hearing record. I am the President of America's SBDC, the Association that represents the nationwide small business development center (SBDC) network of over 950 locations and over 4,000 dedicated professional counselors, advisors, specialists and support staff.

For 34 years the SBDC network has been providing services to small business owners and aspiring entrepreneurs. Over the years our member networks have developed a wide variety of services for small businesses of all sizes that are customized to meet the needs of regional businesses throughout the nation. One of the most important service we offer is assisting small business owners to apply for grants under the Small Business Innovation and Research program (SBIR). Over the years SBDCs all across the country have developed resources and training to enable more and small businesses access grant funds through this program.

To promote the SBIR program SBDCs have developed numerous coaching and training programs. In Missouri, for example, the SBTDC offers technology commercialization services that evaluate intellectual property and provide preliminary patent searches, assists with building the business model and with prototype design, conducts market and technical viability review of technologies and help prepare SBIR/STTR proposals.

Similarly, in Virginia they have developed the Innovations Commercialization Assistance Program. By partnering with SHINE Systems and Technologies in Charlottesville to provide each participant with a Client Market Assessment (CMA), which provides an unbiased SWOT analysis of the client's strengths, weaknesses, opportunities, and threats, with a Summary, Grade, and Recommended Next Steps. Clients, whose innovations were assessed to have commercial promise, are selected for further assistance. Starting with in-person sessions with the subject-matter experts, the client, the SHINE project manager, and the client's SBDC counselor dip deeper, beyond the information already provided. From this session, a commercialization Roadmap is developed, offering tangible steps and directed counseling to guide the entrepreneur in taking the innovation into the market.

In West Virginia, *In-Tech* was created as a unit of the West Virginia Small Business Development Center (WVSBDC) to provide business coaching and technical assistance to West Virginia based pre-venture and small businesses in which innovation serves as a catalyst for economic impact via technology-based products, services, and improved processes. The WVSBDC has a full time Manager for this program whose core services are: Technology Development and Commercialization; Market and Commercialization Needs Surveys; Business Model Generation and Customized & Confidential Product Development and Business Coaching.

Similar programs exist in North Carolina, Massachusetts, Vermont, Arkansas, South Dakota, Utah, Delaware, Ohio and Maryland and throughout the national SBDC network. All these programs share consistent themes—Assistance with the grant writ-

ing and submission process, research into market needs and viability, access to Capital (Conventional and Venture), intellectual property protection, prototyping and manufacturing, and most important—commercialization.

In the National Defense Authorization Act of 2012 (NDAA) the Committee made several valuable changes to the SBIR program. One of the most significant was the emphasis the Committee placed on supporting research with a clear goal of commercialization. This has been one of the key components of SBDC assistance to SBIR grantees. By working with grantees from the perspective of creating a viable business SBDCs have ensured the strength and success of SBIR awardees in reaching commercial success. The goal of SBDC assistance is to create viable businesses, and so our SBIR assistance is geared solely to getting the businesses into the program, getting their technology developed and getting that technology into the market. SBDCs aren't helping with proposals for the grant's sake; they're doing it for the business.

An excellent example of that focus is the efforts of the Arkansas Small Business Technology Development Center working with Fauxsee Innovations, LLC of Magnolia, Arkansas.

*Brothers-in-law Brandon Foshee and Timothy Zigler launched their startup company, Fauxsee Innovations, to develop technology to assist sight-impaired people like Brandon. The company, based in Magnolia, Ark., has won two rounds of funding from the National Science Foundation to support the development of its patent-pending Roboglasses device.*

*Roboglasses are designed to dramatically reduce head and upper-body injuries to the sight impaired. Traditional mobility devices, such as the guide dog or walking cane, do not protect the user from upper-body hazards. Studies have shown that almost half of the 11.4 million visually impaired people in America experience head injuries at least once a month, with 23 percent of those injuries requiring medical attention.*

*The idea for Roboglasses came after Zigler met Foshee and grew curious about the lack of available modern technology to assist sight-impaired individuals.*

*"I came up with the idea while backing up my car and listening for the beeps from my reverse detection system," said Zigler. "I instantly called Brandon and told him my idea and he liked it. **In the beginning it wasn't a business idea at all, but simply a guy trying to help this brother-in-law out.**"*

*The company co-founders first turned to the Arkansas Small Business Technology Development Center (ASBTDC) at Southern Arkansas University for help commercializing their concept. The SAU center helped the pair with their business plan and market research, and then connected them to ASBTDC's technology and innovation specialist, Rebecca Norman, at the University of Arkansas at Little Rock.*

*Zigler and Foshee worked extensively with **Norman** on their SBIR proposals. At first, the two were overwhelmed by the requirements to participate in the SBIR program and were con-*

*sidering raising only private money to support their research and development efforts. “Rebecca Norman of the ASBTDC talked us back into going after SBIR funds,” said Foshee. “She not only encouraged us to try again but was there in the trenches with us every step of the way.”*

*Fauxsee Innovations received a \$150,000 Small Business Innovation Research (SBIR) Phase I award from NSF in 2013, followed by a \$15,000 Phase IB grant. The company has applied for Phase II funding.*

*“Our NSF SBIR Phase I award allowed us to prove that the Roboglasses theory and concept works,” said Zigler. Foshee, who has no light perception and uses a guide dog to navigate, said the Phase IB “In Between” funding “will allow us to further refine our prototype from what we call the ‘carryable’ version to the ‘wearable’ version. In other words, it will help us to miniaturize our prototype.”*

*The specialized assistance ASBTDC was able to offer Fauxsee Innovations was made possible through Federal and State Technology (FAST) funding from the U.S. Small Business Administration. ASBTDC has received the nationally competitive FAST award each year since 2010.*

The combination of SBDC assistance and Brandon and Timothy’s innovative thinking is what created a new business with a potential to help thousands of vision-impaired people. However, this road is far from easy and oftentimes small business owners run into serious roadblocks. This is why the Committee’s efforts were so important. Many clients with worthwhile innovations face hurdles that seem to defy the logic of the SBIR program, and defy their capabilities to successfully apply.

Those hurdles were faced by a client of the Massachusetts SBDC (MASBDC), a small company engaged in the development of anti-cancer drugs. The founder, a PhD with two decades of cancer research experience, contacted the MASBDC office for assistance with submission of their SBIR proposals. He had previously submitted 2 Phase I SBIR proposals, both of which were rejected. He was already well into the process of writing a revised proposal when he contacted the MASBDC. Dan Lilly at MASBDC worked with him to finalize the submission and after submitting the proposal, he worked with Dan to better understand the previous rejections.

This created a roadmap to make substantive positive changes to the submission. That is what’s amazing, a veteran researcher with a long history having difficulty understanding the SBIR process. Luckily, with SBDC help he was able to gain insight into the reviewers and their thoughts about the proposals’s strengths and weaknesses.

Unfortunately the next proposal was also rejected, although the score had improved. MASBDC and the firm continued to review the results and comments in order to further improve the application. Armed with a number of rejections and perplexing reviewer com-

ments, they set out to submit another proposal to overcome the reviewer concerns.

The next version of the proposal came back very close to the funded scoring range. In that proposal, one reviewer commented that the proposal was very well written, thus leaving the success of future applications to the convincing nature of the science. At this point the client became further confounded by the process, particularly since the science had been previously published in top peer review journals. Most of the proposal reviewers loved the science, but others questioned its level of significance as parts of the technology were perceived to be used previously, and thus not novel. It now seemed to be a matter of perception of the science as to whether the proposal would be funded.

Using comments from previous reviewers, the challenge of presenting the significance and impact of the science was tackled head on. The revised proposal sought to overcome the weakness that the technology platform utilized existing technologies. The new proposal now highlighted that other reviewers had specifically commented that “although all the components of the technology may not have been novel, the approach and the utilization of them was truly innovative and could result in great strides in cancer therapy”.

Using this new strategy to present the technology and approach, they submitted another version of the Phase I SBIR application which was successfully funded by NIH.

This typifies the difficulty many SBIR applicants face, a proposal process that seems opaque and is often geared towards outstanding grant writers, not outstanding innovators looking to produce a commercially viable product. To that end, the Committee’s improvements have made a great difference. SBDCs and their many prospective clients appreciate the effort to refocus the program on commercially viable innovations.

As a final point, the members of America’s SBDC would like to encourage continuation of the FAST program. That program was designed to increase the ability of small businesses in “rural” states that did not traditionally succeed in winning SBIR grants. Small business in Utah, Arkansas, South Dakota and Missouri and many other rural states have benefited greatly from the FAST program. It has enabled them to access resources that have greatly improved their success rate. For some time the SBIR program appeared to be almost a “coastal” opportunity, with very limited opportunities for small businesses in the Midwest and Plains states. The FAST program has helped the SBIR program tap the intellectual resources of small businesses all over the country. We at America’s SBDC consider that a significant benefit.

Thank you again for accepting our testimony.

