

Driving Innovation through Federal Investment
Outside Witness Testimony: Dr. Scott E. Rickert, CEO of Nanofilm, Ltd. and Director of PEN Inc.

Innovation is crucial to the economic health of the United States.

Federal investment in the form of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding makes the difference between ideas and commercial products that drive economic benefit for the U.S. economy. SBIRs and STTRs are the fastest, most efficient way to bring innovative ideas to the market.

I began my career as a university researcher in advance materials and nanotechnology, where I developed the method for forming a protective nanofilm on a surface. In 1985, I decided to open my own company, Nanofilm. From the beginning we researched and commercialized breakthrough ideas employing the inherent “less is more” sustainability of nanotechnology in high performance product solutions. I found investors on my own and launched a start-up. It’s been years in the making, and today Nanofilm is a successful private company, employing more than 50 people, selling a variety of products in dozens of countries around the world that solve everyday and specialty needs. We have commercialized sustainable product solutions in:

- Vision health: A nanocoating that protects eyeglass lenses from scratching, improving vision and reducing waste.
- Sustainable dinnerware: A contaminant-resistant and mar-resistant coating for commercial dinnerware used in restaurants and cruise lines. The coating makes the dinnerware easier to clean, reducing the amount of polluting detergents added to the wastewater stream, as well as extending the lifecycle of the products.
- Vision safety: A nanotechnology-enabled anti-fog coating for safety goggles and glasses worn by the military, law enforcement and firefighters, as well as factory, construction and mine workers.
- Infection control: We are in development of a sustainable nanotechnology-enabled coating potentially capable of killing bacteria on a surface for up to five days. We are hoping to work with the Centers for Disease Control to stem the infection control “arms race,” eliminating harsh toxic chemicals that can pollute the water supply and cause viruses and bacteria to mutate into superbugs. This innovation could have benefit in both the professional and consumer markets.

We are working to complete a business combination with Applied Nanotech Holdings, Inc., a Texas-based company, which will result in Nanofilm and Applied Nanotech moving forward under a newly formed company, PEN Inc. The attraction of Applied Nanotech, founded in 1987, is their deep and broad portfolio of intellectual property, including over 250 patents. That level of breakthrough work was made possible in large part by more than 50 SBIR and STTR awards over the years, including work with the U.S. Department of Transportation, The Department of Agriculture and others.

In my work with Applied Nanotech’s research and development experts, I have seen the impact federal support makes. Federal funding has launched projects and facilitated partnerships

between the company and non-profit industry associations and educational institutions. Without that support, it's likely these breakthrough ideas would be languishing as mere science projects. Some of Applied Nanotech's most recent projects include:

- Natural gas safety sensor: A sensor to detect natural gas leaks co-funded by NYSEARCH-Northeast Gas Association (NGA) and the Pipeline and Hazardous Material Safety Administration (PHMSA) of the U.S. Department of Transportation.
- Forensic tool: Sensor technology and an instrument for rapid identification and quantification of pollen in forensic samples. The STTR contract brings together Applied Nanotech, the U.S. Army Research Office and Texas A&M University.
- Citrus Greening Disease detection: A sensor for early detection of the bacterial infection threatening U.S. citrus crops. The California Citrus Research Board and University of California, Davis, have partnered on various stages of the project.

Through the potential merger of Nanofilm and Applied Nanotech, I see clearly the synergy of the public-private partnership as a catalyst for innovation and economic growth.

It is my opinion that innovation is a disciplined process that is well defined. The first step is the one that benefits most from government investment. SBIR and STTR funding takes early-stage ideas from the drawing board to the laboratory. This is when the ideas are high-risk and often high-complexity, making private funding difficult. Federal funding provides the opportunity to develop "proof of concept" or, in effect, to create prototypes.

It's only at this stage that commercial investment becomes a realistic option. Once there is a prototype, the market potential becomes much clearer. Private companies can step in and match the technology to the right products and markets.

From my career spanning both research and entrepreneurial success, I've seen how innovation in nanotechnology, material science and engineered materials is both a societal benefit and an engine of economic growth. However, this is just the beginning.

America's future success – both in innovation leadership and economic strength – requires continued and robust federal investment in the Advanced Materials Economy. We have a strong foundation on which to build. For example, the U.S. holds more than half of all the world's nanotechnology patents, and the global market for nanomaterials is expected to top \$37 billion by 2017.

The early-stage successes are many, including work by Nanofilm and Applied Nanotech, as well as development by others in fields like printed electronics and 3-D printing. The next-stage opportunities are exciting and already in development, including work in biogenetics and nanotechnology. Federal investment in the form of STTRs and SBIRs is crucial to bringing this nascent innovation to fruition. Without it, many realized innovations might still be nothing but lab experiments. With it, growth fields are generating – and can continue to generate -- real-world, high impact products that create thousands of high-quality U.S. jobs and improve people's lives.