

SMITH written statement

Chairman Goodlatte, Ranking Member Watt, members of the subcommittee, it is a great honor for me to testify before such a distinguished body on the important issues surrounding intellectual property and competition.

### **Importance of Innovation**

Innovation is the foundation of our modern society, and the continuing source of strength in our economy. To insure continued prosperity in the United States, we must continue to innovate, and such innovation requires that we have laws, regulations, and policies that foster innovation.

### **Background on UNC Charlotte**

I am Chair of Mechanical Engineering at the University of North Carolina at Charlotte. UNC Charlotte is a relatively new university, founded after World War II. Our annual research budget is small compared to many other universities, on the order of \$35 million annually. We have particular expertise optics, bioinformatics, and precision metrology and manufacturing (which is my area).

While we are young, we have some impressive distinctions. UNC Charlotte is consistently ranked in the top 5 of all universities for:

- number of inventions created,
- number of patents issued, and
- number of new companies created per research dollar spent.

Over the past 10 years at UNC Charlotte, we have created 541 new inventions, received 67 issued patents, and formed 38 new startup companies. Innovation is important in North Carolina generally, and at UNC Charlotte especially.

Faculty in our department invented the software correction used to improve the accuracy of virtually all coordinate measuring machines (CMM's) used throughout the world. We worked on the design and manufacture of the new encasements for the US Constitution and Declaration of Independence. We worked on the design and manufacture of parts for the national ignition facility. We are home to research centers in Precision Metrology, Biomedical Engineered Systems, Energy Production and Infrastructure, and Motorsports and Automotive Research. Our department houses one of the best dimensional metrology laboratories in the world, and one of the highest concentrations of faculty researchers in manufacturing.

The prestigious International Academy for Production Engineering (CIRP) allows no more than 20 Fellows per country. Of the 16 current US Fellows, 4 are in our department: Dr. Matt Davies, Dr. Chris Evans, Dr. Bob Hocken, and me. All of these researchers have strong industry partners. Faculty and students in our department have founded more than 10 start-up companies in recent years.

I was instrumental in the development of technologies used to stop vibrations in machine tools and to replace sheet metal assemblies by monolithic machining. These technologies saved billions of dollars in the aerospace industry. I am an inventor on fifteen UNC Charlotte patent applications, one of which was recognized as one of R&D Magazine's Top 100 inventions of 2010. I am working with industry to help bring this invention to the marketplace.

UNC Charlotte has a history of working closely with industry, and commercializing innovation. On average, about twenty percent of our research funding comes through industry. By comparison, the average amount of industrially sponsored research for American universities is only about five percent.

### **Patents are important for Commercialization**

University research can take innovation only so far. Innovations often need substantial additional development and investment for successful commercialization. Patents do three principal things that promote commercialization

1. They decrease risk by ensuring that if research leads to innovation, the effort can be protected. Management and minimization of risk is perhaps the most important consideration when developing a new product. There will always be risk that a new technology cannot be produced in a commercially viable manner or that it may fail to create a market or gain market share. If, on top of these risks, a company does not have a way to prevent its competitors from copying the new product then the company's incentive to produce the new product decreases dramatically.
2. Because the risk is reduced, patents induce investments. Before investing in a new company, investors spend significant time and money evaluating the strength of the company's intellectual property. Without patents and their presumption of validity, the venture capitalists' risks would be much higher and so their incentive to invest would be much lower. Patents are like a valve that allows capital to flow, and without them the flow would dry up. Similar considerations apply when an existing company chooses to create a new product – development costs for a prospective new product that is protected by a patent is much more likely to be funded than are development costs for an unprotectable idea.
3. Patents allow innovation to be quantified, clarified, and packaged. In a very real sense, a patent is a way to package an idea. The claims of a patent spell out exactly what the patent protects. This clarity makes it easier for people to understand what they are investing in and gives them something tangible to evaluate when deciding whether to develop a new product or invest in a company. Intellectual property is often the only tangible asset a new company has.

### **Academic – Industry Partnership**

Collaboration between universities and industry is certainly important for the country. Recent decades have seen companies focus more and more closely on developing specific products rather than expanding the frontiers of knowledge, and companies that once had large research divisions have largely shrunk or even eliminated those divisions. It has fallen to research institutions such as universities to take up the important work of performing research and to come up with the fundamental new studies that will lead to the products of the future. Drug discovery, advanced manufacturing, nanotechnology, microelectromechanical devices, photonics, and many of our advanced medical technologies are all largely the result of research from academic institutions and federally funded laboratories. The patents that these institutions generate give us the ability to "package" our ideas, find or create industries capable of using

them, and ultimately transfer our discoveries out of the laboratory and into everyday use, creating jobs and improving our standard of living.

When industry sponsors research at universities it often wishes to own the patentable results of that research. For various reasons (including maintaining the tax exempt status of the universities) this is often not possible, but universities are able to license the patentable results of this research to the sponsors. Industry clearly would like to know how much such a license would cost before committing to support the research, but in many cases IRS Revenue Procedure 2007-47 (found at <http://www.irs.gov/pub/irs-drop/rp-07-47.pdf>) prohibits the university from being able to set this cost in advance – and it also requires the university to charge the sponsor of the research the same amount for the license as it would charge to any other party, even though the other party did not underwrite the costs of the research that led to the invention. It is clearly a disincentive for American businesses to work with universities because those businesses cannot know how much it will cost them to use the results of the research that they pay for until that research is completed.

The difficulty stems from the fact that many universities build and renovate their research facilities using tax-exempt bonds. The revenue procedure says that in most cases if any research work is conducted in those facilities using funds provided by a sponsor other than the US government, the university cannot set any economic terms for a license to the expected results of that research until an invention has actually been made and that the university cannot charge the sponsor a lower cost than it would charge any other party. The revenue procedure does include “safe harbor” provisions that allow a small percentage of research to be carried out in such facilities without being subject to these restrictions, but the wording of the safe harbor provisions is so opaque that one cannot determine if it applies to a percentage of square footage of the facilities, to a percentage of the cost of building the facilities, or to some other percentage basis. In the face of this ambiguity most universities feel that they must interpret the rules very conservatively. This is, unfortunately, the prudent course of action because the results of violating the revenue procedure could include the loss of the bonds’ tax exempt status. Because the aggregate value of these bonds is frequently in the range of hundreds of millions of dollars, the consequence of violating the revenue procedure could be truly ruinous to the universities. This revenue procedure should be repealed, or at least the “safe harbor” language should be clarified so that universities are not left in a position in which they are incentivized to accept the most conservative interpretations of the revenue procedure.

### **Support for Innovation**

The US patent system has not had a major reform in nearly sixty years, so it is appropriate for Congress to revisit it now and make needed changes. By making only relatively small changes to the patent system Congress is missing an opportunity to support American innovation more effectively.

Even in a supportive environment, few patents become products. By some estimates, less than two percent of all patents that are issued are ever embodied in commercial products. Nevertheless, patents are a necessary tool for turning many types of ideas into products. What company would fund research work at a university like mine, if the results could not be protected by a patent? Who would make the investment required to turn an innovation into a product if others could easily copy that product after the expensive work was done?

While virtually every industrialized country has its own patent office, the US Patent and Trademark Office was one of the first and is one of the most developed. Both foreign and domestic inventors apply for patents in the US. Many of the inventions are patented only in the US because the US market alone is often large enough to justify the costs of commercialization. To maintain and grow America's economy, we need a strong patent system that encourages investment and innovation, and rewards inventors and risk takers.

Inventors, particularly university inventors, need to maintain the 12 month grace period to file their patent after a publication or presentation. The very nature of university research, with its imperative to publish causes many inventors to publish their ideas before the full patentability and commercial value has been determined.

Universities, small businesses, and independent inventors benefit from "first to invent" over "first to file". Going from a "first to invent" system to a "first to file" system seems likely to hurt individual inventors and small companies and may face some serious constitutional challenges. Small inventors do not have the resources to engage in a race to the patent office for every potentially patentable idea. Indeed, "first to file" might simultaneously result in a large number of poorly prepared patent applications (increasing the backlog), and a financial barrier further excluding small and very small inventors. While "first to file" provides some measure of clarity, it does not support innovation broadly. A 3-tier fee system, replacing the current 2-tier system could make it more affordable for small companies and independent inventors to obtain patents.

Better quality patent reviews could be achieved by allowing third parties to submit printed references to the patent office for a pending patent, and by allowing the patent office to retain more of its fees for their own operations. Because the backlog at the patent office is so high, many patent applications are not even examined for several years. Many initial reviews amount to keyword searches of existing patents. Allowing third parties to submit printed references essentially allows interested parties to assist the patent office in identifying relevant prior art.

This concludes my testimony, Mr. Chairman. I would be happy to answer any questions you, Ranking Member Watt, or other members of the subcommittee have. I thank you.