Testimony of
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to the
Senate Subcommittee on Trade, Tourism
and Economic Development

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Chairman Smith, Ranking Member Dorgan and Members of the Committee:

Thank you for the opportunity to discuss with you today the importance of helping to commercialize discoveries in nanotechnology and some of the critical roles that universities could play.

There is a big future in small things and the consequences for our economy can be enormously positive if we can harness the potential of nanotechnology. By harness, I do not mean probing the depths of understanding of what Nature is telling us when we "go nano". I mean harness in the sense of developing and commercializing technologies that will find places in the market because they meet peoples' needs.

Enhancing our understanding comes from our prodigious efforts in science. Implementation, and therefore economic development, however, derives from **advancing technology**. There will always be important questions for science to answer about nanomaterials, and, just as important, about energy on the nanoscale, e.g., devices using only nanowatts of energy. But, I wish to emphasize that we know enough now that we can move forward, today, to the market place by pushing the nanotechnology envelope.

This is the time to forge the links to our economy. This can be done by providing incentives for efficient pipelines from science to technology to economic development. For the topic today, the focus would be: NANOscience to NANOtechnology but, and here is the good part, to MACROeconomic development. The economic development payoff could be enormous.

In North Dakota, we have made important progress in converting nanotechnology into economic development. Thanks to the vision and support of Senator Dorgan we have been able to forge partnerships with the private and federal sectors to develop microdevices that operate at the nanowatt level. Those devices have the critical advantage of emitting virtually undetectable signals, a property very important in matters of defense and national security.

While our original work was focused on meeting the needs of the Department of Defense, our partnerships with the private sector have led to sophisticated, yet practical, joint efforts to address commercial needs and markets. The value of the partnerships is incalculable because now, the considerable intellectual capital and remarkable technical infrastructure put in place at North Dakota State University to address federal needs has been and will continue to be targeted to the commercial sector. And targeting is what we universities need.

Universities are generally not savvy to the marketplace; never have been, and likely never will be. It is the partnership with the private sector that enables the efficient leveraging of our considerable resources. We universities, not all of us perhaps, and probably not all aspects of a university, but surely

parts of many universities, should be tuned to the markets. And that tuning would best be done in collaboration with our partners in the private sector.

This is a win-win on a grand scale. For us, in Fargo, North Dakota, an area not previously known for high technology-based industries, we now have Microsoft Great Plains, John Deere, Ingersoll Rand and, this month, Alien Technology, **the world leader** in **R**adio **F**requency **ID**entification technology will open its doors in the North Dakota State University Research and Technology Park. They are in Fargo because Senator Dorgan challenged us to form a three part relationship: Federal, State, and Private. And North Dakota has. Our governor, our legislators and our State Board of Higher Education have provided the necessary local leadership and support to make great things happen. The rewards have been enormous. The Senator's vision has led to the Red River Valley Research Corridor, anchored by our two research universities, NDSU, and our sister institution, the University of North Dakota, forming one of the most powerful marketing tools in the Upper Midwest, and the birthplace of the high technology sector in that region.

The NDSU Research and Technology Park is a remarkable achievement for the community, the state and the region: what was once 55 acres of sunflower test plots in the northwest corner of our campus six years ago now supports over 250,000 square feet of research and development space where 400 people come to work every day in high technology industries. By this time next year the numbers will be more than 300,000 square feet and 600 employees. Seventy five percent of those people were not in North Dakota 5 years ago. The average salary is more than double the average wage in Fargo.

We now have, as a result of these partnerships with the private sector, nanotechnologies that, I am confident, will be commercial products within three years. Some examples are:
1-nanostructured coatings to inhibit corrosion on aircraft;
2-nanostructured coatings to reduce fouling on ships that will greatly enhance their fuel efficiency and improve maneuverability;
3-nanowatt level devices for sensing toxic materials, specific radio emissions and changes in temperature and magnetic fields as well as for item tracking and for displays; and,
4-nanowatt level technologies for tracking livestock and other elements of our food supply.

We are presently working with companies to develop nano-based products to improve lifetimes of body replacement parts, increase complexity of the smallest electronic components available today and increase the production of nanomaterials as feedstocks for industry. The key here is that our focus is the market and we are getting the right kind of guidance. Any efforts to better connect the universities to the market will be greatly rewarded in terms of enhanced economic development.

The pipeline from science and technology on our campuses to product development and commercialization has to be put in place wherever we can. The critical step is the forging of links between campus developed nanotechnologies to the private sector. This is no time for gaps. We all know that we are in a global competitive environment and markets move quickly. Missing a product cycle is damaging to every company but it can be fatal for a small enterprise.

I am gratified that your committee is addressing these issues and I am honored to have had this opportunity to offer my comments.

Thank you.