Testimony before the U.S.-China Economic and Security Review Commission

"The Impact of Trade with China on New York State and Opportunities for Economic Growth."

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Thank you to the commission for this opportunity to share some views from our local optics community. We believe that the Federal Government could be better aligned with industry and our state and local governments to put our tax dollars to more effective use and make sure that critical technology and jobs related to the photonics industry remain on shore. This is not only an economic issue, but a matter of National Security.

The 20th Century was the century of the electron and now the 21st century is the century of the photon.

Exactly what comprises the optoelectronics or photonics industry? According to a paper written by the Committee on Optical Science and Engineering, National Research Council in 1998, it is "the field of science and engineering encompassing the physical phenomena and technologies associated with the generation, transmission, manipulation, detection, and utilization of light. Optics have a pervasive impact on our daily lives, but that impact is rarely noticeable because the products of optical technology are, ironically, often invisible and because we accommodate so swiftly to modern technology. Today we pay little attention to the infrared remote control, LCD TV's and laser printers as to the mirrors that have been with us since antiquity." Besides the products we use daily, optics are an enabling technology. If it weren't for the progress in UV lasers and optics, Moore's Law and the dramatic exponential growth of the digital chip could not have happened. According to Washington DC based OIDA (Optoelectronics Industry Development Association) the global optoelectronics industry in 2008 was $356 billion. It seems the U.S. should be doing everything we can to strengthen this industry and generate and retain jobs.

Optics is a critical technology that must remain strong in the US

In 1996 the National Science Foundation and other US agencies asked the Japanese Technology Evaluation Center (JTEC) to assess the current state of optoelectronics research, development, and manufacturing in Japan compared to that in the United States. It found that while optoelectronics is regarded as important in the United States, this field has not achieved anywhere near the visibility and significance that it has in Japan. The panel regarded this as a significant long-term problem for the United States as it struggles to maintain its worldwide leadership in electronics technologies for the future. The panel concluded that in this respect, the Japanese have a much clearer understanding of the crucial role that optoelectronics technology plays in the development of future electronic and communication systems.

In the 20th century, large corporate research facilities such as Bell Labs, 3M and Eastman Kodak Company fueled the creativity and research that birthed enabling technologies for government and commercial applications. Innovations such as solid state, integrated circuitry and MEMS devices gave rise to an endless supply of products that find application in all areas of defense, medical, industrial, and commercial products. Yet now in the 21st century these corporate resources have mostly disappeared as companies focus more on short term profit and less on long term goals. Executives under pressure to increase the company's stock value are constantly faced with decisions of balancing the short and long term needs of the company, and it seems there are few enticements to support research and development efforts. This is where federal and state agencies can play a much more prominent role.

The U.S. should not rely on corporate America to unilaterally develop long range goals and policies that compete with foreign governments. As long as businesses emphasize a short term focus on profits, it is clear that a long term vision must be crafted and implemented by the US government. We are not talking about government bailouts and intervention in the free market economy that serve as short term fixes to address the symptom rather than the source of the problem. We are suggesting that the government do more to incentivize business to invest in our future for the security of our country and the security of our families and their children. Government policy needs to focus on promoting and protecting technological advancements in our nation.

Technological superiority in the global optics industry is critical to the defense and security of our nation as well as being a key enabler of existing and emerging commercial applications. Optics provide Defense with superior advantage through night vision systems, long range surveillance, and missile guidance and aversion systems. One only needs to glance at a modern weapon system in the hands of our soldiers. It has thermal imaging sights, night vision, laser designators, and a plethora of optical devices that protect our soldiers and provide superiority over the enemy of today.

Rochester is the epicenter of the optics community, both in academia and manufacturing

Across the country there are several regions that have a strong base in the photonics or optics industry, and upstate New York is among the most prominent. The domestic optics industry began in Rochester as early as 1880 when Bausch and Lomb and the Eastman Kodak Company began making camera lenses. Industry growth increased so that by the early 1900's Rochester became home to over ten of the largest camera and optics companies in the world. By the mid 20th century, Kodak's "Hawkeye" facility was the largest optics facility in the world. Today the majority of those jobs are in Asia.

There are over 60 leading optical and photonic companies in Rochester alone along with 18 outstanding colleges and universities. This includes RIT and University of Rochester's Institute of Optics, a multimillion dollar research engine based at The University of

Rochester. Since its creation, The Institute of Optics has granted more than 2500 degrees in the field of optics – approximately half of all the degrees awarded in optics in the United States.

As I speak today, there are over 200 executives of New York Photonics Cluster (PIANY) getting together for a golf fundraising event which raised over $16,000 dollars last year for the Children's Hospital at Strong Memorial. The New York Photonics Cluster is the largest and most active Photonics cluster in the country and is a vital resource to economic growth for our local, state and federal governments.

We wish that The Commission held its hearings in Rochester this past May, when over 1,700 representatives from every company and every country concerned with optical fabrication traveled to Rochester, NY for an optical fabrication conference that is held here every other year: Optifab.

New York Photonics, our industry cluster, has been competing with governments that pour many millions of dollars into promoting their Optics, Photonics and Imaging industries. We have been competing on a shoestring budget of less than $250K per year, two thirds of it provided by industry. This year, The New York State Senate eliminated the State's contribution to our efforts.

New York Photonics is also part of The Emerging Industry Alliance of New York State. The Emerging Industry Alliance authored the legislation for the Qualified Emerging Technology Credit, a tax credit for the sunrise industries in New York State.

The role of the State Government is to help the industry promote the industry. There is no way that New York State could get better results for the same dollar than by supporting the Emerging Industry Alliance as they have for 15 years -- until 2010 when funding was cut.

How will this funding cut affect our promotion efforts? For example: at Photonics West, the largest annual conference in our industry, China, Germany, France, and Canada will be promoting their OPI industries in gigantic footprint pavilions that are fully funded by their governments. Germany's pavilion, for example, will be two-stories and over 4,000 square feet. New York State, which competes with those nations by promoting New York as a vital center for this global industry, has chosen not to contribute to the New York Pavilion in 2010. Simply put, we cannot compete without New York's participation.

Another question that was asked of us prior to the convening of this panel was "how can New York support the development of advanced technology industries that are geographically proximate to the university?"

Simply put: this already happens. What is missing is seed money. Every year panels are convened upon the premise that universities need to get more and more research dollars and that this will result in economic development. Full time lobbyists are employed to convince politicians that this is the future of economic development. As an industry

group we have no problem with academics getting research dollars, but it needs to be acknowledged that successful companies know how to innovate. Perhaps some of the research dollars should be provided to companies in the form of vouchers to find research partners from among New York's universities. More R&D dollars need to be invested in companies, not just universities along with providing incentives and tax credits for more commercial R&D and provide seed dollars to support early-stage emerging companies.

Additionally New York State needs to be paying attention to how the I.P. paid for with New York dollars is licensed/transferred, and where the products created from that I.P. are then manufactured. New York State has funded research enabling new products that are now being manufactured in other countries. Surely this is counter to the goals of New York's investment in sunrise technologies.

Incubators - Rochester industry/academia and government support

A good example of academia, industry and government working together in the Rochester optics industry is COM (Center for Optics Manufacturing). In 1999 The University of Rochester, Harvey Pollicove from Eastman Kodak, and the American Precision Optics Manufacturers Association with a $4.8million contract from the US Army Material Command created a collaboration to develop advanced optical technology and equipment for US optical manufacturers. COM was chartered with meeting the needs of a faltering US optics manufacturing industry that was losing ground to overseas manufacturers and in decline for a decade. Two companies which are world known and compete globally were born from this collaboration. QED based in Rochester developed a technology known as MRF (Magneto Rheological Finishing) which is used to produce the world's most accurate optical surfaces and Optipro Systems, which is synonymous with world-leading computer controlled machine tools and equipment for deterministic fabrication of precision optics. Though the funding for this collaboration was relatively small the development that sprang from it was great and impacted every one of us every day of our lives. The MRF technology developed through QED and COM is used by all of the world's top manufactures of UV (ultraviolet) optics for semiconductor lithography systems. These systems enabled the semiconductor industry to achieve decreasingly smaller and smaller line widths leading to the evolution of faster computers and everything digital around us today. Unfortunately, at this point, the funding for COM has been eliminated and that entity no longer exists as an incubator for optics manufacturing.

Conclusions:

1. Craft a National Vision
The United States must craft a clearly defined, long-term vision for the direction of research and more importantly put more emphasis on development.

2. Create Incentives for keeping IP developed in the US to stay in the US
As Dr. Eugene Arthurs (CEO, SPIE) stated in testimony to this commission, "We need to select key manufacturing technologies and do what is needed to have world leading

"plants" in the U.S. The decades of work in the DOE laboratories should lead to solar energy manufacturing here and not the installation and maintenance of imported panels and the outflow of incentive dollars to support jobs elsewhere".

3. We recommend that Federal and State funds continue to support the Incubators, University and Private Sector Research and the Photonic clusters.

4. We recommend that the Federal Government and NYS invest more in this industry by providing expanded SBIR programs, low-cost loans and/or grants/ to help private industry grow and compete globally.

5. We strongly recommend that the Federal Government include a true "Buy American Act" clause in the government contracts that they are awarding for optical components and electro-optical assemblies.

Within the last couple of months the US Army made 2 contract awards for AN/PVS-14, Night Vision Goggle optical subassemblies that totaled over $4.1M. The two companies that received these contracts are simply procuring the optics from offshore sources in Singapore and Japan. It is shameful that our tax dollars continue to be used to create jobs in foreign countries, especially during these difficult economic times.

US policymakers need to do a better job of providing government agencies and industry with direction and the funding that is necessary to foster innovation and keep critical technologies and jobs within the borders of the United States.

Thank you.

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