

PHOTONICS TODAY

Spring 2004

Northrop Grumman's Ron Pirich Helps CAT Play Leading Role in Chem/Bio Defense

Northrop Grumman's Integrated Systems Technology Development Center in Bethpage, NY has become a focal point for research in strengthening national defense against unconventional weapons.

Dr. Ronald Pirich is responsible for chemical, biological, nuclear, and radiological (CBNR) warfare defense at the Center. His team is collaborating with CAT researchers on developing photonic techniques for detecting biological agents, and this relationship is enhanced by Dr. Pirich's service on the CAT Advisory Board (see article below).

Dr. Pirich also serves as

Program Manager for DARPA's Unconventional Pathogen Countermeasures program and the Department of Defense's Chem/Bio Detection programs, and is a key contributor to the development of Northrop Grumman's Bio-Hazard Detection System for the United States Postal Service.

His current efforts include multi-mission sensor integration, development of point and standoff sensors for the detection and classification of various CBNR threats and associated wireless communications, modeling and simulation.

Dr. Pirich has over twenty-five years experience in solid-state research technology,

including nanofabrication and characterization of nano- and microstructures for sensors. He has been awarded ten patents and is author of more than 130 technical papers and presentations.



Dr. Ronald Pirich, Northrop Grumman

Inside this issue:

<i>New Patents Available for Licensing</i>	2
<i>Greg Olsen—Space Traveler</i>	2
<i>Two New Companies for One New CAT Faculty Member</i>	2
<i>New Company: Spectronix</i>	3
<i>Center for Nanoscale Photonics</i>	3
<i>Upcoming Symposium</i>	3
<i>John F. Dove, 1924-2004</i>	3

For more information on the CUNY CAT, contact:

Alan Doctor
CUNY Center for Advanced Technology
Department of Physics, Room J-419
138th Street & Convent Avenue
New York, NY 10031
Phone: 212-650-8265
Fax: 212-650-8481
doctor@ee.cuny.edu
www.cunyphotonics.com

CAT Industrial Advisory Board Meets

A renewed CAT Industrial Advisory Board held its first meeting on Thursday, December 11, 2003. Composed of well-known experts in the photonics industry from several leading companies and universities, as well as CUNY and CAT administrators, the board reviewed the CAT's progress and made recommendations for its future efforts.

After presentations by CAT Director Robert Alfano and CAT Business Development Manager Alan Doctor, Board members broke into working groups to work on increasing the CAT's economic impact and identifying potential company partners. Each working group combined industry and academic representatives, and was facilitated by a member of the CAT's administrative staff.

Working groups then reconvened to present and discuss several new and interesting possible approaches to addressing these issues.

The board recommended building on the CAT's current strengths, emphasizing photonics applications in remote sensing, Homeland Security, and medical fields. Board members encouraged the creation of more spin-off companies as a means towards increasing economic impact. Steps were developed to more fully utilize the CAT's extensive patent base. These included the possible formation of a patent investment fund,

(Continued on page 2)



Advisory Board members from left: Robert R. Alfano (CCNY), Frank Pellegrino (Lockheed Martin), Michael Engelhart (Mediscience Technology Corp.), Ron Pirich (Northrop Grumman), Joseph Giordmaine (Princeton University), Warren Ruderman (independent consultant), Greg Olsen (Sensors Unlimited), Theodore Moustakas (Boston University) and Bob Crowley (Ambit).



Any opinions, findings, conclusions or recommendations expressed are those of the author(s) and do not necessarily reflect the views of the New York State Office of Science, Technology and Academic Research

CAT Industrial Advisory Board

(Continued from page 1)

which would raise funds to pay costs associated with patent filings, while sharing in any royalty and licensing fees from such new inventions. Plans were made to identify key photonics technologies for the next 10-20 years, with an emphasis on those closest to device and application development.

Board members plan to assist the CAT by identifying and establishing contact with potential company partners, reviewing promotional materials generated by CAT staff, and assisting with implementation of new services for companies.

New Patents Available for Licensing

The following patents were recently issued as a result of CAT research, and are available for licensing.

Spectral Polarizing Tomographic Dermatoscope (U.S. Patent No. 6,587,711) by Robert R. Alfano, Yury Budansky and Jingcheng Luo.

Technique for Examining Biological Materials Using Diffuse Reflectance Spectroscopy and the Kubelka-Munk Function (U.S. Patent No. 6,615,068) by Robert R. Alfano and Yuanlong Yang.

System and Method of Fluorescence Spectroscopic Imaging for Characterization and Monitoring of Tissue Damage (U.S. Patent No. 6,631,289) by Robert R. Alfano, Jing Tang and Ping Pei Ho.

Please visit our website at www.cunyphotonics.com for more complete patent and technology opportunity information, or contact business development manager Alan Doctor (212-650-8265 or doctor@ee.cuny.cuny.edu).



Prof. Bonnie L. Gersten
Queens College

Two New Companies for One New CAT Faculty Member

Bonnie L. Gersten, Assistant Professor of Chemistry and Biochemistry at Queens College, recently joined the CAT research team. CAT Director Robert R. Alfano says, "We have a star here."

Prof. Gersten was hired through the CUNY Photonics Initiative in 2002. She earned her Ph.D. in 1999 from Rutgers University, and spent three years at the Army Research Laboratories in Aberdeen, Maryland as an ASEE fellow and materials engineer. Among her several current research interests are colloidal crystalline materials, at the nano- and quantum sizes, and carbon nanotubes. She is now working on characterizing and developing materials of interest to two new

CAT company partners, Applied NanoWorks and Laser Probe.

Applied NanoWorks

Applied NanoWorks (ANW) is a small start-up company located in Watervliet, NY, engaged in developing novel nanomaterials with commercially viable applications. Utilizing Prof. Gersten's expertise in the field of colloidal nanomaterials, and our extensive specialized equipment, the CAT will be characterizing materials provided by ANW.

Characterization techniques to be employed include photoluminescence spectroscopy, quantum efficiency, electron microscopy and others. To support this research ANW is furnishing funds, and is sending



Greg Olsen:
Space Traveler,
Businessman,
Scientist,
CAT Advisory Board
Member

In April 2005, CAT Advisory Board member Gregory Olsen, will become the third civilian to visit the International Space Station. Olsen, the founder of Sensors Unlimited Inc. of Princeton, NJ, plans to bring infrared sensors and crystal growth equipment with him to conduct scientific experiments. We wish him the best of health and luck in this unique endeavor.



staff to observe the analytical measurements and review preliminary results. We expect that this will be a cost-effective means of carrying out this work, and anticipate continued joint efforts in materials development and characterization.

Laser Probe

Laser Probe Inc., a small, employee-owned company based in Utica, NY, was formed in 1992. Prof. Gersten has provided consultational services to Laser Probe, and has developed potential experiments geared toward the development of carbon nanotubes that can meet the company's needs for absorptive elements in detectors.

Spectronix Systems Inc.: New Company Partner

The CAT has recently begun joint research with a small spin-off company, **Spectronix Systems Inc. (SSI)**, based in Scarsdale, NY. SSI is working with the CAT to develop phase-locked fiber laser arrays, which consist of multiple high-power fiber lasers operating in the same phase. The output beams of the fiber lasers interfere constructively to produce a diffraction-limited beam of smaller divergence and

higher peak power in the far field. These features promise extensive applications in manufacturing, medical and communications fields. Such applications depend on self-correction against any random variations to maintain a stable beam profile.

The current research, being led by Prof. Ying-Chih Chen of the Department of Physics and Astronomy at Hunter College, focuses on studying the

feasibility of a self-adjusting phase-locking technique in a two-element fiber laser system. CAT research will demonstrate phase-locked operation in this system and characterize the stability of the output beam.

SSI has provided \$12,000 in research funds, through June 2004. Continued research support is expected through coming phases of device development.

Center for Nanoscale Photonics Established at City College

As a result of increasing CAT activity in the field of nanoscale photonics, including our NYSTAR-funded Enhanced-CAT collaboration with SUNY-Buffalo, the Department of Defense (DoD) has just designated the City College of New York (CCNY) as the Center for Nanoscale Photonic Emitters and Sensors for Military, Medical and Commercial Applications. Funded at \$4M over five years, the new center is one of only two research centers established under the DoD Infrastructure Support Program for Historically Black Colleges and Minority Institutions. We anticipate extensive industry interests in the materials, devices and technologies. New York State companies who provided letters of support to this proposal include Quantronix and Corning. The new Nanoscale Center bolsters CCNY's growing capabilities in

the emerging field of nanotechnology.

The Center will be developing techniques in three main areas:

1. New glass ceramic materials for use in enhanced near-infrared lasers and amplifiers using Cr⁴⁺-doped nanocrystals. These materials have the potential to revolutionize optical communications, fiber optics, remote sensing and biomedical imaging.

2. Improved photodetectors and emitters in the infrared through ultraviolet range using quantum dots and multiple quantum wells. These devices have many applications in the defense and aeronautics industries and beyond, including space communications, laser radar, corrosion and crack detection in metals, missile plume detection, optical storage and air quality monitoring.

3. Pioneer devices that combine wide ranging tunability

and enhanced nonlinearity and efficiency with imperviousness to temperature fluctuations, using hybrid organic and inorganic semiconductor quantum dot materials.

Upcoming Symposium, May 21

The second CUNY Photonics Initiative Symposium will be held on May 21st, 2004, featuring research presentations by recently hired CUNY photonics faculty and other speakers. Speakers include Hiroshi Matsui, Assistant Professor of Chemistry at Hunter College, and Mark Arend, Assistant Professor of Electrical Engineering at City College. Prof. Matsui will present on "Bionanotechnology Approach in Nanoscale Device Fabrication: Protein Nanotubes as Smart Building Blocks," and Prof. Arend will present on "Forward Looking Optical Communication Network Design and Testing." The Symposium will provide an opportunity for faculty, students and staff from throughout CUNY to share knowledge and ideas in photonics, and will also honor the 77th birthday of Distinguished Professor of Physics Joseph L. Birman.

For more information on the Symposium, contact Daniel Moy at 212-650-6941.

Obituary: John Dove, Founder of Dove Electronics

John F. Dove, founder of Dove Electronics, passed away on January 20, 2004 in Utica, New York. He was 79.

Founded in 1983, Dove Electronics has long cooperated with photonics researchers at CUNY, and provided key early support to the foundation of the CAT.

A photonics pioneer in his own right, prior to founding his

company, John worked at the Rome Air Development Center, where he developed the optical technology for the compact disc.

"John will be deeply missed," said CAT Director Robert R. Alfano. On behalf of all at CUNY who have had the privilege of working with John, the CAT sends our condolences to his family and co-workers.



John F. Dove, 1924-2004

New York State Center for Advanced
Technology in Ultrafast Photonics
at The City University of New York
Department of Physics, Room J-419
138th Street & Convent Avenue
New York, NY 10031

PHOTONICS TODAY Spring 2004

New York State Center for Advanced Technology in
Ultrafast Photonics at the City University of New York



For more information on the
CUNY CAT, contact:

Alan Doctor
Business Development Manager
CUNY Center for Advanced Technology
Department of Physics, Room J-419
138th Street & Convent Avenue
New York, NY 10031
Phone: 212-650-8265; Fax: 212-650-8481
doctor@ee.ccny.cuny.edu
www.cunyphotonics.com



Prof. Amy Bieber training a photonic
workforce for New York State

About the CUNY CAT...

"Ultrafast photonics for real-world applications" is the central theme of the Center for Advanced Technology in Ultrafast Photonics at the City University of New York (CUNY CAT). The CAT, designated in 1993, is one of 15 New York State Centers for Advanced Technology. The mission of the center is to develop and disseminate knowledge in photonics technology in order to promote New York economic development for the medical, biological, industrial and military sectors.

The CAT assists New York State companies to reduce expenses, increase productivity and efficiency, improve staff capabilities, and create and retain jobs. To accomplish this, the CAT conducts high-level research; establishes technology transfer mechanisms; provides the photonics industry with access to CUNY technology, research equipment, testing facilities and faculty expertise; trains workers for the photonics industry; works with other organizations to promote New York as an attractive home to photonics-based companies and their employees; and, assists companies to obtain grants and start-up funds.