

# **COMPACT PHOTONIC EXPLORERS**

## **A CUNY-LED RESEARCH EFFORT**

### **SPONSORED BY THE INFOTONICS TECHNOLOGY CENTER**

The City University of New York, in partnership with six other universities, has embarked upon an innovative, multidisciplinary research project to develop a variety of smart, compact, remote-controlled mobile photonic sensing devices. Called "Compact Photonic Explorers," (CPE), these devices will have a range of diagnostic applications, including remote health monitoring, bacterial detection, cancer screening, chemical sensing and industrial and military surveillance.

This project combines miniaturized techniques for emitting, detecting and filtering light, impacting diverse industries and disciplines by spinning off new microscale components and technologies. The initial focus is in the biomedical arena, where we are developing a "photonic pill" that would detect cancer and monitor body functions in living subjects. Future CPEs will detect biological and chemical hazards, such as bacteria and pollutants, and monitor the "health" of compact structures and devices.

Based upon a \$1.34 million grant from the Infotonics Technology Center in Rochester, NY, the CPE project is coordinated by Prof. Robert R. Alfano of the City University of New York (CUNY). Researchers at CUNY are collaborating with teams at Rensselaer Polytechnic Institute, SUNY-Albany, SUNY-Binghamton, University of Rochester and Boston University to develop and test the technologies for a CPE prototype. Areas of development include:

- ◆ Power sources
- ◆ Illumination devices (white light, UV, VIS, NIR lasers and LEDs)
- ◆ Spectroscopic elements
- ◆ Positioning devices
- ◆ Sensors and displays (photodetectors, imagers)
- ◆ Optical components

CPE development will produce advances in several scientific and engineering areas. Its initial biomedical application requires detailed analysis of the fluorescence and absorption properties of biological materials. New materials must be developed for the growth of microscale emitters and detectors in the ultraviolet spectrum. Hitherto undiscovered semiconductor materials with emission properties in the near infrared and yellow portions of the spectrum must be developed. Novel optical components at micro- and nano-scales are being fabricated. Advances are also being made in the design of nanoscale power sources and low-cost microscale assembly and packaging techniques.

Thus, in addition to the diverse commercial applications of the CPE concept, a wide range of new technologies are being developed which will be available for further commercial development.

**FOR FURTHER INFORMATION, CONTACT PRINCIPAL INVESTIGATOR  
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