

## Biological and Chemical Detection Capabilities of the VioSense Team

VioSense has teamed up with a group of scientists from **Oak Crest Research Institute**, the **Jet Propulsion Laboratory** and the **California Institute of Technology** to address the need for pointed detection of biological and chemical agents. The combined expertise encompasses

- Optical micro design,
- Micro fabrication,
- Species-specific spectroscopy,
- Particle trapping and sizing, and
- Optical detection techniques of airborne pathogens.

The scientists at **VioSense** bring expertise in micro optics and micro sensor development, particle sizing, species-specific laser diagnostics techniques and aerodynamic measurements. For the last two years, VioSense has actively participated in biological and chemical simulant detection during large scale tests at White Sands Missile Range, NM.

The scientists from **Oak Crest** bring the diverse, complementary background in organic and inorganic chemistry (required in the development of high performance, advanced sensors), in laser spectroscopy, and in the development of microlaser sources. One of the major, current research foci at Oak Crest is the development of novel, field-based particle monitors based on a combination of optical measurement techniques. In addition, scientists at Oak Crest are pioneering a molecular recognition approach based on transition metal complexes for chemical agent detection as well as developing a complimentary miniature phase-correlation spectrometer for the determination of luminescence lifetime in the field.

The scientists from the **Jet Propulsion Laboratory Microdevices Laboratory (MDL)** and the **California Institute of Technology** bring expertise in end-to-end fabrication and characterization of micro devices. Micro-optics fabrication facilities at MDL include a JEOL e-beam lithography system, a chemically-activated ion beam etching system, and facilities for wet and dry processing of samples. MDL also has a newly completed BioNano-technology Laboratory with all necessary equipment for chemical syntheses and characterization, as well as chemical analysis.

Caltech and JPL have recently pioneered an effective particle-trapping technique using carbon nanotubes. For nanotube growth, two CVD reactor systems are available at the JPL's Microdevices Laboratory (MDL), a low-pressure plasma reactor and a tube furnace reactor.