



Supporting Organizations:



Pre- Conference Symposium Agenda* **

Emerging And Enabling Technologies For Chemical-Biological-Radiological-Nuclear Detection

Wednesday, May 30, 2007

- 7:00 – 8:00 *Continental Breakfast and Registration*
- 8:00– 8:30 Welcome & Introduction from the Symposium Chair
R. Paul Schaudies, Ph.D., Chief Executive Officer, GENARRAYTION
- 8:30 – 9:00 Keynote Address:
Advancements in Medical Countermeasures to Chemical Warfare Agents
Col. Brian Lukey, Ph.D., Commander, U.S. ARMY MEDICAL RESEARCH INSTITUTE OF CHEMICAL DEFENSE (MRICD)
- 9:00 – 9:30 Principal Guest Speaker
Key Challenges in the Detection and Identification of Chemical, Biological and Radiological Materials
Raymond P. Mariella, Jr., Ph.D., Senior Scientist, Engineering Associate Director's Staff, and Director of the Center for Microtechnology and Nanotechnology, LAWRENCE LIVERMORE NATIONAL LABORATORY
- 9:30 – 10:00 **Novel Method of Rapidly Detecting Biological Agents**
The SmartSense™ technology will be discussed in terms of how it is able to instantaneously detect and identify pathogens. In addition, data will be presented regarding its sensitivity, time-to-result, specificity, and non-specific binding. These data are presented for B. globugii spores, ovalbumin, E. coli,

* Each presentation will be followed by a question and answer session, providing attendees ample opportunity to ask the government representatives questions about the opportunities to collaborate with the government on the research and development of bio-chem detection technologies.

** Order of presentations is subject to change.

and baculovirus. An overview of near term implementations of the technology will be presented.

Jeffrey L. Riggs, Ph.D., MPH, President and COO, BIOWARN, LLC

10:00 – 10:30 *Morning Refreshment Break*

10:30 – 11:00 **Phage-Based Biosensor for Specific and Selective Detection of Biothreat Agents**

We are reporting, for the first time, the direct detection of Staphylococcus aureus (S. aureus) using lytic phage as highly specific and selective biorecognition element and Surface Plasmon Resonance-based SPREETA™ sensor as a detection platform. The biosensor is highly sensitive, and the detection limit is 10⁴ cfu/ml. Combination of lytic phage and MRSA-specific antibody allows specific recognition and detection of MRSA, including identification of bacteria together with conformation of MRSA in real time. Overall, this approach is promising and can be employed for rapid and “label-free” detection of dangerous drug resistant bacterial pathogens.

Aleksandr L. Simonian, Ph.D., Professor, Materials Research and Education Center, Samuel Ginn College of Engineering, AUBURN UNIVERSITY

11:00 – 11:30 **A Bioinformatic Method for the Development of a Biomarker Database**

Joseph Vockley, Ph.D., Chief Scientific Officer, GenArraytion

11:30 – 12:00 **Reagentless Real-Time Evanescent Optical Chem- and Biodetection Using Biomimetic Receptors and Ligands**

We have previously reported reagentless real-time detection of CWA using monolayer covalently-immobilized cholinesterase and other enzymes on an evanescent waveguide down to ppt levels in seconds. Monolayer nanosurfaces can detect TICs and explosives down to ppb/ppt levels as well. Using immobilized biomimetic receptors we are able to detect, by visible light (non-laser origin) absorbance spectroscopy, the presence of Cholera toxin (CT), Influenza virus, and T-antigen in aqueous solution simply by adding the solution to a surface of immobilized receptors. Current detection level for T-antigen [β -D-Gal-(1-3)- α -D-GalNAc(1,0)-Me disaccharide linked to serine or threonine residues in cell surface glycoproteins expressed in >85% of human carcinomas such as colon, breast, bladder, and prostate] is 10 ng/liter or 0.1 ppt (10⁻⁴ ppb) for CT. Neuraminidase located on the influenza virus surface is detected at 30 parts per quadrillion (0.03 parts per trillion; approximately 5 X 10⁻¹⁷ M or 30 million molecules of NA per liter; this is 6,000 NA per sample or the equivalent of 15 virus); this assay has been tested against human influenza vaccine, an A and B antigen mix containing hemagglutinin and neuraminidase antigens with a detection level estimated at 30 ppq (0.03 parts per trillion HA and NA) as well as with attenuated whole virus. This hand-held detector costs less than \$2500 (w/o computer or PDA) and has been demonstrated to work with air or aqueous samples in less than 30 seconds in ambient light. Please see US Patent #6,821,738.

H. James Harmon, Ph.D., Professor, Department of Physics, and Center for Sensors and Sensor Technology, OKLAHOMA STATE UNIVERSITY

12:00 – 1:30 *Group Lunch*

1:30 – 2:00 **Methods and Emerging Capabilities for Detection of Chemical Hazards with Temperature Programmed Microsensor Arrays**

We report on the development of conductometric microsensor technology which combines nanostructured sensing films, MEMS microhotplate array platforms, and artificial neural networks signal processing. Microhotplate elements including varied semiconducting oxides are temperature modulated to produce analytically-rich data streams that allow recognition of TICs, CWSs and CWAs at practical target concentrations (~ 500 ppt to 100 ppm) in realistic backgrounds. Efforts to select appropriate sensing materials and signal processing architectures for progressing toward on-line, rapid detection of such hazards will be described.

Steve Semancik, Ph.D., *Project Leader, Chemical Microsensors, Chemical Science and Technology Laboratory, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)*

2:00 – 2:30 **ICx Detection Capabilities for CBRNE**

ICx Technologies sells products designed to find and identify threats, thwart terrorists, sniff out improvised weapons and intercept agents of mass destruction. Our sensors detect chemical, biological, radiological, nuclear and explosive materials. This presentation will focus on fluorescence platforms for the detection of chemicals and explosives.

Larry Hancock, Ph.D., *Vice President for Advanced Materials, ICX NOMADICS, Inc.*

2:30 – 3:00 *Afternoon Refreshment Break*

3:00 – 3:30 **Molecular and Bioinformatics Approaches to Assessing Individual Biodosimetry and Radiation Susceptibility**

When cells and tissues are exposed to ionizing radiation, they initiate complex molecular responses that involve large numbers of genes and diverse cellular functions. Response profiles vary substantially with dose, LET, dose rate, cell type, individual, and various physiological factors, yet little is known about the underlying mechanisms. Analyses of early RNA, protein, and metabolite changes in irradiated cells are leading to the development of promising biodosimeters to improve individual exposure assessment and susceptibility biomarkers that may predict an individual's risks for acute and long-term tissue toxicities. Rapidly improving bioinformatics tools provide increasingly better insight into the key radiation-response networks and pathways, an important prerequisite for identifying candidate targets for designing effective radiation countermeasures to minimize radiation damage to normal tissues.

Andy Wyrobek, Ph.D., *Chair, Department of Radiation Biosciences, Life Sciences Division and Senior Staff Scientist, LAWRENCE BERKELEY NATIONAL LABORATORY*

3:30 – 4:00 **The Challenges of Finding a “Loose Nuke”**

Edward Hartouni, Ph.D., *Division Leader, N Division*, LAWRENCE
LIVERMORE NATIONAL LABORATORY

4:00 – 4:45 **Regulations, Requirements and Design Control Consideration for Fielding
a Chemical Biological Defense Program Product**

Peter Hobart, Ph.D., *Science Director*, U.S. ARMY MEDICAL RESEARCH
INSTITUTE FOR INFECTIOUS DISEASES

Douglass Simpson, *President and CEO*, CORGENIX MEDICAL
CORPORATION

4:45 – 5:00 Closing Remarks by the Symposium Chair

R. Paul Schaudies, Ph.D., *Chief Executive Officer*, GENARRAYTION

5:00 Symposium Adjourns