

2008 ISSSR AGENDA MAP

Monday June 23

07:50 – 10:00	Keynote Session			
10:20 – 12:10	I(A) Algorithms			
13:40 – 15:30	I(B) Algorithms	I(B-P1) Algorithms	I(B-P2) Algorithms	
15:50 – 17:40	I(C) Algorithms Frontier	I(C-P1) Algorithms		
19:30 – 20:30	Algorithm Roadmap Session			

Tuesday June 24

08:00 – 09:50	V(A) Frontier Future			
10:10 – 12:00	II(A) Air			
13:30 – 15:20	II(B) Air	II(B-P1) Air	II(B-P2) Air	V(B) Frontier Phenomenology
15:40 – 17:30	II(B) Air Frontier	II(C-P1) Air	II(C-P2) Air	V(C) Frontier Methodology
18:30 – 20:30	Poster/Exhibit #1			

Wednesday June 25

08:00 – 09:50	III(A) Sea			
10:10 – 12:00	III(B) Sea	III(B-P1) Sea		V(D) Frontier THz I
12:00 – 14:30	Poster/Exhibit #2			THz Round-Table Session
17:15 (Leaves)	Bus to Shea Stadium			
19:10 – 22:30	Mets Baseball Game			

Thursday June 26

08:00 – 09:50	III(C) Sea Frontier	III(C-P1) Sea		V(E) Frontier THz II
10:10 – 12:00	IV(A) Land			
13:30 – 15:20	IV(B) Land	IV(B-P1) Land		V(F) Frontier Nanosensor I
19:30 – 21:30	Conference Banquet			

Friday June 27

08:00 – 09:50	IV(C) Land Frontier	IV(C-P1) Land		V(G) Frontier Nanosensor II
10:10 – 12:10	V(H) Frontier Opportunity	V(H-P1) Frontier Technology	V(H-P2) Frontier Enhanced	

Monday, June 23: 2008 ISSSR Agenda

Stevens Hall: DeBaun Auditorium				
Time Schedule				
Breakfast*				
07:50 – 10:00	Keynote Session			
Morning Break*				

Time Schedule	Burchard Building: Room B118	Babbio Center: Room 122	Babbio Center: Room 220	
10:20 – 12:10	I(A) Algorithms (Plenary): <i>New Opportunities for Spectral Data Exploitation</i>			
Lunch Break				
13:40 – 15:30	I(B) Algorithms: <i>Novel Hardware & Software for Spectral Sensing & Imaging</i>	I(B-P1) Algorithms: <i>Image Formation & Processing for Emerging Sensor Platforms</i>	I(B-P2) Algorithms: <i>Novel Algorithm-Based Concepts for Sensing & Imaging</i>	
Afternoon Break*				
15:50 – 17:40	I(C) Algorithms (Frontier): <i>Leveraging Phenomenology & Novel Processes/Processing</i>	I(C-P1) Algorithms: <i>Spectral Unmixing & Anomaly Detection</i>		
Dinner Break				
19:30 – 20:30		Roadmap Algorithms: <i>An Open Discussion on the Promising Future Directions</i>		

* Breakfast & morning/afternoon break food & drinks will be served in the Babbio Center Atrium

Tuesday, June 24: 2008 ISSSR Agenda

Time Schedule	Burchard Building: Room B118	Babbio Center: Room 122	Babbio Center: Room 220	Babbio Center: Room 221
Breakfast*				
08:00 – 09:50	V(A) Frontier S&T: <i>Future Concepts & Technology</i>			
Morning Break*				
10:10 – 12:00	II(A) Air Sensing: <i>Laser Based Sensors</i>			
Lunch Break				
13:30 – 15:20	II(B) Air Sensing: <i>LIDAR I</i>	II(B-P1) Air Sensing: <i>Passive Infrared I</i>	II(B-P2) Air Sensing: <i>Ion-Mobility & Mass Spectrometry</i>	V(B) Frontier S&T: <i>Spectral Signature Phenomenology</i>
Afternoon Break*				
15:40 – 17:30	II(C) Air Sensing (Frontier): <i>Multi-Spectral & Multi-Modality Innovations</i>	II(C-P1) Air Sensing: <i>LIDAR II</i>	II(C-P2) Air Sensing: <i>Passive Infrared II</i>	V(C) Frontier S&T: <i>Novel Spectroscopic Methodology</i>
Dinner Break				

* Breakfast & morning/afternoon break food & drinks will be served in the Babbio Center Atrium.

Time Schedule	Babbio Center Atrium		
18:30 – 20:30	Poster & Exhibit Session #1**		

** Hors d'oeuvres will be served in the Babbio Center Atrium during the poster/exhibit session.

Wednesday, June 25: 2008 ISSSR Agenda

Time Schedule	Burchard Building: Room B118	Babbio Center: Room 122	Babbio Center: Room 221
Breakfast*			
08:00 – 09:50	III(A) Sea Sensing: <i>Emerging Technology for the Ocean Battlespace</i>		
Morning Break*			
10:10 – 12:00	III(B) Sea Sensing: <i>Detection of Threats in Water</i>	III(B-P1) Sea Sensing: <i>Detector Physics</i>	V(D) Frontier S&T: <i>THz Spectroscopic Sensing I</i>

* Breakfast & morning break food & drinks will be served in the Babbio Center Atrium .

Time Schedule	Babbio Center Atrium	Babbio Center: Room 122
Lunch Session** 12:00 – 14:30	Exhibit Session #2	<i>Special Round-Table THz Measurement Session (Begins at 12:30)</i>

** Hors d'oeuvres will be served in the Babbio Center Atrium during the poster/exhibit session.

Time Schedule	Babbio Center Parking Lot	Shea Stadium	Shea Stadium Parking Lot
17:15	Bus Leaves for Shea Stadium ¹		
19:10 – 22:30		Mets Baseball Game	
22:30			Bus Leaves for Babbio Center ²

¹ Please assemble in front of the Babbio Center by 17:00 (5:00 pm).

² Riders must return to the prearranged meeting location before 22:30 (10:30 pm).

Thursday, June 26: 2008 ISSSR Agenda

Time Schedule	Burchard Building: Room B118	Babbio Center: Room 122	Babbio Center: Room 221
Breakfast*			
08:00 – 09:50	III(C) Sea Sensing (Frontier): <i>Integrated Sensor Platforms for Enhanced Performance</i>	III(C-P1) Sea Sensing: <i>Novel Spectroscopy</i>	V(E) Frontier S&T: <i>THz Spectroscopic Sensing II</i>
Morning Break*			
10:10 – 12:00	IV(A) Land Sensing: <i>Standoff for Gases & Bioaersols</i>		
Lunch Break			
13:30 – 15:20	IV(B) Land Sensing: <i>Standoff for Surface Contaminations & Aerosols</i>	IV(B-P1) Land Sensing: <i>Enhancement Technologies & Approaches</i>	V(F) Frontier S&T: <i>Nanosensor Concepts/Devices I</i>

* Breakfast & morning break food & drinks will be served in the Babbio Center Atrium .

Time Schedule	Babbio Center Parking Lot	Hudson & East River	Lincoln Harbor Parking Lot
18:00 (18:40)*	Bus Leaves for Lincoln Harbor ¹		
19:20 – 22:30		Conference Banquet Dinner Cruise	
22:45 (23:20)*			Bus Leaves for Babbio Center ²

* Note that there will be two Bus runs to Lincoln Harbor, and that Banquet Attendees will receive a ticket for Group 1 or Group 2.

¹ Please assemble at the bottom of the steps leading down from the Babbio Center to Frank Sinatra Drive by 17:50 (5.50 pm) if you are in Group 1, or 18:30 (6:30) if you are in Group 2.

² Bus will also make a subsequent run to the Meadowland Plaza Hotel after stopping at the Babbio Center.

Friday, June 27: 2008 ISSSR Agenda

Time Schedule	Babbio Center: Room 122	Babbio Center: Room 219	Babbio Center: Room 221
Breakfast*			
08:00 – 09:50	IV(C) Land Sensing (Frontier): <i>Technology Enabled Innovative Spectral Sensing</i>	IV(C-P1) Land Sensing: <i>Hyperspectral & Imagery Processing</i>	V(G) Frontier S&T: <i>Nanosensor Concepts/Devices II</i>
Morning Break*			
10:10 – 12:10	V(H) Frontier S&T: <i>Emerging THz Opportunities</i>	V(H-P1) Frontier S&T: <i>Source & Detector Technology</i>	V(H-P2) Frontier S&T: <i>Sensor Enhancement Techniques</i>

* Breakfast & morning break food & drinks will be served in the Babbio Center Atrium .

Technical Sessions & Conference Events

Keynote Sessions	002
<u>Core Technical Sessions</u>	
I. Software & Hardware Algorithms for Enhanced Sensing & Monitoring	003
II. Science & Technology for Air (& Atmospheric) Sensing & Monitoring	010
III. Science & Technology for Sea (& Water) Sensing & Monitoring	018
IV. Science & Technology for Land (& Surface) Sensing & Monitoring	024
V. Frontier (& Emerging) Spectroscopic Science & Technology	030
<u>Special Sessions & Conference Events</u>	
Sensor Algorithms Roadmap Session (Monday Evening, June 23)	041
Poster Session (Tuesday Evening, June 24)	042
Exhibit Session #1 (Tuesday Evening, June 24)	044
Exhibit Session #2 (Wednesday, Noon, June 25)	044
Round-Table THz Measurement Session (Wednesday, 12:30 pm, June 25)	048
Baseball Game Excursion (June 25)	049
Conference Banquet Dinner Cruise (June 26)	050

Monday June 23
Keynote Sessions

07:50 Welcome/ Introduction

Patti Gillespie, U.S. Army Research Laboratory

08:00 DoD Future Needs for Threat Agent Defense

Mr. Edward Wack

Director, Future Acquisition Joint Program Executive Office
for Chemical & Biological Defense

08:30 Invariant Methods for Hyperspectral Image Analysis

Dr. Glenn Healey

Professor, Electrical Engineering & Computer Science
University of California-Irvine

09:00 Three Dimensional Receiver Operating Characteristic (3D ROC) Analysis for Hyperspectral Signal Detection and Estimation

Dr. Chein-I Chang

Professor, Computer Science & Electrical Engineering
University of Maryland-Baltimore County

09:30 Nonlinear Kernel-Based Hyperspectral Target Detection

Dr. Nasser M. Nasrabadi

Senior Research Scientist

U.S. Army Research Laboratory

I. Software & Hardware Algorithms for Enhanced Sensing & Monitoring

I(A) Algorithms (Plenary): New Opportunities for Spectral Data Exploitation... 004

I(B) Algorithms: Novel Hardware & Software for Spectral Sensing & Imaging... 005

I(B-P1) Algorithms: Image Formation & Processing for Emerging Platforms..... 006

I(B-P2) Algorithms: Novel Concepts for Sensing & Imaging..... 007

**I(C) Frontier Algorithms:
Leveraging Phenomenology & Novel Processes/Processing 008**

I(C-P1) Algorithms: Spectral Unmixing & Anomaly Detection..... 009

Monday June 23

I(A) Algorithms (Plenary): New Opportunities for Spectral Data Exploitation
Chair: Patti Gillespie, U.S. Army Research Laboratory

10:20 Advanced Algorithms for Unmixing of Hyperspectral Imagery
Miguel Vélez-Reyes (University of Puerto Rico at Mayagüez)
Invited

**10:50 Rotation-Invariant Hyperspectral Region Classification
Using Three-Dimensional Spectral/Spatial Gabor Filters**
Tien C. Bau (University of California, Irvine)
Student Paper

**11:10 Application of a Canonical-Correlation Feature-Selection Algorithm to
Tunable Quantum-Dot Detectors: Material Discrimination and Gas Detection**
Biliana Paskaleva (University of New Mexico)

**11:30 Standoff Determination of Bioaerosol Size Based on Double Scattering
Measurement with MFOV LIDAR; Concept and Experimental Validation**
Hugo Lavoie (DRDC Valcartier, Canada)

11:50 Synthesis of Hyperspectral Images for Algorithm Assessment
Subhadip Sarkar (University of California, Irvine)
Student Paper

Monday June 23

I (B) Algorithms: Novel Hardware & Software for Spectral Sensing & Imaging
Chair: Majeed Hayat, University of New Mexico

13:40 Infrared Retina Using Nanoscale Quantum Dots and Strain Layer Superlattices
Sanjay Krishna (University of New Mexico)
Invited

13:10 A Real-Time Reagentless Biosensor System for Standoff Detection and Classification of Toxins in Water
Elias Greenbaum (Oak Ridge National Laboratory)

14:30 Hyperscan: Laboratory, Field, and Airborne Suite of Flexible Sensors for Data Collection in the VNIR & SWIR
Nahum Gat (Opto-Knowledge Systems, Inc.)

14:50 Thermal Infrared Spectral Imager with Programmable Spatial and Spectral Resolution and Hardware-Based Implementation of Detection Algorithms
Neil Goldstein (Spectral Sciences, Inc.)

15:10 A Single Chip Fluctuation Enhanced Sensing Front-End in Silicon for Artificial Nose
Sameer Sonkusale (Tufts University)

Monday June 23

I(B-P1) Algorithms: Image Formation & Processing for Emerging Platforms

Chair: Alan Schaum, Naval Research Laboratory

**13:40 3-Dimensional Imaging Laser Radar Technology
and Image Processing Development**

Richard Richmond (AFRL, Wright-Patterson AFB)

Invited

**14:10 Shift Estimation Algorithm for Dynamic Sensors with
Frame-To-Frame Variation in Their Spectral Response**

Todd Giles (University of New Mexico)

14:30 A Hyperspectral Image Analysis Toolbox in MATLAB

Miguel Vélez-Reyes (University of Puerto Rico at Mayagüez)

14:50 Band Selection for Hyperspectral Signature Coding

Sumit Chakravarty (University of Maryland, Baltimore County)

15:10 Significant Misregistration of Hyperspectral Bands Near Absorption Lines

Karni Wolowelsky (Rafael Advanced Defense Systems Ltd, Israel)

Monday June 23

I(B-P2) Algorithms: Novel Concepts for Sensing & Imaging

Chair: Chein-I Chang, University of Maryland, Baltimore County

**13:40 Performance Enhancement of an Algorithmic Spectrometer
with Quantum-Dots-in-a-Well Infrared Detectors**

Woo-Yong Jang (University of New Mexico)

Student Paper

**14:10 Improved Range Estimation of 3D Microscanned LADAR Imagery
Using Principal Component Analysis**

Jennifer Carns (AFRL, Wright-Patterson AFB)

14:30 Data Fusion with Disparate Data Sources

Susan Rose-Pehrsson (U.S. Naval Research Laboratory.)

14:50 Recognizing Images in the Presence of Image Enhancement Operations

Jie Wei (City College of New York)

**15:10 Examination of Chemometric Strategies for Laser-Induced
Breakdown Spectroscopy for Nitrocompounds**

Shikha Rai (Allahabad University, India)

Student Paper

Monday June 23

I (C) Frontier Algorithms: Leveraging Phenomenology & Novel Processes/Processing
Chair: Dwight Woolard, U.S. Army Research Office

15:50 Methods of Hyperspectral Detection Based on a Single Signature Sample
Alan Schaum (U.S. Naval Research Laboratory)
Invited

**16:20 Fluctuation Enhanced Sensing with Zero Crossing Analysis
for High Speed and Low Power Applications**
Chiman Kwan (Signal Processing, Inc.)

16:40 A Data-Driven Approach to Spectral Detection
Val Bykovsky (Utah State University)

17:00 Separating Chemical Signals of Adsorption-Desorption and Diffusive Processes
Gabor Schmera (Space and Naval Warfare Systems Center)

**17:20 Collaborative Reconfigurable Computing Blocks
for Classification and High-Level Decision Making**
Michael Gilberti (Stony Brook University)
Student Paper

Monday June 23

I(C-P1) Algorithms: Spectral Unmixing & Anomaly Detection

Chair: Majeed Hayat, University of New Mexico

15:50 Coping with Mixtures of Backgrounds in a Sliding Dual Window RX Algorithm

Stanley Rotman (Ben-Gurion University of the Negev, Israel)

16:20 Unsupervised Linear Hyperspectral Unmixing

Chein-I Chang (University of Maryland, Baltimore County)

**16:40 A Linear Unmixing Approach for Analysis of
Flow Cytometer Scattering and Fluorescence Data**

Thomas Reichardt (Sandia National Laboratories)

**17:00 Automatic Hyperspectral Target Detection Using
Maximum Orthogonal Subspace Projection**

Weimin Liu (University of Maryland, Baltimore County)

Student Paper

**17:20 Supervised Soft Classification of Hyperspectral Imagery
Based on Linear Mixing Model and Fuzzy Logic**

Wilma Pabón-Ramírez (University of Puerto Rico at Mayagüez)

Student Paper

II.	Science & Technology for Air (& Atmospheric) Sensing & Monitoring	
II(A)	Air Sensing: Laser Based Sensors.....	011
II(B)	Air Sensing: LIDAR I.....	012
II(B-P1)	Air Sensing: Passive Infrared I	013
II(B-P2)	Air Sensing: Ion-Mobility & Mass Spectrometry	014
II(C)	Air Sensing (Frontier): Multi-Spectral & Multi-Modality Innovations.....	015
II(C-P1)	Air Sensing: LIDAR II	016
II(C-P2)	Air Sensing: Passive Infrared II.....	017

Tuesday June 24

II(A) Air Sensing: Laser Based Sensors

Chair: Christopher Gittins, Physical Sciences, Inc.

10:10 Quantum Cascade Laser Open-Path System for Trace Gas Concentration Measurements in the Urban Environment

Claire Gmachl (MIRTHE, Princeton University)

Invited

10:40 Development of a MEMS-Scale Photoacoustic Chemical Sensor Using a Quantum Cascade Laser

Ellen Holthoff (U.S. Army Research Laboratory)

11:00 Standoff and Miniature Chemical Vapor Detectors Based on Tunable Diode Laser Absorption Spectroscopy

Mickey Frish (Physical Sciences, Inc.)

11:20 Optical Properties of Chromium Centers in Transparent Calcium Germanate Glass-Ceramics

Thandar Myint (The City College of New York)

Student Paper

11:40 Single Airborne Particle Fluorescence Spectrometer with Options for Sorting, Heating, and Dual-Wavelength Excitation

Hermes Huang (Yale University)

Invited & Student

Tuesday June 24

II(B) Air Sensing: LIDAR I

Chair: Russell Philbrick, Penn State University

**13:30 CW Tunable CO₂ Differential Absorption LIDAR
for Remote Sensing of Gaseous TATP**

Avishekh Pal (University of South Florida)

Invited & Student

**14:00 A Polarimetric Testbed for Characterizing Aerosol Elastic
Scatter Signatures in the Near and Mid-Wave Spectral Region**

John Aldridge (MIT Lincoln Laboratory)

**14:20 Polarimetric NIR LIDAR Analysis of Scattering Parameters
Related to Anisotropy and Asphericity of Clouds and Aerosol Scatters**

Javier Fochesatto (Geophysical Institute, University of Alaska, Fairbanks)

14:40 High Speed Coherent Standoff Sensor for CB Aerosol and Vapor Cloud Detection

Diego Pierrottet (Coherent Applications, Inc.)

**15:00 The Critical Role of LIDAR Pulse Stability in the
Standoff Infrared Detection of Hazardous Compounds**

Vitas Svedas (Institute of Physics, Lithuania)

Tuesday June 24

II(B-P1) Air Sensing: Passive Infrared I

Chair: Neelam Gupta, U.S. Army Research Laboratory

13:30 SHIMCAD Breadboard: Design and Characterization Overview

David Babcock (Artep, Inc.)

**14:00 Atmospheric Limits on the Detection of Trace Vapors
and Aerosols with Passive Infrared Spectroscopy**

Agustin Ifarraguerri (Science Applications International Corporation)

**14:20 The Role of Fourier Transform Infrared Spectroscopy in the
Effective Deployment of a Gas Identification Toolbox**

Dustin Levy (Smiths Detection)

**14:40 Optoplasmonic Gold Nanoparticle Assembly for Sensing,
Spectroscopy and Heat Transfer**

Donald Roper (University Of Utah)

15:00 A Parallax Method for Remote Spectral Analysis of Gas Plumes

Karni Wolowelsky (Rafael Advanced Defense Systems Ltd.)

Tuesday June 24

II(B-P2) Air Sensing: Ion-Mobility & Mass Spectrometry

Chair: Janet Jensen, U.S. Army Edgewood Chemical Biological Center

**13:30 New Territory in Field Asymmetric Ion Mobility Spectrometry:
Enabling Higher Field Strengths Using a MEMS Fabricated Device**
Lara Jamieson (Owlstone, Cambridge, UK)

**14:00 Investigation of a Microfabricated Flow-Through Preconcentrator Using a
Custom Explosives Vapor Generator and a Calibrated Ion Mobility Spectrometer**
Michael Martin (University of Louisville)

14:20 Chemical Agent Detection Using a CG-IMS: A Comparative Study
Chiman Kwan (Signal Processing, Inc.)

**14:40 Novel Methodology for Energetic Organic Peroxides Analysis:
Direct Analysis in Real Time-TOF MS**
Alvaro Peña-Quenvedo (University of Puerto Rico at Mayagüez)
Student Paper

15:00 Pathogen Phytosensing
Reginald Millwood (University of Tennessee)

Tuesday June 24

II(C) Air Sensing (Frontier): Multi-Spectral & Multi-Modality Innovations
Chair: James Jensen, U.S. Army Edgewood Chemical Biological Center

15:40 Handheld Infrared Spectrometer for Chemical and Biological Threat Detection
Ani Weling (Foster-Miller, Inc.)
Invited

**16:10 Imaging Fourier Transform Spectrometry (IFTS) of
Combustion Events with the Telops First-MW**
Kenneth Bradley (Air Force Institute of Technology)

16:30 Electrically Tunable Semiconductor Membranes for Bio-Molecule Detection
Jean-Pierre Leburton (University of Illinois)
Invited

**16:50 Aerosol Flow Cytometry as a Method for
Characterizing the Biological Content of Airborne Particles**
Thomas Kulp (Sandia National Laboratories)

**17:10 Passive Radio Frequency Identification Sensors
for Humidity-Independent Gas Detection**
Radislav Potyrailo (General Electric Global Research Center)

Tuesday June 24

II(C-P1) Air Sensing: LIDAR II

Chair: Arthur Sedlacek, Brookhaven National Laboratory

15:40 Fluorescence Spectra of Atmospheric Aerosol

Steven Hill (U.S. Army Research Laboratory)

16:10 Modeling of Fluorescence LIDAR ROC Curves

Branimir Blagojevic (Science & Engineering Services, Inc.)

**16:30 Spectroscopic Calibration Correlation of Field
and Lab-Sized Fluorescence LIDAR Systems**

Bernard Déry (Université Laval, Québec)

Student Paper

16:50 Automated Retrieval of Atmospheric Boundary Layer Height

Smadar Egert (Israel Institute for Biological Research)

17:10 Chemical and Biological Standoff Detection LIDARs

Cynthia Swim (Edgewood Chemical and Biological Center)

Tuesday June 24

II(C-P2) Air Sensing: Passive Infrared II

Chair: Daniel Heinz, U.S. Army Edgewood Chemical Biological Center

15:40 3-D Reconstruction of Gas Clouds by Scanning

Imaging Infrared Spectroscopy and Tomography

Roland Harig (TUHH, Hamburg University of Technology)

16:10 Characterization of Chemical Simulant Clouds and Infrared

Viewing Conditions at Dugway Proving Ground

Jeffrey Hall (The Aerospace Corporation)

16:30 Detection of Gaseous Plumes in IR Hyperspectral Imagery

Eitan Hirsch (Israel Institute for Biological Research)

16:50 Hyperspectral Imaging: an Emerging Technique in Remote Sensing

Chein-I Chang (University of Maryland, Baltimore County)

17:10 Maximizing the Effectiveness of Networked Chemical Vapor

Standoff Detectors (CVSD) at Military Installations and Beyond

Norm Mueller (IEM, Inc.)

III.	Science & Technology for Sea (& Water) Sensing & Monitoring	
III(A)	Sea Sensing: Emerging Technology for the Ocean Battlespace.....	019
III(B)	Sea Sensing: Detection of Threats in Water.....	020
III(B-P1)	Sea Sensing: Detector Physics	021
III(C)	Sea Sensing (Frontier): Integrated Sensor Platforms for Enhanced Performance.....	022
III(C-P1)	Sea Sensing: Novel Spectroscopy	023

Wednesday June 25

III(A) Sea Sensing: Emerging Technology for the Ocean Battlespace
Chair: Dan Driscoll, U.S. Navy Surface Warfare Center, Dahlgren

**08:00 Real-Time Selective Detection of Chemical Vapor Plumes
Using the AIRIS-WAD Chemical Imaging Sensor**
Christopher Gittins (Physical Sciences, Inc.)
Invited

**08:30 Long-Wavelength Infrared Imaging System to
Scuba Diver Detection in Three Dimensions**
Debing Zeng (Stevens Institute of Technology)
Student Paper

08:50 Bio-Inspired Adaptive Hyperspectral Imaging for Target Tracking
Tao Wang (The City College of New York)
Student Paper

**09:10 Demonstration of Nanofluidic Biochips for Use in the Direct THz
Spectroscopic Detection and Identification of Biological Species**
Edgar Mendoza (Redondo Optics, Inc.)

**09:30 Development of a Hyperspectral Sensor for Multi-Angular
Measurements of Polarized Reflectance from Coastal Waters**
Alex Gilerson (The City College of CUNY)

Wednesday June 25

III(B) Sea Sensing: Detection of Threats in Water

Chair: Raymond Haren, Wright-Patterson Air Force Base

10:10 TBD

Harry Salem (U.S. Army ARDEC)

Invited

**10:40 Detection of Trace Plasticizers and Dissolved Organic Species
in Water Using UV Laser and LED-Induced Fluorescence**

Anna Sharikova (University of South Florida)

Student Paper

**11:00 Chemical and Biological Sensing Through a
Cellular Imaging-Based Microfluidic Platform**

Philip LeDuc (Carnegie Mellon University)

**11:20 Combination of a Biological Sensor Using Light Emitting Bacteria and a
UV Spectrometer Probe for Homeland Security and Drinking Water Safety**

Joep Appels (microLAN On-line Biomonitoring Systems, The Netherlands)

**11:40 The Use of Reactive Thin Films for an IR-Based
Detection of Toxic Compounds in Water**

Carl Tripp (LASST, University of Maine)

Wednesday June 25

III(B-P1) Sea Sensing: Detector Physics

Chair Neelam Gupta, U.S. Army Research Laboratory

10:10 Light Emitting Diodes on Ion-Implanted Diamond for Sensing Applications

Alexander Zaitsev (The College of Staten Island.)

**10:40 Microwave and Terahertz Radiation-Induced Resistance Oscillations
and Zero-Resistance States in GaAs/AlGaAs Devices**

Ramesh Mani (Georgia State University)

**11:00 Potentiometric Sensing of Biomacromolecules Using
Surface Molecular Imprinting with Self-Assembled Monolayers**

Yantian Wang (Stony Brook University)

11:20 Immuno-Magnetic Nanotags for Chip Based Pathogenic Bacteria Detection

Chen-zhong Li (Florida International University)

11:40 Sensitive Planar Heterojunction Detector from Microwave to Infrared Applications

Jonas Gradauskas (Semiconductor Physics Institute, Lithuania)

Thursday June 26

III(C) Sea Sensing (Frontier):
Integrated Sensor Platforms for Enhanced Performance
Chair Carl Tripp, University of Maine

08:00 Integrated Glass Optical Resonators for Biochemical Sensing
Juejun Hu (Massachusetts Institute of Technology)
Invited & Student Paper

**08:30 DNA Directed Integration of Gold Nanoparticles
into Supramolecular Architectures**
Michael Norton (Marshall University)

**08:50 Fabrication of Subwavelength Aperture Arrays
Using Directed Assembly of Microspheres**
Yi Lou, (North Carolina State University)
Student Paper

**09:10 Nanohole and Nanopillar Arrays for Localized Surface
Plasmon Resonance Sensing**
Radislav Potyrailo (GE Global Research)

09:30 A Novel Plasmonics-Based Nanotechnology to a Label-Free, On-Chip Biosensor
Jianjun Wei (CFDRC Research Corporation)

Thursday June 26

III(C-P1) Sea Sensing: Novel Spectroscopy

Chair: Janet Jensen, U.S. Army Edgewood Chemical Biological Center

08:00 Remote Detection of Hazardous Liquids

Concealed in Glass and Plastic Containers

Samuel P. Hernandez-Rivera (University of Puerto Rico at Mayagüez)

08:30 Recent Progress in Hierarchical Generation of Molecular Testbeds

Michael Norton (Marshall University)

08:50 Spatially Controlled Growth of Aromatic Silane

Li Tan (University of Nebraska, Lincoln)

09:10 Signal Enhancement in CARS for Imaging of

Biological Structure and Ultrafast Dynamics

Svetlana Malinovskaya (Stevens Institute of Technology)

09:30 LIBS Monitoring of Traces in Different Types of Water Samples

Nilesh Rai (University of Allahabad, India)

Student Paper

IV.	Science & Technology for Land (& Surface) Sensing & Monitoring	
IV(A)	Land Sensing: Standoff for Gases & Bioaersols	025
IV(B)	Land Sensing: Standoff for Surface Contaminations & Aerosols	026
IV(B-P1)	Land Sensing: Enhancement Technologies & Approaches.....	027
IV(C)	Land Sensing (Frontier): Technology Enabled Innovative Spectral Sensing	028
IV(C-P1)	Land Sensing: Hyperspectral & Imagery Processing	029

Thursday June 26

IV(A) Land Sensing: Standoff for Gases & Bioaerosols

Chair: Jean-Marc Thériault, Defence Research and Development Canada

10:10 Temporal-Spectral Detection in Long Wave Infrared Hyperspectral Imagery

Daniel Heinz (Science and Technology Corp.)

Invited

10:40 Remote Detection of Hard-Targets Based on Spectral Simulations of Vehicle Exhaust Products

Eldon Puckrin, (DRDC-Valcartier, Canada)

11:00 Passive Standoff Detection and Identification of Crowd Control Products with a LWIR Sensor

Hugo Lavoie (DRDC Valcartier, Canada)

11:20 Dynamic Hyper-Spectral Thermal Signature Model (DHTSM) Validation Analysis: LWIR Spectrum

Chen Lai (U.S. Army Material Systems Analysis Activity)

11:40 FFI Standoff Biological Aerosol Detection Demonstrator Based on UV Laser Induced Fluorescence

Øystein Farsund (FFI, Norwegian Defence Research Establishment)

Invited

Thursday June 26

**IV(B) Land Sensing: Standoff for Surface Contaminations & Aerosols
Chair Hugo Lavoie, Defence Research and Development Canada**

**13:30 Remote Detection of Gases and Liquids
by Imaging Fourier Transform Spectrometry**
Roland Harig (Instiut für Messtechnik, Germany)
Invited

**14:00 Passive Standoff Detection of Surface Contaminants by Differential
Polarization FTIR Spectroscopy: A Modeling and Simulation Study**
Jean-Marc Thériault (DRDC Valcartier, Canada)

14:20 Spectropolarimetric Imaging of Laser-Induced Fluorescence
Neelam Gupta (U.S. Army Research Laboratory)

14:40 Analysis of Laser Induced Fluorescence Data in the Urban Environment
Pierre Lahaie (DRDC Valcartier, Canada)

15:00 Near IR Spectroscopy: A Tool to Environmental TNT Detection
Miguel Gonzalez (University of Puerto Rico at Mayagüez)

Thursday June 26

IV(B-P1) **Land Sensing: Enhancement Technologies & Approaches**

Chair: Radislav Potyrailo, GE Global Research

13:30 Terahertz Detection by Nanometer Scale Field Effect Transistors

Michael Shur (Rensselaer Polytechnic Institute)

Invited

14:00 Magneto-Optically Enhanced Surface Plasmon Resonance Sensing

Rosa A. Lukaszew (College of William and Mary)

14:20 Highly Efficient Surface Enhanced Raman Scattering (SERS) Substrates for Sensing of Chemical and Biological Agents

Anuj Dhawan (Duke University)

14:40 Metal Enhanced Fluorescence for Increased Signal in Sensors

Julia J. Heetderks (University of Maryland)

15:00 Raman Scattering Study of *O*-And *P*-Dinitrobenzenes on the Surface of Cu Nanoparticles with Visible Excitation and Density Functional Theory

Omar E. Rivera-Betancourt (University of Puerto Rico at Mayagüez)

Friday June 27

IV(C) Land Sensing (Frontier): Technology Enabled Innovative Spectral Sensing
Chair: Janet Jensen, U.S. Army Edgewood Chemical Biological Center

08:00 Standoff Raman Detection of Explosives

Samuel P. Hernandez-Rivera (University of Puerto Rico at Mayagüez)

08:30 Surface Enhanced Fluorescence (SEF)

Ruiqiong Li (New Jersey Institute of Technology)

**08:50 Multi-Spectral Microscope for Imaging Transmission Spectroscopy
Employing an Array of Light-Emitting Diodes**

Mikkel Brydegaard (Lund University, Sweden)

Student Paper

**09:10 Collection and Detection of Airborne Microorganisms by Combining
Electrostatic Precipitation with Infrared Spectroscopy**

Luke Doucette (Orono Spectral Solutions)

**09:30 Recent Improvements in NQR Spectroscopy:
The Requirement for Easier Detection of Illicit Materials**

Zvonko Trontelj (University of Ljubljani , Slovenia)

Friday June 27

IV(C-P1) Land Sensing: Hyperspectral & Imagery Processing
Chair: Kirkman Phelps, KRP Consulting

08:00 Anomaly Detection and Verification via Airborne Hyperspectral and High Resolution Imagery Processing and Fusion
Doron Bar (Rafael Advanced Defense Systems Ltd., Israel)

08:30 Airborne Measurements in the Longwave Infrared Using an Imaging Hyperspectral Sensor
Jean-Pierre Allard (Telops, Inc.)

08:50 Statistical Motivated Background Modeling
Michael Kirchhof (FGAN-FOM, Germany)

09:10 Baseline Study in Raman Spectra of Surface Aerosols
Javier Fochesatto (Geophysical Institute, University of Alaska, Fairbanks)

09:30 Band Extraction for Face Recognition in Hyperspectral Data
Stefan Robila (Montclair State University)

V. Frontier (& Emerging) Spectroscopic Science & Technology	
V(A) Frontier Sensing: Future Concepts & Technologies	031
V(B) Frontier Science & Technology: Spectral Signature Phenomenology.....	032
V(C) Frontier Science & Technology: Novel Spectroscopic Methodology.....	033
V(D) Frontier Science & Technology: THz Spectroscopic Sensing I.....	034
V(E) Frontier Science & Technology: THz Spectroscopic Sensing II.....	035
V(F) Frontier Science & Technology: Nanosensor Concepts & Devices I.....	036
V(G) Frontier Science & Technology: Nanosensor Concepts & Devices II.....	037
V(H) Frontier Science & Technology: Emerging THz Opportunities.....	038
V(H-P1) Frontier Science & Technology: Source & Detection Technology.....	039
V(H-P2) Frontier Science & Technology: Sensor Enhancement Techniques.....	040

Tuesday June 24

V(A) Frontier Sensing: Future Concepts & Technologies
Chair: Dwight Woolard, U.S. Army Research Office

07:50 DNA for the Organization of Sensors and Other Elements
Nadrian Seeman (New York University)
Invited

08:15 Atomic-Level Limits for Sensor Systems
Steven Hillenius (Semiconductor Research Corporation)
Invited

08:40 Narrow THz Spectral Signatures through DNA and RNA in Nanofluidic Channels
Elliott Brown (University of California, Santa Barbara)
Invited

09:05 LIDAR Measurements of Chemical Species
C. Russell Philbrick (Penn State University)
Invited

**09:25 Ultrafast Mid-Infrared Spectroscopic Imaging by Combined
Computational and Experimental Optimization**
Rohit Bhargava (University of Illinois)
Invited

Tuesday June 24

V(B) Frontier Science & Technology: Spectral Signature Phenomenology
Chair: Michael Strosio, University of Illinois, Chicago

**13:30 Computational Modeling of the Molecular Complex
Formed by DIPAIN II And T-2 Toxin**
Boris Gelmont (University of Virginia)

14:00 First-Principles Analyses of the Terahertz Spectra of Molecular Solids
Timothy Korter (Syracuse University)

14:20 First Principle Study of DNA Bonded to Silicon Nano Dots
Alexei Bykhovski (North Carolina State University)

14:40 Terahertz (THz) Spectra of Chemical and Explosive
Yiming Zhang (Rensselaer Polytechnic Institute)

**15:00 Selective Detection of Biological and Chemical Agents Using Nanoparticle
Based Surface Energy Transfer Spectroscopy of Gold Nanoparticles**
Paresh Chandra Ray (Jackson State University)

Tuesday June 24

V(C) Frontier Science & Technology: Novel Spectroscopic Methodology

Chair: John Zavada, U.S. Army Research Office

15:40 Two-Dimensional Spectral Signatures for Identifying Bacteria and Chemicals

Jacob Grun (U.S. Naval Research Laboratory)

Invited

16:10 Vibrational Characteristics of Genetic Codons:

A New Path to DNA Spectral Sequencing

Peiji Zhao (North Carolina State University)

16:30 Coupled-Quantum-Dot System for Probability-Based THz Microscopy

Dwight Woolard (U.S. Army Research Office)

16:50 RF Circuit Model of A Quantum Point Contact

Sungmu Kang (University of California, Irvine)

17:10 Magnetic Field Anisotropy in Co/Au Magnetoresistance

Induced by Dodecanethiol Self-Assembly

Brad Knaus (University of South Carolina)

Student Paper

Wednesday June 25

V(D) **Frontier Science & Technology: THz Spectroscopic Sensing I**
Chair: Dwight Woolard, Woolard, U.S. Army Research Office

**10:10 THz Transmission and Scatterometry of Ammonium Nitrate:
Evidence for Photon Localization**
Elliott Brown (Physical Domains, LLC)
Invited

**10:40 Spectroscopic Study of Containers and Their Contents
Using a High Resolution THz System**
Smadar Egert (Israel Institute for Biological Research)

11:00 Reliability Analysis of THz Characterization of Lambda Phage Sequence
Tatiana Globus (University of Virginia)

11:20 A High Resolution Terahertz Spectrometer for Chemical Detection
Alexander Majewski (Goodrich ISR Systems)

11:40 THz Ellipsometry Materials Characterization
Mathias Schubert (University of Nebraska-Lincoln)

Thursday June 26

V(E) **Frontier Science & Technology: THz Spectroscopic Sensing II**
Chair: James Jensen, U.S. Edgewood Chemical Biological Center

**08:00 THz Waveguide Detection of Vibrational Fingerprints
of Explosive Simulants and Explosives**

Joseph Melinger (U.S. Naval Research Laboratory)

Invited

**08:30 Rapid Phase Modulation of Continuous Wave THz Radiation
for High Speed THz Imaging and Spectroscopy**

John Federici (New Jersey Institute of Technology)

08:50 Coherent Spectroscopy Using Infrared and Terahertz Frequency Combs

Daniel van der Weide (Tera-X, LLC)

**09:10 THz Spectroscopy by Frequency-Tuning Monochromatic THz Source:
From Single Species to Gas Mixtures**

Yujie Ding (Lehigh University)

**09:30 Submillimeter-Wave Micro-Resonators for Investigation
of the Dynamical Properties of Biological Molecules**

Angelique Sklavounos (University of Virginia)

Thursday June 26

V(F) Frontier Science & Technology: Nanosensor Concepts & Devices I
Chair: Michael Stroschio, University of Illinois, Chicago

13:30 Nanowire Plasmon Waveguides and Junctions

Laetitia Bernard (Yale University)

Invited

14:00 Silicon/Molecule Hybrid Devices

David Corley (Rice University)

14:20 Self-Assembled Nanostructured Molecular Electronic and Optoelectronic Devices

Richard Claus (Nanosonic, Inc.)

**14:40 Interaction of Biological Molecules with Nanostructures:
The Hybrid DNA-CNT Sensing System**

R. Pandey (Michigan Technological University)

**15:00 Effects of Vibrational Coherences on Transport Current and an Unequilibrated
Phononic Distribution in a Suspended Carbon Nanotube**

Bing Dong (Shanghai Jiaotong University, China)

Norman Horing (Stevens Institute of Technology)

Friday June 27

V(G) Frontier Science & Technology: Nanosensor Concepts & Devices II

Chair: Hong-Liang Cui, Stevens Institute of Technology

**08:00 Infrared Detection Based on Freestanding Network
of Single Walled Carbon Nanotubes**

Jiri Cech (Lehigh University)

**08:30 Integrated Nanostructure-Semiconductor-Molecular Complexes
as Tools for THz Spectral Studies of DNA**

Michael Strosio (University of Illinois-Chicago)

**08:50 Exploring the Use of a Long Molecular Electronic Device for
Developing a New Class of Switches and Sensors**

Greg Recine (Stevens Institute of Technology)

09:10 Intelligent Molecular Sensors

Luis Jauregui (Texas A&M University)

Student Paper

09:30 Nanostructural Control of Metal-DNA Complex for Bioelectronic Application

Chen-zhong Li (Florida International University)

Friday June 27

V(H) Frontier Science & Technology: Emerging THz Opportunities
Chair: James Jensen, U.S. Army Edgewood Chemical Biological Center

10:10 THz Spectral Sensing with Nanotechnology: An Overview
Peter Burke (University of California-Irvine)
Invited

10:30 Directional Terahertz Thermal Emission by Doped Semiconductors with Surface Grating
Byoung Don Kong (North Carolina State University)
Student Paper

10:50 Pulsed Terahertz Wave Generation from Inert Gases and Chemical Vapors
X.-C. Zhang (Rensselaer Polytechnic Institute)

11:10 Performance of Real-Time Chemical Sensing with a Handheld THz Spectrometer
Brian Schulkin (Rensselaer Polytechnic Institute)
Student Paper

11:30 THz Resonances in Chiral Al Nanowires
Eva Schubert (University of Nebraska-Lincoln)

11:50 Use of Ball Lightning for THz Stand-Off Detection of Bio-Chemical Agents
Peter H. Handel (University of Missouri-St. Louis)

Friday June 27

V(H-P1) Frontier Science & Technology: Source & Detection Technology
Chair: John Zavada, U.S. Army Research Office

**10:10 Simulation of THz Generation in a GaN Diode Within
the Limited Space-Charge Accumulation Regime**
Valeriy Sokolov (North Carolina State University)

10:30 Low Cost Resonant-Cavity-Enhanced Mid-Infrared Photodetector
Juejun Hu (Massachusetts Institute of Technology)
Student Paper

**10:50 GaN Based Diluted Magnetic Semiconductor Resonant Tunneling Devices
for High Frequency, Short Time Scale Applications**
Harold Grubin (NanoRTD)

11:10 Graphenated IR Screens
A. Banerjee (New Jersey Institute of Technology)
Student Paper

**11:30 Sample Uniform Reproducible SERS: A New Paradigm
Photonic Crystal Antenna Assisted SERS (PHAASERS)**
Ihab El-Kady (Sandia National Laboratories)

**11:50 Surface Enhanced Raman Scattering (SERS) Substrates with
Controlled Morphology and Architecture Created by Biomineralization**
Hong Shen (University of Washington)

Friday June 27

V(H-P2) Frontier Science & Technology: Sensor Enhancement Techniques

Chair: Hong-Liang Cui, Stevens Institute of Technology

10:10 Less Is More: The Role of Non-Linear Optics in Evanescent Chem/Bio Detectors

H. James Harmon (Oklahoma State University)

10:30 Optical Conductivity of Graphene in Diffusive Regime

S. Y. Liu (Shanghai Jiaotong University, China)

Norman J.M. Horing (Stevens Institute of Technology)

**10:50 Standoff Raman Spectroscopy System for Detection of Explosives,
Chemical Warfare Agents Simulants and Toxic Industrial Compounds**

William Ortiz (University of Puerto Rico-Mayaguez)

Student Paper

11:10 Improving Dynamic Range and Modeling 3-D Adsorption in Sensors

Donald Roper (University of Utah)

**11:30 Launch/Impact Event Discrimination Algorithms Enhancing the
Situational Awareness Capabilities of the UTAMS Platform**

Quoraishee Shafik (U.S. Army RDECOM ARDEC, Picatinny Arsenal)

**11:50 A Novel Highly-Integrated Single Molecular Biosensor System
for Rapid Toxin Detection**

Bingqian Xu (University of Georgia)

Monday Evening, June 23
7:30 pm-8:30 pm
Sensor Algorithms Roadmap Session

Please join us for an open discussion session, as we need your technical expertise to generate a sensing roadmap and topical areas for discussion will include:

- Opportunities for Defense and Security
- Science and Technology Challenges
- Research and Development Focus Areas
- Future Expectations and Payoffs

Tuesday Evening June 24

Poster Session

Fast High-Order Methods for the Wigner-Poisson Equations

Carl T. Kelley (North Carolina State University)

A New Usage of Laser Interferometer for Accurate Determination of Some Physical Parameters of Carbon Dioxide as One of the Most Popular Environmental Pollutant Gas

R. Ghazy (Tanta University, Egypt)

Dynamics of a Two-Dimensional Quantum Dot Subject to Landau Quantization

Norman J. M. Horing (Stevens Institute of Technology)

Graphene Stopping Power for a Fast Charged Particle: Parallel Case

J. M. Horing (Stevens Institute of Technology)

LIBS Characterization of Marine Sediments

Shiwani Pandhija (University of Allahabad, India)

Normal Modes and Light Absorption in Alkyne Functionalized Silicon Surface (111)

Alexei Bykhovski (North Carolina State University)

Chemical Threat Detection via Portable THz Spectroscopy

David Brigada (Rensselaer Polytechnic Institute)

THz-Frequency Transport Process in AlGaSb/InAs Resonant Tunneling Diodes (RTDs) Under a Magnetic Field

Weidong Zhang (North Carolina State University)

Organizational Structure and Electronic Properties of Chiral Molecular Domains and Single Biomolecules

Pengshun Luo (North Carolina State University)

THz Time-Domain Spectroscopy of Selected Chemical/Biological Compounds

Yunqing Chen (Rensselaer Polytechnic Institute)

Data Encoding on Continuous Wave THz Signals for Sensing

Ke Su (New Jersey Institute of Technology)

Emulation of Ball Lightning for THz Stand-off Detection of Bio-Chemical Agents

Peter H. Handel (University of Missouri-St. Louis)

How Sensitive is Safe? Risk-based Targets for Ambient Monitoring

Yin Huang (Drexel University)

Tuesday Evening June 24

Poster Session

Photonic Bands in Frequency-Dependent Media

Xiaoyang Huang (Stevens Institute of Technology)

Photonic Band Modification by Molecular Resonance

Xiaoyang Huang (Stevens Institute of Technology)

Biosensor Based on Double-Stranded DNA Transversal Characteristics

Jorge Seminario (Texas A&M University)

**Fabrication of Metamaterials in THz Region Using Ink Jet System
and Characterization Using THz-TDS**

Yew Li Hor (New Jersey Institute of Technology)

**Sparseness Measures of Signals for Compressive Sampling in the Presence of
Additive White Gaussian Noisy Channel**

Olusegun Odejide (Prairie View A&M University)

Gold Nanoparticle Based NSET Assay for Monitoring RNA Folding Kinetics

Jelani Griffin (Jackson State University)

Detection of Thol-Containing Amino Acids Using Gold-Polystyrene Composites

Davoy Murray (Albany State University)

Method for Detection of Chemical Nerve Agents Using Zirconium-Polystyrene Composites

Seong Seo (Albany State University)

Self Assembly of DNA on Carbon Nanotube: A Simulation Study

Olayinka Ogunro II (Clark Atlanta University)

Laser Induced Breakdown Spectroscopy for Monitoring of Traces in Kidney Stones

Vivek K. Singh (University of Allahabad, India)

**Development of Nano-Composite Particles for Use in the Detection
of Chemical Warfare Agents**

O'Neil Smith (Albany State University)

Optical Methane Sensor Based on a Fiber Loop at 1665nm

Kuanglu Yu (Beijing Jiaotong University)

Tuesday Evening June 24
Wednesday Noon June 25

Exhibitor Session

Opto-Knowledge Systems, Inc.
Pegasus, LLC
Physical Domains, LLC
Redondo Optics
Telops, Inc.
Vibratess, Inc.

OKSI specializes in the development of turn-key electro-optical sensor systems covering the UV, VNIR, SWIR, MWIR and LWIR. Primarily, OKSI develops systems that combine imaging and spectroscopy, including the mechanical assembly (high vacuum dewars for cryogenic operations), electronics, optics, computer interface and signal acquisition, algorithms for signal and data processing. OKSI excels in R&D projects where off-the-shelf solutions are unavailable. The latest products include the HyperScan, the HyperSWIR, and a complete UAV-borne hyperspectral system

Opto-Knowledge Systems, Inc. (OKSI)

19805 Hamilton Ave; Torrance, CA 90502-1341

www.oksi.com Phone: 310/756-0520, Fax 310/756-0511

L.C. Pegasus Corporation was incorporated in the State of New Jersey, in June, 1998, as a high-technology services and consulting company. It specializes in providing software engineering consulting services in telecommunication and Internet related businesses, optical and microwave based on sensing devices for chemical and biological weapons and concealed explosives, as well as hardware design of specialty optical sensors and optical and wireless communication equipment/apparatus. The staff of L.C. Pegasus has extensive experiences in these high-tech and engineering fields, as well as in wireless communications and fiber optic communications network design, monitoring, and management.

The company currently has five full-time employees and several part-time and non-direct employees. In the eight years since incorporation, it has provided commercial software and scientific and engineering services to clients such as AT&T, Telcordia, and Panasonic Technology Center, US Army, US Navy, the municipal governments of the City of Shanghai, the province of Shandong, China, as well as oil service industry and coal mining industry in China.

L.C. Pegasus Corporation

10 Bedford Drive, Basking Ridge, NJ 07920

www.lcpegasus.com Ph:908-781-0393, FAX: 908-781-0167

Physical Domains is a small business engaged in the research and development of several types of RF and photonic systems and related technology. Since its beginning in 2002 Physical Domains has been both a prime- and sub-contractor on several Government Programs, ongoing and completed. In 2002 Physical Domains was awarded a Phase I STTR with the Army Research Office to develop a 400 GHz differential absorption radar. Upon successful completion of Phase I, the Army awarded a Phase II contract in 2003. Physical Domains has also successfully completed a seedling contract with DARPA on a new radar concept for microwave frequencies - the retrodirective noise-correlating (RNC) radar - and has been awarded a follow-on contract. Other contracts include a frequency hopping THz spectrometer for the Army and DTRA, and an SBIR Phase-I contract with NIST to develop GaAs THz photomixers.

Physical Domains has teamed with numerous companies including: Emcore (photomixing technology), Jet Propulsion Laboratory (terahertz radar), Rockwell Scientific Company, (submicron fabrication), Goodrich Corporation (photomixing spectrometer) and MicroAssembly Technologies, Inc. (RF testing and design of ultra-low insertion-loss RF MEMS switch).

Through the NIST Phase I SBIR Program Physical Domains has started the process of commercializing GaAs photomixers for THz applications. Devices have been delivered to several different commercial partners as a first step toward applying photomixers in real THz instruments and systems. Of greatest interest is the THz sweep oscillator that can continuously tune from under 100 GHz to over 2 THz with no cryogenics or large electric/magnetic fields.

Physical Domains, LLC.

3700 Cedarbend Drive, Glendale, CA 91214

Ph: 818-795-3247

Redondo Optics, Inc. (ROI) is a world leader in cutting-edge optical materials, nanotechnology, optical instrumentation, integrated optics and fiber optic sensing technologies based on the unique integration of advanced optics, opto-electronics, and software. The company's core technologies address specific markets in advanced materials, optical sensors and instrumentation, telecommunication components, U.S. security, environmental monitoring, bio-medicine, security, and aerospace. The company has made fundamental breakthroughs in optical materials, optical elements, optical instrumentation, and sensing technology, resulting in five U.S. and worldwide patent applications, with major emphasis in optical materials, security, visualization, and monitoring instrumentation.

Currently, ROI has a staff of 10 highly skilled employees, 2 of whom hold Ph.D. degrees. They perform research and production activities in 1,500 sq. ft. state-of-the-art facilities. ROI's rapid growth has been achieved through a successful commercialization strategy based on in-house RD&D and pilot manufacturing, contract manufacturing, corporate alliances, licensing, and joint ventures. This strategy positions ROI to become a major player in the rapidly growing chemical and biochemical sensor instrumentation, security, and sensing markets.

Redondo Optics, Inc.

2803 Faber Street, Redondo Beach, CA 90278

www.redondooptics.com Ph: 302-292-7673

Telops specializes in the design and production of sophisticated opto-electronic systems for the defence, aerospace and telecommunications industries. We thrive on high expectations and great challenges. Our technical experts understand your business and their diverse backgrounds represent a powerful source of innovation. Whether you are looking to us for equipment, expertise or outsourcing, we will turn your high expectations into success

Telops, Inc.

100-2600 avenue St.-Jean-Baptiste Quebec, Canada G2E 6J5

Tel: (418)864-7808 Fax: (418)864-7843

Vibratess, LLC is a starting up, women owned Small Business Company, spin-off of the University of Virginia. Vibratess is providing scientific services in THz spectroscopic characterization, computational modeling, development, testing and evaluation of THz spectroscopic sensors.

Company's business activity includes such services as: 1) Characterization of organics in liquid and solid states in the THz and sub-THz spectral ranges using vibrational spectroscopy 2) Modeling, simulation and analysis of absorption spectra in a broad frequency range (THz-IR) of biological, organic and inorganic materials including nucleic acids, polypeptides, proteins, lipid membranes and explosives using methods of quantum chemistry and molecular mechanics 3) Developing Tools for detection, identification and characterization of biological and organic molecules using THz Vibrational Spectroscopy 4) Design and fabrication of sample units with improved coupling between THz radiation and materials under the test 5) Prototyping and testing of new sensors and sensor architectures for millimeter/THz spectrometers. 6. Development and evaluation of calibration and verification techniques for THz spectrometers and interferometers.

Currently, Vibratess is working on a PhaseII SBIR Project: "Spectroscopic Imaging Technology for THz Biosensor Integrated with a Lab-on-Chip Platform" with objectives to develop an all optical, apertureless, THz transmission sensor with the spatial resolution much below the diffraction limit. The new process for coupling allows for dramatic improvements in sensitivity, reliability, and selectivity of terahertz detection systems. This new detection platform could be applied to the development of a new class of resonant, highly sensitive and selective portable bio and chemical devices for uses in many different applications.

Vibratess, LLC

221 Cottonwood Dr. Barboursville, VA 22923

Phone: (434) 985-7459, Email: t.khromova@vibratess.com

Wednesday, 12:30 pm, June 25
Round-Table THz Measurement Session

Speakers:

Some Sources of Spectral Artifacts in THz Spectroscopy

Smadar Egert (Israel Institute for Biological Defense)

Spectral Artifact Phenomenology in Terahertz-Based Bio-Sensing and Remote Imaging: Problems & Solutions

Dwight Woolard (U.S. Army Research Office)

THz Metrology: The Challenges of Measuring THz Power and Frequency, and Recent Techniques Based on Photonic and Infrared Technology

Elliott Brown (University of California, Santa Barbara)

Quality Assurance of Real-Time Terahertz Wave Sensing

X.C. Zhang (Rensselaer Polytechnic Institute)

THz-Wave Spectroscopic Measurement with Coherent Frequency-Agile THz-Wave Sources

Hiroaki Minamide (RIKEN, Japan)

First-Principles Analyses of the Terahertz Spectra of Molecular Solids

Timothy Korter (Syracuse University)

Spectral Artifacts in Sub-Terahertz Characterization of Bio-Materials

Tatiana Globus (University of Virginia)

The Effects of Frequency & Amplitude Errors on THz Frequency Range, Repeatability & Resolution Performance

Alexander Majewski (Goodrich ISR Systems)

Wednesday, June 25
Baseball Game Excursion

Shea Stadium
N.Y. Mets vs. Seattle Mariners

7:10 pm game time

For details, please paste the following link into your browser:

<http://www.issr.com/2008/area.shtml>

To register: Tickets are \$28 per person

<http://www.issr.com/2008/reg.shtml>

Thursday, June 26
Conference Banquet Dinner Cruise

N.Y Spirit Cruises “Bateaux”
Lincoln Harbor, Weehawken, NJ

7:30 prompt departure

For details, please paste the following link into your browser:

<http://www.issr.com/2008/area.shtml>

To register for the event: Tickets are \$65 per person.

<http://www.issr.com/2008/reg.shtml>

Guest Speaker:

Mr. John G. Voeller

Senior Vice President, Black and Veatch

White House Fellow, White House Office of Science & Technology Policy

Technical Leader CBRTA

Speaking on: **Is Sensing Behind Others in Technology Approach?**