

FINAL DAYS
TO REGISTER!

BIODEFENSE WORLD SUMMIT 2016

Cover

Conference-At-a-Glance

Dinner Workshops

Biodetection Technologies:
Biothreat and Pathogen Detection

Biodetection Technologies:
Point-of-Care for Biodefense

Biosurveillance Integration

Sample Prep Technologies

Co-located Event:
Rapid Detection for
Food Safety

Sponsorship & Exhibit
Opportunities

Hotel & Travel Information

Registration Information

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THE KNOWLEDGE FOUNDATION'S SECOND ANNUAL

BIODEFENSE WORLD SUMMIT 2016

June 27-30, 2016 | Hilton Baltimore | Baltimore, MD



Empowering the defense
community to recognize,
assess and act on
biological threats

CO-LOCATED WITH:

THIRD ANNUAL
Rapid Detection for
Food Safety

ADVANCES IN MICROBIAL
DETECTION, CHARACTERIZATION
AND PROCESS VALIDATION

CONFERENCE TRACKS:



24TH INTERNATIONAL

Biodetection Technologies:

BIOTHREAT AND PATHOGEN DETECTION



24TH INTERNATIONAL

Biodetection Technologies:

POINT-OF-CARE FOR BIODEFENSE



5TH INTERNATIONAL

Biosurveillance Integration

INTEGRATED MANAGEMENT OF THREATS
TO PUBLIC HEALTH & SAFETY



10TH INTERNATIONAL

Sample Prep Technologies

SAMPLE PREPARATION FOR VIRUS,
TOXIN & PATHOGEN DETECTION &
IDENTIFICATION

KEYNOTE SPEAKERS:



Lt. Col. Kurt Schaecher, Ph.D.,
Deputy Director, Division of Medicine,
USAMRIID, U.S. Army Medical Research
Institute of Infectious Diseases



Peter Gerner-Smidt, M.D., DMS,
Chief, Enteric Disease Laboratory
Branch, Division of Foodborne,
Waterborne and Environmental
Diseases, United States Centers for
Disease Control (CDC)



Aaron M. Firoved, Ph.D.,
Director, National Biosurveillance
Integration Center, U.S. Department
of Homeland Security



Heike Sichtig, Ph.D.,
Principal Investigator/Team Lead,
Microbiology Devices, Center for
Devices (CDRH), US Food and
Drug Administration



Timothy D. Minogue, Ph.D.,
Chief, Molecular Diagnostics
Department, Division of Diagnostic
Systems, U.S. Army Medical Research
Institute of Infectious Diseases
(USAMRIID)

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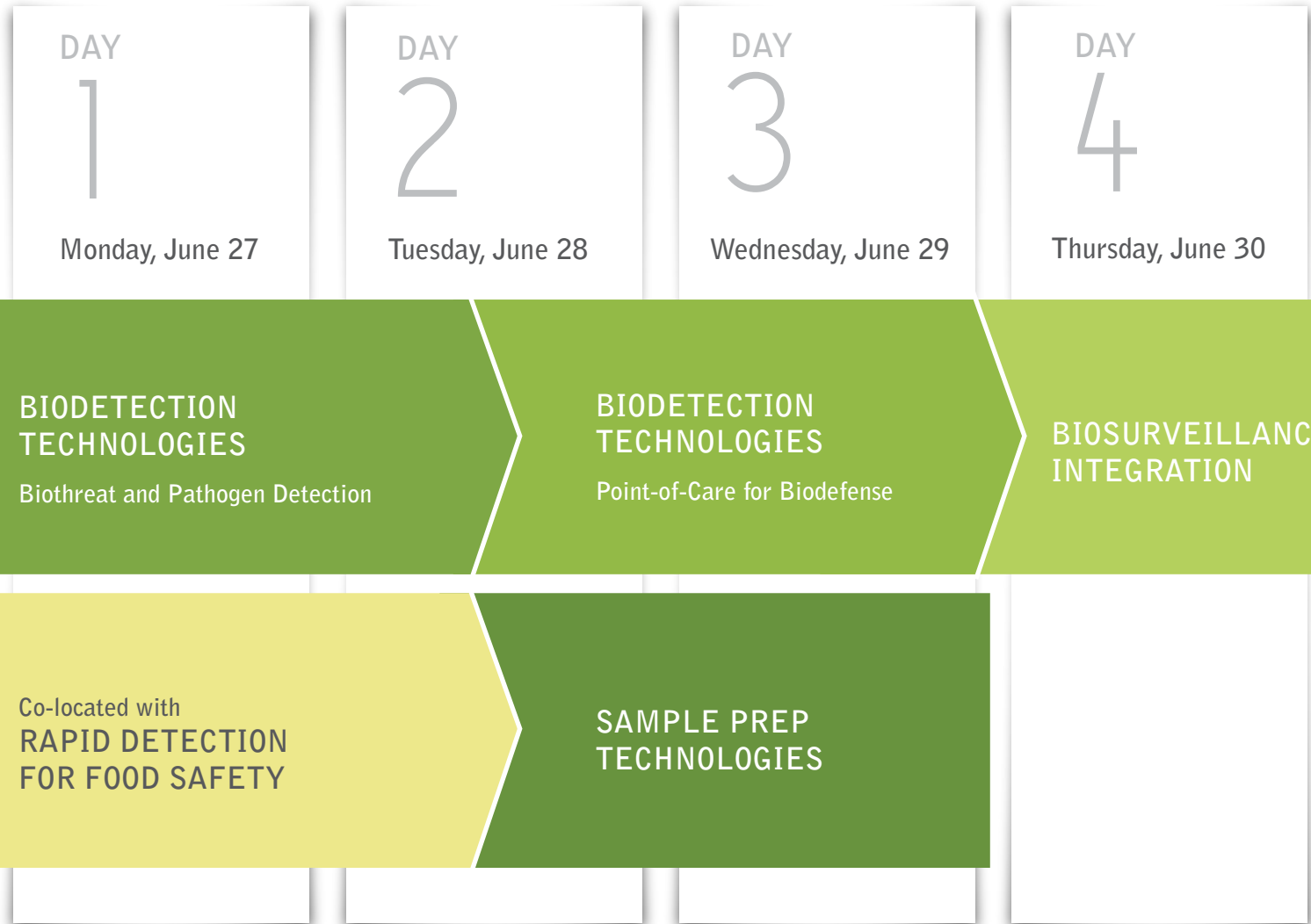
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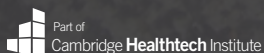
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Dinner Workshops*

TUESDAY, JUNE 28, 2016 | 5:30 – 8:30 PM

*Separate registration required

WS1: RAPID SAMPLE PREPARATION FOR PATHOGEN DETECTION

This workshop will discuss sample preparation technologies for detection, identification and analysis of biomedical, biological and chemical agents, biothreats in point-of-care, laboratory and field settings. It will review the novel and rapid technologies for sample preparation, application of analytical strategies and automation in biodetection.

Topics to be covered include:

- Why efficient sample prep is critical in biodefense applications
- Strategies for concentrating sample and faster pathogen recovery
- Development of qualification methods and protocols
- Advances in sample prep - bridging the gap between advances in biodetection technologies and sample prep technologies
- Review of high throughput sample prep technologies for clinical labs and R&D
- Advances and automation in sample prep for point-of-care and point-of-need applications
- Case studies on rapid sampling and sample preparation deployed for recreational water monitoring, biotech drug manufacturing, egg production, built environments, and wide area surveillance

Instructors:

Dave Alburty, CEO, InnovaPrep LLC

Byron Brehm-Stecher, Ph.D., Associate Professor, Rapid Microbial Detection & Control Laboratory, Iowa State University

HOTEL AND TRAVEL INFORMATION

CONFERENCE VENUE AND HOTEL:

Hilton Baltimore
401 West Pratt St.
Baltimore, MD 21201
Tel: 443-573-8700

Discounted Room Rate: \$229 s/d

Discounted Room Rate Cut-off Date: May 30, 2016

You may call the hotel directly to reserve your sleeping accommodations. You will need to identify yourself as a Cambridge Healthtech Institute conference attendee to receive the discounted room rate with the host hotel. Reservations made after the cut-off date or after the group room block has been filled (whichever comes first) will be accepted on a space- and rate-availability basis. Rooms are limited, so please book early.



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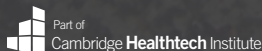
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SPONSORSHIP AND EXHIBIT OPPORTUNITIES

Knowledge Foundation offers comprehensive packages that can be customized to your budget and objectives. Sponsorship allows you to achieve your goals before, during, and long after the event. Packages may include presentations, exhibit space and branding, as well as the use of delegate lists. Signing on early will maximize your exposure to qualified decision-makers and drive traffic to your website in the coming months.

Podium Presentations – Available Within the Main Agenda!

Showcase your solutions to a guaranteed, targeted audience through a 15- or 30-minute presentation during a specific program, breakfast, lunch, or a pre-conference workshop. Package includes exhibit space, on-site branding, and access to cooperative marketing efforts by Knowledge Foundation. Lunches are delivered to attendees who are already seated in the main session room. Presentations will sell out quickly! Sign on early to secure your talk.

Invitation-Only VIP Dinner/Hospitality Suite

Sponsors will select their top prospects from the conference pre-registration list for an evening of networking at the hotel or at a choice local venue. CHI will extend invitations and deliver prospects, helping you to make the most out of this invaluable opportunity. Evening will be customized according to sponsor's objectives i.e.: Purely social, Focus group, Reception style, plated dinner with specific conversation focus

Focus Group

Knowledge Foundation will gladly provide you the opportunity of running a focus group on-site. This exclusive gathering can be useful to conduct market research, collect feedback on a new product idea, and collect marketing intelligence from industry experts on a specific topic.

User Group Meeting/Custom Event

Co-locate your user group meeting or custom event. Knowledge Foundation will help market the event, manage logistical operations, develop the agenda, and more. We can handle the entirety of the meeting or select aspects.



For more information, please contact:

Sherry Johnson

Business Development Manager
Knowledge Foundation, a division of CHI
Phone: (+1) 781-972-1359
Email: sjohnson@healthtech.com



Exhibit

Exhibitors will enjoy facilitated networking opportunities with qualified delegates, making it the perfect platform to launch a new product, collect feedback, and generate new leads. Exhibit space sells out quickly, so reserve yours today!

One-on-One Meetings

Select your top prospects from the pre-conference registration list. CHI will reach out to your prospects and arrange the meeting for you. A minimum number of meetings will be guaranteed, depending on your marketing objectives and needs. A very limited number of these packages will be sold.

Additional branding and promotional opportunities are available, including:

- Conference Tote Bags
- Literature Distribution (Tote Bag Insert or Chair Drop)
- Badge Lanyards
- Program Guide Advertisement
- Padfolios and More...

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MONDAY, JUNE 27

7:00 am Registration and Morning Coffee

REGULATIONS, STANDARDIZATION AND CASE STUDIES

8:25 Chairperson's Opening Remarks

Matthew Lesho, Ph.D., Director, Government Business Development, Luminex Corporation

» 8:30 KEYNOTE PRESENTATION: ESTABLISHING FDA- ARGOS FOR REGULATION OF SEQUENCING-BASED DIAGNOSTICS FOR INFECTIOUS DISEASES

Heike Sichtig, Ph.D., Principal Investigator/Team Lead, Microbiology Devices, Center for Devices (CDRH), US Food and Drug Administration

The presentation will outline studies to evaluate the use of sequencing-based devices as an aid in infectious disease diagnostics, and to gain a better understanding of potential High Throughput Sequencing (HTS) clinical implementation strategies. Regulatory use case scenarios utilizing the FDA-ARGOS database resource will be showcased. The information contained in the presentation concerning possible approaches for validation are suggested approaches open for feedback.

9:00 A Mixed Microbial Pathogen Reference Material: Ground Truth for Assessing Sensitivity and Specificity of NGS-Based Pathogen Detection

Scott A. Jackson, Ph.D., Complex Microbial Systems Group Leader, Biosystems and Biomaterials Division, National Institute of Standards and Technology

Metagenomic sequence data obtained from complex samples is able to provide a qualitative and quantitative understanding of the individual components of the original complex sample. Ideally, NGS technologies in the not-so-distant future will allow point-of-care diagnoses of infectious disease; going from sample-to-answer in under an hour. NIST is developing a complex mixture of pathogen DNA to serve as a standard for assessing the analytical sensitivity and specificity of NGS-based pathogen detection assays/devices.

9:30 Biothreat Agent Sample Inactivation - A UK Perspective

Simon Weller, Scientist, CBR Division, Defense Science and Technology Laboratory, UK Ministry of Defense

Recently DSTL has carried out inactivation studies on Ebola Virus (pre-PCR) and Bacillus anthracis (pre-MALDI-TOF MS). In both instances stringent experimentation has generated results that contradict those reported from previous studies, and indicated that these agents are difficult to inactivate - whilst still retaining enough biological material to allow identification. These results have implications for deployed military laboratories where high level biological containment infrastructure is not available. The presentation will also include discussion of the application of Dstl research (on Ebola inactivation) in the UK network of Ebola Diagnostic Labs in Sierra Leone.

10:00 Coffee Break in the Ballroom Foyer

ADVANCES IN NUCLEIC ACID TECHNOLOGIES & NEXT GENERATION SEQUENCING

10:30 Next-Generation Sequencing-Based Precision Metagenomics for Rapid Biothreat Detection and Characterization

Nur Hasan, Ph.D., Adjunct Faculty, University of Maryland Institute of Advanced Computer Studies and the Center for Bioinformatics and Computational Biology, University of Maryland

The presentation will describe various aspects of novel bioinformatics tools: ease and operational friendliness, data mining efficiency and processing speed, breadth, depth and curation of genome databases to deliver actionable results, flexibility to allow incorporation of specific metadata and/or genome sequences. The presentation will further demonstrate some valuable features that make this technology very attractive and powerful for simultaneous detection and characterization of biothreat agents.

11:00 Enabling the Development of Genomics Expertise for Next-Generation Sequencing Novices

Momchilo (Momo) Vuyisich, Ph.D., Applied Genomics Team, Los Alamos National Lab

We have developed a user friendly, web-based platform that helps process raw sequencing data and perform a number of cutting-edge analyses with only a few mouse clicks. Results are available real-time and graphics, both static and interactive, are provided. The underlying rationale for the development of such a platform will be discussed along with new and specific focus on pathogen detection from complex samples.

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BIODETECTION TECHNOLOGIES: BIOTHREAT AND PATHOGEN DETECTION (CONT.)

11:30 Simultaneous Multiplexed Protein and Nucleic Acid Detection Improves Decision-Making for Biothreat and ID Applications

Amy Altman, Ph.D., Vice President, Biodefense and Protein Diagnostics, Luminex Corporation

Our ability to quickly detect and characterize a deliberate biological attack or an outbreak of an emerging infectious disease is critical to saving lives and minimizing the impact of such an event. To provide more comprehensive situational awareness, Luminex is developing multi-modal approaches to biological detection, allowing for the simultaneous detection of complementary pathogen and host-response targets.

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12:00 Luncheon Presentation (Sponsorship Opportunity Available) or Lunch on Your Own

RAPID AND FUTURE TECHNOLOGIES FOR BIODETECTION

1:55 Chairperson's Opening Remarks

Crystal Jaing, Ph.D., Group Leader, Applied Genomics, Physical & Life Sciences, Lawrence Livermore National Laboratory

» 2:00 PM KEYNOTE PRESENTATION: DEVELOPMENT AND CHALLENGES OF TRANSLATING VIRAL HEMORRHAGIC FEVER RESEARCH TO ACTIONABLE DIAGNOSTIC APPLICATIONS

Timothy D. Minogue, Ph.D., Chief, Molecular Diagnostics Department, Division of Diagnostic Systems, U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)

The current Ebola outbreak highlights the need for effective/rapid diagnostics for viral hemorrhagic fevers. However, several highly pathogenic viruses that present with similar pathology are endemic to similar regions and co-circulate with Ebola. Our group strives to provide research and development of diagnostics to affect time-to-answer, assay sensitivity, and ease of use to help diagnose these types of diseases.

2:30 Sample Preparation Improvements for Real-Time Whole Genomic Sequencing Using Nanopore Technology

Robert Cory Bernhards, Ph.D., Research Microbiologist, BioSciences Division, Edgewood Chemical Biological Center/Defense Threat Reduction Agency

The Department of Defense has a limited toolset for field-deployable detection and diagnostic assays. Nanopore real-time whole genomic sequencing technology offers the potential for biothreat identification even in austere environments.

This presentation will describe improvements in sample preparation that allow for the rapid identification and differentiation of RNA viruses using this disruptive technology.

3:00 Comprehensive and High-Throughput Pathogen Detection Using the Lawrence Livermore Microbial Detection Array

Crystal Jaing, Ph.D., Group Leader, Applied Genomics, Physical & Life Sciences, Lawrence Livermore National Laboratory

The Lawrence Livermore Microbial Detection Array (LLMDA) is a comprehensive DNA detection technology containing probes to detect more than 10,000 species of microbes including viruses, bacteria and fungi. The technology has been applied to vaccine safety, infectious disease, biodefense, agricultural security and microbiome to rapidly identify known and emerging pathogens. The next-generation high-throughput LLMDA is a cost-effective and faster alternative than next-generation sequencing.

3:30 Refreshment Break in the Exhibit Hall with Poster Viewing

4:15 Using Protein Structure and Microbial Genomes to Characterize Pathogen Antibiotic Resistance in Complex Metagenomic Samples

Jonathan Allen, Ph.D., Informatics Scientist, Global Security Computing Applications Division, Lawrence Livermore National Laboratory

Previously sequenced microbial genomes and genes associated with antimicrobial resistance are collected and stored in a novel de Bruijn genome population graph for efficient identification of antibiotic resistance genes in complex metagenomic samples. Protein structure motifs associated with resistance mechanisms are included in the graph to recognize key genetic features of resistance and provide more accurate recognition of antibiotic resistance determinants.

4:45 Rapid Phage Engineering as a Biodefense Platform for Bacterial Threats

Matthew Lux, Ph.D., Research Biologist, BioSciences, US Army Edgewood Chemical Biological Center

The emerging spectre of antimicrobial resistant pathogens, whether natural or engineered, demands technologies that can be rapidly adapted to detect and defeat new threats as they arise. Here we outline the potential of rapid engineering of phage to address this need, and describe ongoing work to develop a set of interchangeable phage components as a modular biodefense platform.

5:15 Welcome Reception in the Exhibit Hall with Poster Viewing

6:15 End of Day

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BIODETECTION TECHNOLOGIES: BIOTHREAT AND PATHOGEN DETECTION (CONT.)

TUESDAY, JUNE 28

8:00 am Morning Coffee

RAPID AND FUTURE TECHNOLOGIES FOR BIODETECTION (Cont.)

8:25 Chairperson's Opening Remarks

Harshini Mukundan, Ph.D., Principal Investigator and Team Leader, Chemistry, Los Alamos National Laboratory

8:30 High-Consequence Bacterial Pathogen Identification and Database Development with MALDI-TOF Mass Spectrometry

Dobryan Tracz, Biologist, Bioforensics Assay Development and Diagnostics Section, National Microbiology Laboratory at the Canadian Science Centre for Human and Animal Health, Public Health Agency of Canada, Government of Canada

MALDI-TOF mass spectrometry-based identification of high-consequence bacterial pathogens is limited by the availability and quality of databases. A high-quality local database, containing mass spectral profiles (MSP) of biothreat bacterial agents and near-neighbour species, was developed according to Bruker Daltonics custom library generation standards. Biothreat agent MSPs were created in Biotyper software, used to verify a MALDI-TOF MS method for bacterial identification, and assessed for possible species-specific biomarker peaks.

9:00 Nanotrap Hydrogel Microparticle Detection of *Francisella Tularensis*

Monique van Hoek, Ph.D., Associate Professor, School of Systems Biology, George Mason University

This research highlights a new proteomics-based approach to the detection of *Francisella*, a biothreat bacteria. Nanotraps are hydrogel microparticles containing various chemical baits, and the Nanotraps can bind, protect and concentrate biomarkers, proteins and bacterial antigens from complex biological solutions. We have used Nanotraps to bind *Francisella* antigens from complex biological solutions and have determined that *Francisella*-specific antigens are captured by the Nanotraps.

9:30 Sponsored Presentation (Opportunity Available)

10:00 Coffee Break in the Exhibit Hall with Poster Viewing

10:45 Bioforensic and Biosurveillance Analysis System to Address Interoperability, Accuracy and Speed for Microbial Attribution

Willy Valdivia-Granda, Ph.D., CEO, Orion Integrated Biosciences

We developed a computational analysis system to accurately establish intra- and interspecies relationships of more than 380,000 known taxonomies. We demonstrate the performance of RIGELmtp using DNA from culture of *Francisella tularensis*, *Bacillus anthracis*, *Burkholderia* spp., Ebola, African Swine Fever and Foot-and-Mouth Disease viruses and more than 1,000 clinical, biological and environmental metagenomic samples. We will discuss the implications of our work in bacterial and viral strain and species disambiguation, correction, genomic-based characterization for bioforensics and biosurveillance.

11:15 A New Model for Quantifying Salmonella Levels in Poultry Carcass Treatment under Variable Thermal Conditions

Pramod K. Pandey, Ph.D., Faculty/Specialist, Department of Population Health and Reproduction, School of Veterinary Medicine, University of California, Davis

Non-uniform temperature distribution during thermal treatment of carcasses enhances the likelihood of pathogen survival in the processed products. Measurement of pathogen levels in samples subjected to variable temperatures, however, is tedious and hence inactivation of pathogens is difficult to verify in such conditions. The proposed mathematical model can be used to detect/enumerate *Salmonella* levels during carcass treatment under non-uniform processing temperature.

11:45 Detection Method Assessment Tool for Chemical, Biological, and Radiological Agents

Penny Norquist, Project Manager, The Food Protection and Defense Institute, University of Minnesota

The Food Protection and Defense Institute (FPDI) has developed a tool to assess detection methods for agents based on their applicability for an intended application. Twenty-three performance attributes are categorized as Outstanding, Excellent, Satisfactory, or Limited based on agent type and parameters specified by SME workgroups. The importance of each attribute is ranked based on the agent type and application (Screening vs. Confirmatory). The tool can be applied to current or future methods.

12:15 pm Luncheon Presentation (Sponsorship Opportunity Available) or Lunch on Your Own

PLENARY SESSION: TRANSLATION OF BIODETECTION TECHNOLOGIES TO FIELD READY APPLICATIONS

1:40 Chairperson's Opening Remarks

Tom Slezak, Ph.D., Distinguished Member of the Technical Staff, Pathogen Bioinformatics, Lawrence Livermore National Laboratory

» 1:45 KEYNOTE PRESENTATION: BIOWATCH: THE FUTURE OF BIODETECTION

Michael Walter, Ph.D., Detection Branch Chief & Program Manager, BioWatch, US Department of Homeland Security

This presentation will look at how BioWatch - the nation's only federally-owned, locally-operated nationwide program - is planning to enhance its technology to work towards faster detection times and save more lives. The program has engaged state and local stakeholders through focus groups to identify and prioritize technology enhancements that would enable mid- and long-term progress.

The current Ebola outbreak highlights the need for effective/rapid diagnostics for viral hemorrhagic fevers. However, several highly pathogenic viruses that present with similar pathology are endemic to similar regions and co-circulate with Ebola. Our group strives to provide research and development of diagnostics to affect time-to-answer, assay sensitivity, and ease of use to help diagnose these types of diseases.

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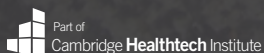
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BIODETECTION TECHNOLOGIES: BIOTHREAT AND PATHOGEN DETECTION (CONT.)

2:30 Translation Challenges in POC Field Readiness: Strategies and Case Studies on Translation of New and Rapid Biodetection Technologies from Lab to Field and Clinic

Alina Deshpande, Ph.D., Senior Scientist/Team Leader, Analytics Intelligence and Technology Division, Los Alamos National Laboratory

I will present case studies for POC immunoassays and multiplex assays applied to infectious disease detection and surveillance, and review specific successes/challenges like the influence of the Ebola crisis in West Africa on development of POC diagnostics for neglected tropical diseases. Specific approaches/strategies to overcome the "valley of death" between POC R&D and translation of novel technologies to field readiness will also be presented.

3:00 Bulk Acoustic Wave (BAW) Bio-Sensor Technology for Liquid Environments

Florian Bell, Sensor System Integration, Qorvo

Qorvo BAW enables ubiquitous deployment of liquid-based biosensors. Multi-GHz arrays use advanced addressing schemes and signal processing to enable several firsts in measurement performance, density, mobility, and distributed sensing—creating radical new approaches towards countermeasure development for biological and chemical threats to aid the warfighter and ensure USA national security.

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3:30 Panel Discussion: Challenges and Opportunities in Translation of Biodetection Technologies

Moderator:

Tom Slezak, Ph.D., Distinguished Member of the Technical Staff, Pathogen Bioinformatics, Lawrence Livermore National Laboratory

Panelists:

Timothy D. Minogue, Ph.D., Chief, Molecular Diagnostics Department, Division of Diagnostic Systems, U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)

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Harshini Mukundan, Ph.D., Principal Investigator and Team Leader, Chemistry, Los Alamos National Laboratory

Michael Walter, Ph.D., Detection Branch Chief & Program Manager, BioWatch, US Department of Homeland Security

3:45 Close of Conference

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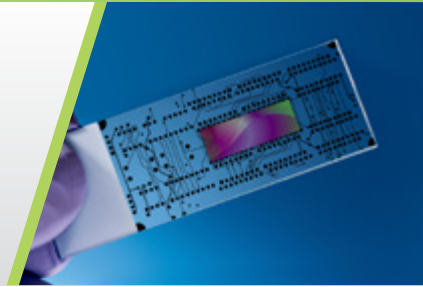
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The Knowledge Foundation's 24th International

Biodetection Technologies: Point-of-Care for Biodefense



TUESDAY, JUNE 28

11:15 am Registration

12:15 pm Luncheon Presentation (*Sponsorship Opportunity Available*)
or Lunch on Your Own

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and Case Studies on Translation of New and Rapid Biodetection
Technologies from Lab to Field and Clinic**

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**3:30 Panel Discussion: Challenges and Opportunities in Translation of
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Moderator:

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Michael Walter, Ph.D., Detection Branch Chief & Program Manager, BioWatch, US Department of Homeland Security

3:45 Refreshment Break in the Exhibit Hall with Poster Viewing

4:15 miRNA Host Response During Ebola Virus Infection

Janice Duy, Ph.D., NRC Postdoctoral Fellow, Molecular Diagnostics Department, U.S. Army Medical Research Institute of Infectious Diseases

Early detection of Ebola virus (EBOV) infection is essential to breaking transmission chains and adjudicating treatment. However, current methods rely on viral identification, which can misdiagnose pre- and asymptomatic individuals. In contrast, disease-driven alterations in the host transcriptome can be exploited for pathogen-specific biomarkers. We have identified EBOV-induced changes in circulating miRNA populations of nonhuman primates and humans, and present a proof-of-principle miRNA classifier of disease.

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Dinner Workshops

Biodetection Technologies:
Biothreat and Pathogen Detection

Biodetection Technologies:
Point-of-Care for Biodefense

Biosurveillance Integration

Sample Prep Technologies

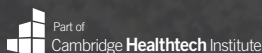
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BIODETECTION TECHNOLOGIES: POINT-OF-CARE FOR BIODEFENSE (CONT.)

4:45 Pathogen Biomarkers for Rapid Clinical Diagnosis in POC

Harshini Mukundan, Ph.D., Principal Investigator and Team Leader, Chemistry, Los Alamos National Laboratory

Direct measurement of virulence factors secreted by pathogens in a host during active infection for the effective diagnosis of infection in a POC setting. Our team has developed novel assay strategies to measure complex pathogen signatures in the background of the host (blood, urine, serum). Application of these strategies using a waveguide-based biosensor platform developed at LANL to the diagnosis of tuberculosis and other diseases will be presented.

5:15 End of Day and Workshop Registration

5:30 Suggested Dinner Workshop*

RAPID SAMPLE PREPARATION FOR PATHOGEN DETECTION

*Separate registration required; click [here](#) for details

WEDNESDAY, JUNE 29

8:00 am Morning Coffee

TOOLS AND TECHNOLOGIES AT THE POINT-OF-CARE

8:25 Chairperson's Opening Remarks

Weihua Guan, Ph.D., Assistant Professor, Electrical Engineering, Pennsylvania State University

8:30 Drop-n-Go Malaria Molecular Diagnosis

Weihua Guan, Ph.D., Assistant Professor, Electrical Engineering, Pennsylvania State University

To efficiently profile parasite carriers quickly in resource-limited regions during the course of malaria elimination, we propose a mobile molecular diagnostic system. The battery-powered, low power consumption and handheld instrument offers unprecedented integration of GPS location and cloud-based databases with smartphone connectivity. This versatile molecular diagnostic platform can be widely disseminated to a variety of other situations that demand portability, connectivity and ease-of-use.

9:00 A Smartphone Colorimetric Microplate Reader for Point-of-Care ELISA Quantification

Qingshan Wei, Postdoctoral Scholar, Electrical Engineering, Bioengineering, University of California, Los Angeles

We developed a cost-effective and handheld smartphone-based colorimetric microplate reader for rapid digitization and quantification of immunoserology-related ELISA tests in a conventional 96-well plate format. Using this post-of-care (POC) testing platform, we quantified four different FDA-approved ELISA tests (mumps IgG, measles IgG, HSV-1, and HSV-2) in a clinical microbiology lab using 1138 remnant patient samples and achieved >~99% accuracy for each ELISA test.

9:30 Selected Poster Presentation: Smart Phone-Enabled Diagnostic Platform for Detection of Pathogen Nucleic Acids

Robert J. Meagher, Ph.D., Biotechnology and Bioengineering Department, Sandia National Laboratories

Toward the aim of creating simple but robust distributed diagnostics for infectious diseases, we present innovations in isothermal nucleic acid amplification,

microfluidic device design, and smart phone-based assay detection. We have created a smart phone app that simplifies instrumentation for molecular diagnostics by controlling assay operation, scoring, and data archiving. We are presently employing our techniques to survey for mosquito-borne viruses, and to detect febrile pathogens such as Ebola.

10:00 Coffee Break in the Exhibit Hall with Poster Viewing

ADVANCES IN FIELDABLE TECHNOLOGIES AND ASSAYS

10:45 NGS Microbial Forensics at the Point-of-Need

Tom Slezak, Ph.D., Distinguished Member of the Technical Staff, Pathogen Bioinformatics, Lawrence Livermore National Laboratory

We have built and delivered computer systems that support complex NGS pathogen detection and characterization at the point-of-need, without assuming any network connectivity. Paired-end FASTQ input will be analyzed as metagenomic reads and also assembled to analyze as contigs. When coverage of a threat agent is sufficiently deep, phylogenetic analyses will be performed. Results are presented in user-friendly format with analysis details and confidence measures available.

11:15 Selected Poster Presentation: Cost effective Surveillance of Zoonotic Pathogens on Human/Animal Interface

Viacheslav Fofanov, Ph.D., Assistant Professor, Informatics and Computing Program, Department of Mathematics and Statistics, Northern Arizona University

Nearly two thirds of human-affecting pathogens are zoonotic and more than 70% of these either originate in wildlife or use animal populations as disease reservoirs. Pathogen surveillance in wildlife, remains difficult and costly, particularly in free-ranging or elusive animal. We have designed and are currently implementing and validating a high-throughput, highly-scalable, and inexpensive multi-pathogen PCR-amplicon sequencing-based panels to leverage the power of High Throughput Sequencing techniques in wildlife surveillance.

11:45 Sponsored Presentation (Opportunity Available)

12:15 pm Networking Luncheon

ADVANCES IN FIELDABLE TECHNOLOGIES AND ASSAYS (Cont.)

1:40 Chairperson's Opening Remarks

Tania Konry, Ph.D., Assistant Professor, Pharmaceutical Sciences, Northeastern University

1:45 Advancing Bacteriophage-Based Detection of Pathogens

Sam Nugen, Ph.D., Associate Professor, Food Science, University of Massachusetts, Amherst

The use of bacteriophages for pathogen detection has shown significant promise in recent years. As new tools in synthetic biology are developed, the ability to design the next generation of bacteriophage-based sensors and separators. We have developed detection schemes to streamline the sample-to-results and minimize the limit of detection of these assays. These improvements allow a portable, easy-to-use and low-cost sensor platform without sacrificing performance.

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BIODETECTION TECHNOLOGIES: POINT-OF-CARE FOR BIODEFENSE (CONT.)

2:15 ScanDrop Platform for Microbial Detection and Phenotypic drug Analysis

Tania Konry, Ph.D., Assistant Professor, Pharmaceutical Sciences, Northeastern University

We have developed novel microfluidic technology: ScanDrop for specific identification of pathogens of interest directly from patient sample. The developed biotechnology will accelerate diagnosis through multiplex pathogen and inflammatory cytokine detection, along with rapid (< 1 hour) antibiotic susceptibility testing (AST), thereby identifying patients requiring aggressive therapy and optimizing antibiotic treatment.

2:45 Outer Membrane Vesicles Protect Encapsulated Enzymatic Function for Implementation at the Point-of-Care

Nathan J. Alves, Ph.D., Research Associate, Center for Bio/Molecular Science and Engineering, Naval Research Laboratory

All bacteria secrete outer membrane vesicles (OMV) serving functions from cell-cell communication to packaging of virulence factors and genetic material. Utilizing synthetic biology techniques, bacteria can be programmed to produce, package and secrete enzymes encapsulated within OMVs. The intra-OMV microenvironment maintains enzyme activity, compared to free enzyme, when subjected to elevated temperatures, freeze-thaw, lyophilization, and from proteases making them ideal reagents for use at Point-of-Care.

3:15 Dessert Break in the Exhibit Hall with Poster Viewing

4:00 Microfluidic Analysis of Circulating Exosomes toward Clinical Diagnosis of Cancer

Yong Zeng, Ph.D., Assistant Professor, Department of Chemistry, University of Kansas

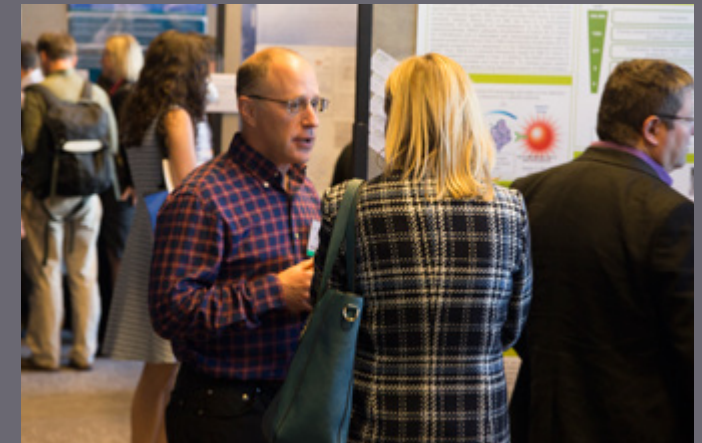
Probing circulating exosomes is an emerging paradigm of non-invasive blood-based tests for screening/early detection of cancer and monitoring of treatment response. However, rapid isolation and molecular analysis of exosomes remain challenging. We have developed a simple and low-cost microfluidic device which enables selective capture of exosomes directly from human plasma and multiplexed detection of tumor-associated peroxosomal protein biomarkers. This device features simple chip design and robust operation, which affords the potential adaptability to the clinical utilities at the point-of-care settings.

4:30 Close of Conference

Gain Further Exposure for Your Research Present a Poster at the Biodefense World Summit

The Knowledge Foundation encourages attendees to gain further exposure by presenting their work in the poster sessions. To secure a poster board and inclusion in the conference materials, your abstract must be submitted, approved and your registration paid in full by May 20, 2016.

Poster Inquiries: jring@healthtech.com



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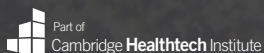
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The Knowledge Foundation's 5th International

Biosurveillance Integration

Integrated Management of Threats to
Public Health & Safety



THURSDAY, JUNE 30

7:25 am Registration and Morning Coffee

RISK ANTICIPATION

8:25 Chairperson's Opening Remarks

David L. Hirschberg, Ph.D., Lecturer and Scientist, Department of Interdisciplinary Arts and Sciences and the Institute of Global Engagement, University of Washington, Tacoma

» 8:30 KEYNOTE PRESENTATION: SUCCESS AND HURDLES IN BSV KNOWLEDGE EXCHANGE: BEYOND COLLECTING DATA SETS

Aaron M. Firoved, Ph.D., Director, National Biosurveillance Integration Center, U.S. Department of Homeland Security

Knowledge integration goes beyond traditional data aggregation from various entities. Knowledge integration begins with well-defined relationships between end-users and data owners with a path towards accessibility, analytics, and decision support. This talk will address recurring obstacles that plague constructive knowledge exchange between interagency partners and highlight real-world processes and capabilities that have proven successful.

9:00 Climate Change, Emerging Infectious Diseases and Community Health Resilience: The Need for Early Warning

Jeffrey Stiefel, Ph.D., Executive Coordinator, Climate Change and Health Resilience, U.S. Department of Homeland Security

In the U.S., we can expect wide variations in geographical distribution of food and waterborne illnesses and other infectious diseases. There are concerns that climate change may provide opportunities for pathogens to expand or shift their geographic ranges. What can be done to provide communities and public health relevant advanced and/or near real time information on varying disease threats to local and regional populations in widely disparate geographical locations.

THREAT IDENTIFICATION & CHARACTERIZATION

9:30 Third Generation Sequencing for Rapid Biosurveillance

Dave Ussery, Ph.D., Comparative Genomics Group Lead, Biosciences Division, Oak Ridge National Laboratory

Portable 'third generation' sequencing technologies can allow for rapid determination of DNA sequences from environmental samples, with quite long read lengths (10,000 bp or longer). We present 'proof of principle' results from

known samples, showing that this emerging technology can rapidly detect viruses, bacteria and other organisms from an environmental isolate, in real time.

10:00 Networking Coffee Break in the Ballroom Foyer

10:45 Wearable Technologies: A Paradigm Shift for the Department of Defense

Nicole Rosenzweig, Ph.D., BioDefense Branch Chief, Edgewood Chemical Biological Center, U.S. Army

Imagine entering an environment immunologically naive to the pathogen flora and without detection assays optimized for the new environment. This is the norm for the Department of Defense. While research continues to expand our detection capacities in these environments, personal health monitoring can be immediately improved. By leveraging the substantive commercial market in wearable technologies, an opportunity exists to rapidly improve the readiness of our warfighting by improving decision and threat awareness in this environment.

11:05 Developing a Strategy for Rapid Response to Emerging Threats: Evaluation of New Molecular Technologies, Comparison with Existing Best Practices, Training with Model Public Health Scenarios and Anticipating the Unexpected

David L. Hirschberg, Ph.D., Lecturer and Scientist, Department of Interdisciplinary Arts and Sciences and the Institute of Global Engagement, University of Washington, Tacoma

Emerging infectious diseases include new or unrecognized diseases, those that are spreading to new geographic areas and hosts, as well as those that are re-emerging. In this talk, I will separate data from hysteria and discuss ideas that could lead to better policy decisions for world agencies, international businesses, local governments, and individuals when faced with an emerging infection.

11:25 Cataloging the World? The Future of Biosurveillance

Calvin Chue, Ph.D., Research Biologist, U.S. Army Edgewood Chemical Biological Center; Adjunct Professor, Johns Hopkins University

Biosurveillance requires a cohesive, concerted effort that spans the world community. Scientific data belongs to all of humanity, but privacy, commercial utility and security considerations must be accounted for. Binomial classification has proven benign, will the same be said of biosurveillance?

11:45 A National Approach To Sustainable Syndromic Surveillance

Chelsea Wright Thompson, Ph.D., ORISE Fellow, Agriculture Defense Branch, Chemical and Biological Defense Division, Science & Technology Directorate, U.S. Department of Homeland Security

12:15 pm Networking Luncheon

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INTEGRATION ANALYSIS & SHARING

1:40 Chairperson's Opening Remarks

Dave Ussery, Ph.D., Comparative Genomics Group Lead, Biosciences Division, Oak Ridge National Laboratory

1:45 Integrative Biosurveillance in High Burden of Disease Populations

Harshini Mukundan, Ph.D., Team Leader, Chemistry Division, Los Alamos National Laboratory

Consideration of external factors is critical to the success of diagnostic methodologies and biosurveillance strategies when deployed in high-disease burden populations. Without focusing on a particular pathogen, we have chosen to study the interplay between the most abundant diseases in a pediatric population and present novel insights with respect to findings, understanding and issues with effective biosurveillance in this population.

2:15 A Next Generation Biosurveillance Application for Big Data Integration and Analysis

Payam Etmnani, Co-founder and Managing Partner, Bitscopic, Inc

This presentation is a case study of a software system successfully deployed at the US Veterans Administration (VA) which successfully addresses biosurveillance integration issues. The real work begins with processing of vast volumes of data in real-time and performing a meaningful analysis that reliably alerts operators of genuine threats and arms them with the necessary information to respond to threats in time.

2:45 Sponsored Presentation (Opportunity Available)

3:15 Refreshment Break

3:30 Enhancing Analytics through Standards, Policy and Interoperable Product Line

Michael Ricciardi, Managing Partner, Computer Science, Relevant Technology, Inc.

By adopting standards for data processing and algorithm development, we expedite the ability to gather, process and increase accuracy of actionable intelligence and situational awareness for early detection of natural and nefarious bio events.

4:00 PANEL DISCUSSION: Biosurveillance Integration - Challenges and Opportunities for Integrated Management of Threats to Public Health & Safety

Moderator: David L. Hirschberg, Ph.D., Lecturer and Scientist, Department of Interdisciplinary Arts and Sciences and the Institute of Global Engagement, University of Washington, Tacoma

Panelists: Nicole Rosenzweig, Director, Joint Program Executive Office for Chemical & Biological Defense, U.S. Department of Defense

Harshini Mukundan, Ph.D., Team Leader, Chemistry Division, Los Alamos National Laboratory

A well-integrated national biosurveillance enterprise can save lives by providing essential information for better decision making at all levels. This panel will explore how technological advances can be implemented to further address the biosurveillance core functions of aberration detection, risk anticipation, threat identification and characterization and information integration, analysis and sharing.

5:00 Close of Conference

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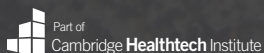
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The Knowledge Foundation's 10th International

Sample Prep Technologies

Sample Preparation for Virus, Toxin
& Pathogen Detection & Identification



TUESDAY, JUNE 28

12:15 pm Registration

ADVANCES IN PREANALYTICAL PROCESSING

1:40 Chairperson's Opening Remarks

Michael Heller, Ph.D., Professor, Departments of Bioengineering and Nanoengineering, University of California, San Diego

» 1:45 KEYNOTE PRESENTATION: EBOLA OUTBREAK 2014-2015: EXPERIENCES FROM THE FIELD IN SAMPLE PREPARATION AND RAPID DIAGNOSIS

Lt. Col. Kurt Schaefer, Ph.D., Deputy Director, Division of Medicine, USAMRIID, U.S. Army Medical Research Institute of Infectious Diseases

This brief is a summary of the 2 different time periods during the Ebola Outbreak response; July-August 2014 and November 2014 to January 2015. I describe the steps taken to set up a clinical diagnostic laboratory focused on generating results from patients for outbreak control and the differences between the two different time periods.

2:15 Tissue Prints for High Quality RNA and DNA Samples without Damaging the Original Tissue

Sandra Gaston, Ph.D., Principal Investigator, Tufts Medical Center, and Scientific Director of the TMC Biorepository, Director of Urological Research, New England Baptist Hospital

Our laboratory has developed a set of tissue print technologies that offer an innovative and practical approach to obtaining high quality RNA and DNA from biopsies and other "high value" specimens without compromising pathology diagnosis. In this presentation, we will describe how tissue print technologies have allowed us to take a "biopsy focused" approach to cancer biomarker discovery and validation.

2:45 System Integration as a Critical Requirement for Microfluidic Sample Processing

Maxim Shusteff, Ph.D., Principal Investigator, Microfluidic Sample Preparation Project, Lawrence Berkeley National Lab*

In order to exploit the advantages and benefits of microfluidic technologies, at least equivalent effort and attention must be devoted to system-level design and integration, as to the microfluidic device itself. Here, we present platform-level design considerations for microfluidic sample processing, and their implementation in two example systems in which a microfluidic device is embedded. *With contributions from Erika J. Fong.

3:15 Biological Sampling and Detection in a Functional Training Exercise Using a Non-Threat Surrogate Material in Place of Attenuated Biothreat Agents

Nancy J. Lin, Ph.D., Biomedical Engineer, Biomaterials Group, Biosystems and Biomaterials Division, Material Measurement Laboratory, National Institute of Standards and Technology

3:45 Refreshment Break in the Exhibit Hall with Poster Viewing

4:15 Engineered Protein Nanopores for Challenging Tasks in Molecular Diagnosis

Liviu Movileanu, Ph.D., Director of Structural Biology, Biochemistry and Biophysics Graduate Program, Director of Undergraduate Program in Biophysical Science, Syracuse University

Protein nanopore-based sensing elements represent a pressing demand in molecular biomedical diagnosis. Here, I will present a strategy for improving the stability of a redesigned protein nanopore using ferric hydroxamate uptake component A, an outer membrane protein of *E. coli*. Future membrane protein design developments will serve as a platform for the integration of robust protein components into devices.

4:45 Purifying High Molecular Weight DNA from Challenging Samples

Thomas Lum, Manager, Aurora Product Specialist, Boreal Genomics

A major challenge in nucleic acid sample preparation is the separation of DNA and RNA from contaminants that co-purify when using common extraction methods. Here we present a unique method for the separation of nucleic acids based on the nonlinear response of long, charged polymers to electrophoretic fields. We will also discuss examples of user applications that have been enabled by the Aurora system using SCODA technology.

5:15 End of Day and Workshop Registration

5:30 Suggested Dinner Workshop*

RAPID VACCINE TECHNOLOGIES WORKSHOP – THERAPEUTICS FOR EMERGING AND RE-EMERGING INFECTIOUS DISEASES

*Separate registration required; click [here](#) for details

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SAMPLE PREP TECHNOLOGIES: SAMPLE PREPARATION FOR VIRUS, TOXIN & PATHOGEN DETECTION & IDENTIFICATION (CONT.)

WEDNESDAY, JUNE 29

8:00 am Morning Coffee

TARGET ENRICHMENT AND CLINICAL TEST VALIDATION

8:25 Chairperson's Opening Remarks

Alexis Sauer-Budge, Ph.D., Senior Research Scientist, Fraunhofer Center for Manufacturing Innovation and Adjunct Research Assistant Professor, Biomedical Engineering, Boston University

8:30 Rapid Phenotypic Methods for Diagnosing Infections and Antibiotic Susceptibility Testing

Alexis Sauer-Budge, Ph.D., Senior Research Scientist, Fraunhofer Center for Manufacturing Innovation and Adjunct Research Assistant Professor, Biomedical Engineering, Boston University

Traditionally, bacterial pathogens have been identified using culture-based methods that can take several days to obtain results. This can lead to physicians making treatment decisions based on an incomplete diagnosis. To decrease diagnosis time, we are developing novel devices and methods for isolating, concentrating, and detecting dilute viable pathogens and coupling these with novel downstream detection modalities.

9:00 System for Rapid Isolation and Detection of DNA/RNA/ Exosome Biomarkers: "Sample to Answer" Molecular Diagnostics

Michael Heller, Ph.D., Professor, Departments of Bioengineering and Nanoengineering, University of California, San Diego

New AC dielectrophoretic (DEP) microarray devices now allow rapid isolation and detection of important circulating cell free (ccf) DNA, ccf-RNA and exosome biomarkers directly from hematological and solid tumor cancer patient blood, plasma and serum samples. This new DEP technology combines sample preparation and biomarker detection into a viable "sample to answer" solution for molecular diagnostics.

9:30 Developing Biospecimen Evidence-Based Practices

Helen M. Moore, Ph.D., Chief, Biorepositories and Biospecimen Research Branch, Cancer Diagnosis Program, Division of Cancer Treatment and Diagnosis, National Cancer Institute

The National Cancer Institute has led the way in developing Best Practices for Biospecimen Resources, sponsoring new research in Biospecimen Science, and building groundbreaking research biospecimen collections including postmortem biospecimens for the NIH GTEx program. New projects to build evidence-based best practices for frozen and FFPE tissues will be described.

10:00 Coffee Break in the Exhibit Hall with Poster Viewing

10:45 High Efficiency Plasma Separation and Smartphone-Based Molecular Diagnostics at Point-of-Care

Changchun Liu, Ph.D., Research Assistant Professor, Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania

Rapid diagnosis of pathogens and diseases at the point-of-care is critical for prompt and appropriate therapeutic intervention. In this talk, I will present our recent efforts towards the development of an integrating point-of-care molecular diagnostics system, including high efficiency plasma separators, integrated

microfluidic devices for nucleic acid extraction and endpoint quantification, and smartphone-based molecular diagnostics.

11:15 Smartphone-Operated Handheld Microfluidic Liquid Handling System for Biodetection

Zhenyu Li, Ph.D., Assistant Professor, School of Engineering & Applied Science, The George Washington University

Microfluidics and lab-on-a-chip technologies have enabled sophisticated liquid manipulation. However, most current microfluidic platforms still rely on off-chip infrastructures such as pressure sources, computers and high voltage generators to achieve their functions. In this talk, I will present a smartphone-operated handheld microfluidic liquid handling system which can automatically perform all the sample mixing, incubation and washing steps of a bead-based immunoassay without human intervention.

11:45 Sponsored Presentation (Opportunity Available)

12:15 pm Networking Luncheon

SYSTEMS ADVANCEMENTS FROM SAMPLE TO DIAGNOSIS

1:40 Chairperson's Opening Remarks

Michael Connolly, CEO, Integrated Nano-Technologies

1:45 3D Microfluidic Combinatory Chip for High-Throughput Drug Screening

Weihua Guan, Ph.D., Assistant Professor, Electrical Engineering, Pennsylvania State University

Despite the great progress on microfluidic based high throughput drug screening, many challenges still exist such as handling sequential assay steps and facile, automatic multiplexed sample loading. To tackle this challenge, we have developed a novel and low cost 3D microfluidic combinatory chip with arbitrary assay steps and minimal hands-on requirement. We applied this paradigm-shifting technology to drug-resistant Malaria parasite and the results are compared with conventional assays.

2:05 Sample to Result Molecular Food Safety Test in 30 Minutes for \$10

Vincent Gau, Ph.D., President, Genefluidics, Inc.

Currently, there are no accurate and economical ways to address food safety at the point of sale locations, such as fast food chain stores, supermarkets, and restaurants. Our technology enables rapid identification of unique sequences of targeted foodborne pathogens by ordinary food handlers. Overall, our technology is a powerful and efficient way to rapidly and accurately identify foodborne pathogens at an affordable price.

2:25 Biostabilization Methods in Sample Preparation, Banking, Storage, and Shipment: Comparison of Different Approaches

Igor I. Katkov, Ph.D., Chief Scientific Officer, Celltronix

Biostabilization is an essential part of any bioprocessing, which includes banking, storage, shipment of biological sample as they tend to perish/degrade over the time if not properly biostabilized. This presentation will discuss the basic thermodynamics and compare all approaches and their pro's and con's particularly for the biodefence applications

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2:45 High Throughput Simple Sample Preparation for Rapid High Resolution Glycan Analysis by Capillary Electrophoresis on DNA Sequencers

Jenkuei Liu, Ph.D., Senior Staff Scientist, Thermo Fisher Scientific

We developed a rapid glycan analysis process including simple high throughput sample preparation, automatic purification of glycans with magnetic beads, three fluorescent dyes, high throughput capillary electrophoresis, and rapid data analysis software. Analysis of 96 samples with profiles and relative quantities of glycans can be finished in 9 hours, in contrast to the current 5 days.

3:15 Dessert Break in the Exhibit Hall with Poster Viewing

4:00 PANEL DISCUSSION: Challenges and Opportunities in Advanced Sample Preparation

Moderator:

Michael Heller, Ph.D., Professor, Departments of Bioengineering and Nanoengineering, University of California, San Diego

Panelists:

Michael Connolly, Ph.D., CEO, Integrated Nano-Technologies

Maxim Shusteff, Ph.D., Principal Investigator, Microfluidic Sample Preparation Project, Lawrence Berkeley National Lab

Dave Alberty, CEO, InnovaPrep

Innovative sample prep and target enrichment can significantly increase the sensitivity and repeatability of clinical tests. The panel will explore novel robust sampling and bioforensic techniques in applications for biodefense, field & point-of-care biomedical & clinical applications, food & water testing, and environmental & agricultural sampling.

5:00 Close of Conference

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Third Annual Knowledge Foundation

Rapid Detection for Food Safety

Advances in Microbial Detection,
Characterization and Process Validation

CO-LOCATED
EVENT

MONDAY, JUNE 27

7:00 am Registration and Morning Coffee

8:25 Chairperson's Opening Remarks

Arun Bhunia, Ph.D., Professor of Food Microbiology, Department of Food Science, Purdue University

8:30 KEYNOTE PRESENTATION: THE CHANGING LANDSCAPE OF FOOD SAFETY IN PUBLIC HEALTH – GENOMICS AND METAGENOMICS

Peter Gerner-Smidt, M.D., DMS, Chief, Enteric Disease Laboratory Branch, Division of Foodborne, Waterborne and Environmental Diseases, United States Centers for Disease Control (CDC)

The role of public health in food safety is to monitor trends in and detect, investigate, and control outbreaks of foodborne illnesses in humans. Using information generated from whole genome sequences of cultures, metagenomic assays that include sequencing the pathogens directly from the clinical specimen will be designed to ideally provide the same information that is generated by whole genome sequencing of cultures.

METHODS OVERVIEW

9:00 Rapid Methods - Where They Come From and How They Have Impacted Food Testing

Peter Feng, Ph.D., Research Microbiologist, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration

The FDA is responsible for ensuring the safety of food that enters into "interstate" commerce. The assessment that foods are free of pathogens relies heavily on testing, hence method development tends to evolve parallel to food safety regulations. Rapid methods are more sensitive than conventional assays, but the increased sensitivity has also created interesting challenges and problems for the regulatory agencies and the food industry.

9:30 Culture-Independent Methods for Food Safety

Bart Weimer, Ph.D., Professor, Director, Population Health and Reproduction, University of California, Davis

Use of genome and metagenome tools are moving quickly for food safety applications. Additionally, use of capture and concentration methods are gaining acceptance for pathogen detection directly from foodstuffs. These new methods are not widely adopted by the food industry, yet are being adopted for regulation. This session will provide practical insights and method evaluation for this new area of food safety.

10:00 Coffee Break in the Ballroom Foyer

10:30 Recent Developments in Rapid, Immunoassay-Based Methods for Shiga Toxin-Producing *E. coli* and Shiga Toxin

Andrew Gehring, Ph.D., Research Chemist, Lead Scientist at USDA, Agricultural Research Service, Eastern Regional Research Center, United States Department of Agriculture (USDA)

11:00 Paper-Based Analytical Devices for Detection of Foodborne Bacteria

Bledar Bisha, Ph.D., Assistant Professor, Food Microbiology, University of Wyoming
Paper-based analytical devices (μ PADs) are detection platforms which offer easy-to-use and inexpensive alternatives to current diagnostic methods used in food microbiology. A comprehensive summary of recent developments in μ PAD-based detection of foodborne bacteria will be presented, including strategies to enhance sensitivity and specificity, enhanced sample preparation, and the potential role these devices can occupy as a tool in field-based diagnostics.

11:30 Sponsored Presentation (Opportunity Available)

12:00 pm Luncheon Presentation (Sponsorship Opportunity Available) or Lunch on Your Own

OPTICAL METHODS & SPECTROSCOPY FOR FOOD SAFETY

1:55 Chairperson's Opening Remarks

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Biodetection Technologies:

Biothreat and Pathogen Detection

Biodetection Technologies:

Point-of-Care for Biodefense

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RAPID DETECTION FOR FOOD SAFETY (CONT.)

2:00 Advances in Flow Cytometry for Rapid Detection of Foodborne Pathogens

Byron Brehm-Stecher, Ph.D., Associate Professor, Rapid Microbial Detection & Control Laboratory, Iowa State University

Flow cytometry (FCM) is an instrumental tool for rapid detection and characterization of microbial cells based on their light scatter and fluorescence properties. Although FCM was developed originally for analysis of relatively large mammalian cells, it is finding increased use by microbiologists, including food microbiologists. An overview of FCM's use in microbiology, including the latest advances in FCM technology and data analysis techniques, will be provided.

2:30 Optical Scattering Sensor for Label-Free Rapid Detection of Pathogen and Indicator Bacterial Colonies on Petri-plate

Arun Bhunia, Ph.D., Professor of Food Microbiology, Department of Food Science, Purdue University

The laser optical sensor, designated BARDOT (bacterial rapid detection using optical scattering technology) has been shown to directly identify bacterial colonies on Petri-plate without any probes or labeling reagents. BARDOT has been successfully used for detection of Enterobacteriaceae and coliforms, which are widely used as "indicators" for pathogen contamination to evaluate microbiological quality and safety, and to assess sanitary and hygienic practices employed during food production, preparation, handling and storage.

3:00 Rapid and Reagent-Free Identification of Antibiotic-Resistant Nosocomial Bacteria by Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy

Jacqueline Sedman, Ph.D., Assistant Professor, Food Science and Agricultural Chemistry, McGill University

The capability of ATR-FTIR spectroscopy to discriminate between antibiotic-resistant and susceptible strains in the absence of antibiotic such as VRE and MRSA provides a new rapid and reagent-free method that can contribute to timely diagnosis of antibiotic-resistant nosocomial infections.

3:30 Refreshment Break in the Exhibit Hall with Poster Viewing

4:15 PANEL DISCUSSION: Rapid Detection Methods for Food Safety: Overcoming Barriers to Implementation

Moderators:

Arun Bhunia, Ph.D., Professor of Food Microbiology, Department of Food Science, Purdue University

Byron Brehm-Stecher, Ph.D., Associate Professor, Rapid Microbial Detection & Control Laboratory, Iowa State University

Panelists:

Gary R. Acuff, Ph.D., Professor and Texas A&M AgriLife Research Faculty Fellow; Director, Center for Food Safety, Texas A&M University

Bart Weimer, Ph.D., Professor, Director, Population Health and Reproduction, University of California, Davis

Rapid detection methods are critical in insuring the safety of consumers and avoid costly product recalls. This panel will explore the latest rapid detection methods for food safety, discuss the pros and cons of each method and examine the challenges to overcome the barriers to implementation.

5:15 Welcome Reception in the Exhibit Hall with Poster Viewing

6:15 End of Day

TUESDAY, JUNE 28

8:00 am Morning Coffee

8:25 Chairperson's Opening Remarks

» 8:30 KEYNOTE PRESENTATION: HOW TO VALIDATE PROCESS CONTROL WHEN YOU CAN'T FIND PATHOGENS: USING INDICATORS AND SURROGATES

Gary R. Acuff, Ph.D., Professor and Texas A&M AgriLife Research Faculty Fellow; Director, Center for Food Safety, Texas A&M University

It is increasingly important to assure that process interventions to control pathogenic bacteria are functioning correctly and achieving desired goals. Validation is a fundamental part of HACCP, and processors who currently have HACCP plans in place should validate their plans and process control as part of proper implementation. This presentation will provide a practical approach to developing validation protocols, specifically addressing the utilization of indicators or surrogate bacteria to estimate pathogen response to process controls.

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RAPID DETECTION FOR FOOD SAFETY (CONT.)

NANOTECHNOLOGICAL AND BACTERIOPHAGE-BASED APPROACHES FOR PATHOGEN DETECTION

9:00 New Advanced Colorimetric Assay Performed during the Enrichment Process for the Detection of Foodborne Pathogens

Bruce Applegate, Ph.D., Professor, Center for Food Safety Engineering, Purdue University

Methodology for the detection of foodborne pathogens requires an enrichment step which is the time sink in most protocols. A colorimetric method which exploits this step for detection has been developed for *E. coli* O157:H7. The method also allows for the selective recovery of the pathogen if present and can be developed for other organisms as well.

9:30 Cassette PCR for Rapid Detection of Pathogenic *Escherichia coli* in Meat

*Dammika P. Manage, Research Associate, University of Alberta**

Current detection and diagnostic techniques for food borne pathogens are time intensive and laborious. Here we show a PCR-based technique for the rapid identification of *E. coli* in beef. We employ a self-contained miniaturized device, called cassette PCR, a multi-test system for simultaneous detection of multiple pathogens or multiple markers of pathogenicity, in multiple samples. The cassette comprises an array of glass capillaries that hold desiccated gels that contain all reagents needed for PCR, including primers. Each capillary reaction unit detects one specific target, with multiple different capillaries in each cassette. The user need only add sample(s). The cassette design is flexible. The current cassette can analyze 7 samples simultaneously for 4 pathogenic markers along with negative and positive quality controls. Proprietary enrichment methods for cassette PCR avoid contributions by dead bacteria. The sensitivity of cassette PCR for screening spiked meat samples matches conventional "gold standard" methods. Cassette PCR can reliably detect 1-3 cfu in artificially spiked meat trim, based on fractional analysis. In contrast to the current techniques that can take up to 24h, cassette PCR can provide definitive results within a work shift. *Additional authors: Jana Lauzon, Patrick Ward, Patrick M. Pilarski, Linda M. Pilarski, Lynn M. McMullen

10:00 Coffee Break in the Exhibit Hall with Poster Viewing

10:45 Magnetophoretic Chromatography for the Detection of Pathogenic Bacteria with the Naked Eye

Sanghee Lee, Ph.D., Research Associate, Chemical Engineering, Pohang University of Science and Technology, Korea

A facile and sensitive analytical method that uses gold-coated magnetic nanoparticle clusters (Au/MNCs) and magnetophoretic chromatography with a precision pipet has been developed for the detection of Salmonella bacteria. Once the magnetophoretic chromatography process has been carried out for 10 min, the presence of 100 cfu/mL Salmonella bacteria can be detected with the naked eye.

11:15 A Disposable Cartridge for Automated Universal Sample Preparation System

Michael Connolly, Ph.D., President & CEO, Integrated Nano-Technologies, LLC
INT has developed an automated sample preparation system which incorporates magnetic clean-up utilizing nano-magnetic particles followed by size exclusion column. The system uses an aggressive sample disruption enabling effective isolation of nucleic acids from a wide variety of samples, including blood, tissue, food, soil and whole insects.

11:45 Engineering Bacteriophage for the Ultrasensitive Detection of Foodborne Pathogens

*Troy Hinkley, Department of Food Science, University of Massachusetts**

The top 14 foodborne pathogens in the United States create almost 9 million infections per year and almost half (~46%) are linked to leafy green produce contaminated from soiled agricultural water. As a result, we have developed a bacteriophage-based detection system to identify and quantify bacterial contaminants. * Angelyca A. Jackson, Samuel D. Alcaine & Sam R. Nugen

12:15 pm Close of Conference

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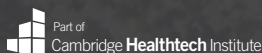
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CONFERENCE SELECTION

	Monday - Tuesday (am), June 27-28	Tuesday (pm) - Wednesday, June 28-29		Thursday, June 30
Biodefense World Summit	Biodetection Technologies: Biothreat & Pathogen Detection	Biodetection Technologies: Point-of-Care for Biodefense	Sample Prep Technologies	Biosurveillance Integration
Co-located Event	Rapid Detection for Food Safety			

Workshop Pricing (Includes access to workshops only)	Commercial	Academic, Government, Hospital-Affiliated
	\$499	\$299

Tuesday, June 28, 2016 5:30 – 8:30 pm	Tuesday, June 28, 2016 5:30 – 8:30 pm
WS1: RAPID SAMPLE PREPARATION FOR PATHOGEN DETECTION	WS2: RAPID VACCINE TECHNOLOGIES – THERAPEUTICS FOR EMERGING- AND RE-EMERGING INFECTIOUS DISEASES

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There is no additional cost for a poster presentation, but poster abstracts are due by May 20, 2016. Once your registration has been fully processed, we will send an email containing a unique link allowing you to submit your poster abstract. If you do not receive your link within 5 business days, please contact jring@healthtech.com.

* Knowledge Foundation reserves the right to publish your poster title and abstract in various marketing materials and products.

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