knowledgefoundation.com

Knowledge Foundation International Conference

SAMPLE PREP 2011

Sample Preparation for Virus, Toxin & Pathogen Detection & Identification

April 4-5, 2011
San Diego, CA USA

Distinguished Faculty:

David S. Alburty,
InnovaPrep LLC;
Alburty Lab, Inc.

Kingsley Amoako,
Canadian Food Inspection Agency, Canada

Quitterie Brossard-Desjonqueres,
Bertin Technologies, France

Robert E. Carlson,
Receptors LLC

Gabriele Christoffel,
Qiagen GmbH, Germany

Loganathan Doraisamy,
Menon & Associates, Inc.

Sandra M. Gaston,
Beth Israel Deaconess Medical Center;
Harvard Medical School

Thomas Haiqing Gong,
Nanyang Technological University, Singapore

Michael J. Heller,
University of California San Diego

David Kelso,
Northwestern University

Hanyoup Kim,
Sandia National Laboratories

Catherine Klapperich,
Boston University

Milena Iacobelli Martinez,
ICx Biosystems

Andre Marziali,
University of British Columbia, Canada

Andrew E. Page,
InnovaPrep LLC

Sébastien Ribault,
Merck Millipore,
Millipore SAS, France

Patrick Sislian,
Deton Corp

Len Vanderbosch,
Invitek GmbH

KNOWLEDGE FOUNDATION
TECHNOLOGY COMMERCIALIZATION ALLIANCE

knowledgefoundation.com

SAMPLE PREP 2011

April 4-5, 2011 • San Diego, CA USA

Sample Preparation for Toxin & Pathogen Detection

Call for Sponsors & Exhibitors

SPONSORSHIP AND EXHIBIT OPPORTUNITIES

Attendees at this event represent the very top industry, government and academic researchers from around the world and provide an extremely targeted and well-qualified audience for exhibitors and sponsors. Your participation as an exhibitor or sponsor is the most cost effective way to gain high quality, focused exposure to these industry leaders. Among other benefits, sponsorship packages include your logo on marketing materials to promote your participation and expose your company to 10's of thousands of prospects prior to the program - in addition to the highly targeted audience we deliver at the event itself.

CONFERENCE SPONSORSHIPS

A variety of conference sponsorships are available which offer incremental levels of visibility to conference delegates at the event — as well as opportunities for marketing exposure prior to the event. Taking advantage of pre-conference options has the added benefit of getting your organization's name out to a large group of interested decision makers.

register online at
knowledgefoundation.com

NETWORKING EVENT SPONSORSHIPS

These "mini" sponsorships offer representatives of your organization a dedicated opportunity to network with conference delegates — with your organization clearly recognized as the host of the event.

- Cocktail Receptions
- Dinner Banquets
- Luncheons
- Hospitality Suites

WORKSHOP SPONSORSHIPS

Your company may sponsor an instructional workshop (subject to approval) for delegates in conjunction with the conference. Highlight your organization's expertise! Delegate feedback indicates that these scientific/technical vehicles enhance retention of your organization's presence in their minds — increasing the potential for drawing customers long after the conference is over. Call Craig Wohlers at (617) 232-7400 ext. 205 or email cwohlers @ knowledgefoundation.com today for pricing information and customization options.

COMPREHENSIVE DOCUMENTATION AVAILABLE

Nothing can substitute the benefits derived from attending **Sample Prep 2011**. But if your schedule prevents you from attending, this invaluable resource is available to you. Please allow 2-3 weeks after the conference date for delivery. *Note: Documentation is included with conference fee for registered delegates*

SAMPLE PREP 2011

Sample Preparation for Toxin & Pathogen Detection

April 4-5, 2011 • San Diego, CA USA

CONFERENCE AGENDA

Monday, April 4, 2011

8:00 *Registration, Exhibit Viewing/Poster Setup, Coffee and Pastries*

8:50 **Organizer's Welcome and Opening Remarks**

9:00 **Development of IPF Automated Nucleic Acid Extraction System**

David Kelso, PhD, Center for Innovation in Global Health Technologies (CIGHT), Dept of Biomedical Engineering, Northwestern University

Pre-analytical processing typically involves nucleic acid capture on paramagnetic particles (PMPs), extensive washing to remove inhibitors and elution. We have developed an extraction method which replaces wash steps with transporting PMPs though an immiscible-phase filter (IPF) yielding nucleic acid as pure as that obtained from conventional purification. A flexible automated system applicable to a broad range of biological matrices will extract nucleic acids with minimal user input is under development.

9:30 **Nucleic Acid Sequence and Methylation Enrichment Using SCODA**

Andre Marziali, PhD, President and CSO, Boreal Genomics Inc.; Director, Engineering Physics, Dept of Physics and Astronomy, University of British Columbia, Canada

We have previously presented a novel electrophoretic concentration technology, named SCODA (Synchronous Coefficient of Drag Alteration) for efficiently purifying and concentrating nucleic acids. SCODA is able to purify DNA from a variety of complex matrices, including samples that contain strong PCR inhibitors. We are also able to recover nucleic acids from extremely dilute samples, with successful concentration from starting DNA concentrations in the zeptomolar range. More recently we have demonstrated that SCODA can be made specific to the sequence of DNA targets to be concentrated, opening the opportunity for sequence enrichment applications. Recent experiments show that SCODA can enrich for single nucleotide mutations by 10,000 fold compared to the wild type, and that it is capable of separating identical sequences that differ only in degree of methylation. This presentation will give a brief overview of the SCODA technology with emphasis on recent progress in sequence specific DNA concentration.

10:00 **Automated Nucleic Acid Library Preparation for Sequence-Based Unknown Pathogen Detection**

Hanyoup Kim, PhD, Research Scientist, Sandia National Laboratories

DNA sequencing technology is advancing at an unprecedented rate, but sample preparation relies on slow, labor-intensive, manual bench-top processes. We have developed an automated droplet-based platform coupled with multiple lab-on-a-chip modules to process clinically-derived DNA samples by directly interfacing with next generation sequencers (NGS). This platform maximizes the sensitivity of NGS by enriching informative nucleic acids sequences (those derived from the pathogen) and suppressing background DNA (those from the host).

10:30 *Networking Refreshment Break, Exhibit/Poster Viewing*

11:00 **Rapid Isolation and Detection of Virus Directly from Whole Blood Samples Using HC-DEP**

Michael J. Heller, PhD, Professor, Depts of Nanoengineering and Bioengineering, University of California San Diego

A high conductance dielectrophoresis (HC-DEP) procedure has been developed which allows rapid separation and detection of virus directly from "un-diluted whole blood" samples. Using a HC-DEP microarray device, red fluorescent Cherry T7 bacteriophage was separated from whole blood samples in minutes. The fluorescent T7 bacteriophage is held in high field areas while blood cells move to low field areas. All the blood cells are washed away, while the fluorescent T7 bacteriophage remains in the high field areas. The isolated, highly purified viruses are then ready for further analysis.

11:30 **Maximizing the Value of Clinical Biopsies for Monitoring Tissue Response to Biological Insults**

Sandra M. Gaston, PhD, Principal Investigator, Division of Surgical Research, Dept of Surgery, Beth Israel Deaconess Medical Center; Assistant Professor of Surgery, Harvard Medical School

Prostate, breast and colon cancer screening programs each include routine collection of tissue biopsies from relatively healthy individuals within the community. Conceptually, such samples could be useful in assessing population exposure to dietary or environmental toxins, provided that the primary goal of cancer detection is not compromised. We have developed a set of innovative "tissue print micropeel" technologies that allow us to obtain high quality RNA and DNA based molecular profiles without compromising the biopsies for surgical pathology. In addition to providing a valuable tool for cancer biomarker studies, biopsy tissue print RNA and DNA samples also reveal inflammatory and endocrine responses associated with non-malignant disease or with medications. Using this approach, with appropriate patient consent, biopsy tissues collected in the normal course of cancer surveillance could also provide important information about environmental exposures to pathogens or toxins that is otherwise unobtainable.

12:00 **Unravelling the Potential of Formalin-Fixed Paraffin-Embedded Tissue**

Gabriele Christoffel, Qiagen GmbH, Germany

The vast archives of clinically annotated, formalin fixed paraffin-embedded (FFPE) tissue samples provide extremely valuable research potential. Unfortunately, quality of nucleic acids and proteins extracted from FFPE material strongly depends on the

treatment before, during and after fixation and embedding as well as on the retrieval of usable analytes. Major difficulties are crosslinking and heavy fragmentation of biomolecules, as well as the limited amount of FFPE sample material. The purification procedure needs to be highly efficient to recover as much usable analytes as possible. This talk will provide insights into major problems and possible solutions for the isolation of the biomolecules as well as for suitable downstream analyses.

12:30 *Luncheon Sponsored by the Knowledge Foundation Membership Program*

2:00 **Sample Preparation - From Technologies to Devices**

Sébastien Ribault, PhD, Predevelopment-Technology-Collaboration R&D Manager, BioMonitoring, Lab Solutions, Merck Millipore, Millipore SAS, France

Sample preparation prior to molecular detection has to accommodate a broad range of matrices originating from biopharmaceutical industry, medical diagnostic, and environmental monitoring. Sample volume reduction is a key for sensitivity as well as removal of inhibitors, including proteins and undesired nucleic acids. We have developed technologies allowing positive selection of microbial contaminants nucleic acids versus eukaryotic ones, and proteins removal prior to concentration and final analysis. We incorporated the selected options in a device for contaminants testing focusing on high-volume processing, ease-of-use, reduced hands-on time, and false positive risk management. The efficiency of the method was proven for bacteria detection in hospital (urine, plasma, cerebrospinal fluid) and in biotech (bioreactor cell culture) samples. A great deal of effort was spent on the DNA-free topic for reagents and disposables, in order to avoid false positives with universal amplification assays.

2:30 **Triggered Bioaerosol Sampling onto Dry Electret Filters; Wanted: Dead or Alive**

David S. Alburty, CEO, InnovaPrep LLC

Tactical detect-to-warn bioaerosol systems must provide a physical sample for verification of a detected threat. A combined detector/collector developed by Areté Associates and InnovaPrep collects such samples on a dry electret filter at a rate of 200 LPM. The sample is rapidly eluted from the filters using a simple hand-held device, and is then concentrated and prepared for identification. Dry collection can reduce the viability of collected organisms. The effects of sampling and preparation on the post-sampling viability of vegetative bacteria will be compared to that of collected spores.

3:00 **Inexpensive Sample Preparation and Storage for HIV Viral Load Testing**

Catherine Klapperich, PhD, Associate Professor, Dept of Biomedical Engineering, Boston University

We have built and begun testing a small, portable tool that could be used to test a patient for HIV on the spot, or at "point-of-care". The tool, which is about the size of a student microscope, doesn't require a power supply. The sample pops out of the tool so it can be processed and then shipped and stored. The input sample is whole blood and the output is dried, preserved RNA that can be stored at room temperature for later testing.

3:30 *Networking Refreshment Break, Exhibit/Poster Viewing*

4:00 **Improving Process Workflow in Molecular Diagnostic Testing**

Len Vanderbosch, General Manager Invitek USA, Invitek GmbH

The workflow process in molecular diagnostic testing, from sample collection to final data analysis and reporting, involves a number of coordinated steps that requires a variety of interactions and manipulations of samples. Reducing the number of necessary steps while introducing the capability to perform multiplex analysis represent opportunities to simultaneously minimize potential for errors and improve processing timelines. The RTP® technology available from Invitek GmbH provides sample processing capabilities that will eliminate specific steps required for extracting and purifying nucleic acids from a variety of samples. The INFINITI® Analyzer from AutoGenomics, an automated multiplexing microarray platform for the analysis of DNA samples provides the ability to sort and measure multiple signals from a single sample. When used in conjunction, these two technologies can significantly improve the efficiency and effectiveness of any molecular diagnostic laboratory.

4:30 **An Automated Sample Preparation Module - a Part of Automated Portable Field Diagnostic System: Technology and System Integration**

Speaker to be confirmed

Abstract not available at time of printing. Please visit www.KnowledgeFoundation.com for the latest Program updates.

5:00 **Mentor-100: A Fully-Automated Stand-Alone Environmental Bio-Detector**

Loganathan Doraisamy, PhD, Senior Systems Engineer, Menon & Associates, Inc.

Mentor-100, a portable, fully-automated bio-detector, uses a patented Nuclear Magnetic Resonance(NMR) based detection method to quickly and sensitively detect pathogens in the environment. The Mentor-100 is decontaminable and fully reusable, with sub-systems for aerosol collection, sample preparation, and NMR. This bio-detector is capable of unattended operation using its wireless capability to communicate with a control center. The development and qualification of the overall system has been supported by the Department of Homeland Security (DHS) and the Defense Threat Reduction Agency (DTRA).

5:30 *Concluding Discussion, End of Day One*

SAMPLE PREP 2010

April 4-5, 2011 • San Diego, CA USA

Sample Preparation for Toxin & Pathogen Detection

CONFERENCE AGENDA

Tuesday, April 5, 2011

8:00 *Exhibit/Poster Viewing, Coffee and Pastries*

9:00 **Nano-Immunomagnetic Capture of *B. Anthracis* Spores in Food**

Kingsley Amoako, PhD, Research Scientist, Canadian Food Inspection Agency, Canada

Food is vulnerable to potential bioterrorist attacks and critical to a mitigation strategy, is the rapid concentration and detection of biothreat agents from food matrices. Magnetic nanoparticles offer a unique advantage in that they have a large surface area for efficient capture of cells. We have demonstrated the efficient capture and concentration of *B. anthracis* spores using nano-immunomagnetic particles and this is being explored for a potential food application to enhance sensitivity of downstream detection technologies. **In collaboration with: N.Goji, K.Hahn, T.Janzen, M.Shields*

9:30 **Sample Preparation Integrated Waterborne Pathogen Monitoring System**

Thomas Haiqing Gong, PhD, Associate Professor, Thermal and Fluids Engineering Division, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore

Waterborne pathogen monitoring of drinking water is extremely challenging due to the large sample volume (1-1000 liters of water) and dirt particles in water sample. We present a sample preparation method for processing a large volume of water which is also integrated with a PCR array for rapid detection of waterborne pathogens. We also present an instrument which automatically processes the captured pathogens from cell capture to cell lysis, DNA extraction, purification and sample loading into a qPCR array with control reactions.

10:00 **Universal Sample Prep for Third Generation Sequencing**

Milena Iacobelli Martinez, PhD, Senior Laboratory Scientist, ICx Biosystems

Third generation sequencing technologies require purified HMW DNA to attain read lengths of tens of thousands of bases and beyond for optimal sequencing output. Therefore, ICx Biosystems has developed a universal sample prep device capable of isolating HMW DNA suitable for sequencing from environmental samples including spores, bacterial cells, and viruses. The integrated SCODA technology allows for specific concentration of HMW DNA and removal of contaminants that are detrimental to downstream processes.

10:30 Networking Refreshment Break, Exhibit/Poster Viewing

11:00 **Integrated Bioparticle Concentration for Improved Detection in Autonomous Systems**

Andrew E. Page, President & CTO, InnovaPrep LLC

Autonomous detection systems are one cornerstone in protecting our nation and troops from biological threats. InnovaPrep has developed an automated concentration system that fills the need for an interface between large sample volumes and submilliliter volumes required by sample preparation and detection modules. The system provides orders of magnitude improvement in detection limits and is currently under evaluation in two DHS aerosol detection programs (e.g. MBAND-Biowatch Gen3, AESaP) and a DTRA-funded water monitoring application. Bioparticle fractionation, concentration, and integration hurdles will be discussed.

11:30 **Nanotechology-Based Sample Prep Approaches for Rapid Molecular Detection of Foodborne Pathogens**

Speaker to be confirmed

Abstract not available at time of printing. Please visit www.KnowledgeFoundation.com for the latest Program updates.

12:00 **Filling the Critical Gap in Sample Preparation**

Robert E. Carlson, PhD, President and Chief Science Officer, Receptors LLC

Bacteria and viruses are a serious healthcare, agriculture and household problem. Receptors' Affinity By Design™ technology addresses the three critical areas of microbe contamination and infection control: detection, disinfection and prevention. Our market focused products are: (a) sampling and sample preparation for detection and diagnostics; (b) capture and clean for disinfection; and (c) antimicrobial surfaces for prevention. Receptors' Smart Materials™ address the economic, environmental and health costs of bacterial and viral contamination through the application of our simple and cost effective CARA™ technology. Our ACTIVEcapture™ products bridge the critical cost versus efficiency market gap.

12:30 *Lunch on Your Own*

2:00 **Sample Collection and Preparation for Virus and Pathogen Detection with Alternatives Methods**

Quitterie Brossard-Desjonqueres, Biotech Engineer - Product Manager, Bertin Technologies, France

In the context of environmental contamination control and bio-sample preparation, Bertin Technologies designs a range of laboratory equipment based on new technologies. Coriolis® is dedicated to the monitoring of bioaerosols. This cyclonic technology ensures a sampling method supplying a liquid sample compatible with Rapid Microbiological Methods (RMM) in order to get rapid,

reliable and specific data on airborne microorganisms and to go beyond impaction method limits. Precellys®24 is dedicated to the sample preparation and cell lysis, to homogenize and grind soft and hard biological materials. This bead beating technology improves the first critical step in any molecular biology process and ensures high throughput, reproducibility, and time saving. Both equipment, Coriolis® and Precellys®24, combined with molecular diagnostic methods, provide sensitive, accurate and quantitative data about several airborne pathogens (e.g. warfare agents) as spores of pathogens, non cultivable microorganisms or even viruses. The combination of these equipment, Coriolis® with Precellys®24, with advances in molecular bio-analysis have now made it possible to rapidly detect, identify and accurately quantify airborne microorganisms and viruses. The limitations in monitoring and identifying pathogens in bioaerosols by microscopy or cultural methods can now be addressed by combining cyclonic air sampling, Coriolis®, bead-beating lysing cells, Precellys®24, with molecular diagnostic methods to provide sensitive, accurate and quantitative data on several pathogens. Several studies carried out with partners have shown interesting results and proved the efficiency of Coriolis in airborne viruses and pathogens' collection and will it be presented.

2:30 **Role of Sample Prep As An Integrated Part of Nucleic Acid Amplification Technology for Detection Of Human Enteric Viruses**

Speaker to be confirmed

Abstract not available at time of printing. Please visit www.KnowledgeFoundation.com for the latest Program updates.

3:00 **Cough Analyzer of Airborne Bacteria for Tuberculosis Diagnosis**

Patrick Sislian, PhD, Principal, Deton Corp

Active Tuberculosis (TB) causes approximately 2 million annual deaths. An estimated 9.3 million people worldwide develop TB every year, of which ~4.4 million are undiagnosed. Improved TB diagnostic tests for developing countries will reduce the spread of infection and result in ~625,000 annually adjusted lives saved. In industrialized countries (e.g. US), the goal is TB elimination through diagnosis of multi-drug resistant TB (MDR-TB) and non-resistant TB in high-prevalence and high-risk populations. Most current diagnostics rely on sputum samples which are difficult to collect and are usually contaminated by saliva, lowering their quality. Furthermore, they inherently have a tradeoff between practicality (time, resources, training, cost) and performance (sensitivity and specificity). Deton's proposed device is practical. A patient wears a disposable mask and coughs naturally into a novel impactor that breaks up the cough droplets in air and collects their DNA. The impactor avoids both sputum samples and microfluidics for lysing cells. The proposed device's high performance is based on the automation of the collected DNA with a nucleic acid amplification test (NAAT) specific to TB and multi-drug resistant TB (MDR-TB). It serves as a point-of-care diagnostic or SSM replacement with an estimated total available yearly market of 280 million tests.

3:30 **Selected Oral Poster Highlights and Open Discussion**

4:00 *Concluding Remarks, End of Conference*

SAMPLE PREP 2011

Sample Preparation for Toxin & Pathogen Detection

April 4-5, 2011 • San Diego, CA USA

REGISTRATION FORM 3025

ONLINE

Please register me for	Member	Non-Member
❑ Sample Prep 2011 (Commercial)	❑ $1019	❑ $1199
❑ Sample Prep 2011 (Acad./Gov.)*	❑ $679*	❑ $799*
❑ Poster Space Reservation (must be registered attendee)	❑ $65	❑ $65

Become a member of the Alliance & take 15% off your registration fee

❑ I would like to become a member of the Knowledge Foundation Technology Commercialization Alliance:
- ❑ **$229/yr Individual Commercial Member** ❑ **$49/yr Individual Student Member**
- ❑ **$169/yr Individual Government/Academic Member**

❑ I cannot attend, but please send the conference documentation.
- ❑ Enclosed is my check for $99. ❑ Invoice Me

❑ Enclosed is a check/bank draft for US$_____

❑ Invoice me ❑ Charge my Credit Card: ❑ VISA ❑ MC ❑ AMEX in the amount of US$_____

Card #:_____Exp.: _____

❑ Please send me information on exhibit and sponsorship opportunities.

Name: _____

Job Title: _____

Organization: _____

Division: _____

Address: _____

City/State/Zip: _____

Tel:_____Fax: _____

Email: _____

*The academic/government rate is extended to all participants registering as full time employees of government and universities. To receive the academic/government rate you must not be affiliated with any private organizations either as consultants or owners or part owners of businesses.

FAX, MAIL, CALL, E-MAIL TO:

The Knowledge Foundation, Inc.
18 Webster Street
Brookline, MA 02446 USA
Tel: (617) 232-7400
Fax: (617) 232-9171
E-Mail: custserv@knowledgefoundation.com

Payment: All payments must be made in U.S. funds drawn on a U.S. bank. Please make check(s) payable to The Knowledge Foundation, Inc. and attach to the registration form even if you have registered by phone, fax or e-mail. To guarantee your registration, payment must be received prior to the conference. Confirmation of your booking will follow.

Discount Accommodations and Travel: A block of rooms has been allocated at a special reduced rate. Please make your reservations by March 1, 2011. When making reservations, please refer to the The Knowledge Foundation. Contact The Knowledge Foundation if you require assistance.

Venue: Hilton San Diego Resort & Spa
1775 East Mission Bay Drive
San Diego, CA 92109

For Hotel Reservations Contact:

Andersen Travel
Phone: (508) 429-6494 or 1-800-229-6494
Fax: (508) 429-7380
Email: kramer@andersentvl.com

Substitutions/Cancellations: A substitute member of your company may replace your attendance at any time at no charge if you find your schedule prevents you from attending. Please notify us immediately so that materials can be prepared. If you do not wish to substitute your registration, we regret that your cancellation will be subject to a $100 processing fee. To receive a prompt refund, we must receive your cancellation in writing 30 days prior to the conference. Unfortunately cancellations cannot be accepted after that date. In the event that The Knowledge Foundation, Inc. cancels an event, The Knowledge Foundation, Inc. cannot resume responsibility for any travel-related costs.

Unable to Attend?

You can purchase a full set of conference documentation. Simply check the box on the registration form and send it to us along with your payment. Please allow 4 weeks after the conference date for delivery.