FINAL WEEKS
To Register!

Cover

Biological & Chemical Sensors for **HEALTHCARE APPLICATIONS**

Biological & Chemical Sensors for **EMERGING APPLICATIONS**

CO-LOCATED SYMPOSIUM **IMPLANTABLE BIOMEDICAL SYSTEMS**

Sponsor & Exhibit Opportunities

Hotel & Travel Information

Registration Information

Register Online!
SensorsGlobalSummit.com

BIOLOGICAL + CHEMICAL

SENSORS SUMMIT 2017

December 5 - 7, 2017 | Hilton San Diego Resort & Spa | San Diego, CA

CONFERENCE PROGRAMS

Biological + Chemical Sensors for
HEALTHCARE APPLICATIONS

Biological + Chemical Sensors for
EMERGING APPLICATIONS

CO-LOCATED SYMPOSIUM

IMPLANTABLE BIOMEDICAL SYSTEMS

FEATURED PRESENTATIONS

Panasonic's Material Technology Development for Stretchable Electronic Applications
Andy Behr, Panasonic

The Future of Brain Implants
Newton Howard, Ph.D., Massachusetts Institute of Technology

Wearable Electrochemical Sensors
Joseph Wang, Ph.D., University of California San Diego

Advanced Diagnostics in Endoscopy for Different Imaging Modalities
George Duval, Boston Scientific

Precision Health and Integrated Diagnostics
Ryan Spitler, Ph.D., Stanford University

Cambridge 25 YEARS HEALTHTECH Institute

A Division of Cambridge Innovation Institute

FINAL WEEKS
To Register!

Biological + Chemical Sensors for HEALTHCARE APPLICATIONS

December 5 - 6, 2017

Register Online!
SensorsGlobalSummit.com

Cambridge HEALTHTECH Institute
A Division of Cambridge Innovation Institute

Exponential increases in demand for the next generation of clinical diagnostic, monitoring and measuring sensors for applications in implantable and wearable devices have created new commercial market opportunities with explosive growth potential. Low cost materials and advances in nano and micro fabrication techniques within the manufacturing process have led to significant increases in the commercialization of biological and chemical sensors for healthcare applications. This conference track will examine the latest advancements in research, engineering and manufacturing and will provide attendees with the state-of-the-art in biosensors commercialization for healthcare.

TUESDAY, DECEMBER 5

7:30 am Registration and Morning Coffee

8:25 Chairperson's Opening Remarks
Ahmed Busnaina, Ph.D., Director, National Science Foundation Nanoscale Science and Engineering Center Northeastern University

OPENING KEYNOTE PRESENTATION

8:30 Precision Health and Integrated Diagnostics (PHIND): A Vision for the Future
Ryan Spitler, Ph.D., Deputy Director, Precision Health and Integrated Diagnostics Center, Stanford University School of Medicine
This presentation will describe the vision of precision health and integrated diagnostics (PHIND), which will use data from health monitoring devices and other sources to predict and prevent adverse health outcomes. Based on lifelong learning, customized approaches for the types of monitoring and intervals of surveillance can be adjusted on a continual and individual basis. These capabilities will work towards keeping individuals healthy for as long as possible and if necessary enable interventions at the earliest possible point.

SENSORS ROADMAP FOR HEALTHCARE

9:00 The National Nanotechnology Coordination Office and Support for Nanosensors for Health, Safety, the Environment and Sustainability
Stacey Standridge, Acting Chief of Staff, National Nanotechnology Coordination Office, National Nanotechnology Initiative
The National Nanotechnology Coordination Office (NNCO) supports multiple efforts by National Nanotechnology Initiative member agencies to advance the development and commercialization of nanotechnology enabled sensors for health, safety, the environment, and sustainability. This presentation will provide an overview of NNCO activities related to nanosensor development and resources and support for sensor development by NNI agencies.

9:30 Microscale pH Modulation on Demand: A Platform for Tuning Biological Reactions in Microenvironment
Young Shik Shin, Ph.D., Senior Research Scientist, Robert Bosch Research and Technology Center/Stanford Genome Technology Center
pH plays important roles in a broad range of biological functions such as protein-protein interactions, enzymatic activity, chemical reactivity, and molecular assembly. Here, we introduce an electrochemical platform that can generate spatially well-defined regions of different pH within an aqueous solution. pH of each microenvironment can be dynamically controlled by oxidizing/reducing an electrochemical additive, quinone, with patterned indium tin oxide electrodes on the substrate. Optical transparency of the underlying glass substrate and electrodes allows the platform to function as a drop-in replacement for bioassays that employ optical readout. In our present design, multiple electrodes in each reaction chamber generate up to 10 different pH regions so that one experiment or assay can test several pH conditions simultaneously, or multiple assays optimized at different pH values can be run in the same batch without the need for changing buffers or using multiple reaction chambers.

10:00 Networking Coffee Break

APPLICATIONS AND MARKET FOR INGESTED, TRANSCUTANEOUS & *IN VITRO* SENSOR SYSTEMS

10:30 FEATURED PRESENTATION: Advanced Diagnostics in Endoscopy for Different Imaging Modalities
George Duval, Principal R&D Engineer, Boston Scientific

11:00 Opportunities for Improvements in Non-Invasive Monitors for Newborn Medicine
Jagjit Teji, M.D., Attending Neonatologist, Pediatrics Division of Neonatology, Ann and Robert H. Lurie Children's Hospital of Chicago
About 500,000 babies out of 4 million in the USA and 1 out of 8, in 135 million worldwide are delivered worldwide prematurely. They require Neonatal Intensive Care for achieving highest potential in growth and development. Currently, Giraffe Isollete, an incubator, is the only device made for the babies and every few years some improvements are made on the existing one. It is cumbersome using devices made for adult population but that is all we have. The devices should be made for and used for the babies and children. Non-invasive monitoring and management with sensors could have potential here.

Biological + Chemical Sensors for HEALTHCARE APPLICATIONS

December 5 - 6, 2017

Register Online!
SensorsGlobalSummit.com

11:30 Rapid Diagnosis of Malaria from Urine Samples: Most Epidemic Disease of Eastern India

Shikha Singh, Ph.D., Assistant Professor, Biotechnology, Siksha Anusandhan University, India

The need to expand malaria diagnosis capabilities alongside policy requirements for mandatory testing before treatment motivates exploration of noninvasive rapid diagnostic tests (RDTs). We have recently isolated urine specific antigens and developed antibody against those antigens from malaria patients (under the project grant from DST, Govt. of India, IDP/MED/2012/16). Till now, no work has been carried out or reported for development of antibody based diagnostic sensor to detect these antigens from urine and saliva of malaria patients. To fill these gaps, present proposal designed to develop the urine based rapid malaria specific immunosensor (from already developed antibody) its optimizations, validations and pilot field study to check its accuracy in malaria endemic tribal community.

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

1:55 Chairperson's Remarks

Dorothy Farrell, National Nanotechnology Coordination Office, National Nanotechnology Initiative; Project Manager, Alliance for Nanotechnology in Cancer, National Cancer Institute

2:00 Integrated Microfluidic Platform for Rapid Antimicrobial Susceptibility Testing and Bacterial Growth Analysis

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

The rapid emergence of antibiotic resistance presents an alarming challenge for management; it is now increasingly likely that many patients will be treated with inactive therapy, leading to adverse outcomes. Here, a novel technology called ScanDrop that incorporates a bead-based assay and microfluidics device will address the shortcomings of current diagnostic technologies. As conceived, ScanDrop provides ultrafast (< 20 min), highly sensitive, direct-from-patient sample diagnostics for UTI pathogens without the need for culture pre-amplification, and provides AST results within 15 min of specimen acquisition. In this proposal, we aim to further develop and validate the previously developed and patented ScanDrop technology. In the proposed aims the team of bioengineers working with microbiologists with extensive expertise in clinical and basic microbiology and diagnostic method evaluation will first validate detection assays for specific pathogens; second, integrate a novel droplet co-encapsulation technology previously developed by the Konry lab to deliver bacterial viability reagents into each droplet for susceptibility testing; third, incorporate these assays within ScanDrop allowing for optical interrogation of nanoliter reaction volumes and merging with antimicrobial droplets for AST.

2:30 Home Monitoring of Disease Progression in Patients

Lukas Scheibler, Ph.D., Executive Vice President, Head R&D, Acucela

Patients with retinal diseases such as neovascular AMD require frequent follow-up in the physician's office as delayed treatment results in irreversible vision loss. These often expensive visits are a major burden for the often elderly patient population, their caregiver, but also physicians. Home monitoring of disease progression allows following patients more tightly and bringing them into the clinic for treatment on a timely basis. Recent advancements in retinal imaging technologies will be discussed that allow for the development of home monitoring devices and systems.

3:00 Non-Invasive Continuous Blood Glucose Monitoring Using Microwaves: Human Clinical Trial Results

Heungjae Choi, Ph.D., Ser Cymru Research Fellow, School of Engineering, Cardiff University

Diabetes population is rapidly rising and a truly non-invasive and accurate continuous blood glucose monitoring sensor is considered as the holy-grail of diabetes research. In this talk, state-of-the-art minimally-invasive continuous glucose monitoring techniques will be reviewed and the design and performance evaluation of a microwave-based non-invasive continuous blood glucose monitor will be presented. A clinical trial involving 24 human subjects with and without diabetes was carried out to prove the accuracy and repeatability of the proposed system, showing mean absolute relative difference (MARD) of 12.5% for all 24 subjects.

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

4:15 PANEL DISCUSSION: From the Bench to Production - Overcoming the Challenges of Sensor Development through Advanced Micro and Nanoscale Manufacturing Methods for Healthcare Applications

Moderator: Ahmed Busnaina, Ph.D., Director, National Science Foundation Nanoscale Science and Engineering Center Northeastern University

Luther Lindler, Ph.D., Senior Scientist (ST), Biological Programs, Chemical and Biological Defense Division Science and Technology Directorate, U.S. Department of Homeland Security

Invention at the nanoscale promises to revolutionize novel bio-sensors for pathogen detection and monitoring of a large number of biomarkers. Utilization of nanoscale printing technology that creates a novel biosensor platform for real-time pathogen monitoring and for wearable sensors to monitor physiologic state. Join our panel of experts as they discuss the latest micro and nanoscale methods for manufacturing the next generation of biosensors.

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

6:15 End of Day

Cambridge HEALTHTECH Institute
25 YEARS
A Division of Cambridge Innovation Institute

FINAL WEEKS
To Register!

Biological + Chemical Sensors for HEALTHCARE APPLICATIONS

December 5 - 6, 2017

Register Online!
SensorsGlobalSummit.com

Cambridge HEALTHTECH Institute
A Division of Cambridge Innovation Institute

WEDNESDAY, DECEMBER 6

8:00 am Roundtable Discussions with Continental Breakfast

Participants choose a specific breakout discussion group to join. Each group has a moderator to ensure focused discussions around key issues within the topic. This format allows participants to meet potential collaborators, share examples from their work, vet ideas with peers, and be part of a group problem-solving endeavor. The discussions provide an informal exchange of ideas and are not meant to be a corporate or specific product discussion.

NEXT GENERATION BIOSENSING

8:55 Chairperson's Opening Remarks

Charles Young, Ph.D., Principal Professional Staff, Chief Scientist, Applied Biology Group, Asymmetric Operations Sector, The Johns Hopkins University Applied Physics Laboratory

9:00 Towards New Avenues in Minimally-Invasive Intracutaneous Electrochemical Biosensing

Joshua Windmiller, Ph.D., CTO & Founder, Biolinq Technologies, Inc.

This talk highlights the development of a novel class of minimally-invasive electrochemical biosensors that facilitate the quantification of relevant metabolomic, ionic, and neurochemical information residing in the viable epidermis in a continuous, real-time fashion. Fabricated through manufacturing processes that are scalable, cost-effective, and highly precise, these novel biosensing modalities seek to bridge the gap between analytical-grade instrumentation typically found in the hospital laboratory and user requirements for unobtrusive, low-profile, skin-applied devices able to deliver timely, actionable information using existing wirelessly-enabled wearable and mobile platforms.

9:30 Objective Measures for Clinical Assessment and Precise Understanding of Disease Progression

Christopher M. Hartshorn, Ph.D., Program Manager, Office of Cancer Nanotechnology Research, National Cancer Institute

The rapid adoption of wearable and external sensing platforms since 2015, by the consumer health market, have begun to pave the way for similar platforms to act as objective measures for continuous, out of clinic cancer research and patient assessment. This talk will look at various efforts across the National Institutes of Health attempting to enable more objective measures for out-of-clinic assessment and understanding disease progression, more precisely in time and context.

10:00 Printed Batteries Enabling Wearable to Unawarable

Rajan Kumar, CEO and Founder, Ocella LLC

Humans are in contact with textiles the vast majority of their lives, but we have yet to see an approximate level of incorporation of sensor & electronics in textiles as in we have seen in our homes, cars, televisions, and wearable devices. By integrating electronics, including IOT devices, into textiles, the E-textile segment promises to bring the integrated world even closer to its human users. With such integration, E-textiles have the likely potential to reshape the way we interact with computing systems, from touchscreens in mobile devices, to an intimate body contact and continuous monitoring of our bodies. Unfortunately, smart clothing currently inhibited by non-conforming, bulky, rigid batteries that require valuable space, weight and time-consuming mounting. We need cheaper, conformal, and simple electronics to enable this future of ubiquitous computing.

10:30 Coffee Break in the Exhibit Hall with Poster Viewing

ADVANCED MATERIALS, DESIGN & MODELING FOR BIOSENSORS

11:15 Droplet-Based Microfluidic Detection of Pathogens and Indicator Organisms Based on Growth Characteristics in Selective and Differential Growth Media

Charles Young, Ph.D., Principal Professional Staff, Chief Scientist, Applied Biology Group, Asymmetric Operations Sector, The Johns Hopkins University Applied Physics Laboratory

Even with the advent of rapid molecular and immunological detection methods in environmental and clinical laboratories, there are many instances where growth and isolation of the organism is necessary to confirm results of rapid methods, determine whether the organisms are living or dead, or for follow-on analysis. In this presentation, we will describe our current efforts to apply a rapid, droplet-based microfluidic method for the growth-based differential detection and isolation of microbes in as little as 4 hours.

REGULATORY CHALLENGES TO COMMERCIALIZATION

11:45 Regulatory Considerations for Commercialization of Medical Devices

Orlando Lopez, Ph.D., Program Director, National Institute of Dental and Craniofacial Research (NIDCR); Formerly Biomedical Engineer, Lead Regulatory Reviewer, Office of Device Evaluation, FDA

Discussion of the FDA regulatory process and associated considerations for taking a new medical device to market. Specific emphasis will be given to performance testing considerations needed to demonstrate safety and effectiveness of sensor-based devices.

12:15 pm End of Biological and Chemical Sensors for Healthcare Applications

FINAL WEEKS
To Register!

Biological + Chemical Sensors for EMERGING APPLICATIONS

December 6 - 7, 2017

Register Online!
SensorsGlobalSummit.com

Emerging applications for sensors in defense, energy, environmental and industrial markets have experienced significant market growth over the last 10 years. This conference track will examine these emerging sensor markets and will showcase the latest technological advancements in materials, design, modeling, engineering and manufacturing.

WEDNESDAY, DECEMBER 6

12:15 pm Registration

1:40 Chairperson's Remarks
Mark Buccini, Director, Business Unit Strategy, Texas Instruments

OPENING KEYNOTE PRESENTATION

1:45 Wearable Electrochemical Sensors
Joseph Wang, Ph.D., SAIC Endowed Chair, Distinguished Professor, Chair of Nanoengineering Department, University of California San Diego
This presentation will discuss recent developments in the field of wearable sensors, integrated directly onto both textile materials and on the epidermis for various non-invasive monitoring applications. Technical challenges and prospects for using textile- and tattoo-based electrochemical sensors for monitoring the wearer's health, fitness, or surrounding environment will be discussed, along with several demonstrations and prospects for future healthcare and sport applications.

APPLICATIONS AND MARKET

2:15 Using Crowdsourced Sensor Data for the Benefit of All
Francois Beauchaud, Principal Engineer, Bosch Sensortec

2:45 Printed/Flexible/Stretchable and Functional Fabric Sensors and Sensor-Based Systems for E-Health and Fitness Applications
Roger H. Grace, President, Roger Grace Associates
To be presented will be a brief inventory of several of the more interesting printed, flexible, stretchable and functional fabric (P/F/S-FF) sensor and sensor-based system technologies currently under development or in production worldwide by commercial organizations that specifically address electronic health (e-Health) as well as portable/wearable fitness applications. In addition, we will address worldwide research and development activities at leading institutes and university research labs for these technologies.

3:15 Need Plasma?
Michael McNeely, President/CEO, Executive Management, GattaCo LLC
A new Capillary Pressure Re-Set technology has been developed that eliminates the breakthrough pressure of filtration membranes. When used in conjunction with a whole blood sample and plasma separation membrane, plasma can be separated from the sample and metered to a precise volume all using passive capillary forces only. A rapid, disposable, no-moving parts, centrifuge replacement tool using this technology is presented.

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

4:15 Real-Time Bioelectronic Detection of Microbial Pathogens
Lisa Diamond, CEO, Pinpoint Diagnostics Division, Pinpoint Science LLC
A new generation of biosensor technology has made possible the immediate, label-free electrical detection of specific biomolecules with great precision and at low cost. A general-purpose device uses swappable cartridges to detect specific pathogens in samples of blood or other biofluids. Results are displayed in seconds with a smartphone app. This technology forms the basis for new, cost-effective, rapid point-of-care diagnostic assays for infectious diseases such as Zika, Ebola and pandemic influenza.

4:45 Wearable Sensors and Personalized Avatar for Warfighter Mobile Health and Protection
Andrezej Przekwas, Ph.D., CTO and Senior Vice President of Research, CFD Research Corporation

5:15 Growth Markets for Emerging and Biological Sensors
Khasha Ghaffarzadeh, Ph.D., Research Director, IDtechEX
Biosensors and chemical sensors are improving fast thanks to new materials microfabrication technologies and printed electronics. This presentation will highlight the latest innovations and their addressable markets. Applications in gas sensing, point-of-care diagnostics and wearables are the ones to watch.

5:45 End of Day

25 YEARS Cambridge HEALTHTECH Institute
A Division of Cambridge Innovation Institute

Biological + Chemical Sensors for EMERGING APPLICATIONS

December 6 - 7, 2017

Register Online!
SensorsGlobalSummit.com

THURSDAY, DECEMBER 7

8:00 am Morning Coffee

ADVANCED MATERIALS, DESIGN & MODELING FOR EMERGING APPLICATIONS

8:25 Chairperson's Opening Remarks
Ray Huang, Principal Engineer, Exponent

8:30 FEATURED PRESENTATION: Panasonic's Material Technology Development for Stretchable Electronic Applications
Andy Behr, Technology Manager, Electronic Materials Division, Panasonic
New classes of more durable and temperature resistant stretchable materials will enable the next wave of flexible electronics. Researchers from Panasonic Electronic Materials have developed a proprietary non-silicone thermosetting stretchable polymer technology which may address many of the challenges associated with current stretchable thermoplastic and thermosetting polymer materials. This resin has been used as the base for several developmental embodiments including a stretchable films and conductive pastes.

9:00 The Los Angeles Pediatric Research Using Integrated Sensor Monitoring Systems (PRISMS) Center
Rima Habre, Ph.D, Assistant Professor, Preventive Medicine, University of Southern California
Dr. Habre will be describing the informatics platform being developed within the Los Angeles PRISMS Center. The Pediatric Research using Integrated Sensor Monitoring Systems (PRISMS) program was launched by the US National Institute of Biomedical Imaging and Bioengineering to develop wearable, sensor-based, integrated health monitoring systems for measuring environmental, physiological, and behavioral factors in epidemiological studies of pediatric asthma. The goal is to be able to predict ahead of time, for a given individual, an asthma attack and mitigate if not prevent it.

9:30 Power Optimized Processing Techniques to Maximize Battery Life in Deeply Embedded Sensor Systems
Mark Buccini, Director, Business Unit Strategy, Texas Instruments
This presentation describes several unique techniques useful in dramatically reducing the power consumption attributed to sensor processing in deeply embedded medical systems including personal portable health care and wearable, battery-powered applications. Managing a restricted power budget in small-scale battery-powered medical and wearable instruments is the fundamental message delivered in this presentation. The importance of a duty-cycling based system architecture, power-gating external sensors, utilizing autonomous processing and data conversion, as well as strict adherence of energy-aware firmware practices will be discussed and the benefits quantified.

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

10:45 Molecularly Imprinted Polymers for Sensing Applications
Sam Li, Ph.D., Professor, Chemistry, National University of Singapore
Here we demonstrate a new approach to prepare molecularly imprinted polydopamine (PDA) for chemical and biomolecular sensing applications. A thus prepared PDA sensor was demonstrated for the detection of 2,4,5-trichlorophenoxyacetic acid (TCPAA), a commonly used pesticide, using quartz crystal microbalance (QCM) with a high selectivity and low detection limit (LOD) of 59.0 nM (15.1 ppb). We present a new approach for molecular imprinting with great potential applications in sensors, functional biomaterials, biomedicines, etc.

11:15 AI Powered Sensor Networks
Chris Poulin, Principal Partner, Patterns and Predictions
We will discuss our latest efforts in the development of sensor networks powered by an artificial intelligence technology, originally funded by DARPA. Specifically, we will first review the historical uses cases that broke ground in this technical area of real-time behavioral monitoring. The second part of the talk will focus on our latest breakthroughs in intelligent sensor network deployment and scale.

11:45 Sponsored Presentation *(Opportunity Available)*

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

NEXT GENERATION WEARABLES

1:40 Chairperson's Remarks
Stacey Standridge, Acting Chief of Staff, National Nanotechnology Coordination Office, National Nanotechnology Initiative

1:45 Taking Wearables to the Next Generation
Shreyas Shah, Ph.D., Member of the Technical Staff, Physiological Communications, Bell Labs/Nokia
The vast array of biological signals emanating from our body are important indicators of our overall health and well-being. While measuring vital signs is now commonplace in the comforts of our very homes, tapping into the rich in-body biochemistry has proven to be much more challenging. This talk will highlight our development at Bell Labs towards an integrated solution on this front, leveraging our expertise in nano/bio-materials, advanced photonics, MEMs and wireless network architectures.

2:15 Wearable Computers on the Edge of the Cloud
Roozbeh Jafari, Ph.D., Associate Professor, Center for Remote Health Technologies and Systems, Texas A&M University
In the past few years, the sensor community has observed a large number of applications that have been developed using wearable computers. There are, however, a number of fundamental challenges that need to be addressed before realizing the true ubiquitous use of the wearable systems for health, wellness and consumer applications. We will present our experimental results and validation studies on several cohorts of human subjects for various applications and will offer concluding remarks on the trends of wearable computing technology development and potential future directions for consumer electronics.

25 YEARS Cambridge HEALTHTECH Institute
A Division of Cambridge Innovation Institute

Register Online!
SensorsGlobalSummit.com

REGULATORY COMPLIANCE, PRIVACY AND SAFETY

2:45 Privacy and Security Regulatory Considerations in the Use of Wearable Devices

Roger Shindell, President and CEO, C Suite, Carosh Compliance Solutions

In the rapidly changing world of wearable medical devices maintaining the security and privacy of information being collected and transmitted is on everyone's mind. With more and more regulatory agencies getting involved in these privacy and security issues, a clear understanding of your obligations under HIPAA/HITECH, the Federal Trade Commission, the FDA, and even the Securities and Exchange Commission is critical.

3:15 Networking Refreshment Break

4:00 PANEL DISCUSSION: Sensor Commercialization - Challenges and Opportunities

Moderator:

Stacey Standridge, Acting Chief of Staff, National Nanotechnology Coordination Office, National Nanotechnology Initiative

This panel will focus on the identification and discussion of challenges that are faced by the sensor development community during the fabrication, integration, and commercialization of sensors. The National Nanotechnology Coordination Office (NNCO) provides technical and administrative support to the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee, serves as a central point of contact for federal nanotechnology R&D activities, and provides public outreach on behalf of the National Nanotechnology Initiative.

5:00 End of Biological and Chemical Sensors for Emerging Applications

Cambridge HEALTHTECH Institute
25 YEARS
A Division of Cambridge Innovation Institute

Register Online!
SensorsGlobalSummit.com

THURSDAY, DECEMBER 7

8:00 am Registration and Morning Coffee

8:25 Chairperson's Opening Remarks
Bill von Novak, Principal Engineer, Qualcomm

OPENING KEYNOTE PRESENTATION

8:30 The Future of Brain Implants
Newton Howard, Ph.D., Professor of Neurocomputation & Neurosurgery, University of Oxford; Director of Synthetic Intelligence Lab, Massachusetts Institute of Technology
Scientists across the globe have long dreamt of bringing artificial intelligence from theory to practice; this dream grows even closer as Dr. Howard and his team begin work on an exciting, new project in the field of neuroscience. Their ultimate aim is to better the quality of life for those suffering from neurological disorders by bridging the gap between man and machine. In his talk, Dr. Howard will present on where artificial intelligence and brain machine interfaces could be over the next 10 years.

ADVANCED COMMUNICATIONS FOR IMPLANTABLES

9:00 Part 1: Design of a Large-Scale Wireless Network of Brain Implants
Farah Laiwalla, M.D., Ph.D., Senior Research Associate, Brown University School of Engineering
In order to dramatically increase the scale of neural reading and stimulation, a wireless network of implantable silicon neural chiplets is proposed. Hardware-efficient circuits and robust communication protocols are derived to achieve efficient wireless power transfer, RF telemetry and data networking in the cortical environment. Practical aspects of readying such system for animal/human clinical trials will be highlighted.

9:30 Part 2: Design of a Large-Scale Wireless Network of Brain Implants
Vincent Leung, Ph.D., Technical Director, Circuit Lab, University of California, San Diego
In order to dramatically increase the scale of neural reading and stimulation, a wireless network of implantable silicon neural chiplets is proposed. Hardware-efficient circuits and robust communication protocols are derived to achieve efficient wireless power transfer, RF telemetry and data networking in the cortical environment. Practical aspects of readying such system for animal/human clinical trials will be highlighted.

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

10:45 Ultra Low Power MICS Band Test Chip
Steve Shellhammer, Principal Engineer, Qualcomm
The Medical Implant Communication Systems (MICS) band is often used for wireless communication between medical implant devices and external interrogators. This presentation will describe a test chip developed at Qualcomm which operates on significantly lower power than commercially available MICS-band chips. The presentation will give an overview of the test chip design and test results, as well as an overview of the wireless protocol design. It may also be possible to give a demonstration at the conference.

11:15 Trends in Implantable Device Packaging for Wireless Transmission
Asheesh Divetia, General Manager, Cirtec Medical
As the demand grows for smaller and smaller device size, innovation in design, materials, and processing will dictate new techniques to surpass current limitations. Let's explore how additive technologies, innovations in package design and fabrication and advances in wireless communication and power transmission are shaping a new wave in implantable device design. Let's look beyond the current barriers in radio transparency and power consumption to find new ways to achieve a new patient experience.

11:45 Sponsored Presentation *(Opportunity Available)*

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

WIRELESS POWER FOR IMPLANTABLES

1:40 Chairperson's Remarks
Bill von Novak, Principal Engineer, Qualcomm

1:45 Modeling and Simulation Based Recharge Optimization for Implanted Medical Devices
Venkat Gaddam, Principal Electric Engineer, Medtronic
I describe a system level modeling approach for optimizing the rate of inductive power transfer to an implant while ensuring that thermal exposure levels for tissue remain safe. The Virtual Integrated Recharge system (VIRS) takes a multi-physics approach to describe coupled behavior of the charging circuitry, electromagnetics and heat transfer. VIRS has been practically implemented as a design tool for commercial products in development.

Cambridge 25 YEARS HEALTHTECH Institute
A Division of Cambridge Innovation Institute

Co-Located Symposium

IMPLANTABLE BIOMEDICAL SYSTEMS

Wireless Charging & Communications for Implantable Medical Devices

December 7, 2017

Register Online!
SensorsGlobalSummit.com

2:15 A Noble Dual Link RF Energy Transfer and Data Backscattering for Brain Implantable Microsystems

Yoon-Kyu Song, Ph.D., Assistant Professor, Department of Nano Science and Technology, Graduate School of Convergence Science and Technology, Seoul National University, Korea

Here we propose a wireless neural recording micro-implant for a minimally invasive brain-machine interface (BMI). We have demonstrated a prototype system based on midfield wireless energy and data transfer to extract emulated neural signals with the head phantom, ensuring practical utility of the micro-implant as a fully-implantable brain machine interface.

2:45 Power Management for Medical Implants

Bill von Novak, Principal Engineer, Qualcomm

Medical implants require power to operate - from microwatts to watts in some cases. This power is provided by batteries or external wireless power sources, but managing this power can be difficult. This talk will discuss power management strategies/designs for medical implants and give a few examples of such designs.

3:15 Networking Refreshment Break

4:00 Ultrasonic to RF to Infrared: Mode and Frequency Selection for User-Friendly Implantable Wireless Links

Stephen O'Driscoll, Ph.D., Staff Scientist and Engineering Manager, Verily

Implantable devices have varying size constraints and are placed at different depths and in multiple tissue types. The optimal methods for wireless power transfer to and communication with implanted devices can vary with those physical and anatomical factors. This talk explores how to optimize mode and frequency across physical and anatomical constraints and how to factor in user experience to find effective solutions which will be used.

4:30 Wireless Power Delivery for Ventricular Assist Devices

David C. Yates, Research Fellow, Department of Electrical and Electronic Engineering, Imperial College London, United Kingdom

Wireless power transfer (WPT) can provide a practical solution to powering implantable ventricular assist devices without requiring a power cable that punctures the skin. While maximizing link efficiency is normally the design aim of a WPT system in free space, there may be more suitable objectives if a receiver is implanted inside a patient, especially for devices with higher power consumption. This talk proposes alternative design principles to minimize the adverse effects of such a WPT system on the human body.

5:00 End of Implantable Biomedical Systems

MEDIA PARTNERS

FINAL WEEKS
To Register!

Register Online!
SensorsGlobalSummit.com

Cambridge 25 YEARS HEALTHTECH Institute
A Division of Cambridge Innovation Institute

SPONSORSHIP & EXHIBIT OPPORTUNITIES

CHI 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 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 CHI. 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

Select specific delegates from the pre-registration list to attend a private function at an upscale restaurant or a reception at the hotel. From extending the invitations, to venue suggestions, CHI will deliver your prospects and help you make the most of this invaluable opportunity.

Focus Group

CHI 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.

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.

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!

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…

For additional information, please contact:
Sherry Johnson
Business Development, Manager
781-972-1359 I sjohnson@healthtech.com

HOTEL & TRAVEL

Conference Venue and Hotel:
Hilton San Diego Resort
1775 East Mission Bay Drive
San Diego, CA 92109
Phone: 619-276-4010

Reservations: Go to the travel page of **SensorsGlobalSummit.com**

Discounted Room Rate: $175 s/d plus $8.00 resort fee*

Discounted Reservation Cutoff Date: November 7, 2017

Please visit the travel page of **SensorsGlobalSummit.com** for additional information

FINAL WEEKS
To Register!

Cover

Biological & Chemical Sensors for **HEALTHCARE APPLICATIONS**

Biological & Chemical Sensors for **EMERGING APPLICATIONS**

CO-LOCATED SYMPOSIUM
IMPLANTABLE BIOMEDICAL SYSTEMS

Register Online!
SensorsGlobalSummit.com

BIOLOGICAL + CHEMICAL
SENSORS SUMMIT 2017
December 5 - 7, 2017 | San Diego, CA

Pricing and Registration Information

CONFERENCE PRICING

BASIC PACKAGE (Includes access to 1 conference program, excludes Symposium and tutorials)	**Commercial**	**Academic, Government, Hospital-affiliated**
Registrations after October 27, 2017, and on-site	$1199	$899

STANDARD PACKAGE (Includes access to 2 conference programs or 1 conference program and 1 Symposium, excludes tutorials)

Registrations after October 27, 2017, and on-site	$1799	$1149

SYMPOSIUM PRICING

(Includes access to Symposium only, excludes conference programs and tutorials)

Registrations after October 27, 2017, and on-site	$799	$599

TUTORIAL PRICING

~~One Tutorial~~	~~$499~~	~~$299~~
~~Two Tutorials~~	~~$749~~	~~$499~~

PROGRAM SELECTIONS

Tues. - Wed. (am) | December 5 - 6	Wed. (pm) - Thurs. | December 6 - 7	Thurs. | December 7
T1: Biological & Chemical Sensors for Healthcare Applications	T2: Biological & Chemical Sensors for Emerging Applications	S1: Implantable Biomedical Systems
Tutorials (separate registration required)		
~~TUT1: Enhancing Sensor Reliability and Commercializing Sensor Data~~	~~TUT2: Commercialization Opportunities in Printed/Flexible Fabric Sensors~~	

Poster Submission: Poster abstracts are due by October 27, 2017. 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. *CHI reserves the right to publish your poster title and abstract in various marketing materials and products.

CONFERENCE DISCOUNTS

Group Discounts: Discounts are available for multiple attendees from the same organization. For more information on group rates contact Joseph Verange at 781-247-6263.

ADDITIONAL REGISTRATION DETAILS

Each registration includes all conference sessions, posters and exhibits, food functions, and access to the conference proceedings link.

Handicapped Equal Access: In accordance with the ADA, Cambridge Healthtech Institute is pleased to arrange special accommodations for attendees with special needs. All requests for such assistance must be submitted in writing to CHI at least 30 days prior to the start of the meeting.

To view our Substitutions/Cancellations Policy, go to healthtech.com/regdetails

Video and or audio recording of any kind is prohibited onsite at all CHI events.

25 YEARS Cambridge HEALTHTECH Institute
A Division of Cambridge Innovation Institute

How to Register: SensorsGlobalSummit.com

reg@healthtech.com • P: 781.972.5400 or Toll-free in the U.S. 888.999.6288

Please use keycode **SGS F** when registering!