Post Conference Summary

SENSORS IN MEDICINE 2015

24 – 26 March
2015
London

Linking Academic Clinical and Commercial Worlds

© 2015 Captum Capital Limited. All worldwide rights reserved.

ABOUT SENSORS IN MEDICINE 2015

The Third Annual Sensors in Medicine Conference took place at the Royal Geographic Society in London on 24-26 March 2015

SENSORS IN MEDICINE 2015 brought together thought leaders from academic, clinical and commercial worlds to discuss where sensor technology is impacting medicine and healthcare. The Conference was supported by an Exhibition, which seems to grow every year; the Poster Competition, supported by MRC Technology.

This slide presentation is intended to provide a flavour of the Conference for those unable to attend, and to give confidence to those deciding to join us in 2016.

It would be remiss not to express our thanks to the many people who helped make the Conference a success. We look forward to seeing you in 2016.

Michael Brand
Conference Chair

CONFERENCE OBJECTIVES

- Promote innovative new commercial sensor technology
- Highlight leading academic research near to commercial use
- Provide a platform to showcase emerging sensor companies
- Explore trends in healthcare applications of sensor technology
- Facilitate formation of partnerships for investment and technology transfer

THE COMMITTEE

Dr. Michael Brand
Captum Capital Limited

Prof. Jon Cooper
University of Glasgow

Dr. Stuart Hendry
Alacrita Consulting

Dr. Danny O'Hare
Imperial College, London

Dr. Michael Pringle
Clinical Diagnostics Solutions

Prof. Chris Van Hoof
imec

VENUE

Royal Geographic Society

Exhibition Road, London, SW7 2AR.

"the desire for knowledge for its own sake is the one which really counts…"

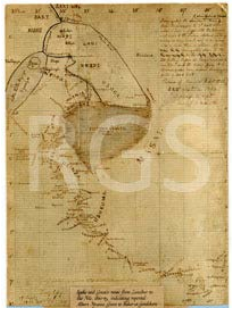
Apsley Cherry Garrard,
The Worst Journey in the World, 1922

Lowther Lodge built in 1874

Ondaatje Theatre

Exhibition Road Entrance

The RGS has been the home to many famous expeditions:



Route of Speke & Grant from Zanzibar to the Nile, 1862

Endurance frozen in the ice, Shackleton's Antarctic Expedition, 1914 - 1917

Hillary and Tenzing Norgay at Camp IV after their ascent of Everest, 1953

Ranulph Fiennes North Pole Unsupported Expedition 1990

PROGRAM

Tuesday 24th March

8:30 am Registration & Coffee
9:00 am Introduction
9:05 am Keynote: Thomas Olesen
9:45 am Digital Health
1:00 pm Lunch
2:00 pm Advanced Technology
5:00 pm Panel Discussion
6:00 pm Reception
8:00 pm Close

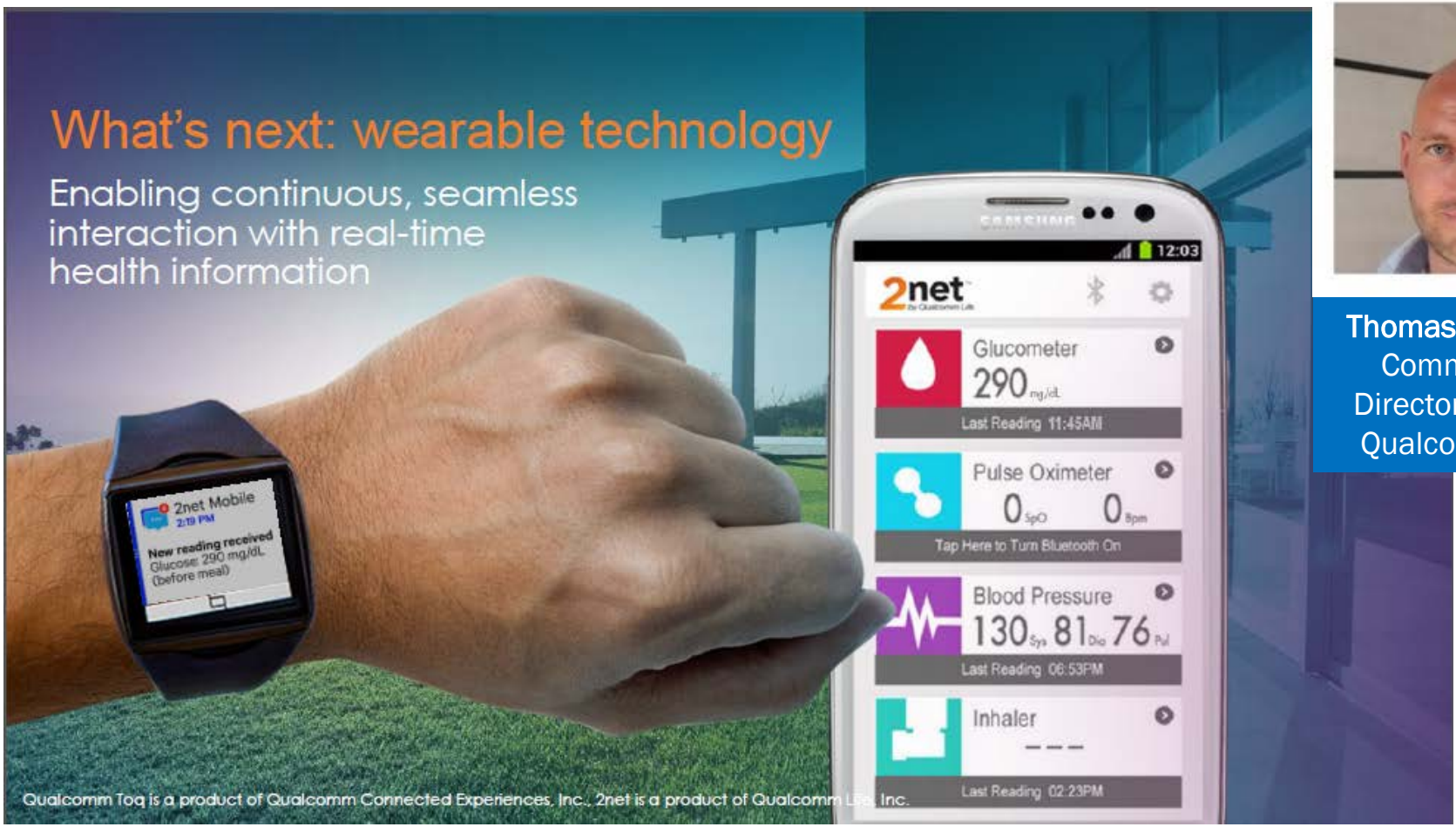
Wednesday 25th March

8:30 am Registration & Coffee
9:00 am Introduction
9:05 am Keynote: Dr. Oliver Hayden
9:45 am Sensors for Cancer
11:30 am Wearable Sensors
1:00 pm Lunch
2:00 pm Sensors for Infectious Diseases
4:00 pm Clinical Applications
5:00 pm Close

Thursday 26th March

9:00 am Registration and Coffee
9:30 am Workshop: Medical Device Clinical Trials
5:00 pm Workshop ends

KEYNOTE:CONNECTED, CONTINUOUS & CO-ORDINATED: HOW MHEALTH IMPROVES STANDARDS OF CARE AND OUTCOMES



Thomas J Olesen
Commercial Director, Europe
Qualcomm Life

DIGITAL HEALTH

Chaired by:

Walter De Raedt
Program Manager
Body Area Networks
imec

COMMON SENSE: WHICH MARKETS WILL SENSORS SUPPORT IN THE NEW MOBILE HEALTH ECOSYSTEM

The potential savings

O2 health

€99 billion savings in care costs by 2017 with mHealth implementations

Total healthcare cost savings in EU in 2017 (EUR)		Diagnosis		Treatment and Monitoring		Cost savings in ADE		Wellness and prevention		Workforce to support mHealth
99 bn	=	3.7 bn	+	32 bn	+	.17 bn	+	69 bn	-	6.2 bn

Equating to a potential of 40 million doctor days by 2017

Source: PWC Socio-economic impact of mHealth: An assessment report for the European Union

14

Telefónica

Dr. Mike Short
CBE
Telefonica

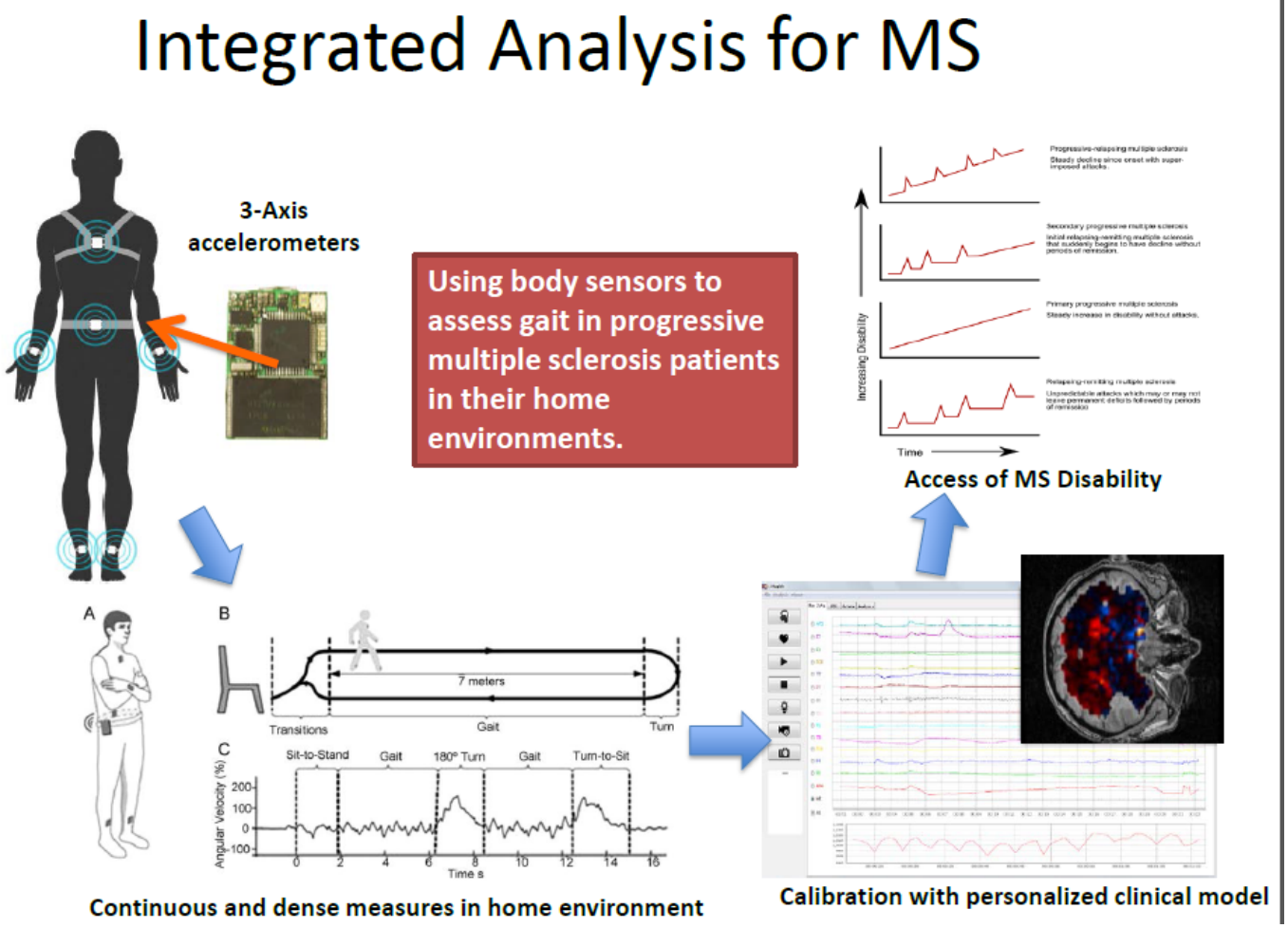
WEARABLE TECHNOLOGIES FOR REMOTE DIAGNOSIS OF RESPIRATORY CONDITIONS

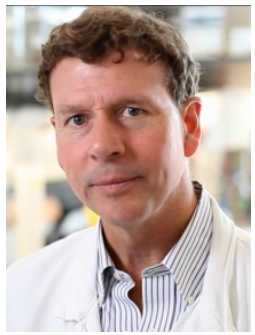
Dr. Esther Rodriguez-Villegas
Imperial College
Department of Electrical and Electronic Engineering

AcuPebble: a wearable, wireless device, the approximate size of a pound coin, which sticks onto a person's neck or chest to detect sounds emanating from the heart and respiratory system. The device uses advanced algorithms to sift through a range of sounds to determine only the ones that may indicate deteriorating health or illness in patients.

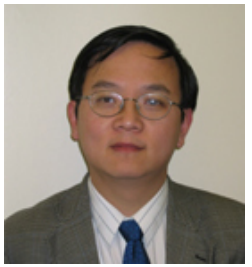

gsk
do more
feel better
live longer
Wearable Sensors for Disease-Specific Data Collection in Clinical Trials – a Pharma Approach
Dr Luis Garcia-Gancedo
luis.x.garcia-gancedo@gsk.com

PERVASIVE ACTIGRAPHY AND EEG MONITORING FOR MULTIPLE SCLEROSIS





Prof. Paul Matthews
Imperial College Department of Medicine



Prof. Yi-ke Guo
Imperial College Department of Computing

A CLINICIAN'S PERSPECTIVE ON DIGITAL HEALTH

Data Sources

Too many already?

AbedGraham Healthcare Strategies Ltd

Dr. Saif Abed
AbedGraham Healthcare

ELEVATOR PITCHES

Exhibitors were given the opportunity to make an “Elevator Pitch” during the Conference

scienion
ENABLING LIFE SCIENCE

Dr. Benjamin Nitsche

HAMAMATSU
PHOTON IS OUR BUSINESS

Dr. Chris Burton

KTN
the Knowledge Transfer Network

Dr. Terry O’Neill

ADVANCED TECHNOLOGY

Chaired by:

Prof. Martyn Boutelle
Imperial College
Department of Bioengineering

LAB-ON-A-CHIP IN MEDICINE

OUR SOLUTION

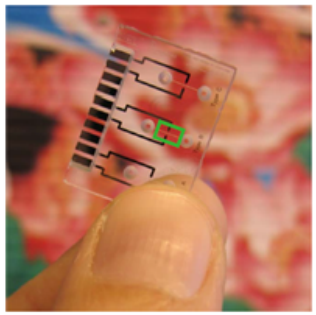
- The fertility chip

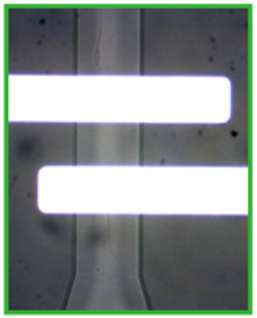
UNIVERSITY OF TWENTE.

Prof. Wouter Olthius
University of Twente

CHIP DESIGN *microfluidic impedance cytometry*

- Dimensions
  - Electrode: width 20 µm, interelectrode distance 30 µm
  - Channel: depth 18 µm, width 38 µm

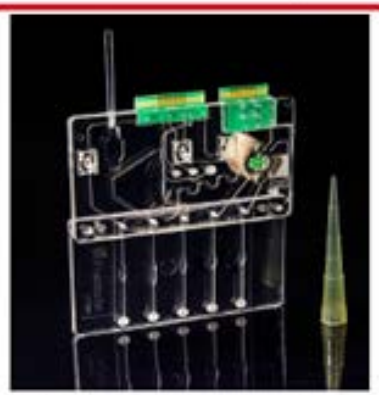




UNIVERSITY OF TWENTE.

SENSORS FOR MONITORING KIDNEY AND LIVER FUNCTION

Integrated microsystem "bleed-to-read"

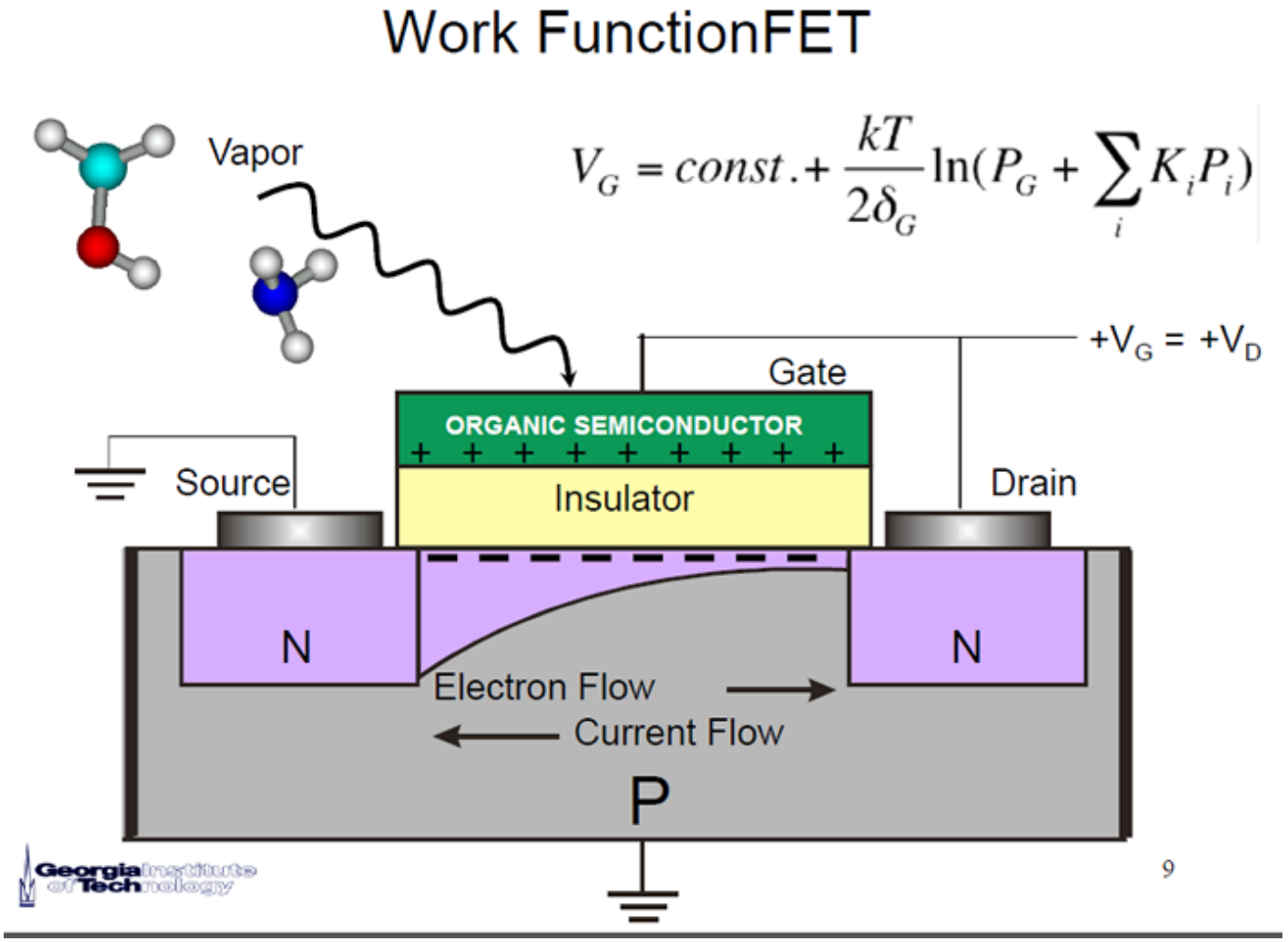


d-LIVER

UNIVERSITAT ROVIRA I VIRGILI

Prof. Ciara O'Sullivan
Universitat Rovira I Virgili

CHEMFETS IN MEDICINE. WHY THEY DIDN'T MAKE IT – YET?



Prof. Jiri Janata
Georgia Institute of Science and Technology

PANEL DISCUSSION: SENSORS FOR MEDICINE: TECHNOLOGY PUSH OR CLINICAL PULL ?

Panel members each had 3 minutes to give their views before the topic was open for audience discussion

Dr. Michael Brand
Captum Capital
Panel Chair

Prof. Martyn Boutelle
Dept. of Bioengineering
Imperial College

Daniel Green
Yaqrit Ltd.
Entrepreneurship Fellow
Imperial College

Jeremy Huddy MRCS
Clinical Research Fellow
NIHR DEC London

Walter De Raedt
Program Manager
Body Area Networks
imec

KEYNOTE: SENSING FOR IN-VITRO DIAGNOSTICS - QUO VADIS?

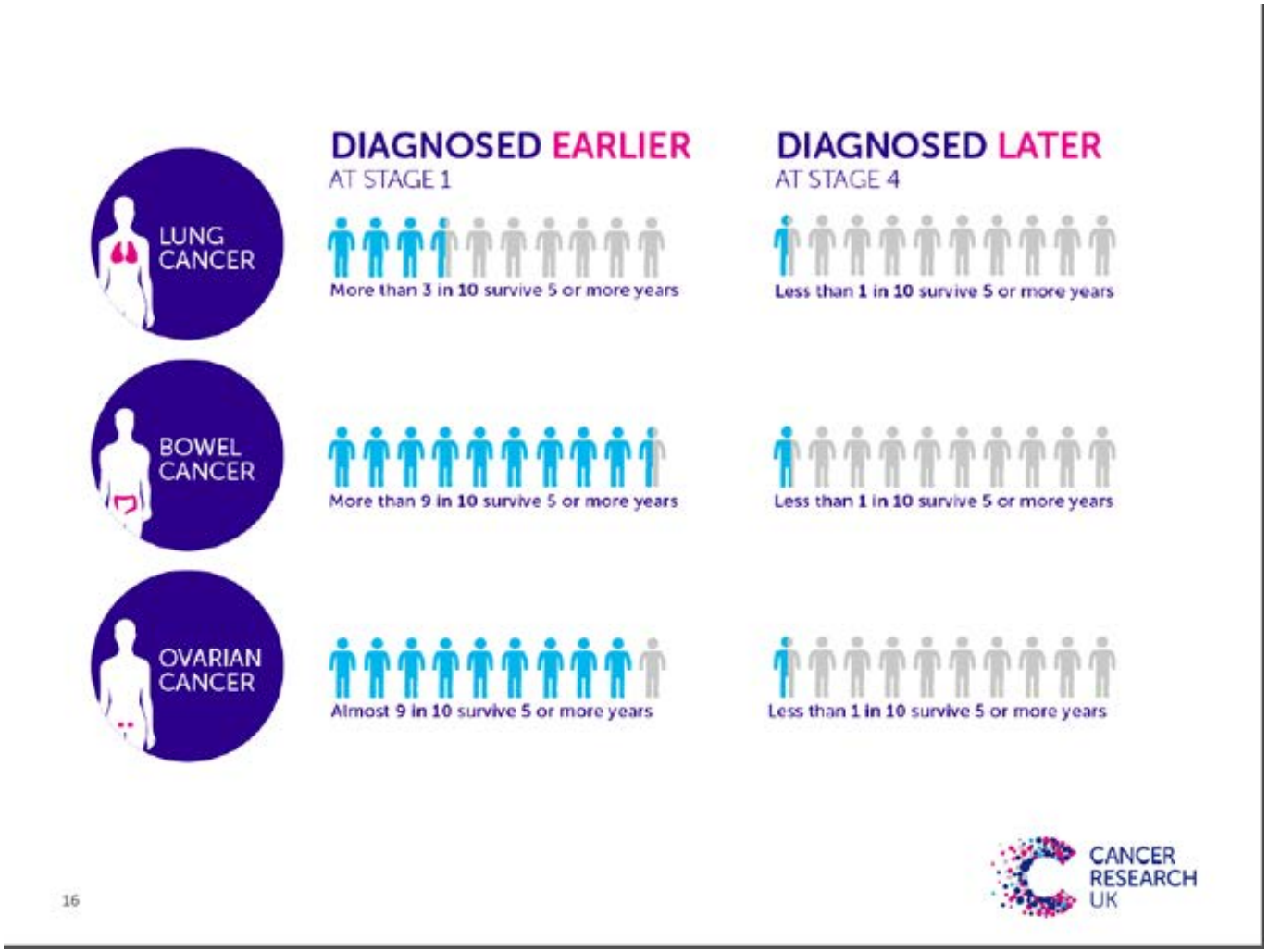
Restricted © Siemens AG 2015. All rights reserved

Sensors for Cancer

Chaired by:

Dr. Michael Brand
Captum Capital

EARLY DIAGNOSIS: OUR GREATEST OPPORTUNITY

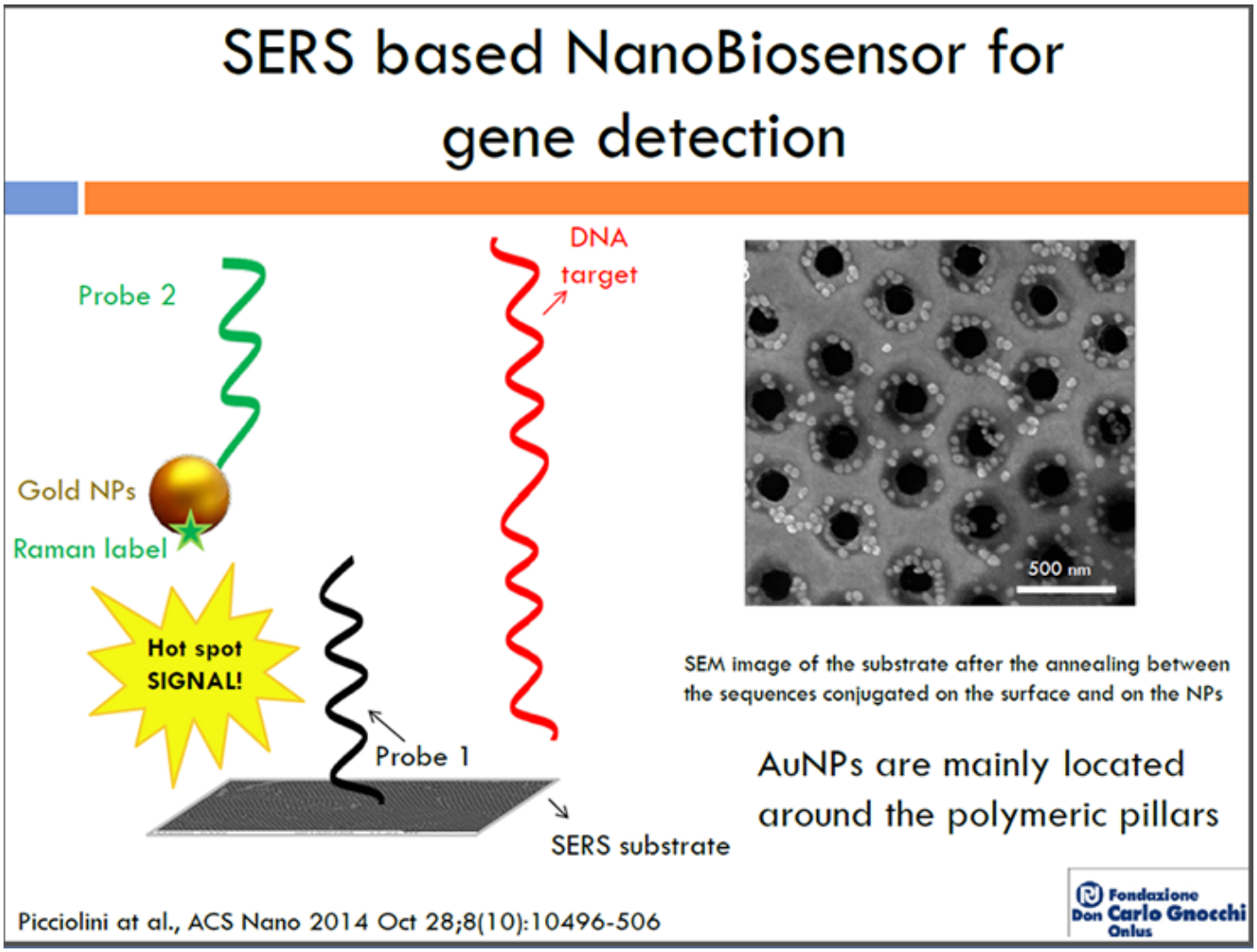


Dr. David Jenkinson
Cancer Research Technology

DETECTION OF VOLATILE ORGANIC COMPOUNDS (VOCS) FOR BOWEL AND LUNG CANCER

Billy Boyle
Owlstone Ltd.

2D SERS SUBSTRATES FOR ULTRASENSITIVE DETECTION OF MULTIPLE GENETIC LEUKAEMIA BIOMARKERS



Dr. Silvia Picciolini
Fondazione Don Carlos Gnocchi

DETECTION OF BREAST CANCER 1 (BRCA1) GENE USING ELECTROCHEMICAL DNA BIOSENSOR BASED ON IMMOBILIZED ZNO NANOWIRES

Electrochemical DNA Biosensor

- **Steps involved in electrochemical DNA hybridization biosensors:**
  - **Formation of the DNA recognition layer**
  - **Actual hybridization event**
  - **Transformation of the hybridization event into an electrical signal**

Dr. Zainiharyati Mohd Zain
Universiti Teknologi MARA

Wearable Sensors

Chaired by:

Dr. Michael Brand
Captum Capital

SMART NON-WOVENS AND TEXTILES FOR pH MONITORING ON SKIN AND IN WOUNDS

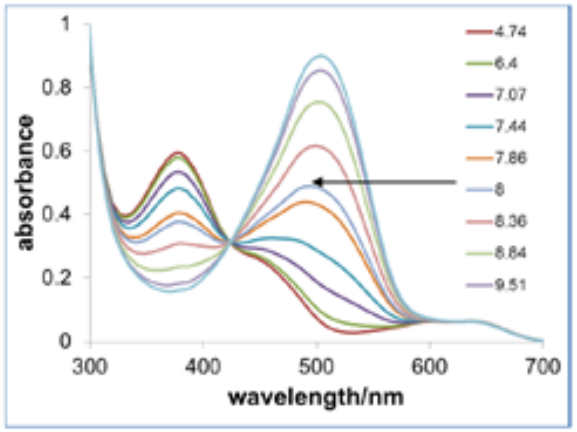
JOANNEUM RESEARCH MATERIALS

Sensor cotton swabs

10

Simultaneous wound cleaning and pH-monitoring

- pH above 8.0 critical for healing



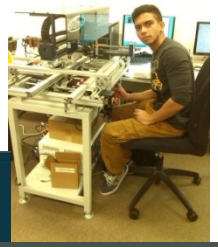
γ-Sterilisation (25 kGy) and cytotoxicity testing acc. ISO 10993-5
Endotoxin < 20EU/item, no major decrease in fibroblast activity with eluate/contact

THE INNOVATION COMPANY

G. J. Mohr, Sensors and Actuators B 206 (2015) 788

Dr. Gerhard Mohr
Joanneum Research

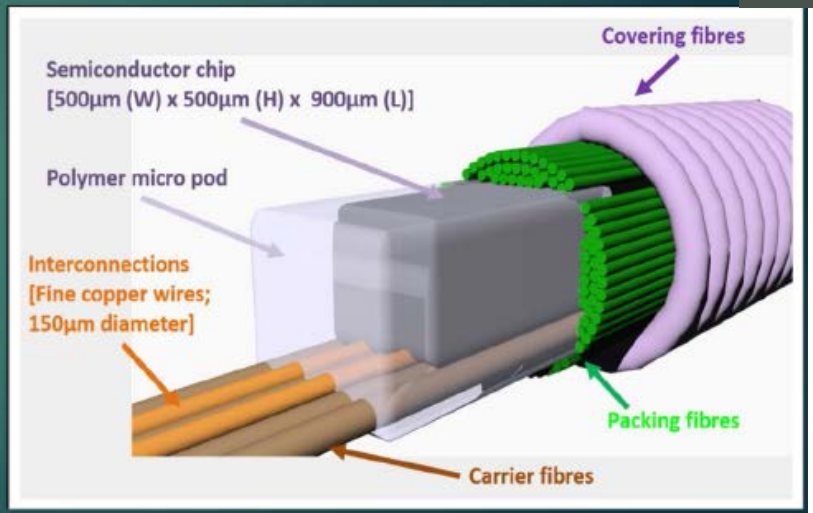
SMART BANDAGE FOR REMOTE MONITORING OF TEMPERATURE AND THE MOISTURE CONTENT OF WOUNDS



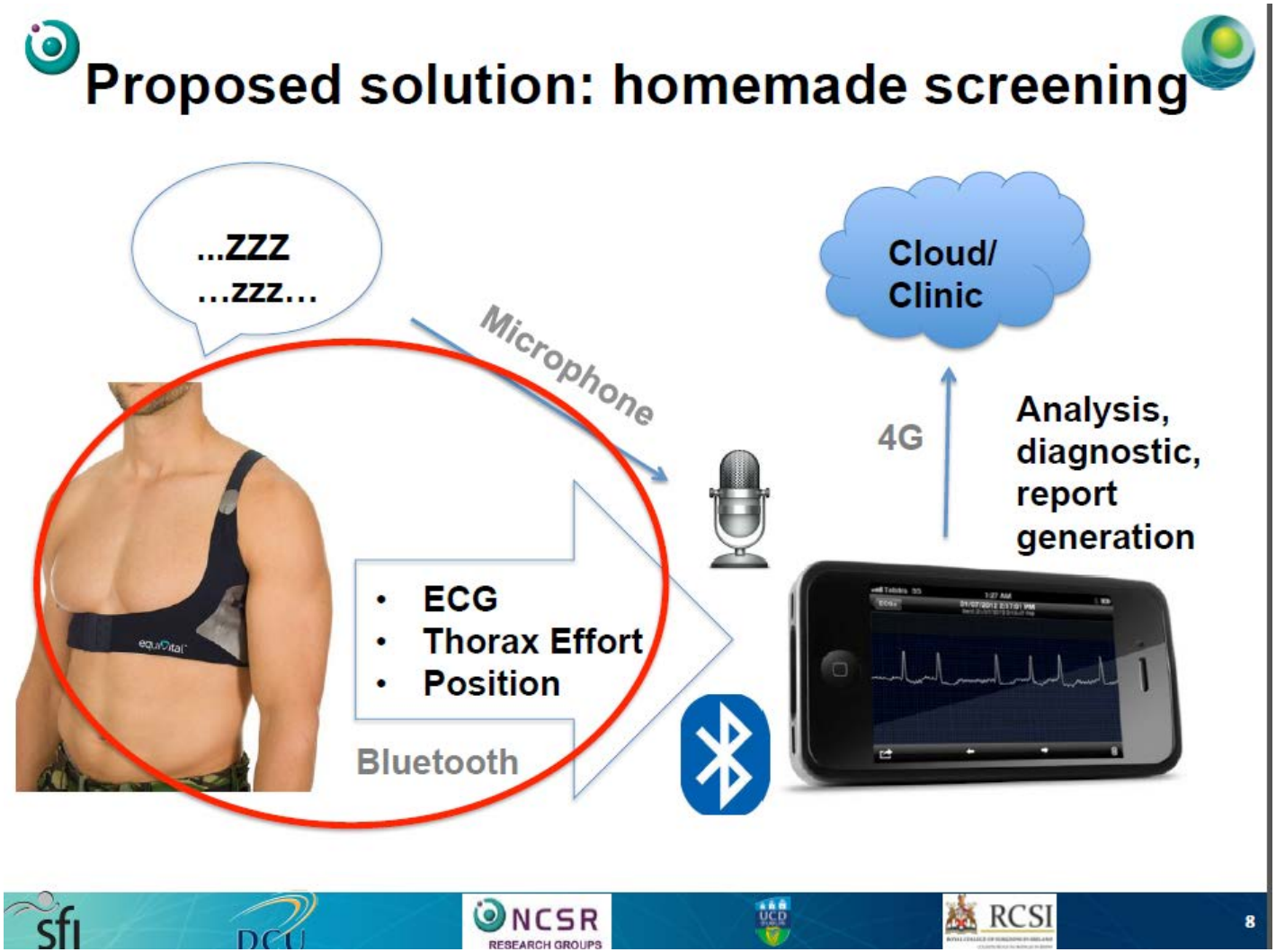
Pasindu Lugoda
Nottingham Trent University

Our technology

- Electronic temperature sensing(ETS) yarn
- Commercially available thermistors embedded within fibres of the yarn
- The thermistors have been encapsulated by a polymer micro-pod to provide mechanical strength to the chip.
- The yarn could be used to knit/weave any textile structure
- Several thermistor can be placed in parallel within the textile structure
- Several yarns could be included in a fabric



EVALUATION OF USE OF WEARABLE SENSOR GARMENT IN HOME SCREENING FOR SLEEP APNEA EVENTS

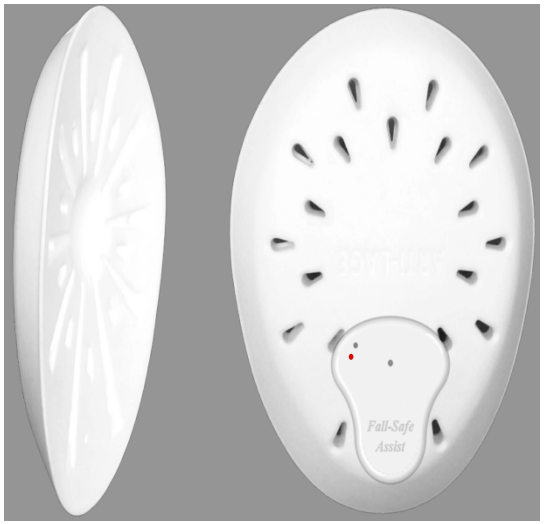


Dr. Aymen Ben Azouz
Dublin City University

FALL-SAFE ASSIST – NEW SENSOR TECHNOLOGY FOR DETECTING FALLS - INFALLIBLY

FALL-SAFE ASSIST

Wearable assistive technology for the elderly



William Beckett
Hip Impact Protection Ltd.

Hip Fall Safe® Protectors

ELEVATOR PITCHES

Exhibitors were given the opportunity to make an “Elevator Pitch” during the Conference

BIODOT

Dr. Andrew Sweet

NHS National Institute for Health Research
Diagnostic Evidence Co-operative London

Dr. Jennifer Peed

MewburnEllis LLP
INTELLECTUAL PROPERTY

Emma Graham

Sensors for Infectious Diseases

Chaired by:

Prof. Jon Cooper
University of Glasgow

THE LONGITUDE PRIZE

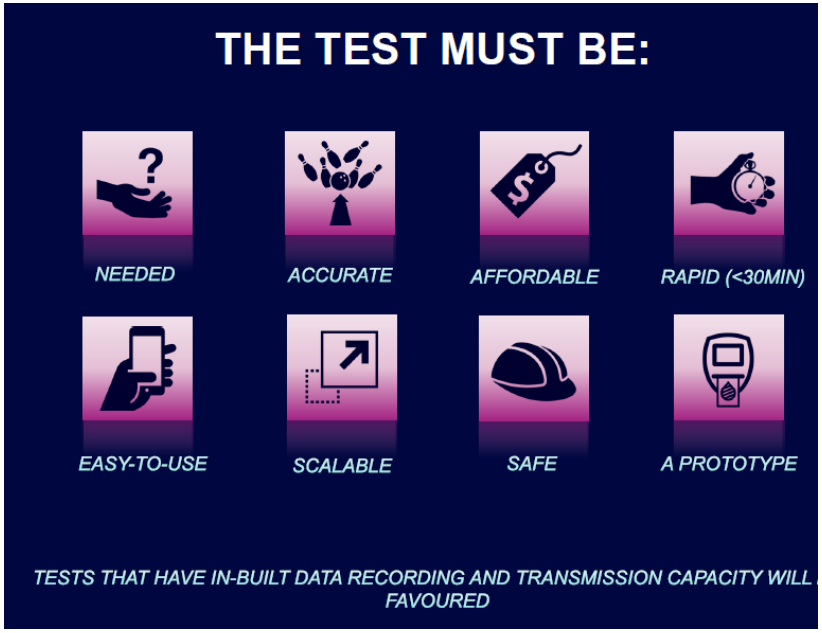
The Longitude Prize will reward a competitor that can develop a transformative point–of–care diagnostic test that will:

conserve antibiotics for future generations

and

revolutionise the delivery of global healthcare

Joshua Ryan-Saha
NESTA

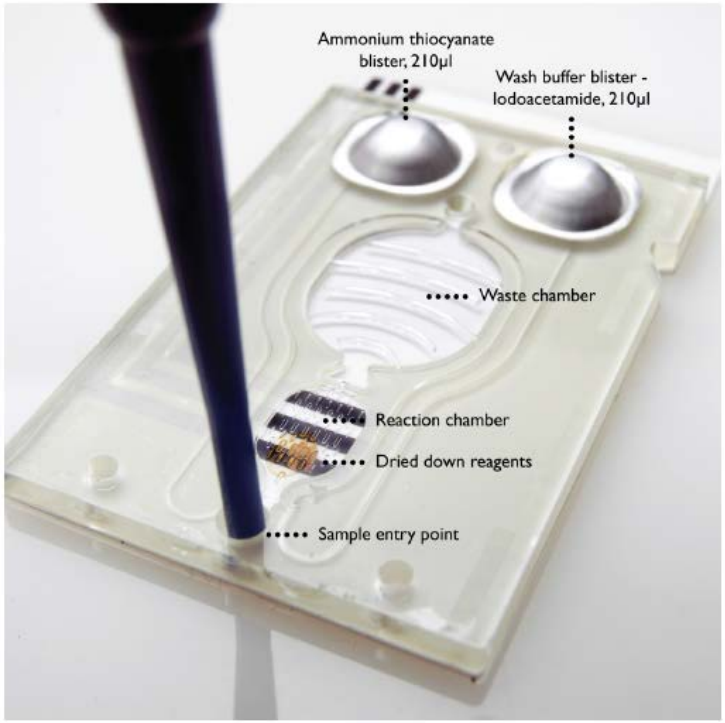


TB OR NOT TB? QUANTUMDX HAS THE ANSWER. THE FUTURE IN POINT OF CARE DIAGNOSTICS.

Dr. Chris Adams
QuantuMDx Ltd.

A TRULY HAND HELD, RAPID, QUANTITATIVE POINT OF CARE SYSTEM FOR INFECTIOUS DISEASE DIAGNOSIS IN RESOURCE LIMITED SETTINGS

The Assay Cartridge



- Single use disposable
- Injection moulded fluidic cartridge
- Carbon ink electrode with dielectric
- Fluid filled blisters containing wash buffer and reaction reagent
- All other reagents dried in reaction chamber
- Chip sample enclosure

AgPlus diagnostics

Timothy Dwyer
AgPlus Diagnostics Ltd

SOUND DIAGNOSTICS - MULTIPLEXED TESTING FOR INFECTIOUS DISEASES

Prof. Jon Cooper
University of Glasgow

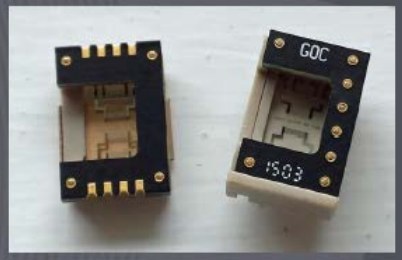
Clinical Applications

Chaired by:

Dr. Michael Brand
Captum Capital

POINT OF CARE BREATH TEST FOR DIAGNOSING AND MANAGING COMPLICATIONS IN DIABETES INTEGRATED FOR MHEALTH APPLICATIONS

Applied Nanodetectors: Scalable Detection Platform



- Sensor array
- Detection of multiple species simultaneously in real time
- Easily integrated
- Reliable and accurate results
- Proprietary and potential for patented manufacturing process
- Potential for low cost advanced sensor solution

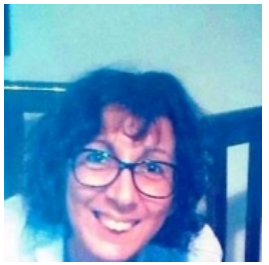
Dr. Victor Higgs
Applied Nanodetectors Ltd

FAST AND EASY METHODS FOR REAL-TIME PIEZOELECTRIC BIOSENSOR

Piezoelectric Biosensors:

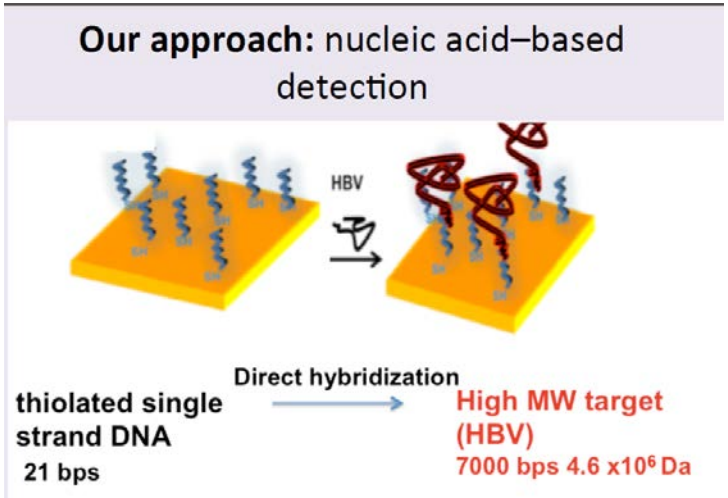
Quartz Crystal Microbalance with dissipation Monitoring (QCM-D)

Application of alternating voltage over the metal electrodes of the crystal induces thickness-shear oscillations of an AT cut (reverse piezoelectric effect)



Dr. Nicoletta Giamblanco
University of Catania

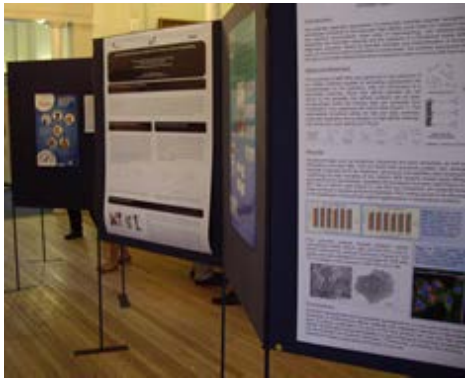
Biosensor for HBV virus detection
Hepatitis B virus (HBV) infection is one of the major health problems worldwide, and may lead to chronic hepatitis, cirrhosis and primary liver cancer.



POSTER COMPETITION

The Winning Posters:

- Luca Marmugi, University College London
  All optical atomic magnetometer for heart magnetic induction tomography
- Niamh Brannelly, University of the West of England
  Imedimetric assessment of polyaniline modified silver electrodes for blood ammonia sensing
- Jules Hammond, University of Bath
  Nanogap generator-colelctor devices with miniaturised electronics for analytical applications
- Sammer-ul Hassan, University of Southampton
  A droplet based portable continuous chemical sampling and monitoring device



The Poster Competition was sponsored by:
Medical Research Council Technology

EXHIBITION


3M


and
APPLIED NANODETECTORS


BIODOT


camtech
innovations


equivital
TM


HAMAMATSU
PHOTON IS OUR BUSINESS


COMSOL

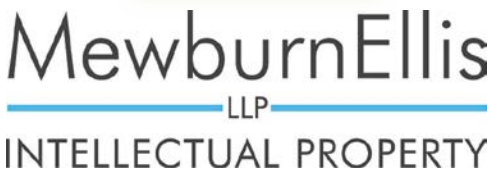

Hip
Fall Safe®
Protectors


IBST


KTN
the Knowledge Transfer Network


Nano
flex
Electrode Excellence


NHS
National Institute for
Health Research
Diagnostic Evidence Co-operative London


MewburnEllis
LLP
INTELLECTUAL PROPERTY


OpTek
SYSTEMS


QuantuMD


Sensor100


scienion
ENABLING LIFE SCIENCE


UWE
BRISTOL
University of the
West of England

SPONSORS

Sensors in Medicine 2015 was made possible through the generous support of our sponsors:

Captum

Captum Capital Limited

MRC T

MRC Technology

ROYAL SOCIETY OF CHEMISTRY

The Royal Society of Chemistry

RECEPTION

The Sensor Party of the Year

2015 Cocktail of the Year: The Long Island Iced Tea

An enticing mixture of Gin, Vodka, White Rum, Cointreau, Cola, Lime Juice. Served in a tall glass over ice Thirst quenching, but to be treated with respect.

WORKSHOP

Medical Device Clinical Trials

Dr. Sandiv Sharma, Imperial College Dept. of Chemistry
Case Study

Prof. Panyiotis Kyriacou, City University
Case Study

Prof. Peter Heasman, Newcastle University
The Challenge of Ethical Review

Dr. Robert Dickinson, Imperial College Dept. of Bioengineering
MHRA/FDA Approval

Susan Laws, Duane Morris
Legal Issues: IP & Liability

Chris Brand, Captum
Statistical Reasoning in Clinical Trials

Dr. Finn Willingham , NIHR DEC Newcastle
Working with the NHS

Alex Forrest, Chubb Insurance
Insurance Protection

MEDIA PARTNERS

Sensors in Medicine *is proud to partner with:*

10 times

_connect
Electronics, Sensors, Photonics
Knowledge Transfer Network of Innovate UK Network

aamg
RSC | Advancing the Chemical Sciences

BioBusiness

INNOVATION
INNOVATION & TECHNOLOGY TRANSFER
www.greekinnovation.eu

one nucleus™
The Business Catalyst for Life Sciences

LabBulletin
your partner in science

SelectScience® Celebrating 15 years
The Fastest Way to Expert Opinion

Sensor100

sensors
http://www.mdpi.com/journal/sensors

SCI
where science meets business

ROYAL SOCIETY OF CHEMISTRY

Technology Networks.com
Scientific Communities

WISE

Sensors in Medicine *social networks:*

ABOUT SENSOR 100

- **Sensor100** is a global network of people and organisations active in research, development and commercialisation of bio-sensors and chemo-sensors
- The primary objective of **Sensor100** is to facilitate the transfer of sensor technology from the lab to commercial use
- The **Sensors in Medicine** Annual Conference series is organised by **Sensor100**
- The free monthly eNewsletter is distributed by email to network members in over 70 countries worldwide

www.sensor100.com

For more information, contact:

Dr. Michael Brand

Sensor100 is managed by:

Captum Capital Limited
Cumberland House
35 Park Row
Nottingham NG1 6EE
United Kingdom
t: +44 (0) 115 988 6154
www.captum.com

Sensors in Medicine 2016

Join the Sensor100 mailing list for program updates