



Sensors in Food and Agriculture 2018

18 – 19 July 2018

John Innes Centre
Norwich Research Park

Welcome

Sensor technology is playing an increasingly important role in the production of food, literally from farm to fork.

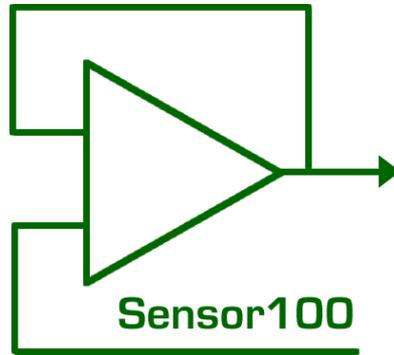
Monitoring crop production in the field, animal welfare, food manufacture and consumer protection are all areas where sensor technology makes a significant contribution.

Sensor100 annually brings together innovators in the application of sensors to agriculture and food production. This short set of slides provides an introduction to **Sensors in Food and Agriculture 2018**. [Register](#) now to learn new things, meet new people, discover new technology, all in the informal environment which characterises Sensor100 conferences.

Michael Brand
Conference Chair



Organised by:



Sensor100 is an international network of people and organisations active in the development and commercialisation of sensor technology applied to life sciences



Venue

The John Innes Centre is an independent, international centre of excellence in plant science, genetics and microbiology

It is among the UK's leading agricultural research centres



Norwich Research Park
Colney Lane
Norwich
Norfolk NR4 7UH

[Directions](#)

www.jic.ac.uk



Program

Wednesday 18th July

09:00	Keynote address: Prof. Julie McCann
10:00	Sensors in crop production
13:00	Lunch
14:00	Sensors in crop production Contd.
18:00	Presentations end
18:00	Networking reception
20:00	Reception ends

Thursday 19th July

09:00	Keynote address: Dr. Eithne Dempsey
10:00	Sensors in food production
13:00	Lunch
14:00	Sensors in animal welfare
16:00	Concluding remarks; next steps; poster awards
17:00	Conference ends

[Full Program](#)



Keynote address: 18th July

“So you want to use IoT in Agri?”



Research interests

Decentralised Algorithms, Protocols, Cross-Layered Solutions to Wireless Sensor Networks, Ubiquitous and Mobile computing and Autonomic Computing.

Prof. Julie McCann
Department of Computing
Imperial College London



Sensors in Crop Production



Automated detection of plant pathogens in the field - the future of precision agriculture

Dr. Kevin King, Rothamsted Research



3D Multispectral imaging systems for near range plant and fruit trait assessment

William Averdieck, Fotenix Limited



High definition soil sensor system HD-S3

Prof. Peter Wilson, University of Bath



Non-intrusive insect monitoring using LIDAR, from counting to classification

Klas Rydhmer, FaunaPhotonics ApS



Ag Tech 2.0: Artificial Intelligence and Beyond

Ed Plowman, Hummingbird Technologies



Crop Production



Targeted Detection of *Zymoseptoria tritici* in *Triticum*
Chris Adams, Imperial College Silwood Park



Sensors for reporting soil nitrogen availability
Prof. Tony Miller, John Innes Centre



Multispectral Imaging in agriculture
Isobel Ashbey, Cambridge Consultants



Heterogeneous agricultural autonomous robotic platform:HAARP
Dr. Pejman Iravani, University of Bath



Development of an automated smart trap for wheat pathogen detection
Dr. Daniel McCluskey, University of Hertfordshire



Applications of IoT in agriculture in developing countries
Dr. Foyso Chowdhury, BRAC University, Bangladesh



Keynote address: 19th July

“Biosensing devices for animal fertility and disease monitoring”

Research interests

Micro and nanosensor technology including nano/microfabrication (applications in human and animal healthcare);

Design and fabrication of integrated fluidics/sensor microsystems which exploit the unique properties of electrocatalytic/nanomaterials for biomedical diagnostics.



Dr. Eithne Dempsey
Department of Chemistry
Maynooth University
Ireland



Sensors in Food Production



The development of a Chilli Hotness Meter - Scoville Meter

Dr. Martin Peacock, Zimmer and Peacock



Rancidity of coconut cream

Charles Veys, Arosa



Monitoring spoilage of meats with 'zero-cost' paper-based gas sensors

Dr. Firat Güder, Imperial College London



Keynote address 19th July

“Utilising machine learning and IoT solutions to improve livestock health and welfare”

Research interests

The main goal of her research is to improve animal health and welfare on farms. To achieve this she combines understanding of disease biology, epidemiology, animal behaviour with use of innovative technologies (precision livestock technologies), data analytics and predictive modelling.



Dr. Jasmeet Kaler
University of Nottingham
School of Veterinary Medicine
and Science



Sensors in Animal Welfare



Biosensors for real-time monitoring of biohazards and disease in aquaculture

Dr. Ian Johnston, University of Hertfordshire



Sensor orientation for the indication of lameness in sheep

Zainab Al-Rubaye, University of Northampton



Exhibits

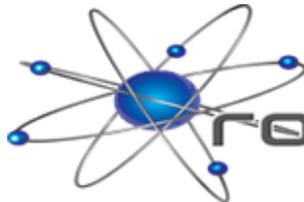
**Arosa
Instruments
Limited**

B I O D O T

HAMAMATSU
PHOTON IS OUR BUSINESS

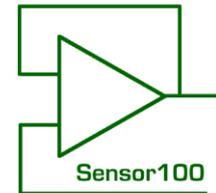
IBST

KTN
the Knowledge Transfer Network

 **roboscientific**

Zimmer & Peacock

eSensor Manufacturing and Technology



Exhibitors have a 10 minute speaking slot during the program.
Exhibitor spaces are available: contact info@sensor100.com



Posters

Posters are invited from post-graduate students and others

All posters will be entered into the poster competition, judged by the delegates. The top three posters will win trophy awards



Can't come to the conference?
Send us your poster as a pdf, we'll print it and enter it into the competition
Nominal fee for printing applies
Contact info@sensor100.com for more information.

LATERAL FLOW IMMUNOASSAY (LFIA) AND IMMUNOSENSOR FOR DETECTION OF TUBERCULOSIS (TB)
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ABSTRACT
 Lateral flow immunoassays (LFIA) and plasmonic enzyme-linked immunosorbent assay (ELISA) are advantageous over conventional detection methods in terms of their simplicity and rapidity. Tuberculosis, or TB, is an infectious bacterial disease caused by Mycobacterium Tuberculosis. It remains one of the deadliest diseases in the world. The detection of Mycobacterium Tuberculosis using LFIA and ELISA was developed via antibody-antigen interaction. The high confident level of developed ELISA was achieved by tonality colours of blue and red colours for present and absence of target antigen Mycobacterium Tuberculosis ESAT 6-Like protein ESXB (CFP 10). LFIA have been reported using various types of labels but colloidal gold nanoparticles are still the preferred choice as a label because of their easy synthesis, visual detection and stability. The developed technique was successfully tested and confirmed with sputum samples diagnosed with positive TB patients, thus providing enough evidence for early diagnosis of TB disease.

INTRODUCTION
 Tuberculosis (TB) is unique among the major infectious diseases caused by Mycobacterium tuberculosis lacks accurate rapid point-of-care diagnostic tests. In resource-constrained countries, affordable methodologies for the detection of disease such as TB at ultralow concentrations can potentially improve the standard of living. Current strategies for ultrasensitive detection often require sophisticated instruments that may not be available in laboratories with fewer resources. This problem is overcome by introducing a signal generation mechanism that enables the detection of a few molecules of analyte with the naked eye. Lateral flow immunoassays (LFIA) are advantageous over conventional detection methods in terms of their simplicity and rapidity. These assays have been reported using various types of labels but colloidal gold nanoparticles are still the preferred choice as a label because of their easy synthesis, visual detection and stability. The plasmonic enzyme label of an enzyme-linked immunosorbent assay (ELISA) controls the growth of gold nanoparticles and generates blue and red color solutions when the analyte is present and absence respectively.

WHO GLOBAL TB REPORT 2016
 TB among top 10 causes of death worldwide
 10.4 million people fell ill from TB
 1.8 million people died from TB
 That's 28,500 people every day
 That's over 4,900 people every day
 60% of TB cases worldwide occurred in just SIX COUNTRIES
 China, India, USA, Nigeria, Pakistan, South Africa
 TB in Malaysia?

CONCLUSION
 Ultrasensitive naked eye/label free detection system and plasmonic ELISA for tuberculosis detection was developed. The ability of developed detection system (Lateral Flow Immunoassay and ELISA) was enhanced with fabricated and optimized detection kit. Tuberculosis detection in resource-constrained countries does not require specialized equipment due to the simple color readout offers high sensitivity, making it potentially competitive with high-sensitivity immunoassay technology.
 The authors gratefully acknowledge the Newton-Uggett Omar Fund (British Council - MOSTI) and Science Fund from MOSTI (Malaysian Ministry of Science and Innovation)

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Figure 1: Lateral Flow Immunoassay
 Diagram showing the LFIA mechanism. A sample pad contains conjugate particles (antibody-antigen-gold nanoparticles) and a control pad. The sample pad is coated with antibodies and gold nanoparticles. The control pad is coated with antibodies and gold nanoparticles. The test line is coated with antibodies and gold nanoparticles. The sample pad is coated with antibodies and gold nanoparticles. The control pad is coated with antibodies and gold nanoparticles. The test line is coated with antibodies and gold nanoparticles. The sample pad is coated with antibodies and gold nanoparticles. The control pad is coated with antibodies and gold nanoparticles. The test line is coated with antibodies and gold nanoparticles.

Figure 2: Conventional and Plasmonic ELISA
 Diagram comparing conventional ELISA and plasmonic ELISA. Conventional ELISA uses a colorimetric reaction to produce a red color. Plasmonic ELISA uses a plasmonic reaction to produce a blue color.

Figure 3: Tuberculosis Detection
 Photographs showing the results of TB detection. Positive TB sputum shows a red line on the test line and a blue line on the control line. Negative TB sputum shows a blue line on the control line and no line on the test line.

Figure 4: Flow of sample
 Photographs showing the flow of sample through the LFIA device. The sample pad is at the bottom, followed by the conjugate pad, test line, control line, and wicking pad at the top.

Figure 5: Red signals present on test line and control line
 Photographs showing the results of TB detection. Red signals are present on the test line and control line, indicating a positive signal when sputum sample of positive tuberculosis of patient 3 until 4 is dispersed on the sample pad.



Reception

Sensor100 conferences always include a seasonal reception. Past receptions have included Sacred gin, an Italian theme, roast beef rolls, Sagitiba and Mexican tapas, and a Christmas party.

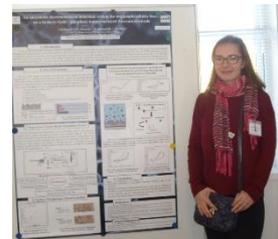
Join us at SFA2018 to see what the caterers in Norwich can concoct. It will be good!

Finger food, beer & wine and soft drinks guaranteed.

Meet the exhibitors



Judge the posters



Meet the speakers



Registration

Register for:

- Wednesday 18th July
- Thursday 19th July
- Both 18th & 19th July

Full Registration fees:

- Commercial £600
- Academic £500
- Student £150

20% VAT added to fees

Discounts

- 10% for group registration from same organisation
- 45% Single Day 18th July (includes Reception) – Discount Code **SFA18-1**
- 55% Single Day 19th July - Discount Code **SFA18-2**

Student rates apply to those in full time education leading to a higher degree. Documentary evidence may be required.

[Register Now!](#)



About **Sensor100**

Founded in 2011, Sensor100 is an international network of organisations and people active in the development and commercialisation of sensors for application in the life sciences

Currently with over 3000 members in over 70 countries, Sensor100 provides:

- a monthly eNewsletter
- conferences on the application of sensors in medicine, the environment, and food & agriculture

Join our mailing list to receive the eNewsletter:
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