



# 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.

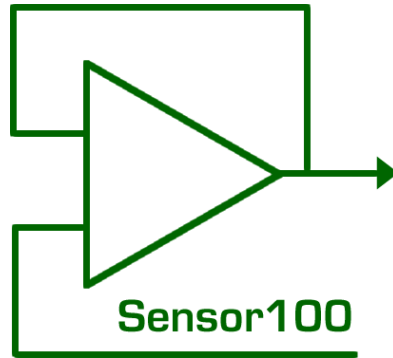
Monitoring crop production in the field, animal welfare, food manufacture and consumer protection are all areas where sensor technology makes a significant contribution.

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](http://www.jic.ac.uk)



# Program

## Wednesday 18<sup>th</sup> 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 19<sup>th</sup> 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: 18<sup>th</sup> 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: 19<sup>th</sup> 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 19<sup>th</sup> 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

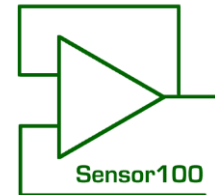
**IBST**

**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](mailto: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](mailto:info@sensor100.com) for more information.

**LATERAL FLOW IMMUNOASSAY (LFIA) AND IMMUNOSENSOR FOR DETECTION OF TUBERCULOSIS (TB)**  
 Nazifah Ariffin<sup>1,2</sup>, Noremylia<sup>1,2</sup>, Nor Azah Yusof<sup>1,2</sup>, Jaafar Abdullah<sup>1,2</sup>, Helmi Wasoh<sup>3</sup>  
<sup>1</sup>Institute of Advanced Technology, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia  
<sup>2</sup>Department of Chemistry, Faculty of Science, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia  
<sup>3</sup>Faculty of Biotechnology and Biomolecul Science, 43400 Universiti Putra Malaysia, Serdang, Selangor, Malaysia

**ABSTRACT**  
 Lateral flow immunoassays (LFIAs) 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 LFIAs 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). LFIAs 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 (LFIAs) 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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**Department:** Lab  
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 • FDC, Institute of Advanced Technology, UPM  
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# 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.

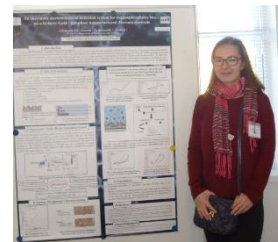
Join us at SFA2018 to see what the caterers in Norwich can concoct. It will be good!

Finger food, beer & wine and soft drinks guaranteed.

Meet the exhibitors



Judge the posters



Meet the speakers



# Registration

## Register for:

- Wednesday 18<sup>th</sup> July
- Thursday 19<sup>th</sup> July
- Both 18<sup>th</sup> & 19<sup>th</sup> 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 18<sup>th</sup> July (includes Reception) – Discount Code **SFA18-1**
- 55% Single Day 19<sup>th</sup> 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:  
[www.sensor100.com/Newsletter.html](http://www.sensor100.com/Newsletter.html)

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