

## IAS WORKSHOP REPORT:

# Exploiting the full potential of rapid diagnostic test technology and mobile connectivity for improved disease and control

### Workshop Aims

There is vast unexploited potential in combining recent advances in diagnostic test development, with advances in connectivity and digital technology to improve human and animal health, and food security. This workshop will bring together experts in diagnostic test development, digital technology and related disciplines to examine the state-of-the-art tools available, and crucially to explore barriers to implementation - technical as well as cultural.

### Summary of the workshop

Thirty experts from academia, industry and government met for two half-days in May 2019 in Wates House, University of Surrey. Attendees included biologists, veterinarians, data managers and engineers and ranged from research scientists, to industry leaders and heads of World Reference Laboratories for animal diseases. The workshop consisted of 30-minute talks from key experts (six per day) interspersed with interactive discussions and poster presentations. A successful and enjoyable networking dinner was held in Guildford on the first night of the meeting.

### Event themes

The workshop was opened by Professor Vince Emery, framing the context and aims of the workshop. Prof Theo Kanellos, Head of Strategic Partnerships at the Animal Health firm Zoetis, then gave a thought provoking keynote on digital and diagnostic aids and their role in advancing animal health as part of a portfolio of approaches necessary in an evolving market.

The first session focussed on the latest low cost rapid diagnostic technology with talks from Prof Wamadeva Balachandran (University of Brunel) on a novel diagnostic platform for poultry pathogens and Dr Tina Joshi (University of Plymouth) on the development of rapid diagnostics for human infections. Ensuing discussions highlighted the challenge of low profit margins for livestock industries in LMICs and implications for the cost of diagnostic tests, as a key driver for technological improvement.

In the following session 2, the theme of diagnostic tests was continued and expanded to cover the latest developments in isothermal amplification of pathogen genomes as a diagnostic approach, with contrasting talks from an industry perspective, and academics implementing the tests. Dr Nick Morant (Optigene) spoke on “‘Genie and the LAMP’ - rapid and portable molecular diagnostics and Dr Dorina Timofte (University of Liverpool) on her experience of using new molecular tools and MALDI-TOF mass spectrometry for diagnosis of animal infections.

Four posters were presented by University of Surrey researchers Dr Aurore Poirier, Dr Jai Mehat/Mrs Lucy Rhys-Davies, Dr Jono Betts and Dr Susan McNally on work at the School of Veterinary medicine developing and refining diagnostic tests for a wide range of animal and human pathogens in clinical and environmental samples.

Thursday morning started with a keynote talk from Dr Marta Broto-Aviles (Imperial College London) addressing some of the challenges raised in sessions 1 and 2, and offering potential solutions using bioengineered materials such as metal nanoparticles, describing work undertaken as part of the I-

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Sense project. In session three attention turned to implementation of the new test technology in the field, with some practical experience from the Head of the World Reference Laboratory for Foot and Mouth, illustrating the challenges of implementing rapid tests in the field. Prof Alasdair Cook (University of Surrey) then spoke on the work of the Veterinary Health Innovation Engine (vHive) which is bringing together animal health challenges such as those discussed throughout this workshop, with digital solutions.

In the final session, two academics gave practical examples of state-of-the-art ongoing funded projects where the combination of data, digital innovation and rapid diagnostics are being used. Firstly, Dr Arnoud van Vliet described the use of whole genome sequencing to identify bacterial targets for rapid diagnostic tests, followed by Dr Aurore Poirier who spoke of novel LAMP based technology for the detection of important poultry pathogens in LMICs.

More details can be found in the workshop [brochure](#)

#### Next steps

The workshop was a potential catalyst for multiple collaborations between academia, industry and government reference laboratories. Concrete steps have already been made in the form of joint PhD studentships between Surrey and Pirbright and further opportunities are in the pipeline.

Workshop themes are also now being directly incorporated into a literature review, to provide a comprehensive publishable manuscript demonstrating clear priorities for research in this area, highlighting opportunities and barriers with potential to influence policy for implementation of new technology. This is due to be submitted early in 2020.



#### Acknowledgements

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### List of collaborating institutions represented at the workshop:

University of Surrey

University of Brunel

Imperial College London

University of Liverpool

The Pirbright institute

University of Plymouth

Zoetis

Optigene