

SEMINAR

ALL ARE WELCOME

11 January 2017 (Wednesday), 11am
The Auditorium (Level 1)

Hosted by: Dr Daisuke Urano

Towards the development of low cost, equipment free diagnostic systems for crops, livestock and human health

Dr. José Botella

University of Queensland, Australia



Imagine a future where you could find out if your son has contracted the flu without going to the doctor, whether you could find out if your banana plants are infected with the devastating fusarium tropical race 4 without calling an expert, or whether you could check if your cows have contracted mastitis without calling the veterinarian. Keep going and imagine that you could do all that with your own hands in one hour or less. Finally imagine that this development would not be restricted to rich people or developed countries and the diagnostic assays could be performed for 1 US dollar or less. This scenario is not as imaginary as it looks, in fact it is a lot closer than you think.

Recent progress in molecular biology, electronics and nanotechnology has brought us closer than ever to the diagnostics revolution. The new generation diagnostics use very sophisticated technology to produce exceptionally simplified outputs that in many cases will not require specialized personnel to perform the analysis or interpret the results. I will present the latest advances produced by a young and gifted team of scientists working at the Plant Genetic Engineering Laboratory and the Australian Institute for Bioengineering and Nanotechnology. A number of new diagnostic technologies have been developed for different purposes; some are amenable to multiplexing in order to simultaneously test for multiple pathogens while others are single-plex but can detect pathogens in the field, in 60 minutes or less and without the need for scientific equipment or electricity.

Dr. Jimmy Botella is a Professor of Plant Biotechnology at the University of Queensland. He obtained a degree in Quantum Chemistry from the University of Madrid (Spain) and a PhD in Biochemistry from the University of Malaga (Spain). After postdoctoral positions at Michigan State University and Pennsylvania State University he joined the University of Queensland in 1995 where he founded the Plant Genetic Engineering Laboratory (PGEL) specialising in the fields of tropical and subtropical agricultural biotechnology. Dr Botella has several international patents in the field of Plant Biotechnology, is a founding member of two biotechnology companies and a member of the Expert Scientific Panel for the Agricultural Biotechnology Council of Australia. Dr Botella was awarded the Chinese Academy of Sciences Visiting Professorship for Senior International Scientists in 2014-15. Highlights of the research at the Plant Genetic Engineering Laboratory are the production and field trials of the world's first genetically modified pineapples and the development of new technologies to confer protection against pathogenic fungi and nematodes in crops. The PGEL has developed a number of platform technologies that can be applied to multiple crops in order to confer resistance to pathogens and significantly reduce the use of synthetic pesticides. Dr Botella's research group has recently combined nanotechnology and molecular biology to create diagnostic technologies for the on-site, virtually equipment free detection of pathogens in crops, animals, humans and foods. The new diagnostic methods can be used in the field without the need to transport samples to specialised laboratories. Over the last 20 years, Dr Botella has performed collaborative research with groups in the USA, Germany, UK, Spain, Malaysia, India, The Philippines, Thailand, China, Japan and Korea. Dr. Botella is a grant reviewer for the National Science Foundation (US), US Department of Agriculture, Australian Research Council, and the research funding agencies of Spain, Sweden, Israel, Belgium, Singapore and Saudi Arabia.

Recent Publications:

1. Lau HY, Wu H, Wee EJH, Trau M, Wang Y, **Botella JR** (2017) Specific and Sensitive isothermal Electrochemical Biosensor for Plant Pathogen DNA Detection with Colloidal Gold Nanoparticles as Probes. *Scientific Reports*
2. Lau HY, Wang YL, Wee EJH, **Botella JR**, Trau M (2016) Field Demonstration of a Multiplexed Point-of-Care Diagnostic Platform for Plant Pathogens. *Analytical Chemistry* 88: 8074-8081
3. Wee EJH, Lau HY, **Botella JR**, Trau M (2015) Re-purposing bridging flocculation for on-site, rapid, qualitative DNA detection in resource-poor settings. *Chemical Communications* 51: 5828-5831