

Pushing the innovation envelope: Technical challenges for the renewable industries

Thursday, 18 April 2013 09:00 - 17:00

Resource restrictions for commonplace materials and energy supplies are having social and economic impacts on the global population. As the limitation on resources will become more paramount as global consumerism increases, the development of materials, products and energy sources that can extend, alleviate or side step these limitations are required. As a multi-component problem, there are multiple solutions, innovations and opportunities to be had. This event will address and discuss these problems and look at what the future holds.

Who should attend

All those involved or interested in the innovation of technologies for the mitigation of climate change through the development of low carbon solutions.

Meeting chair: **Alex Stavrindes**, National Centre for Industrial Microwave Processing, The University of Nottingham, UK

- 9:00 – 9:45 **Registration**
- 9:45 – 10:00 **Introduction by the Chair: Alex Stavrindes**, National Centre for Industrial Microwave Processing, The University of Nottingham, UK
- 10:00 – 10:30 **Optimising performance of energy crops and matching to end uses**
Professor Iain Donnison, Environmental Impact Theme Leader, Institute of Biological, Environmental & Rural Sciences (IBERS), Aberystwyth University
Bioenergy and industrial biotechnology provide opportunities to boost economic growth and the creation of green jobs through their contribution to the development of the knowledge based bioeconomy. In particular they offer the opportunity for the two major manufacturing industries (agriculture and chemical) to come together and develop new opportunities which will revolutionize both industries. Moreover there are opportunities for multiple wins from the knowledge based bioeconomy, with environmental and societal benefits as well as for the rural and national economies. The opportunities exist for the development of new crops, new uses for old crops and co-products, and the creation of new value chains based around crop biology and engineering.
- 10:30 – 11:00 **Talk to be confirmed**
Dr Klaus Hellgardt, Reader in Chemical Engineering, Imperial College of Science, Technology and Medicine, London
- 11:00 – 11:30 **Speakers' photo then mid-morning break and trade show/poster viewing**
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- 11:30 – 12:00 **Talk title to be confirmed**
- 12:00 – 12:15 **Is renewable energy sustainable?**
Mr Melvyn Solomon, Carbon Assets, UK
Taking a look at the historical development of renewable energy innovations and to explore where it's all going?.
- 12:15 – 12:30 **The possible solution of food versus fuel issue**
Dr. Amit Sarin, Amritsar College of Engineering & Technology (NBA Accredited), India
The production of biofuel from edible oils has raised serious concerns on preserving food security of the planet. In addition, it will lead to inflationary pressures in vegetable oil market, which was recently being witnessed. To minimize the use of biodiesels synthesized from edible oils like due to raising food versus fuel issue, biodiesel from edible oil was blended with biodiesels derived from tree borne non edible oil seeds to examine the effect on low temperature flow property of biodiesel. These properties improved after blending.
- 12:30 – 13:30 **Lunch and trade show/poster viewing**
- 13:30– 14:30 **Question and Answer Session**

Delegates will be asked to submit questions to a panel of experts. Questions can be submitted before the event or on the day

14:30 – 15:00

Talk title to be confirmed

Dr Jason P Hallett, Imperial College London, UK

15:00 – 15:30

Afternoon Tea

15:30– 16:00

Is synthetic biology a solution for the renewable energy future?

Professor Phillip C Wright, University of Sheffield, Chemical & Biological Engineering

Synthetic biology has been proposed as a solution to many societal problems. These areas are diverse and range from solving various diseases through to attacking global warming and renewable energy. This talk assesses the state-of-play in global efforts to deploy synthetic biology solutions and attempts to examine the balance between hope and hype. Case studies on systems of 1-3rd generation biofuels are given and energy carriers such as ethanol, butanol, hydrogen, diesel and electricity are presented as case studies.

16:00 – 16:30

Biofuels: challenges for a sustainable energy future

Dr Alexandre Strapassonm, Centre for Environmental Policy, UK

Biofuels is an opportunity for tackling climate change and promoting sustainable development globally. However, the confluence of energy and food demands, and the increasing scarcity of natural resources impose an increasing need to find new environmental policy strategies. The challenge is how to promote biofuels in a symbiotic way with food production and conservation of ecosystems. Brazil is a clear example of a nation where it is possible to produce both food and fuel in harmony, as evidenced by almost 40 years of sugarcane-based ethanol programme. Alexandre Strapasson will discuss these issues and how to promote sustainable biofuels worldwide.

16:30 – 17:00

Chairman's summing up

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This meeting was organised by Euroscicon (www.euroscicon.com), a team of dedicated professionals working for the continuous improvement of technical knowledge transfer to all scientists. Euroscicon believe that they can make a positive difference to the quality of science by providing cutting edge information on new technological advancements to the scientific community. This is provided via our exceptional services to individual scientists, research institutions and industry.

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About the Chair

Alex Stavrinides has a multi-disciplinary background covering biotechnology, bioprocess and microwave technologies. In the completion of his doctorate at Liverpool John Moores University, he developed a novel system of controlled irradiation of biological and biocatalytic processes for the enhancement of specific bioproducts and intermediates. Now residing at the National Centre for Industrial Microwave Processing, Dr. Stavrinides applies microwave field technologies to biological principles for the niche application of microwave-biotechnology, covering a gamete of technologies including bio-energy, product bio-processing and background fundamental field effects in microbial and biocatalytic processes.#

About the Speakers

Melvyn Solomon spent most of his professional life as a successful headhunter for City institutions in London where he built up an extensive network of senior bankers and managers from the world of finance. In 2006 he was introduced to timberland projects where he became interested in the newly emerging green economy. He travelled extensively attending environmental conferences and

befriending numerous businesses with few, if any, connections to the UK. He recognised a gap in this market and in 2009 set up Carbon Assets which acts as a vehicle for introducing foreign companies involved in forestry, cleantech and renewable energy to UK businesses that are also committed to climate change. He is an avid networker and has consulted for many UK institutions seeking to diversify their portfolios towards greener opportunities and often speaks at conferences around the world.

Alexandre Strapasson is a PhD Researcher at Imperial College London and works on energy and environmental affairs with focus on biofuels. He is also Chair of Imperial College Brazil Forum and a Visiting Lecture in biofuels at the French Institute of Petroleum (IFP) in Paris. Alexandre worked for several years in the Brazilian Government, as Head of the Department of Bioenergy at the Ministry of Agriculture, and as UNDP Consultant for energy and climate change affairs to the Ministry of the Environment. He is Agronomy Engineer, and took a Masters in Energy at the University of Sao Paulo.

Iain Donnison leads research at Aberystwyth University on Environmental Impact. He is a graduate of the Universities of Reading and Cardiff and held fellowships at the Max Planck Institute for Plant Breeding in Cologne. He moved to Aberystwyth 18 years ago and currently leads a BBSRC strategic Programme on Energy grasses & Biorefining and the BEACON Biorefining Centre of Excellence. His research interests span the optimisation of energy crop yield, the matching of biomass feedstocks to end uses, and the use of bioenergy as a land management tool for conservation. He is committed to working with industry to ensure that academic research is translated into products and processes to deliver economic, social, and environmental benefits.

Phillip C. Wright (PCW) (University of Sheffield, UoS) was an EPSRC Advanced Research Fellow (01-06), and is Professor of Systems Biology and Engineering in Chemical and Biological Engineering (2002-) and Head of Dept (2008-). PCW has a BE(Hons) ('91) and PhD in Chemical Engineering ('97) from the University of NSW and an ME(Hons) in Mechanical Engineering (1994) from Wollongong. He worked as a cadet then graduate engineer at BHP in Wollongong ('86-94). He was a lecturer then reader in chemical engineering at Heriot-Watt (97-02). He has published >150 peer reviewed journal papers and has been PI on >£2M in the last 4 years. He is currently using synthetic biology and metabolic engineering approaches to improve energy generation (2nd and 3rd generation biofuels: EU FPVII and industry-funded) and production of biopharmaceuticals. He focuses on measurement and integration of multi-level biological data (e.g. proteomic and mRNA data), mathematical tools and characterising -omics-scale data. He is a Fellow of the Institution of Chemical Engineers.

Keywords: macroalgae, bioenergy, environment and ecosystem services, Cellulosic Ethanol, Thermophil, Thin film solar cells, nano-wire, solar electricity, quantum electronics, thin-film; photovoltaic; solar cell, transparent conductor, lithium batteries, energy storage, BBSRC, funding, bioenergy, biobutanol, advanced fermentation, re-commercialisation, next generation biofuels, Microwave, biofuel, cellulosic, 2nd generation, ethanol, Amylase, Bacillus, chromosome, co metabolic, medium, Proficiency productivity, Renewable energy, alternative energies, innovation, climate mitigation, cleantech, renewables, sustainability, technology, innovation, historical the future, Bioenergy, Industrial Biotechnology, Conservation, bioeconomy, Blending effects; Edible oil, Non edible oil, Low temperature flow properties., Biofuels, land-use change, agro-ecological zoning, public policies, global warming, synthetic, biology, renewable, energy

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POSTERS

Influence of metal contaminants on oxidation stability of biodiesel

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Abstract

According to proposed National Mission on biodiesel in India, study on stability of biodiesel from tree borne non-edible oil seeds like *Jatropha* was undertaken. European biodiesel standard EN-14214 calls for determining oxidation stability at 110 °C with a minimum induction time of 6 h by the Rancimat method (EN- 14112). Neat *Jatropha* biodiesel exhibited oxidation stability of 3.95 h and research was conducted to investigate influence of presence of transition metals, likely to be present in the metallurgy of storage tanks and barrels, on oxidation stability of *Jatropha* methyl ester. It was found that influence of metal was detrimental to oxidation stability and catalytic. Even small concentrations of metal contaminants showed nearly same influence on oxidation stability as large amounts. Copper showed strongest detrimental and catalytic effect.

Keywords: Oxidation stability; Rancimat; Antioxidants; Metal contaminants; *Jatropha* biodiesel.