BBSRC
bioscience for the future

2015

INNOVATOR OF THE YEAR

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Contents

Welcome to Innovator of the Year 2015

The UK is a world-leader in bioscience. Harnessing this excellence can help us address the challenges we face in our food systems, energy supply and lifelong wellbeing.

Innovator of the Year, now in its seventh year, celebrates the individuals with the vision and drive to realise the potential of their research for public good. The competition plays a pivotal role in translating BBSRC funded basic bioscience into impacts for the UK and beyond, supporting a vibrant bioeconomy.

Tonight we recognise and reward academics who have harnessed the potential of their science by announcing the winners of BBSRC's Innovator of the Year competition.

The finalists are excellent exemplars of how UK bioscience is helping to address the huge range of challenges that face the world today. The work we are highlighting this evening demonstrates the UK's vast world-leading research base and shows how this puts us at the forefront of access to new innovations, products and therapies.

I would like to take this opportunity to congratulate and thank all of the finalists for their achievements in bioscience.

Jackie Hunter

Professor Jackie Hunter
BBSRC Chief Executive

INNOVATOR OF THE YEAR

This competition recognises and rewards individuals and small teams who have harnessed the potential of their excellent research. It recognises the impacts arising from research BBSRC has invested in.

There are nine finalists who have been shortlisted by an independent panel. Today (31st March) a judging panel met with each of the finalists and have selected winners in three categories:

- Commercial Innovator
- Social Innovator
- Most Promising Innovator

The judges have also selected one overall **Innovator of the Year**. Winners in each category will receive a £15,000 award and a trophy. The overall Innovator of the Year receives a further £15,000.

This is the seventh year that BBSRC has run the Innovator of the Year Awards.

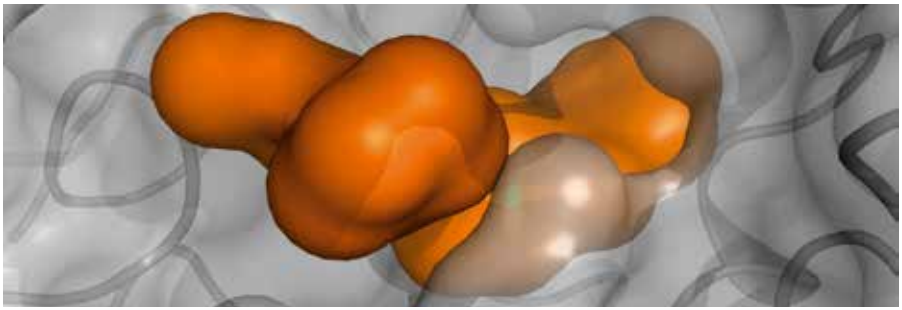
For previous winners and more information please see: **www.bbsrc.ac.uk/innovator**

Andrew Hopkins

University of Dundee

Professor Andrew Hopkins and his team at the University of Dundee have pioneered new algorithmic approaches to drug design. The new innovative technology mimics the creative process of a human drug designer, learning from all available data. The system demonstrates that intellectual property for new drugs can be designed and 'invented' by an algorithm. This important development in the use of computers in drug discovery has great potential to improve productivity.

The technology has proven itself commercially with the creation of the spin out company, ex scientia Ltd, focused on delivering effective candidates for drug development to treat unmet medical needs.



University of Dundee

From left to right: Gary Barker, Keith Edwards and Sacha Allen.

Keith Edwards

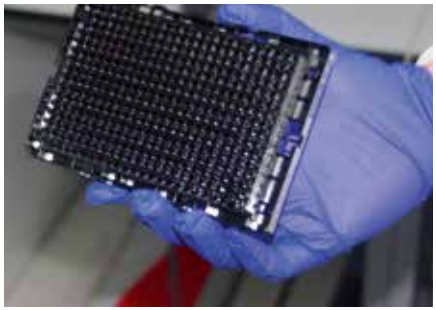
University of Bristol

Wheat breeding is slow but using molecular markers (smart breeding) speeds up the process. Professor Keith Edwards and his team at the University of Bristol are world leaders in developing molecular markers for wheat breeding.

Professor Edwards' team used wheat DNA sequences and an innovative bioinformatics pipeline to generate more than 1M molecular markers. These markers have been used to establish two wheat genotyping platforms.

The team has worked with genotyping companies LGC and Affymetrix to develop a package of validated markers and high-throughput genotyping platforms, this technology will be extended further in future to develop more flexible platforms to reduce costs.

This innovation reduces the costs involved in bringing new wheat varieties to market and speeds up the introduction of improved varieties. As an example one wheat breeder was able to use molecular markers to automate their genotyping process, reducing costs and increasing throughput ten-fold.



University of Bristol

From left to right: Andrea Harper and Ian Bancroft

Ian Bancroft

University of York

University of York

Understanding how differences in gene sequence and activity affects a plant's characteristics, such as yield, is key to harnessing the power of modern science and bioinformatics. The technology – Associative Transcriptomics – developed by Professor Ian Bancroft and Dr Andrea Harper of the University of York, uses advanced statistical approaches to find links between the characteristics of a plant and the underlying gene sequence and activities. Innovatively, Professor Bancroft's approach focuses only on genes which are active and so, by discounting genes which have been switched-off and other 'junk-DNA', Professor Bancroft and his team can increase the speed and reduce the cost of finding markers that breeders can use to develop better crops.

The main impact of Associative Transcriptomics is economic as the technology helps increase the efficiency of crop production. In oilseed rape, the insights gained have led to the development of molecular markers for the breeding of hybrid cultivars. In oil palm, the technology has enabled the identification of molecular markers to predict the productivity of oil palm clones. Additional social impacts are anticipated from on-going work, where the availability of foods such as banana and papaya are at risk due to plant diseases for which resistant cultivars are urgently needed and only Associative Transcriptomics is likely to deliver molecular markers quickly.

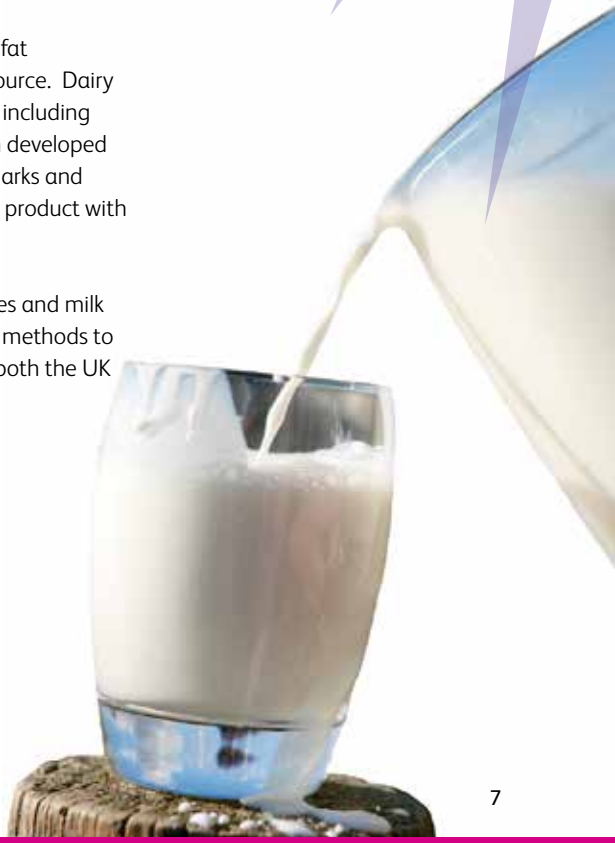
Ian Givens

University of Reading

Professor Ian Givens and his team from the University of Reading have altered the diet of cows to help reduce both saturated fats in dairy products and the carbon footprint of these foods.

In the UK we exceed dietary targets for saturated fat consumption and dairy products are the largest source. Dairy products are an important source of key nutrients including calcium and iodine. Professor Givens and his team developed this innovative cow diet with industry, including Marks and Spencer, now selling this milk as their mainstream product with significant environmental benefits.

Through this innovation, National Milk Laboratories and milk analyser manufacturer Foss have developed rapid methods to measure saturated fat in milk. This has benefited both the UK dairy farmers and the milk processors.



Geoffrey Barton

University of Dundee

Professor Geoffrey Barton from the University of Dundee has developed Jalview – a free programme for visualisation and analysis of proteins, DNA and RNA sequences. More than 55,000 copies are in regular use across the world, making it the standard programme of its kind. Jalview is central to the daily work of thousands of research scientists, students and teachers at all levels.

The free Jalview software makes complex analyses and data integration possible, saves its users time in analyzing their data and so enables them to plan more efficient experiments. As such, it has economic benefit by eliminating wasted effort in research across a broad swathe of life sciences research. Jalview is the standard multiple alignment editing and analysis tool and so has huge social impact through the thousands of students who are taught sequence analysis and structure/function relationship using it. The 3,200 citations (Google Scholar) to the Jalview papers and 275,000 starts each year from 120 countries highlight Jalview's importance to life-sciences research world-wide.

University of Dundee

Susan Baigent

The Pirbright Institute

Dr Susan Baigent from The Pirbright Institute has developed sensitive techniques to test for the presence of vaccine and virulent strains of the poultry pathogen Marek's disease virus in chicken samples, particularly feathers.

The tests are being patented in partnership with Zoetis, who offer testing to customers to demonstrate successful vaccination, and also to monitor levels of the virus in flocks.

The methods are now being modified to test samples of chicken house 'dust', to monitor virus levels in the birds' environment.

The Pirbright Institute

From left to right: Daniel Bracewell and Oliver Hardick

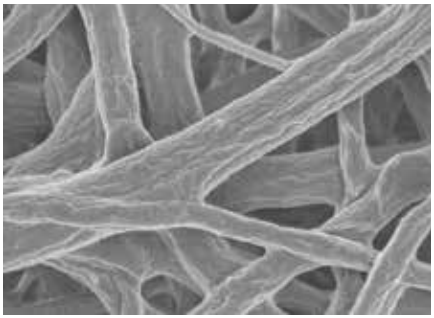
Daniel Bracewell & Oliver Hardick

University College London

Existing purification technologies for drug safety and efficacy are a significant proportion of the cost of bioprocessing. The new nanofibre purification technology developed by Dr Oliver Hardick and Dr Daniel Bracewell at the University College London, and being commercialised by the spinout Puridify, can increase productivity ten-fold. It allows the cost-effective manufacture of a wide range of existing and new biomolecule products. This will play an important role in widening patient access to expensive drugs in the UK and worldwide.

While still in a R&D phase, the development of this innovative technology could provide more diverse, affordable healthcare to a growing population.

By offering a reduction in drug manufacturing costs for both existing and new drugs, and through establishing UK-based manufacturing capacity the technology aims to benefit the UK economy and generate spill-over social benefit to the UK public.



University College London

Travis Bayer

University of Oxford

Dr Travis Bayer from the University of Oxford has developed a low cost herbicide to eradicate parasitic weeds in sub-Saharan Africa – a major limitation on crop productivity for subsistence farmers.

Field trials in Kenya have proven successful, showing significant reductions in weed numbers and improvements in harvests.

Dr Bayer and his team, with support from the Bill and Melinda Gates Foundation and the UK Department for International Development (DFID), have formed a spinout company called Asilomar Bio, to move the technology beyond the lab.

Improving the productivity of subsistence farms in the developing world is key for enhancing the food security and income stability of hundreds of millions of people. Use of this technology could potentially improve harvest yields by 50%.

University of Oxford

From left to right: Michelle Simons, Gary Silkstone, Brandon Reeder, Svetlana Gretton, Chris Cooper, Elizabeth Welbourn, Badri Rajagopal and Thoufieq Saik.

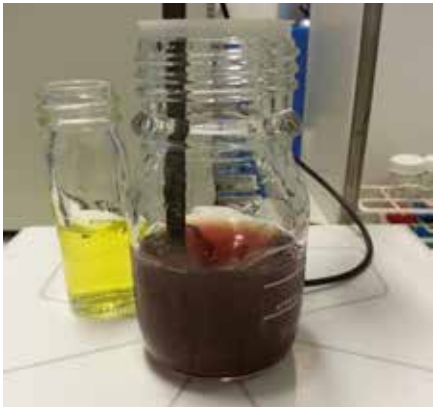
Chris Cooper

University of Essex

Red blood cells have a limited shelf life, need blood group typing, cannot be used in immune compromised individuals, are not available at the scenes of major emergencies, and are susceptible to contamination. These problems could be eased by the development of an artificial blood substitute.

Professor Chris Cooper and his team at the University of Essex have engineered novel haemoglobin molecules as a basis for an artificial blood substitute and launched a spin-out company, CymBlood in 2015 with the intention of taking a new product to clinical trials in 2019/2020.

The multi-billion pound market in red blood cells is growing, with global demand expected to reach 167 million units by 2017. A safe artificial blood substitute will be able to make significant inroads into this market by adding clinical benefit to patients in three ways; availability, safety and convenience/efficiency.



University of Essex

Finalists

Commercial

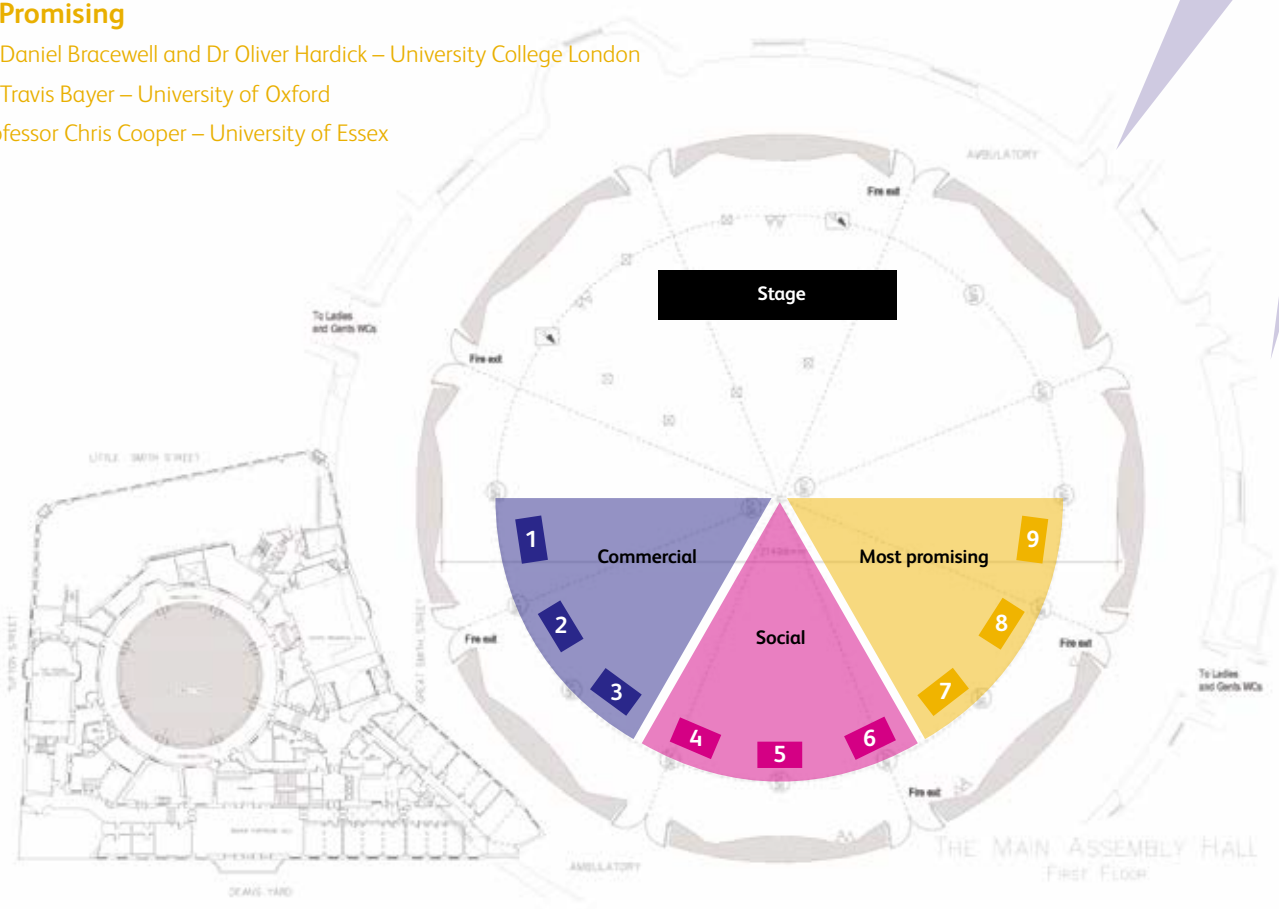
1. Professor Andrew Hopkins – University of Dundee
2. Professor Keith Edwards – University of Bristol
3. Professor Ian Bancroft – University of York

Social

4. Professor Ian Givens – University of Reading
5. Professor Geoffrey Barton – University of Dundee
6. Dr Susan Baigent – The Pirbright Institute

Most Promising

7. Dr Daniel Bracewell and Dr Oliver Hardick – University College London
8. Dr Travis Bayer – University of Oxford
9. Professor Chris Cooper – University of Essex



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