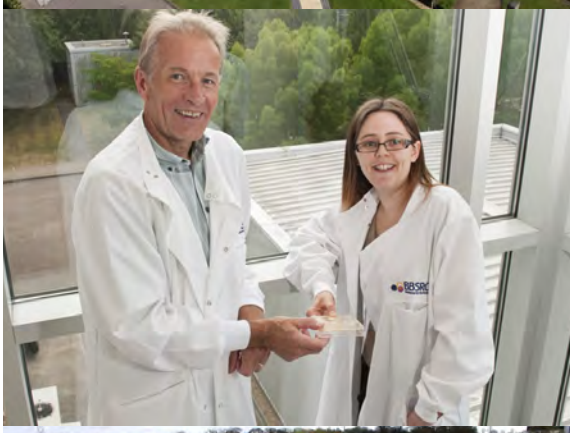
Introducing the

# John Innes Centre

JIC providing global solutions, securing our future



The John Innes Centre is an independent, international centre of excellence in plant science and microbiology. JIC's unique blend of research spans the full spectrum from fundamental science through to strategic applications and practical outcomes. We believe that it is only through combining scientific excellence with strategic relevance that we can help address the major societal and environmental challenges that lie ahead.

## Our mission:

- to create scientific understanding of the fascinating biology of plants and microbes and to apply this knowledge for the benefit of society and the environment through research, knowledge exchange, commercialisation and training.

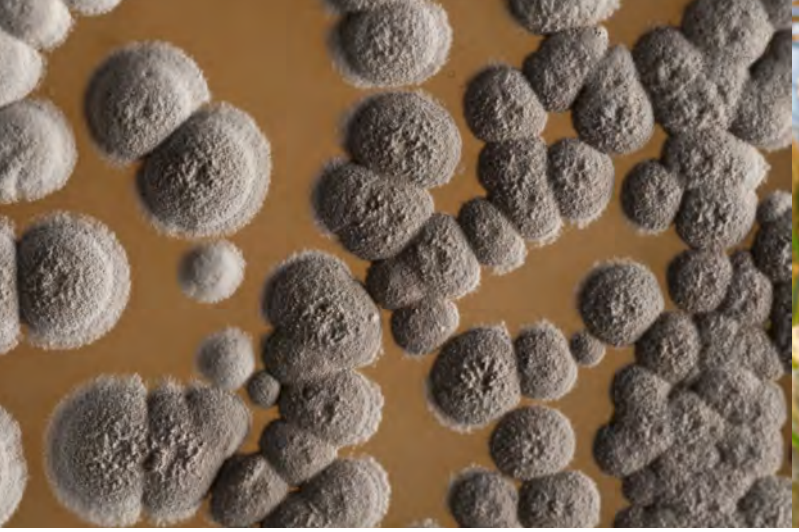
## Our strategy:

- to ensure world leading research and to develop opportunities for innovative and long term research in plant and microbial sciences. A central principle of our research is the use of genetics, continuing the long and prestigious history of genetics at the JIC
- to translate research in the areas of yield and quality in crop plants, the use of microbial and plant products to promote human health and the use of plants and microbes in biotechnology
- to use novel genetic approaches to generate new varieties and strains of plants and microbes that can be used to further knowledge and to enhance productive and biotechnological capacity
- to apply modern biotechnology to agriculture in an environmentally-sustainable context
- to use a wide range of contemporary approaches to develop dialogue with policy makers and the public
- to train the scientific leaders of the future in a broad range of scientific and transferable skills.

BBSRC

www.jic.ac.uk

John Innes Centre



## What we are

The JIC is an internationally renowned bioscience research centre. Our research focuses on

- Growth underpinning yield in plants
- Biotic interactions of plants
- Wheat improvement
- Metabolisim of plants and microbes

JIC wins most of its funding to support research in open competition from funding agencies in the UK and worldwide. More than 50% of our income is from UK government sources, with the majority from the Biotechnology and Biological Sciences Research Council (BBSRC). Charities and the EU 'Framework' science programmes are our other largest sources of income. JIC actively engages with industry, and supports knowledge exchange and commercialisation through collaborative and sponsored research.

## Our impact

The expertise of JIC scientists has made important contributions to industry and society in the UK and world-wide. These include: the discovery and application of conserved gene order in grasses for cereal improvement; the characterisation of the dominant dwarfing phenotype that underpins improved wheat crop productivity; the understanding and application of flowering time; contributing to the first sequencing of a plant genome and the development of genomic systems for exploiting *Streptomyces*, the principal source of anti-infectives for human health. It has been independently estimated that JIC research contributes as much as £3.4bn to the global economy in the field of wheat production alone.
See http://bit.ly/JICEconomicImpact

## Our scientists

JIC is a dynamic, multinational community of about 360 scientists and post graduate students. Our reputation for scientific excellence is international and we attract some of the best scientists and brightest students from around the world. JIC is committed to training of the next generations of scientists. Activity includes events for locally 'gifted and talented' school-students, an undergraduate summer school (joint with The Sainsbury Laboratory) that gives students the unique opportunity to spend the summer on site (http://opportunities.jic.ac.uk/summerprogramme), three different routes to a PhD including the prestigious rotation studentships (http://www.jic.ac.uk/students/PhDprogs.htm), followed by post doctoral training fellowships, career progression and independent fellowships.

## Our strategic focus

***Food Security*** Globally we face the unprecedented challenge of doubling food production within the existing area of arable land, whilst making our systems more sustainable. JIC's research on wheat, Brassicas and legumes, major rotation crops used in UK and global agriculture contributes to this sustainable intensification by providing the science and technology needed to accelerate the scope and speed of crop breeding. Our research on biotic interactions in plant genetics and the fundamental understanding of disease processes will lead to new agricultural solutions for control. Strong long-term links with major players in the industry underpin these developments.

A brochure highlighting aspects of work in food security undertaken by JIC together with the co-located Sainsbury Laboratory (www.tsl.ac.uk) is available at http://bit.ly/JICFoodSecurity

***Healthy ageing*** Small molecules made by microbes and plants play essential roles in all aspects of human health. Bacteria, particularly Actinomycetes, are prolific sources of secondary metabolites that are used as anti-infectives, anti-cancer agents, immuno-suppressants and herbicides. Plant-derived natural products are essential components of the human diet, and have well established, yet poorly understood, roles in promoting long term human health as part of a well- balanced diet. Our objectives align with the national strategy, Food 2030 http://archive.defra.gov.uk/foodfarm/food/pdf/food2030strategy.pdf

***Industrial biotechnology*** Plants capture solar energy and convert this, directly and indirectly, into virtually all of the food, fibre, fuel and industrial feedstocks required for human existence. Our research provides key understanding for developing new products and feedstocks from plants within a renewable and sustainable supply chain. Microbes provide a wealth of bioactive compounds and biocatalysts that are of industrial importance. We are well placed to capture the potential for further discovery of such molecules, and contribute to the expansion of their exploitation into new industrial applications and for the benefit of human and animal health.

***Enabling themes and technology platforms*** Our advances incorporate novel approaches to computational and systems biology and bioinformatics. Within the JIC we support a number of services and technology platforms - a large Bio-Imaging Facility (state-of-the-art electron and confocal microscopes); an associated data management system for digital image processing (OMERA); Metabolomics (HPLC and mass spectrometry specialising in natural product chemistry); Proteomics (an Orbitrap QTOF was recently purchased, together with The Sainsbury Laboratory, for sensitive quantitative mass determinations); Glycomics (for the synthesis and analysis of novel carbohydrates); TILLING (supported by *RevGen*UK as a national resource) and Genotyping platforms for DNA analysis; the BRACT transformation service (barley, wheat, *Brachypodium*, Brassicas, a national resource) and Microarrays (Affymetrix for *Arabidopsis* and *Brachypodium*).

## Business Development

Business Development at JIC utilises our international standing and our alumni to foster research networks and commercial links in key areas of economic development such as China, India, SE Asia and Latin America. On site, John Innes Enterprises offers commercial access to a range of technical services, including crop plant transformation (BRACT), mutation detection in crops (*RevGen*UK), microbial natural product technology (Streptech) and Entomology. iDNA Genetics, a JIC-owned company, provides genotyping services to academia and industry.

## Scientific facilities

The JIC occupies land on the outskirts of Norwich in Eastern England - the built footprint of the site is 48,214m$^2$. We maintain a broad range of state-of-the-art facilities and equipment, including specialised analytical laboratories, conventional and containment glasshouses and controlled environment suites. The centre hosts a major centre for crop plant genetic resources, including some of the largest wheat, barley, oat and pea collections in the world. The Insectary provides contemporary resources for insect propagation and research.

The site and majority of buildings are owned by the John Innes Foundation (JIF). Major capital projects that have been completed in the last 5 years include the *Arabidopsis* barn, and a Training Suite which provides a resource for integrated training in multidisciplinary biology. As well as a laboratory, it contains a networked IT suite and lecture theatre and breakout areas for more informal discussion. A Data Centre and its 1Gb JANET connection provides the Institutes on-site with improved capacity to support genomics, bioinformatics and modelling. A spatial plan for the site envisages the progressive creation of a new Science Park.

JIC operates field trial plots to support crop genetics programmes on the main site and at the nearby Church Farm, owned by JIF. With BBSRC funding, a secure field trial area has been created on the main site for assessing GM traits.

*For more information, please visit our website at www.jic.ac.uk*

## Norwich Research Park

JIC is located on the NRP, one of Europe's largest single-site concentrations of research in Health, Food and Environmental Sciences. The scientific partners on the NRP are JIC, The Genome Analysis Centre, The Sainsbury Laboratory, Institute of Food Research, the Norfolk and Norwich University Hospital and the University of East Anglia. Together the partners employ over 2,700 researchers within a total workforce of more than 12,000. The Norwich BioIncubator and the new NRP Innovation Centre provide further scientific integration by attracting research-based companies to the Park.

Alliances within the NRP broaden our expertise and capabilities, and maintain critical mass in the breadth of disciplines and academic activities needed to contribute to global strategic objectives in food security, human health and living with environmental change. Joint appointments, cross-funded studentships and the sharing of resources within a joint planning network are key strategies for maintaining a thriving and attractive research community.
More information is available at www.nrp.org.uk

## Biotechnology and Biological Sciences Research Council

JIC is one of eight mission-driven Institutes which receive strategic funding from the BBSRC. The Institutes provide critical national capability and expertise in strategically important areas, underpin key sectors of the UK economy such as agriculture, bioenergy, biotechnology, food and drink and pharmaceuticals and maintain unique research facilities of national importance www.bbsrc.ac.uk

## John Innes Foundation

JIF is an independent charity formed in 1910 following a bequest from John Innes, a landowner in the City of London. John Innes Foundation trustees play an active part in the management of JIC and provide direct support for JIC's research and training, principally through sponsorship of several graduate studentships each year, and by their support for educational programmes and the infrastructure of the site. The trustees also support the study of the history of genetics and plant science; and the Foundation owns a very significant collection of archive material which is kept at JIC and made available to scholars and the public.

***Finding out more*** This is a brief introduction to the John Innes Centre – please visit our website www.jic.ac.uk to find out more about the Centre, to sign up for our regular e-newsletter, Advances and find out about events for 'Friends of JIC'.

*The John Innes Centre is a registered charity (No. 223852) and a company limited by guarantee (registered in England No. 511709). The JIC is grateful for the continuing support of the John Innes Foundation (registered charity No. 313462).*

October 2011

BBSRC

NRP Norwich Research Park

John Innes Foundation

**Images**
**Front page**
*Main buildings*
*Professor Mervyn Bibb and Dr Lucy Foulston*
*The greenhouse complex*
*Harvesting trial plots*

**Inside pages**
Streptomyces *colonies*
*Wheat ears*
Arabidopsis
Brassica oleracea

**Back page**
*Dr Lionel Hill - Metabolomics laboratory*
*Dr Jun Fan*