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GATSBY

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INTRODUCTION

BY LORD SAINSBURY OF TURVILLE

Settlor of the Gatsby Charitable Foundation



This year has been an important and exciting one for Gatsby with major developments taking place in each of the main areas which Gatsby supports. Many of these developments have benefitted from Gatsby's experience of working in the relevant area for many years, and show how philanthropy, like most other activities, benefits from a long-term perspective.

NEUROSCIENCE

When I was at Cambridge as an undergraduate I was very excited by the scientific discoveries then taking place there, and as a result I switched from studying history to experimental psychology. My supervisor was the brilliant and charismatic Richard Gregory and his research into optical illusions and perception led to my lifelong interest in neuroscience.

The first opportunity to support neuroscience research came with the establishment of the Gatsby Computational Neuroscience Unit at University College London (UCL) in 1998. The success of the Unit coupled with recent technological advances led us to undertake Gatsby's most ambitious project to date – a £100 million partnership with the Wellcome Trust to establish the Sainsbury Wellcome Centre for Neural Circuits and Behaviour (SWC) also at UCL. After a number of years of hard work in planning, design and construction this opened in 2015.

The challenge which neuroscience faces is to understand the relationship between gene activity, neurons, neural circuit function and behaviour – in other words how circuits within our brains give rise to complex behaviours. SWC will bring together a team of world-class scientists from multiple disciplines who will work together fusing state-of-the-art molecular and cellular biology, imaging, electrophysiology, behavioural techniques and computational modelling.

This work we believe requires both cutting-edge infrastructure and an inspiring environment, and Ian Ritchie Architects – having visited laboratories and talked to scientists across the world – has produced a building which has the best possible facilities and is also beautiful. It has an amazing front façade whose rippling glass panels represent waves of activity in the brain. It also has exhibition spaces at street-level which seek to engage passers-by in the Centre's work through a series of illusions that demonstrate interesting aspects of vision, perception and the brain.

I am delighted that Professor John O'Keefe has agreed to head SWC as the Inaugural Director. John is a world leader in his field, with his discovery of 'place cells' in the hippocampus playing a vital role in our understanding of memory and navigation. This work was recognised in 2014 with the Nobel Prize in Physiology and Medicine, and I would like to again record my congratulations to John and his collaborators. John has provided invaluable input to the design of SWC, and is putting together a team of brilliant scientists to take the science forward.



THE SAINSBURY
WELLCOME CENTRE
IS GATSBY'S MOST
AMBITIOUS PROJECT
TO DATE – A £100
MILLION PARTNERSHIP
WITH THE
WELLCOME TRUST



Left: The front façade of the Sainsbury Wellcome Centre has rippling glass panels representing waves of activity in the brain.



PLANT SCIENCE

We will make sure that SWC has the long-term resources and financial freedom to carry out the innovative research that we want to see – the benefits of such an approach are shown by The Sainsbury Laboratory (TSL) in Norwich. TSL was founded by Gatsby and our partners in 1987 to investigate plant interactions with microbes and viruses, and it has been incredibly successful. It is a relatively modest-sized institute but in 2010 TSL and its partner the John Innes Centre topped a worldwide survey of more than 88,000 institutions involved in plant and animal sciences due to their research papers being cited more frequently than those from any other organisation. This year four TSL scientists were also named by Thomson Reuters in the top 1% of most highly cited scientists in animal and plant sciences across the world for the 2014/15 period.

Importantly TSL is making sure that its fundamental discoveries are being transferred to farmers and consumers through its TSL+ programme and its partnership with the Two Blades Foundation. When my great friend Roger Freedman first highlighted to me the appalling lack of funding for plant science in the 1980s, a major motivation behind Gatsby getting involved was the huge potential benefits, particularly in the developing world, of fully translating and applying the results of ground-breaking research. Those benefits now look like being realised.

It is also encouraging that the Sainsbury Laboratory at Cambridge University is now fully staffed and is already gaining an international reputation for its research.

SCIENCE AND ENGINEERING EDUCATION

It is a scandal that when employers are finding it difficult to recruit trained technicians, half a million 16 to 24 year olds are unemployed. This has to be seen as a major failure of our system of technical education. It is also not one which will be solved by employing more and more apprentices without ensuring that they are trained on properly accredited programmes. Technical education and the development of an effective system of accredited provision and technician registration by the key professional bodies continues, therefore, to be a major area of work for Gatsby.

A key factor in increasing the number of registered technicians is addressing current deficiencies in the UK's career guidance system so that every pupil, whatever their class, ethnicity or gender, can make better decisions about the courses they take and the careers they pursue, understanding enough about the world of work to know what knowledge and skills they need to acquire to succeed.

Because of this, in 2014 Gatsby commissioned Sir John Holman to identify good practice in career guidance – both here and abroad – and then point the way to embedding such practice in all of our schools. Sir John's tenacity and thoughtfulness have resulted in a report which offers practical steps for collaborative action between schools, employers and government in the form of ten recommendations and eight benchmarks identifying the different dimensions of good career guidance. We are now piloting the benchmarks across 15 schools and colleges to demonstrate that this simple model of career guidance is something that the government should insist all state schools adopt.



Above top: Practical class on plant pathology at the Gatsby Plant Science Summer School.

Above : Detail from Francis Bacon – *Portrait of R.J. Sainsbury* (1955); Sainsbury Centre for Visual Arts; © The Estate of Francis Bacon.



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ECONOMIC DEVELOPMENT IN EAST AFRICA

Over the last seven years we have worked across East Africa with a number of agricultural sectors – such as tea, cotton and forestry – to increase their productivity. Now that these initiatives are beginning to be successful we have been looking at ways to transfer new technology into firms in East Africa.

In particular we have been learning from Fundación Chile (FC), a non-profit organisation which has had a very successful impact on investment, innovation and technology transfer in Chile. FC's successes include catalysing the transformation of Chile, a country with no native salmon population, into the world's second largest salmon producer by transferring cage cultivation technology, investing in a fish ranch to produce salmon eggs locally, and setting up an industry association to jointly own and operate smoking and storage facilities.

Building on the FC model, in 2015 we agreed co-funding with the Department for International Development to establish a highly ambitious new industry development organisation for East Africa. Msingi will seek to catalyse the growth of high-potential new industries by supporting entrepreneurial businesses through technology transfer, capability building and investment, and in time we hope will contribute to the structural transformation of East Africa's economies.

PUBLIC POLICY

There is a great need to improve public policy-making in the UK, and Gatsby now supports three institutions which seek to do this. The Institute for Government's main focus is to improve the machinery of government, and it is encouraging to see how enthusiastically the civil service continues to respond to the evidence-based proposals the Institute puts forward.

The Centre for Cities is also gaining an excellent reputation for its work. The new government faces many challenges, including huge imbalances of prosperity across the UK. This issue was highlighted by this year's Cities Outlook report by the Centre, which demonstrated the stark fact that one in three 22-30 year olds who relocate move from other UK cities to London. Action is needed to avoid urban decay and revitalise cities across the UK, and the Centre is coming forward with practical and valuable solutions.

Finally, the Institute for Manufacturing and its Centre for Science, Technology and Innovation, which Gatsby supports, is doing excellent work developing policies to revitalise the manufacturing sector.

THE ARTS

It was a great pleasure this year to attend the exhibition 'Francis Bacon and the Masters', jointly put on by the Hermitage Museum and the Sainsbury Centre for the Visual Arts, first in St Petersburg and now at the Sainsbury Centre. This brought together works by Bacon from my parents' collection with masterpieces from the Hermitage Museum, and demonstrated what a great painter he was.

Finally, I would like, as in previous years, to thank the brilliant team who run the Gatsby Charitable Foundation. Once again they have done an excellent job not only in putting together transformative projects in the areas in which we are interested, but also in making them happen. The wise advice and help of the Gatsby Trustees is also much appreciated.

David Sainsbury
Settlor

PLANT SCIENCE

ADVANCING KNOWLEDGE IN FUNDAMENTAL PLANT BIOLOGY AND NURTURING TALENT AMONG YOUNG SCIENTISTS

We aim to support research which builds a fundamental understanding of plant biology. To this end we provide core funding for two major laboratories. The Sainsbury Laboratory at Norwich is a research centre for the study of plant-pathogen relationships. The more recently established Sainsbury Laboratory Cambridge University is devoted to the study of plant development.

These centres of excellence attract world class researchers and offer inspiration and opportunities to the young scientists and teachers we encourage and support through our studentships, summer school and educational projects.

We also sustain an extended group of plant scientists through our Plant Science Network, and award ad hoc grants to researchers whose work needs additional support from a funder prepared to take risks in support of ground-breaking research.

Some of the greatest challenges posed by population growth and climate change will only be met by translating a fundamental understanding of plant biology into improvements in agriculture. Where opportunities to advance new knowledge into practical use are identified we provide support for their development.

SAINSBURY LABORATORY CAMBRIDGE UNIVERSITY (SLCU)

The aim of SLCU is to develop an integrated understanding of the regulatory mechanisms underlying plant growth and development. A major highlight this year has been the recruitment of Yrjo Helariutta and Henrik Jönsson to the two vacant professorial positions. Professor Helariutta investigates the development of plant vascular tissues, which provide structural support and long-distance transport of water, nutrients and signals. Professor Jönsson develops computational models to provide insights into developmental processes.

A core goal of SLCU is to combine computational approaches with experimental data. For example, the Wigge and Locke groups are collaborating to understand how temperature regulates seedling growth. For this, they also collaborate with the Webb laboratory in the Department of Plant Sciences – illustrative of the many links SLCU has established with the science base across Cambridge.

SLCU has an active outreach programme aimed at discussing its work with diverse audiences and highlighting the importance of plant science research. It also aims to inspire the next generation of plant scientists, and this year hosted several events targeted at GCSE and A level students. In addition, SLCU and the Department of Plant Sciences are working together to develop displays in the Botanic Garden that represent the work of plant scientists in Cambridge.

THE GATSBY PLANT SCIENCE EDUCATION PROGRAMME

Our education projects are now managed as a single programme run jointly by SLCU and the Botanic Garden in Cambridge. This should bring greater coherence – and more innovation – to the ways in which we engage and inspire 11-21 year olds across the UK with plant science.

Science and Plants for Schools (SAPS) works to strengthen plant science education in schools by inspiring the next generation of plant scientists and supporting teachers to bring plant science to life for all pupils. An external evaluation of SAPS in summer 2014 showed it is one of teachers' top two sources for biology and plant-related resources. Teachers have been particularly enthusiastic about a new set of animations demonstrating key plant processes, and a suite of resources designed to support new A levels in Biology (the first focusing on plant dissection). At the Association for Science Education Annual Meeting the SAPS team engaged with 500 science teachers, technicians and other educators through a range of activities. 700 trainee biology teachers also received a set of SAPS practicals in January 2015.

The Gatsby Plant Science Summer School is an annual event consisting of practicals, career sessions and talks from leading scientists, designed to present opportunities in plant science to bioscience undergraduates. The 2014 edition involved 80 first year undergraduates from 25 UK universities, 60 speakers and tutors, and 10 secondary school science teachers/technicians. Keynote presentations were given by Professor Giles Oldroyd of the John Innes Centre and Professor Johnathan Napier of Rothamsted Research. Following the summer school, 97% of the students indicated they were likely to study plant science in their second year.



Right: Sainsbury Laboratory
Cambridge University.



1%

Four TSL scientists were named by Thomson Reuters in the top 1% of most highly cited scientists in animal and plant sciences across the world.

THE SAINSBURY LABORATORY, NORWICH (TSL)

TSL continues to contribute major advances in the science of plant-microbe interactions, and four of its scientists were named by Thomson Reuters in the top 1% of most cited scientists across the world for the 2014/15 period. Recent highlights include research into how plant pathogens adapt to new hosts and manipulate host immunity, and how plants sense invading microbes. The Laboratory continues to be at the forefront of technological developments and has made significant investments in Synthetic Biology and Proteomics.

The Laboratory's TSL+ programme aims to transfer fundamental scientific discoveries to farmers and consumers, particularly by delivering biotechnological solutions to emerging crop disease problems. To build this work further, TSL has appointed two new group leaders, Dr Ksenia Krasileva and Dr Matthew Moscou, focusing on wheat diseases. In addition, TSL has strengthened its partnership with the Two Blades Foundation, which runs a research group at TSL led by Dr Peter van Esse. The Laboratory has also successfully secured multiple partnerships with industry.

THE TWO BLADES FOUNDATION (2BLADES)

Gatsby provides core funding to 2Blades – a charitable organisation based in the US that supports the development of crops with long-term disease resistance and promotes their deployment in agriculture worldwide, focusing particularly on developing countries.

This year 2Blades has prioritised responding to threats to worldwide wheat production caused by cereal rusts. Through an international effort involving scientists in the UK, US, India, Israel and Australia, and using a novel approach to gene discovery developed in close collaboration with TSL researchers, 2Blades passed a significant milestone in 2014, successfully demonstrating a new and very rapid method for the isolation of disease resistance genes for field deployment.

In 2014 2Blades expanded its programmes for subsistence farming to include cassava, an important staple crop in developing countries. Cassava production is limited by several diseases, and 2Blades has initiated support to develop lines resistant to bacterial blight and brown streak virus. In addition 2Blades developed a second, multi-crop commercial partnership this year and now has two development programmes partnering with leading seed companies. Both programmes are run in an alliance with TSL.

THE GATSBY PLANT SCIENCE NETWORK

The Gatsby Plant Science Network consists of Gatsby-funded undergraduates, postgraduates, postdocs and alumni, along with mentors chosen from UK universities with teaching and research interests in plant science. It meets every year for presentations and discussions, and provides an important forum for those undergraduate and postgraduate students supported by Gatsby to meet influential members of the plant science community. About 80 network members met in September 2014 at Somerville College, Oxford, where the Sainsbury PhD students gave presentations on their research.

In April 2014 a total of seven students became Sainsbury Undergraduates, and Jaynee Hart (University of Glasgow) and Alex Blackwell (University of Cambridge) obtained Sainsbury PhD studentships.

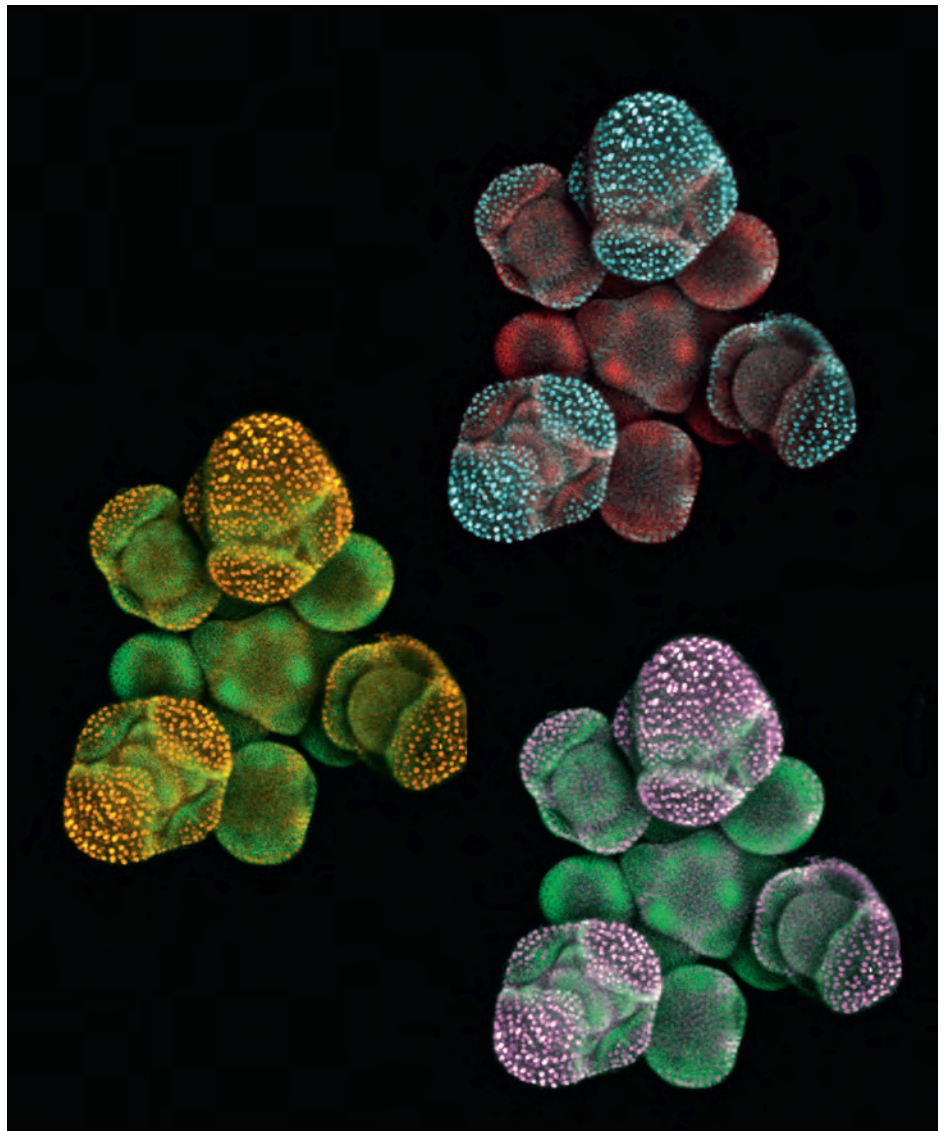
THE UK PLANT SCIENCES FEDERATION (UKPSF)

Our support for the UKPSF has enabled the Federation to follow up its 2014 report on the 'Current Status and Future Challenges of UK Plant Science' with a series of working groups focused on training & skills, funding, regulation and translation of research. The recommendations from these groups, received in November 2014, are now being formulated into a 25-year road map for UK plant science.

Below: Dr Benoit Landrein at SLCU is studying dynamics of gene regulatory networks in the shoot apical meristem of *Arabidopsis* using both experimental approaches and computational modelling.



THE TWO BLADES FOUNDATION PASSED A SIGNIFICANT MILESTONE IN 2014, SUCCESSFULLY DEMONSTRATING A NEW AND VERY RAPID METHOD FOR THE ISOLATION OF DISEASE RESISTANCE GENES FOR FIELD DEPLOYMENT



NEUROSCIENCE

ADVANCING KNOWLEDGE IN EXPERIMENTAL AND THEORETICAL NEUROSCIENCE AND SUPPORTING RELATED ACTIVITIES

A key challenge in neuroscience is to understand how brain cells and circuits perform the computations that directly underpin behaviour. This requires a multidisciplinary approach and the development of new techniques and technologies. We believe this can best be achieved by developing a world-class research centre hosting a diverse group of scientists with a common interest in the workings of the brain. As such, we are partnering with the Wellcome Trust to establish the Sainsbury Wellcome Centre for Neural Circuits and Behaviour (SWC) at University College London (UCL).

Gatsby has also developed a number of innovative collaborative programmes around the world, reflecting the types of research we envision being carried out at SWC. Through our continued support to these we have a wealth of expertise to help our thinking on the development of the Centre's scientific focus.

In addition, we continue to convene and support cutting-edge research meetings and symposia, as well as invest in public education and outreach programmes.



SAINSBURY WELLCOME CENTRE FOR NEURAL CIRCUITS AND BEHAVIOUR (SWC)

Neuroscientists are now being recruited to SWC and bespoke laboratories being installed in the completed building, with the first staff moving in during summer 2015.

SWC was designed by architectural practice Ian Ritchie Architects in collaboration with a group of scientific advisors, aiming to create a functional and inspirational environment easily adaptable to the scientific demands of the future. The design's innovative use of cast glass has created a translucent building envelope that is thermally insulated and allows daylight into the labs through a glowing wall. The front façade is a ripple of glass panels inspired by the waves of activity in the brain. The laboratory spaces are in an innovative mezzanine format to increase connectivity between the laboratories and office spaces. A wide range of meeting spaces, break-out areas, and a brasserie and roof-top open-air garden with spectacular views of the London skyline should also encourage a sense of community and collaboration. SWC also aims to engage the public with the world of neuroscience research – art installations at street level highlight visual illusions and how our brain processes signals, and a landscaped pocket park, open to the general public, will include projections of stunning neuroscience images. The building was designed with energy, spatial efficiency and sustainability in mind, and is on target to receive a BREEAM 'excellent' rating.

SWC neuroscientists will use cutting-edge molecular and cellular biology, imaging, electrophysiology, behavioural techniques, and computational methods to investigate how brain circuits process information to guide behaviour. To answer the exciting questions in neuroscience requires a technologically-advanced environment. Infrastructure has been designed so that scientists can quickly and easily adapt their own labs to meet their needs both now and in the future. Scientists will also be supported through high-performance computing facilities and advanced prototyping and fabrication laboratories designing and manufacturing bespoke equipment. Under the leadership of SWC Director, Professor John O'Keefe, efforts are under way to recruit the first wave of early-career scientists that will move into SWC in late 2015. The building has been designed to host around a dozen experimental research groups.

We have supported the world-class Gatsby Computational Neuroscience Unit at UCL for more than 17 years. It focuses on computational theories of perception and action in neural and machine systems, with an emphasis on learning. The Unit, which currently consists of four research groups, and which will eventually expand to six, will move to SWC in summer 2015.

This is an exciting juncture as construction comes to a close and research ramps up. SWC will eventually house about 200 scientists and support staff working at the frontiers of knowledge in fundamental neuroscience and addressing one of the greatest challenges of the 21st century – how our brain works.

EXPERIMENTAL GROUP LEADERS AT SWC

Professor John O'Keefe is the Inaugural Director of SWC and has been actively involved in the development of the building over the past four years. He is interested in the function of the hippocampal formation and, in particular, its role in spatial behaviour and memory. In 2014, he shared the Nobel Prize for this work on how the brain creates a map of the space surrounding us and how we navigate through a complex environment.

We are delighted to welcome SWC's first recruits, Professor Troy Margrie and Dr Adam Kampff.

Information about the world around us is gathered by our sensory organs and relayed to the brain. Professor Margrie's research determines how individual brain cells and small circuits contribute to the processes underlying sensation, particularly our sense of smell.

Dr Kampff studies the principles of brain function that support intelligent behaviour and how to implement them in machines. This includes looking at how the activity in brain cells constructs a representation of the outside world and how this helps us adapt our behaviour or situation.



EYEWIRE IS SUCCESSFULLY AND RAPIDLY
CONTRIBUTING TO HIGH-IMPACT DISCOVERIES
IN NEUROSCIENCE, SUCH AS DIRECTION
SELECTIVITY IN THE RETINA



THEORETICAL NEUROSCIENCE

We have recently committed to providing ongoing five-year grants to the Centre for Theoretical Neuroscience at Columbia University in New York and the Gatsby Programme in Theoretical Neuroscience at Hebrew University in Jerusalem. Together with the Gatsby Computational Neuroscience Unit, they form a collaborative alliance of the world's top theory centres. The tri-centre group have met annually for the last eight years and have joint programmes of research, and student and postdoctoral exchanges.

CALIFORNIA CONSORTIUM

In 2010 we established a consortium of five laboratories at three institutes across California collaborating to develop and refine tools for the functional analysis of cortical circuits underlying higher brain function, such as visual perception and attention. We recently provided support for a further two years for an ambitious new programme looking at whole brain dynamics. While important computations are carried out at the level of local circuitry, these are strongly modulated by, and can only be understood in the context of, long range interactions that involve the entire brain. These large scale recordings and perturbation studies will result in extensive datasets that will help guide the development and refinement of theoretical models of brain dynamics, providing collaborative links to Gatsby-supported theory centres.

ADVANCING TECHNOLOGY

We are collaborating with partners to develop and manufacture a state-of-the-art device for detecting the activity of multiple neurons. A consortium of UCL (with grant funding from Gatsby and Wellcome), the Howard Hughes Medical Institute, and the Allen Institute for Brain Science was formed in mid-2013 to support the endeavour with nano-electronics institute, imec. In the past year, the probe development project has progressed very well. A review is under way to investigate options to expand the capacity and utility of the probes and evolve the design for other model systems.

EDUCATION AND OUTREACH BRAINFACTS.ORG

Since 2011, we have partnered with the Kavli Foundation to support the Society for Neuroscience (SfN) to create and maintain BrainFacts.org. Under the scientific leadership of the editorial board and SfN's Public Education and Communication Committee, the site has continued to meet all project goals and to grow as a trusted source for authoritative information about the brain, with sustained growth in traffic (124,000 users every month), global reach (more than 10 countries), content and content partnerships.

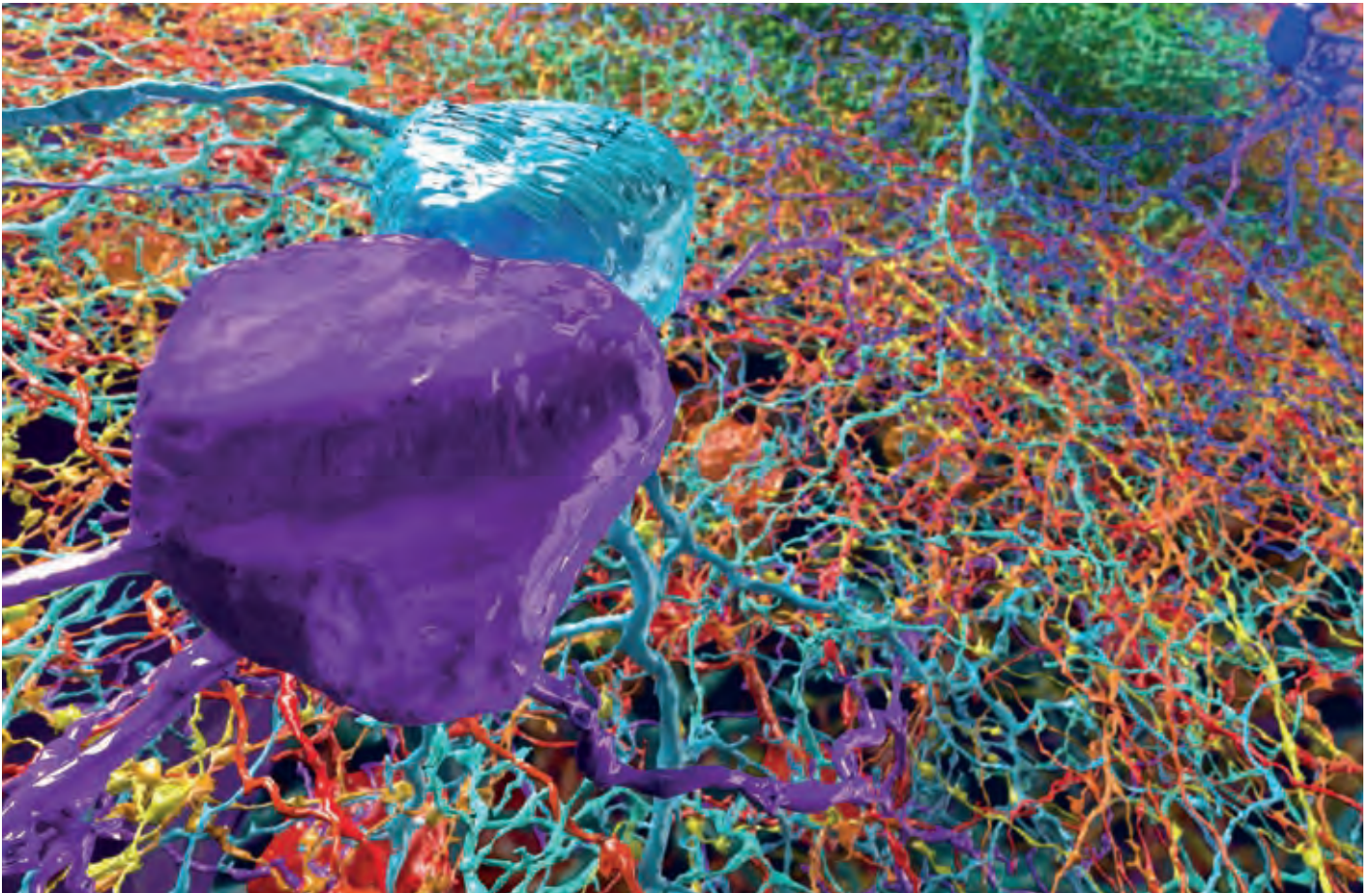
EYEWIRE.ORG

Many theories about connections in the brain lack evidence because we have never been able to see the brain's 'wiring' clearly. Revolutionary new technologies are starting to provide the right kind of images, but in torrents that are so overwhelming that no single person can comprehend the data. 'Citizen science' projects aim to overcome such challenges by enlisting hundreds of thousands of volunteers to collect, analyse and interrogate data in creative ways.

We previously supported Professor Sebastian Seung's laboratory to use computer vision to enhance the accuracy of tracing by humans for high-throughput construction of circuit wiring diagrams. This led to the creation in 2012 of EyeWire, an online game to map the brain that advances neuroscience by helping researchers discover how neurons connect and network to process information. The semi-automated segmentation involved uses up to 100 times less human labour than purely manual work. EyeWire currently has about 150,000 players across 130 countries, but aspires to register one million members – a feat not yet achieved by any citizen science project. EyeWire is successfully and rapidly contributing to high-impact discoveries in neuroscience, such as direction selectivity in the retina. Given this success in both engaging the public and informing research, we have supported the establishment of WiredDifferently to act as a citizen science community for neuroscience research, hosting platforms such as EyeWire and becoming a genuine entwining of education, research and entertainment in neuroscience.

130

People from 130 countries have played the online game EyeWire, helping researchers discover how neurons connect and network to process information.



SCIENCE AND ENGINEERING EDUCATION

STRENGTHENING SCIENCE AND ENGINEERING SKILLS IN THE UK BY DEVELOPING AND ENABLING INNOVATIVE PROGRAMMES AND INFORMING NATIONAL POLICY

Our work in education focuses on three objectives. The first is increasing the supply and status of technicians – those in the workforce with intermediate-level skills in science, technology, engineering and mathematics (STEM). Technicians are the linchpins of the UK economy. They work alongside scientists and engineers throughout many high-growth industries, from food and health to aerospace and construction. As such they are vital to our future economic prosperity. Over 1.5 million technicians are employed in the UK, but an aging workforce and technological advances mean that we will need to train as many as 700,000 technicians over the next decade to meet demand from employers.

Our second objective is strengthening science teaching in schools. We promote activities which encourage innovation, stimulate the use of engaging practical activity in science lessons and STEM Clubs, and encourage young people to study science post 16.

Our final objective is promoting a more coherent national system of STEM education and career guidance, by both supporting initiatives which improve collaboration across the system and informing government policy through targeted research and advice.

STRENGTHENING THE TECHNICIAN WORKFORCE

The occupations and professions with the strongest reputations gain their status and identity from the public, not from government or its agencies. These professions prize highly their independence and, crucially, they use professional standards and professional registration schemes as a means of self-regulation. All training and qualifications must meet these standards, which guarantees a minimum level of occupational competence and reinforces the strength of the profession and its public reputation.

We believe a robust set of professional registers for STEM technicians will help to give technician occupations the status they deserve. While technician registers have existed in a limited form for a number of years, we are working with professional bodies in science, engineering and technology to expand this activity and make professional registration for technicians the new norm.

In engineering, the three largest professional bodies (the Institution of Civil Engineers, Institution of Mechanical Engineers and the Institution of Engineering and Technology) are working collaboratively towards a common goal: growing the number of registered engineering technicians (EngTech) in their membership to 100,000. We are supporting this coordinated campaign – EngTechNow – to work with employers to show how EngTech registration can benefit businesses.

In science, the Science Council has licensed ten professional bodies, including the Royal Society of Chemistry and the Society of Biology, to elect technicians to two new science registers – Registered Science Technician (RSciTech) and Registered Scientist (RSci). We are supporting these efforts and hope to see 30,000 science technicians registering over the next few years. We are also supporting BCS – the Chartered Institute for IT – to work with employers to promote a new Registered IT Technician (RITTech) register which will be launched later this year. The new register will recognise the many different roles of an IT technician, from frontline IT support through to database management.

Beyond our partnerships with the professional bodies, we are also supporting UnionLearn – the education and skills arm of the TUC – in its work to promote technician registration in unionised workplaces, and the HEaTED programme, which promotes and delivers training for university technicians that can lead to registered status. In addition, we are working with government on its ‘trailblazer’ apprenticeship reforms which, over time, should see all publicly-funded apprenticeships in STEM aligned to professional registration standards.

1.5 million

Over 1.5 million technicians are employed in the UK, with as many as 700,000 more required over the next decade to meet demand.

Technical education should offer young people a clear route from school into rewarding technician occupations. High-quality technical education requires a learning environment with industry-standard facilities and expert staff with up-to-date knowledge and skills. It requires investment in partnerships with local employers to understand their needs and the opportunities for young people. It often also involves specialist training that is only needed by relatively small numbers of individuals, making it difficult for every college to create economically-viable class sizes.

Only a coherent approach to planning technical education in a local area, underpinned by good labour market intelligence, can ensure an efficient use of resources to maximise quality. To this end, we are supporting a few pilot projects with consortia of Local Enterprise Partnerships (LEPs) and FE colleges (where most technical education in England is delivered). These aim to explore how specialisation in the provision of technical education can avoid duplication and gaps, and help colleges build sustainable capacity to respond to employer needs. In parallel, we are working with the Royal Academy of Engineering to build a picture of the current state of engineering facilities in FE colleges and working with the Nuffield Foundation to profile the background and experience of STEM teachers in FE in order to inform planning for teacher recruitment and professional development. We are also partnering with several universities and colleges, and the Education and Training Foundation, to develop FE teacher training modules with an emphasis on subject-specialist teaching skills.

Outside of FE, we continue to support the development of University Technical Colleges, which offer a curriculum for 14-18 year olds that combines employer-led practical project work with rigorous academic study – providing an excellent foundation for a career as a technician, scientist or engineer.

Below: We believe that a robust set of professional registers for technicians will help to give technician occupations the status they deserve.



SCIENCE IN SCHOOLS

The assessment of practical work in science GCSEs and A levels has been the most contentious aspect of science education reform over the past 18 months. We joined forces with the Wellcome Trust and Nuffield Foundation to challenge the decision made by Ofqual to remove the direct assessment of practical skills from these qualifications. Our strong, combined voice has ensured that practical science has stayed high on the agenda for Ofqual and politicians, and that practical activities now form a large part of the requirements produced by the Awarding Organisations. However, in order to monitor developments, we have jointly with the Wellcome Trust commissioned a major three-year study into the quantity and quality of practical science in UK schools.

Given the changes in the curriculum and its assessment, our work supporting teachers and technicians to deliver practical science remains crucial. Our 'Get Set Demonstrate' campaign, run by the British Science Association, developed inspirational videos which have already been watched more than 20,000 times. The campaign also coordinated National Demo Day, when over 200 schools undertook exciting science demonstrations. We have also worked with STEMNET to train 330 STEM Ambassadors to deliver engaging practical science support in schools. Our long term support for the STEM Clubs programme continues to bear fruit, with 70% of UK secondary schools now having a STEM Club.

We also retain a keen interest in the supply of science teachers. While our major 'on-the-ground' programmes to increase the number of physics and chemistry specialists in schools have now concluded, we continue to offer advice to government agencies around teacher recruitment and retention policy. This work benefits hugely from our long-term partnership with the Institute of Physics, and we will work closely with them during 2015/16 to inform the new government on teacher supply issues.



GIVEN THE
CHANGES IN THE
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CRUCIAL



Left: 70% of UK secondary schools now have a STEM Club.

Above right: In March 2015, over 68,000 visitors attended over the four days of the Big Bang Fair in Birmingham NEC.



SUPPORTING A COHERENT NATIONAL SYSTEM OF STEM EDUCATION

We support a few key initiatives which aim to increase coordination and collaboration between the wide range of organisations promoting STEM education and skills.

We have committed long-term support to the National STEM Centre in York which holds, and is progressively digitising, the largest UK collection of freely available, high-quality STEM curriculum support resources. We also support the Big Bang Fair, the country's largest science and engineering event for young people, which attracted over 68,000 visitors over four days in March 2015.

Our long-term support for the SCORE and ACME initiatives – which aim to improve communication between government and the science and mathematics communities – came to an end in 2015. However, our desire to ensure government has timely, pragmatic policy advice which articulates practical solutions rather than simply identifying problems, remains undimmed. An example of this is our current work on career guidance.

Good career guidance helps inspire young people towards further study and enables them to make informed decisions whenever choices are open to them. However, career guidance provision in this country has been heavily criticised over many years. Too often career guidance in the UK is insufficient, of dubious quality and provided too late to meet young people's needs. Against this background, last year we published the report of an 18-month study by Sir John Holman into what 'good' career guidance provision looks like – both here and abroad – and how it can be embedded in all schools. The report was positively received in all quarters, including teacher unions, employer groups and Ministers. We have now committed £1 million to support a pilot programme across 15 schools and colleges in one UK region which will explore how Sir John's recommendations can be implemented most efficiently and how any barriers to implementation can be overcome.

We also offer advice to policy-makers on a range of issues relevant to our interest areas, both formally through published reports and consultation responses, and informally through meetings and ongoing dialogue. Over the next 18 months, we anticipate commissioning research on a number of topics, including: apprenticeships and higher-level vocational qualifications; the use of labour market information to inform skills policy at both national and local levels; the science curriculum and its assessment in schools; and teacher supply. Our research and policy notes are all available on our website.

AFRICA

ACCELERATING INCLUSIVE AND SUSTAINABLE GROWTH IN EAST AFRICA

Gatsby has worked in Africa since 1985 and is currently focused on accelerating inclusive and sustainable growth in East Africa. We plan to achieve this by demonstrating innovative and ambitious approaches to transforming key sectors, such as cotton in Tanzania.

We fund and run programmes while also synthesising and sharing lessons from our own activities and those of others. Through this we aim to test, refine and prove models for sector transformation, allowing others to confidently adopt them at scale in different contexts. Ultimately this should contribute to the increased growth and competitiveness of key sectors, creating jobs and raising incomes for poor people across East Africa.

We are working in the Tanzanian cotton and textiles sectors, the tea sectors in Tanzania and Rwanda, and forestry sectors across East Africa. We also support Kenya Markets Trust to run sector programmes in the country, including in the dairy, water, agricultural inputs, seed and livestock sectors.

You can find more information on these programmes on our website. Some notable developments in 2014/15 are highlighted over the following pages.

DEVELOPING EAST AFRICA'S INDUSTRIES OF THE FUTURE

East Africa is a dynamic region with some of the fastest-growing economies in the world. Its rapidly increasing population – coupled with rising wages elsewhere – gives it a huge opportunity to move into new and high-potential industries, driving the structural transformation which will relieve poverty by creating jobs, raising incomes and accelerating development.

If East Africa can grasp this opportunity, its economies will move beyond their current dependence on raw materials and agriculture. Instead, economies will be based on dynamic, value-adding industries with enterprising firms delivering high-quality products for a global market. Individual and firm-level skills will be built. Cutting-edge technology, business models and management practices will be mastered. Innovation from elsewhere will be rapidly absorbed, while East African countries will be continually generating their own innovations to drive sustained growth and competitiveness. There will be a transformative impact on poverty, jobs and incomes.

Gatsby and the UK's Department for International Development (DFID) are partnering to create a highly ambitious new industry development organisation, tasked with helping East Africa achieve this vision over the long-term. Msingi will catalyse the growth of high-potential industries by supporting pioneer and strategic businesses through technology transfer, capability building and investment. Ultimately, Msingi will aim to contribute to the structural transformation of East Africa's economies, creating many new jobs and increasing incomes.

Msingi will be a long-term, independent institution, led by East Africans who will provide the local knowledge, networks and skills necessary for success. Gatsby and DFID have together committed \$50 million of flexible funding (50:50) for Msingi first five years.

Over 2014/15 a Nairobi-based team has begun preparatory work for Msingi. This has included analysing possible focus industries, assessing the region's investment landscape and designing Msingi governance.

We are now concentrating on finalising the set-up of Msingi and recruiting its first Board and CEO.



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Below: Worker at the Karura tree nursery in Kenya.



SUPPORTING THE TRANSFORMATION OF KENYA'S COMMERCIAL FORESTRY SECTOR

Kenya's forestry sector is central to its economy and its future. Five key forests regulate 75% of the country's renewable water supplies, while more than 80% of the energy generated in Kenya comes from wood. Forests support the livelihoods of millions of Kenyans and are home to a huge variety of animal and plant species, many of which cannot be found elsewhere.

As Kenya's population and economy grows, the demand for fuelwood and construction materials, such as sawn timber, is accelerating. However, Kenya is only able to meet about 70% of this demand through sustainable domestic supply. The annual deficit of 12 million m³ is met by formal and informal imports plus unsustainable extraction from natural forests, with deforestation running at about 12,000ha per year. This will only get worse: population growth, industrialisation and urbanisation are predicted to increase demand to 66 million m³ by 2030, while sustainable supply is projected to stay almost static. This would see the annual deficit nearly treble to 34.4 million m³.

The consequences for Kenya's environment and economy in such a scenario would be severe. Therefore the country desperately needs to transform its commercial forestry sector – relieving the pressure on natural forests, fuelling sustainable economic growth, and creating jobs and increased incomes for hundreds of thousands of people.

Gatsby is establishing a programme to support this transformation. It will make a variety of interventions along the value chain and in supportive markets, partnering with different public and private players to:

- Improve returns for growers;
- Enhance profitability and employment in wood processing; and
- Secure the sustainable supply of commercial services and collaborative research.

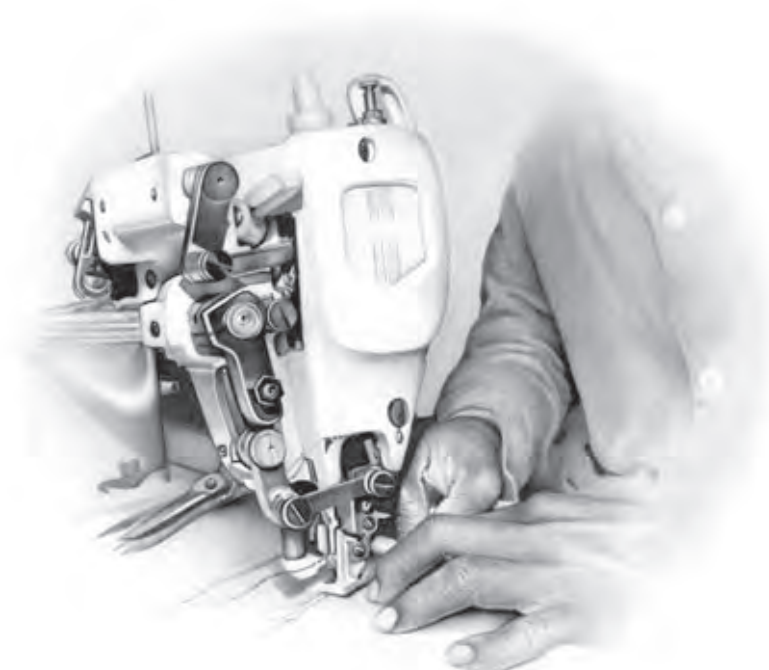
The programme will initially work in three areas:

- 1) Finding and supporting the right independent institutions to form strategies for providing services to the sector, such as setting standards, providing training and coordinating collaborative research.
- 2) Engaging commercial players to design and pilot longer term market development activities, such as working with industrial buyers of fuelwood to create more inclusive value chain arrangements between producers, processors and end-users.
- 3) Realising an enabling policy environment while addressing the forest financing gap through targeted analysis and regular dialogue with key stakeholders.

BUILDING ON MOMENTUM IN THE TANZANIAN TEXTILES SECTOR

From Great Britain in the 18th Century to South Korea in the 1950s, the textiles and apparel sector has repeatedly been an engine for development, contributing to periods of rapid job creation and economic growth. For countries with relatively low wages, the sector provides the opportunity to adopt technology from elsewhere and create large numbers of jobs for semi-skilled workers. Through this process countries can acquire the organisational and technological capabilities vital to building future industries.

Recognising this, the Tanzanian government has highlighted the sector as crucial to achieving its aim of becoming a middle income country by 2025. To help, in 2012 Gatsby established the Textiles Development Unit (TDU) in Tanzania's Ministry of Industry and Trade, tasked with developing the resources and skills that will create the right environment to increase foreign and domestic investment into the sector. The ultimate vision is of a thriving sector creating tens of thousands of jobs, increasing exports, providing a higher value market for all of Tanzania's cotton and contributing significantly to economic growth and poverty reduction.



Above: The Tanzanian government has highlighted the textiles sector as crucial to achieving its aim of becoming a middle income country by 2025.



Highlights so far include lobbying work on the proper declaration of the value of imported cloth. This one step alone has enabled fairer competition between local producers and those importing from Asia, resulting in a number of local mills now operating three shifts seven days a week, compared to one shift three days a week in 2011. The TDU has also: brought stakeholders together to form an industry association; established a national training programme for apparel supervisors to become trainers of operators; and supported investments in new equipment and in re-establishing moribund mills.

Gatsby renewed support in 2014 to allow the TDU to scale up activities, including:

- Supporting local industry by facilitating business links and enhancing business capabilities;
- Developing and rolling out further training programmes, for example, for technicians and higher level skills;
- Building significant capabilities to target and facilitate international investments; and
- Maintaining pressure on key policy issues through ongoing facilitation of the industry association, plus analytical work to inform direct influencing.

Above: Kenya desperately needs to transform its commercial forestry sector – relieving the pressure on natural forests, fuelling sustainable economic growth, and creating jobs and increased incomes for hundreds of thousands of people.

PROMOTING ECONOMIC DEVELOPMENT IN MOZAMBIQUE

We support the investment company AQUIFER to catalyse economic and social development and relieve poverty in Mozambique by creating sustainable agri-businesses. AQUIFER aims to encourage greater private sector investment in Mozambican agriculture by pioneering business models, demonstrating opportunities and sharing lessons.

AQUIFER has a 100 per cent shareholding in Grupo Mozfoods S.A. and its main subsidiary Companhia do Vandúzi, which grows, sells and exports fresh produce. Vandúzi operates in Manica province and now employs more than 1,800 people and works with 750 out-growers.

Since Vandúzi's foundation in 2004 it has become Mozambique's largest exporter of fresh produce, specialising in exporting exotic vegetables to European and South African retail markets. The technical challenges in selling to these markets are significant, with stringent safety and quality requirements. This year Vandúzi went through a vigorous external auditing process run by the British Retail Consortium, which certifies food safety through globally-recognised standards. Vandúzi achieved A / A+, which is the highest possible grade. This makes Vanduzi the only fresh produce company with this level of BRC attainment within the region.

80%

Over 80% of the energy generated in Kenya comes from wood.

In 2014 Vandúzi also achieved a GLOBALGAP certificate, meeting an internationally recognised set of farm standards dedicated to Good Agricultural Practices. This certifies that food has been produced safely and sustainably, respecting the environment and the welfare of workers.

Meeting these and other standards has allowed Vandúzi to build relationships with a wide and varied set of customers, including Marks & Spencer, Finlays and South African retailer Woolworths. The company has also diversified to supply products directly to firms working in the extractive sectors, including the increasing gas and coal operations in the north of Mozambique.

Vandúzi operates in the most challenging of environments, facing issues with infrastructure and the shortage of local skills, plus significant risks in terms of climate, pests and disease. Despite this, the company has undoubtedly revitalised the local economy over the last five years, and management are working hard to tackle challenges, mitigate risks and secure financial sustainability.

PUBLIC POLICY

SUPPORTING INDEPENDENT RESEARCH ORGANISATIONS WHICH PROVIDE EVIDENCE-BASED ADVICE TO POLICY-MAKERS

Our grant-making in public policy focuses on three organisations – the Institute for Government; the Centre for Cities; and the Centre for Science, Technology & Innovation Policy.

During David Sainsbury's time as the UK's Minister of Science and Innovation from 1998 to 2006, he came to feel politicians and civil servants' attempts to deliver change and best serve the public were being frustrated by outdated and inefficient processes surrounding government.

While some reform of this machinery was possible within government, David Sainsbury felt impartial, independent organisations would be best placed to keep such reform on the agenda on a continuing basis. Therefore, after leaving office he set up a charity called the Institute for Government to provide evidence-based advice and practical suggestions to promote more effective government.

The Institute shares a philosophy with another independent think tank founded by David Sainsbury, the Centre for Cities, which looks to help Britain's cities improve their economic performance.

Gatsby also supports the Centre for Science, Technology & Innovation Policy, based at Cambridge University's Institute for Manufacturing. The Centre's research projects are designed to fulfil the evidence needs of policy-makers charged with developing the UK's national innovation system.

INSTITUTE FOR GOVERNMENT

The Institute for Government works with the main political parties in Westminster, senior civil servants in Whitehall, and officials and politicians in the rest of the UK to promote more effective government. It provides impartial, evidence-based advice and training, drawing on best practice and research in government, universities and business from around the world.

The UK General Election in May 2015 was a core focus of the Institute's work this year. In the run-up, the Institute ran a number of programmes, including one focused on improving public and media understanding of the process of forming a government, and another examining and explaining how a new government can create the processes and structures necessary to realise its goals.

The Institute also ran a private programme of work with all parties to help them prepare for government. This work focused first on ensuring that policy proposals received sufficient challenge and were likely to be both implementable and enduring, and second, that potential ministers and their teams were prepared for secretary of state roles and the realities of running a department.

Extensive work beyond the election included: the 'Whitehall Monitor Annual Report' (a data-driven analysis of the size, shape and performance of the civil service); a policy implementation project in partnership with the Joseph Rowntree Foundation; and an examination of devolution and the systems for inter-governmental relations across the UK.

The Institute also ran events series – including 'Women Leaders' and 'Government and the Economy' – and hosted many keynote speeches, including by outgoing Head of the Civil Service Sir Bob Kerslake and Chief Executive of the Civil Service John Manzoni.

Above right: David Sainsbury at keynote speech by John Manzoni, Chief Executive of the Civil Service, hosted by the Institute for Government

CENTRE FOR CITIES

The Centre for Cities is an independent research organisation committed to helping Britain's cities improve their economic performance by studying the drivers of success. The Centre produces practical research and policy advice for city leaders, government and businesses.

This year the Centre's flagship 'Cities Outlook' report received stronger than ever press coverage by demonstrating the stark fact that one in three 22-30 year olds who relocate move from other UK cities to London. The Centre followed this up by commissioning YouGov polling to understand how people in other cities perceive London.

The Centre also worked with McKinsey on a major report called 'Industrial Revolutions', aiming to create a snapshot of the most economically significant UK clusters. Its findings stressed the importance of skills and infrastructure for getting firms to thrive and the UK to compete in growing global industries.

Other publications included practical, case-study based reports on themes including: reducing youth unemployment; encouraging house-building in the places that need them; and improving cities' public transport services.

This year the Centre also convened its first full day conference. The Northern Futures Summit, co-hosted with the then Deputy Prime Minister's office, brought together more than 300 city and business leaders to hear about ways of encouraging strong growth in Northern cities.

In addition the Centre hosted a number of events, including three high-level roundtables with international speakers to help inform cities and policy-makers of good practice outside the UK. These were: Governor Martin O'Malley from Maryland, who has been a pioneer of evidence-based policy-making in the US; Harvey Brookes, a key player in Auckland's move towards a metro mayor; and Professor Philip McCann, who offered insights into European urban policy.



CENTRE FOR SCIENCE, TECHNOLOGY & INNOVATION POLICY

The Centre for Science, Technology & Innovation Policy (CSTI), based at Cambridge University's Institute for Manufacturing, carries out practical policy research exploring what makes national innovation systems effective at translating new science and engineering ideas into technologies, industries and economic wealth. An important focus of CSTI's recent research has been on the relationships between technology, manufacturing and sector policies – in particular, the potential to support greater alignment between national industrial capabilities and high value economic opportunities.

CSTI's research agenda is shaped in collaboration with a range of policy partners. Recent studies include a benchmarking analysis of quantum technologies for the Engineering & Physical Sciences Research Council; a review of international advanced materials strategies for the Government Office of Science; and an analysis of international manufacturing innovation priorities for Innovate UK and the Department of Business, Innovation & Skills.

As part of its work comparing technology and industrial policies in different countries, CSTI has convened a number of policy dialogue workshops in the UK and abroad. The most recent workshop, focusing on 'manufacturing and innovation policy', was held in the White House and opened by President Obama's chief science & technology advisor, Dr John Holdren.

THE ARTS

SUPPORTING THE FABRIC AND PROGRAMMING OF ARTS INSTITUTIONS WHICH HAVE LONG RELATIONSHIPS WITH GATSBY'S FOUNDING FAMILY

David Sainsbury's parents, Robert and Lisa, began building their art collection in the 1930s. They rapidly became two of the UK's leading patrons of the arts, particularly notable for their championing and support of emerging artists – including Francis Bacon, Henry Moore and Alberto Giacometti.

In 1973 they gifted to the University of East Anglia (UEA) their collection of several hundred paintings, drawings and sculptures from around the world to be housed in a new building – the Sainsbury Centre for Visual Arts (SCVA) – which was designed by Norman Foster and funded by Gatsby.

We continue to support SCVA and two other institutions founded by Robert and Lisa at UEA, as well as a small number of other organisations and initiatives we have long relationships with, as they seek ways to make inspiring art accessible to new generations.



SAINSBURY CENTRE FOR VISUAL ARTS

The Centre's most prestigious exhibition ever, 'Francis Bacon and the Masters', opened in December 2014 to mark the 250th anniversary of the State Hermitage Museum, St Petersburg. It featured 13 works by Bacon from the Sainsbury Collection, plus others from the Tate and Yale University, alongside masterpieces by Picasso, Rembrandt, Goya, Gauguin, Matisse, Velazquez, Van Gogh and Rodin owned by the Hermitage. The exhibition transferred to SCVA in April 2015, with many of the works displayed in the UK for the first time.

In 2014 SCVA's 'Monument: Aftermath of War and Conflict' exhibition formed part of a collaboration between galleries in England, Normandy and the Pas de Calais to mark the centenary of the First World War. Pieces ranged from delicate graphite drawings to a number of monuments remade to scale. Four works from The Day Before – Star System series by Renaud Auguste-Dormeuil were also displayed. Each digitally captures the location of the stars in the night sky immediately before an event of notorious destruction.

Above: Sainsbury Centre for Visual Arts.

Right: Chamber Orchestra of Europe performing with Bernard Haitink at the Concertgebouw in Amsterdam.

CHAMBER ORCHESTRA OF EUROPE

We continue to support the acclaimed Chamber Orchestra of Europe, which brings together about 60 musicians from Europe, all with parallel careers as international soloists, national orchestra Leaders and Principals, and tutors and professors.

Highlights from the year included concerts at the Easter Festival in Aix-en-Provence, the Lucerne Festival, the Styriarte Festival and the Aldeburgh Festival with conductors and soloists including Pierre-Laurent Aimard, Martha Argerich, Renaud and Gautier Capuçon, Isabelle Faust, Bernard Haitink, Oliver Knussen, Emmanuel Krivine, Murray Perahia, Tamara Stefanovich and Thomas Zehetmair.

The orchestra also celebrated Bernard Haitink's 85th birthday with two concerts at London's Barbican Centre and undertook a number of European tours with world-class artists including Emanuel Ax, Isabelle Faust, Janine Jansen, Vladimir Jurowski, Susanna Mälkki, Viktoria Mullova, Christian Tetzlaff and Jean-Yves Thibaudet.



30,000

The new home for the RSC's 30,000 piece costume store will give the public access to the collection for the first time.

ROYAL SHAKESPEARE COMPANY – THE OTHER PLACE

We are contributing to the reinstatement and reimagining of the RSC's iconic studio theatre, The Other Place in Stratford-upon-Avon.

The Other Place began life as a tin shed rehearsal room before being converted in 1974 into a studio space for adventurous work by contemporary writers, housing many landmark productions with actors including Judi Dench, Ian McKellen and Helen Mirren. It closed in 2006 during the Royal Shakespeare Theatre's transformation.

The new Other Place will include a 200-seat flexible studio theatre, two new rehearsal rooms and a new home for the RSC's 30,000 piece Costume Store – open to the public for the first time.

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