ANNUAL REVIEW
2013

GATSBY

GATSBY IS A FOUNDATION SET UP
BY DAVID SAINSBURY
TO REALISE HIS CHARITABLE OBJECTIVES.
WE FOCUS OUR SUPPORT ON A LIMITED
NUMBER OF AREAS:

PLANT SCIENCE RESEARCH

NEUROSCIENCE RESEARCH

SCIENCE AND ENGINEERING EDUCATION

ECONOMIC DEVELOPMENT IN AFRICA

PUBLIC POLICY RESEARCH AND ADVICE

THE ARTS

WE ARE PROACTIVE IN DEVISING PROJECTS TO ACHIEVE OUR AIMS. WE ARE ENTHUSIASTIC ABOUT SUPPORTING INNOVATION. WE ARE ANALYTICAL AS WE BELIEVE IT IS IMPORTANT TO UNDERSTAND THE OPPORTUNITIES AND PROBLEMS WE TACKLE. WE TAKE A LONG-TERM VIEW AS WE DO NOT THINK MUCH CAN BE ACHIEVED BY SHORT, ONE-OFF PROJECTS. WE ARE ALWAYS EAGER TO FORM PARTNERSHIPS WITH ORGANISATIONS WHO SHARE OUR GOALS.

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INTRODUCTION
BY LORD SAINSBURY OF TURVILLE

Settlor of the Gatsby Charitable Foundation

One of the many great pleasures of my involvement with Gatsby is watching the steady progress and growth of projects through years of careful nurturing and long-term support. This year I was delighted to attend the 25th anniversary celebrations of The Sainsbury Laboratory in Norwich, which Gatsby and our partners founded to investigate plant interactions with microbes and viruses.

At the time of its creation, the field of plant-microbe interaction was in its infancy. However, I was approached with a compelling vision of the way that the new molecular genetic technologies could revolutionise our understanding of how microbial pathogens invade plants and plants defend themselves, and how this understanding could then be translated and applied to protect crops from diseases.

> CREATING AN ENVIRONMENT TO ATTRACT THE BEST SCIENTISTS AND INSPIRE THEM PROVED CRUCIAL

It was clear at the time that simple access to the new technologies - while vitally important to progress - would not be enough on its own. To make the most of these advances would require an intellectually inspiring environment, scientists at the top of their field, excellent infrastructure, and the financial freedom to carry out innovative experiments. The basis for all this would be a long-term commitment to achieving a clear and ambitious vision, freeing the institution from the inevitable compromises that have to be made when there is pressure to justify past spending and secure future funds by showing that short-term goals have been met.

The designers of the Laboratory and those who steered its creation and subsequent evolution delivered all this and more, developing an institution that is acknowledged as world-leading in its field and has made many discoveries of fundamental importance to biology – for example, Sir David Baulcombe's Lasker Medical Prize-winning work on small RNAs in plants, which opened the door for the discovery of specific RBNAs that are involved in cancer, heart conditions and viral infections.

Sir David is just one of the many outstanding scientists the Laboratory has attracted and supported, and current scientists and alumni continue to leave their scientific mark on the worldwide research community.

The success of the Laboratory very much informed the development of the Sainsbury Laboratory Cambridge University (SLCU), which opened in 2011. This was particularly true when it came to the design of the building. In Norwich, creating an environment to attract the best scientists and inspire them proved crucial, and this was very much in our thoughts when developing SLCU. It is therefore extremely pleasing that SLCU and its architect Stanton Williams won the 2012 RIBA Stirling Prize. We asked Alan Stanton and his team to lift standards and change perceptions regarding laboratory design, and I would again like to record my congratulations to them for achieving this so spectacularly.

In the same way that SLCU's foundations lie in our long-term support to plant science, Gatsby's largest project to date - the Sainsbury-Wellcome Centre for Neural Circuits and Behaviour (SWC) at University College London (UCL) - will build on the success of the Gatsby Computational Neuroscience Unit, which we established 16 years ago. Our long-term support for the Unit at UCL has helped it become one of the world's leading centres for theoretical neuroscience. SWC, scheduled to open in summer 2014, will be the new home for the Unit along with a dozen experimental research groups. SWC will thus help link and unite computational, theoretical and experimental work in neural circuits and behaviour. In this way, SWC will try to realise the ambitious vision of understanding exactly how the brain's neural circuits carry out the information processing that directly underlies behaviour.

Work such as this, where the benefits will only be seen over the long-term, demonstrates one of the important roles a private charitable foundation can play. Governments, especially at times of challenging economic conditions, are under pressure to back safe, short-term projects. In contrast, private foundations can back initiatives that are more high-risk and take longer to prove their worth. They can also support unfashionable causes, providing compelling evidence on the need for action in areas that might otherwise fall from the agenda. This year our education team has made particularly strong progress with government on efforts to increase the supply and status of technicians – those in the workforce with intermediate-level skills in science, technology, engineering and mathematics.

Technicians are key to the UK's future competitiveness and prosperity, yet we face a shortage of millions by 2020. It is encouraging that Gatsby and our partners' research in this area has begun to influence policymakers, and we are now working with the government on reforms to ensure technician registration becomes an intrinsic part of all relevant apprenticeships. This should help ensure that science, engineering and IT apprenticeships are centred on the transferable skills and knowledge that industry actually needs, thus enhancing employment prospects and delivering higher wages to those who possess them.

To build on this momentum, we are now increasingly looking at the Further Education sector, which has a crucial role to play in technical education, but again is a neglected area, little understood by the public at large and thus a low priority for government without sustained prompting.

The need to supply government with impartial, evidence-based advice was very much the motivation behind Gatsby's founding of the independent, non-partisan think-tank Institute for Government. This year I was particularly pleased that the Institute produced its first annual Whitehall Monitor report, which aims to build a systematic framework for thinking about the effectiveness of Whitehall, and which I hope can contribute hard evidence to the highly-charged debate that surrounds civil service reform.

I am very pleased that another non-partisan research organisation which we founded - the Centre for Cities - has had its success recognised at Prospect magazine's Think Tank of the Year Awards, where it received the 'One to Watch' accolade. Cities have a key role to play in the UK's recovery from recession, and the Centre will continue to offer impartial evidence, detailed analysis and policy recommendations on how cities can be supported to aid economic growth.

Left: Worker unloading tea-leaves at factory.

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Above top: Topping-out ceremony Sainsbury Wellcome Centre, 26 June 2013.

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Above bottom: Centre for Cities – Launch of Cities Outlook 2013.

> WORK SUCH AS THIS, WHERE THE BENEFITS WILL ONLY BE SEEN OVER THE LONG-TERM, DEMONSTRATES ONE OF THE IMPORTANT ROLES A PRIVATE CHARITABLE FOUNDATION CAN PLAY

Innovation is another critical component in continued economic growth, and this year has seen the launch of the Gatsby-funded Centre for Science, Technology & Innovation Policy. This research unit at the Institute for Manufacturing in Cambridge is exploring how national innovation systems can effectively translate new science and engineering ideas from the public research base into novel technologies and emerging industries. Its holistic approach to research will see it address different aspects of innovation systems in an integrated way and analyse and compare different national systems. Ultimately its research projects are designed to give policymakers the evidence they need to develop sound innovation strategies that will help create economic wealth.

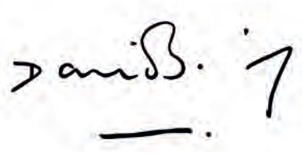
Our work in Africa also centres on compiling evidence and demonstrating it to others – this time in proving that innovative but relatively high-risk approaches to economic development can be successful so that governments and other donors can scale them up and increase their impact. The past year has been notable for our joint acquisition with the Wood Family Trust of two privatised tea factories in Rwanda on behalf of smallholder famers. We hope the initiative will show that smallholder-ownership of tea factories can be commercially successful. To avoid some of the pitfalls of similar schemes, we have contracted the Kenya Tea Development Agency (KTDA) to initially manage the factories while training locals to aid the transition to 100 per cent Rwandan-staffed factories.

This initiative should not only raise the incomes of the farmers involved, but also allow KTDA to spread its expertise regionally, while potentially providing a model for the privatisation of other factories and the development of new sites, both in Rwanda and beyond. This is only possible due to the long timescale we can afford the initiative, and the fact that, as a private foundation, we can accept a degree of risk that publicly-funded bodies simply cannot.

This ability to innovate was one of my main motivations in establishing Gatsby, which was also inspired by my parents' philanthropy. I am delighted that Gatsby continues to support the three arts institutions at the University of East Anglia (UEA) that they founded. This year has seen the completion of major redevelopment works at the Sainsbury Centre for Visual Arts (SCVA), built in 1978 to house the art collection my parents donated to UEA so that it can be shared with as many people as possible.

This year Lord Foster, the SCVA's architect, delivered the second Robert Sainsbury lecture as part of UEA's 50th anniversary celebrations and used it to explain how the ideas he developed, and the work that he did on the Centre, influenced his future buildings. I was delighted as my father always rightly believed that his choice of Lord Foster to design the Centre was one of the best decisions he ever made.

The enormous amount of work that has gone into the development of the SCVA over the years illustrates the imagination and hard work which is necessary to manage the innovative projects that Gatsby supports, and I would like to take this opportunity to again thank the Gatsby team and its Trustees for the thought, energy and idealism which produces so many successful projects.



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. Beyond the laboratories, we also sustain an extended group of plant scientists through our Plant Science Network.

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.

THE SAINSBURY LABORATORY, NORWICH (TSL)

TSL continues to contribute major advances in the science of plant-microbe interactions. Recent highlights centre on how plant pathogens adapt to agricultural systems, how they manipulate host immunity, and how plants sense invading microbes. The Laboratory has also initiated a synthetic biology programme (SynBio), and reported on a method to engineer plant genomes with important ramifications for breeding and biotechnology.

> THE QUALITY AND QUANTITY OF TSL SCIENTIFIC OUTPUT DURING THE CURRENT RESEARCH CYCLE WERE FOUND TO BE AMONG THE BEST OF ANY RESEARCH INSTITUTE IN THE WORLD

Transferring such fundamental scientific discoveries to farmers and consumers is the purpose of the Laboratory's TSL+ programme, which continues to deliver solutions to emerging crop disease problems.

In May 2013, TSL went through its fifth quinquennial external review. The panel rated the Laboratory as "remarkably successful". It reported that "the quality and quantity of TSL scientific output during the current research cycle were found to be among the best of any research institute in the world". The success of the Laboratory is further underlined by the fact that all four TSL group leaders have secured highly competitive European Research Council grants.

SAINSBURY LABORATORY CAMBRIDGE UNIVERSITY (SLCU)

SLCU opened in 2011 with the mission to elucidate mechanisms that regulate plant growth and development. In January 2013 the Directorship passed to Ottoline Leyser, with the Inaugural Director, Elliot Meyerowitz, returning to the California Institute of Technology. Professor Meyerowitz maintains an active research presence at SLCU as a Distinguished Associate.

Four new principal investigators joined the Laboratory during 2013. Siobhan Braybrook investigates the contribution of changes in cell wall mechanical properties to growth and form. Sebastian Schornack was recruited from TSL, and is studying developmental mechanisms in roots by exploiting knowledge of how microbes manipulate these mechanisms. Katja Jaeger works on the environmental control of flowering, and Jerzy Paszkowski on the recruitment of transposable elements into the regulation of development.

The Laboratory's scientific and outreach activities are strongly supported by the stunning architecture of the SLCU building. We always aspired to set a new benchmark for laboratory design, and we are delighted that SLCU and its architect, Stanton Williams, won the 2012 RIBA Stirling Prize. This is the first time that a research laboratory has won, with the judges commending the statement that the building makes about the cultural importance and relevance of science in general, and plant science in particular.

Above: Confocal microscopy image of a germinating Arabidopsis embryo with a bottom to top wave.

> UNTIL NOW, GENETIC ENGINEERING OF PLANTS HAS BEEN BASED ON INTRODUCING DNA AT RANDOM LOCATIONS IN THE GENOME. HOWEVER, 'TAL CODE' GENOME-EDITING TECHNOLOGY ENABLES THE PRECISE MODIFICATION OF THE PLANT GENOME

25 YEARS OF TSL

On June the 24th 2013, TSL celebrated its 25th anniversary by hosting a symposium in Norwich. The event brought together alumni, council members and other associates to celebrate what is a unique place to conduct science. Throughout the day participants reflected not only on TSL achievements but also on the wide range of activities that alumni have pursued since leaving the Laboratory.

TSL has made its mark over its first 25 years by contributing to major advances in biology. The Laboratory's literature citation footprint is exceptional for a relatively modest-sized institute. Many discoveries, from immune receptors to small RNAs, have been achievements of fundamental importance in biology. A commemorative booklet and short film were produced to reveal the people and personalities behind these discoveries, and to show their perspective on what makes the Laboratory such a special place.

THE TWO BLADES FOUNDATION (2BLADES)

We provide core funding to 2Blades, a charitable organisation which supports the development of crops with long-term disease resistance, and promotes their deployment in agriculture worldwide, focusing particularly on developing countries.

2Blades has completed experimental work on its first programme, reporting field trials of multiple disease-resistant tomato varieties and demonstrating that the new resistance doubles crop yields.

Until now, genetic engineering of plants has been based on introducing DNA at random locations in the genome. However, 'TAL code' genome-editing technology enables the precise modification of the plant genome. Working with the inventors, this year 2Blades has licensed rights to the technology to most of the major seed companies, supporting its general use in agriculture.

2Blades has also entered a major collaborative R&D programme with leading seed company DuPont Pioneer for the development of disease-resistant soybeans. This collaboration supports 2Blades' ongoing programmes in Brazil and at TSL, and should ensure the rapid introduction of disease-resistant soy varieties in America.

Opposite: Electron microscope image of the shapes of hairs on an Arabidopsis leaf produced by branching of a single cell.

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, talks 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.

Across 2012/13, a total of ten students became Sainsbury Undergraduates and five enthusiastic young plant scientists were awarded a Sainsbury PhD studentship – Jonathan Hughes and Alice Baillie at Sheffield University, Patrick Dickinson at Cambridge University, Sylwia Kacprzak at Southampton University and Jennifer Walton at the John Innes Centre.

About 80 network members gathered at the 2013 annual meeting held at Queens' College, Oxford to hear the Sainsbury PhD students give presentations on their research. Professor Hagen Bailey, from Oxford's Department of Chemistry, also outlined his work on the fundamental properties of membrane proteins - in particular channels and pores - and their potential applications in biotechnology.

THE GATSBY PLANT SCIENCE SUMMER SCHOOL

This annual event consists of an intensive week of practicals, career sessions and talks from leading scientists, designed to present the opportunities in plant science to 80 bioscience undergraduates.

In 2013 the programme included presentations on insect-plant interactions and phytoremediation; Professor Vivian Moses speaking on the GM controversy; and Professor Beverley Glover talking about flower diversity.

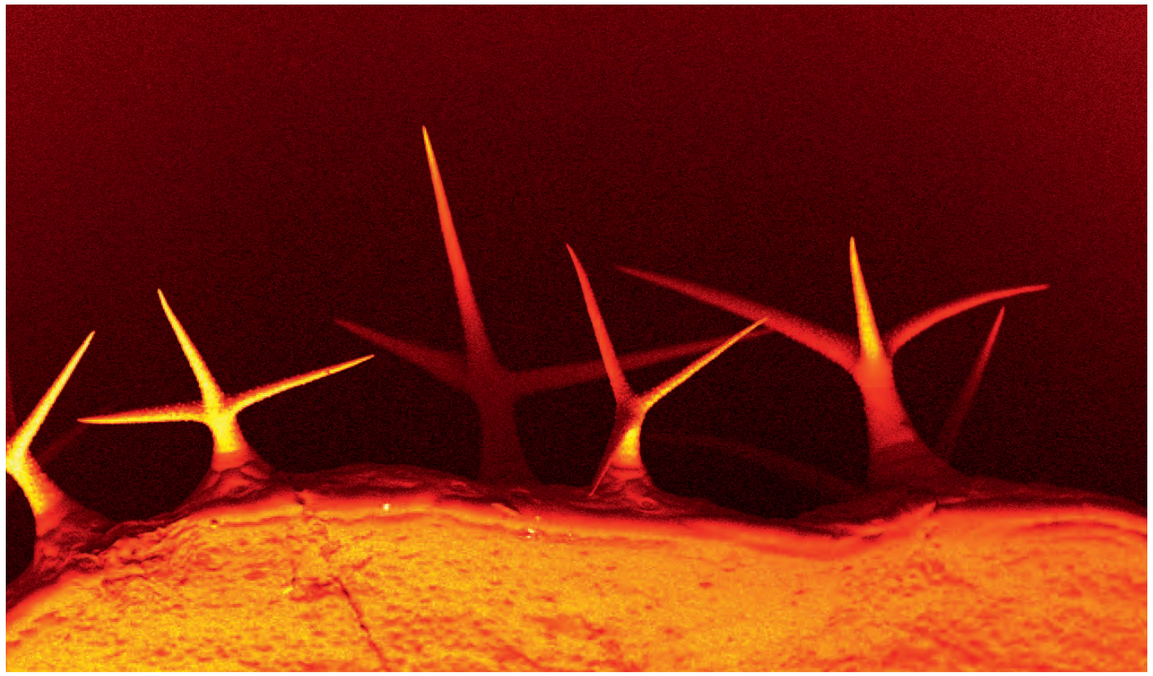
Recent research suggests the School is successfully increasing the number of plant science PhDs, while also encouraging other students to pursue careers in plant science without a PhD.

SCIENCE AND PLANTS FOR SCHOOLS (SAPS), CAMBRIDGE UNIVERSITY BOTANIC GARDEN

We have supported SAPS for more than 20 years in its work 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.

The two finalists for this year's Society of Biology School Teacher of the Year were from among the ever-growing network of SAPS Associates and had undertaken plant projects with a SAPS Award. The American Society of Plant Biology also selected SAPS as one of two winners in their 2013 Education Competition for Innovative Instruction.

This year more than 50% of all UK teacher training institutions have been represented at SAPS workshops, and it partnered with SLCU to extend its impact on those who train biology teachers with two successful 'Train the Trainer' workshops. The SAPS website also continues to grow, with visitor numbers doubling this year.



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 necessitates a multidisciplinary approach as well as 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 have partnered with the Wellcome Trust to establish the Sainsbury Wellcome Centre for Neural Circuits and Behaviour (SWC) at University College London (UCL).

As part of this initiative we have developed and invested in a number of innovative collaborative programmes around the world, reflecting the types of research we envision being carried out at SWC. These programmes have given us access to a wealth of expertise to help our thinking on the Centre's planning and the development of its scientific focus.

In addition, we believe in the value of supporting cutting-edge meetings and symposia, and in reaching out to the public via projects such as BrainFacts.org, our partnership with the Society for Neuroscience and the Kavli Foundation to create an online source of authoritative information about the progress and promise of brain research.

SAINSBURY WELLCOME CENTRE FOR NEURAL CIRCUITS AND BEHAVIOUR (SWC)

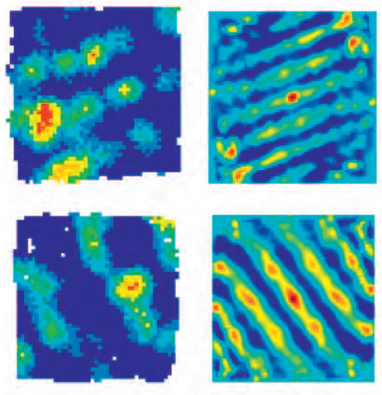
We are partnering with the Wellcome Trust to develop this world-class research centre at UCL. The neuroscientists working in the new facility will use state-of-the-art molecular and cellular biology, imaging, electrophysiology and behavioural techniques, supported by computational modelling, to investigate how brain circuits process information to create neural representations and guide behaviour. SWC will link and unite computational, theoretical and experimental work, becoming the new home for the Gatsby Computational Neuroscience Unit - which we have supported for more than 16 years - along with a dozen experimental research groups.

Following the successful demolition of the existing building on the site, the ground-breaking ceremony took place in May 2012. Construction of SWC, designed by architect Ian Ritchie, then started in earnest. By June 2013, the last beam had been placed at the top of the building and a topping-out ceremony was held, attended by more than 200 guests including representatives from Gatsby, Wellcome, UCL, the major contractors and other key stakeholders. Work is now ongoing to fit out the laboratories.

This capital project has been extremely well managed by the excellent project team and remains on-budget and on-schedule, with researchers and associated staff set to occupy the building and begin research from summer 2014.

At the topping-out event, the appointment of Professor John O'Keefe as SWC's Inaugural Director was announced. Professor O'Keefe is an internationally recognised neuroscientist at UCL. He is a Fellow of the Royal Society and the Academy of Medical Sciences, and has received a number of prestigious awards including the Grawemeyer prize in Psychology and the Gruber prize in Neuroscience. His own research concentrates on the hippocampus – an area of the brain crucial for the storage of spatial and episodic memory. In his initial role as SWC Interim Director, Professor O'Keefe has been actively involved in the design and development of the building over the last two years. We are therefore delighted that he has agreed to lead the centre through the next exciting stage that involves identifying outstanding scientists and staff to join SWC.

Right: Sainsbury Wellcome Centre, UCL, Howland Street.



NEURO-PROBES

We are delighted to be collaborating with a number of partners to develop and manufacture a state-of-the-art device for detecting the neural activity of multiple neurons in animal brains.

A consortium of UCL (with grant funding from ourselves and the Wellcome Trust), the Howard Hughes Medical Institute, and the Allen Institute for Brain Science is collectively providing €4.2 million to support the endeavour.

The 38-month project will be undertaken in conjunction with imec – a nano-electronics research institute in Leuven, Belgium. Imec will design, develop and fabricate these devices, leveraging its nano-electronics expertise.

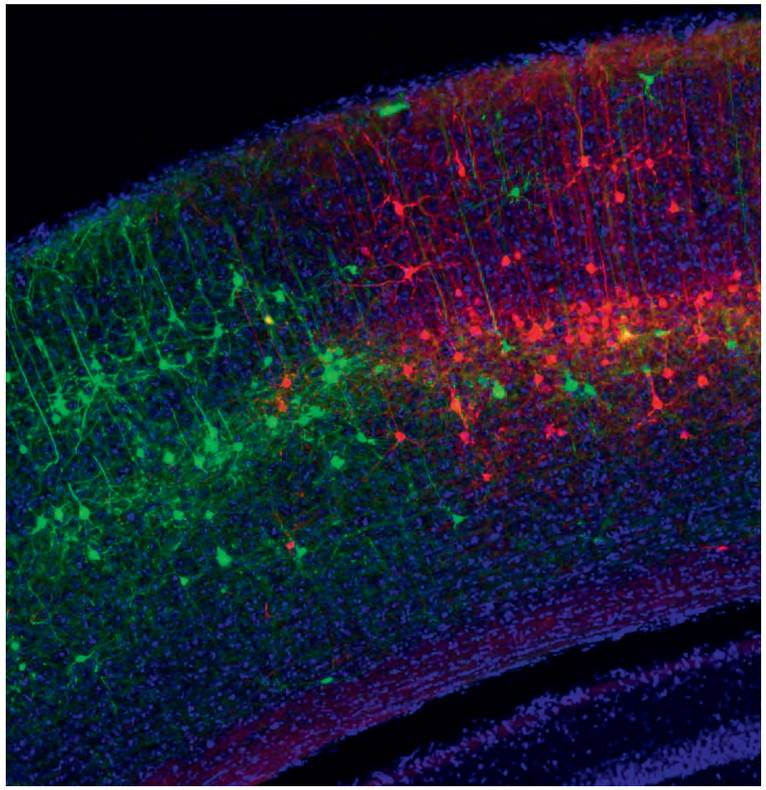
The proposed sensor will advance current neural probe technology used to detect electrical activity in the brain. The innovative solution will incorporate recording electrodes at a much higher density and provide better performance than existing technology by an order of magnitude. This will allow researchers to record brain activity with an unprecedented combination of resolution and a very large number of sites.

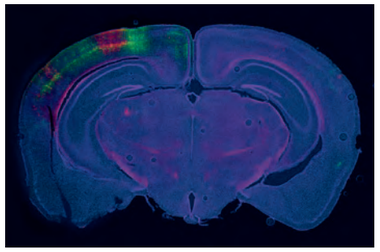
The sensors under development have the potential to enable transformational neurobiology experiments and to contribute to a fundamentally improved understanding of how neurons in the brain work together to process information and control behaviour.

The consortium will develop and test the technology, then identify a model that can be manufactured for purchase by the research community. The new probes are expected to become widely available in late 2016.

> THE INNOVATIVE SOLUTION WILL INCORPORATE RECORDING ELECTRODES AT A MUCH HIGHER DENSITY AND PROVIDE BETTER PERFORMANCE THAN EXISTING TECHNOLOGY BY AN ORDER OF MAGNITUDE

Above: The two panels on the left show the firing rate of cells in part of the brain called the parasubiculum as an animal moves around a square-shaped arena (warm colours mean higher firing rates). The two panels on the right are the corresponding autocorrelation mathematical analyses that show a strong tendency for the cells to fire with striped patterns. These band-like firing patterns may be important in how the brain processes information on spatial location and surroundings (as reported in Krupic, Burgess and O'Keefe, Science 2012).





Left and above: Modified rabies viruses were injected into mouse visual areas to identify their connections with other parts of the brain. The patterns of red and green labelling reflect differences in the connections of the different visual cortical areas. This allows understanding of how specific cell types and brain areas interact to process visual information and generate the perception of a visual scene.

ASCONA MEETINGS ON NEURONAL CIRCUITS

Since 2003, highly regarded meetings have taken place every two years in Ascona, Switzerland, hosting approximately 110 participants. The meetings aim to highlight exciting research directions in the neuronal circuit field, and bring together researchers who think about neural circuits from multiple different angles but are unlikely to interact with each other on a daily basis.

We recently provided majority funding to support the series in 2013, 2015 and 2017 and extend its scope into emerging fields not previously well accessible to the circuit community.

The meeting in October 2013 focused on research relating the assembly and architecture of dedicated neuronal circuits to their function. It covered topics including the assembly of defined circuits by specific neurons; the functioning, information coding and plasticity of circuits in the developing and adult brain, through to the behavioural functions that they sub-serve; and computational approaches to circuit modelling.

OXFORD CENTRE FOR NEURAL CIRCUITS AND BEHAVIOUR (CNCB)

Together with the Wellcome Trust we funded the development of this centre, which opened in 2012 and focuses on circuit mechanisms underpinning adaptive behaviour.

This year the Director of CNCB, Professor Gero Miesenböck, was awarded the Brain Prize 2013 and the InBev-Baillet Latour International Health Prize 2012 for his pioneering work on optogenetics, and Dr Martin Booth, a CNCB Group Leader, won the Erlangen Graduate School in Advanced Optical Technologies' 2012 Young Researcher Award. In November 2012 the CNCB was also pleased to welcome a new Group Leader, Dr Korneel Hens, who joined from the École Polytechnique Fédérale de Lausanne.

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 to increase the supply and status of technicians – those in the workforce with intermediate-level skills in science, technology, engineering and mathematics (STEM). Technicians are vital to our future prosperity and competitiveness. Without a sufficient and sustained supply of high-quality technicians, the UK's ability to embrace increasing levels of technological complexity and adopt higher value-added market strategies is severely threatened. We continue to work with many partners to address this threat.

Our second objective is to support the teaching of science in schools. Our current efforts in this area are focused on improving the teaching of practical science. Experiments are the essence of science and, in addition to being popular with students, high-quality practical work develops technical skills and improves scientific understanding. Yet, over the last 20 years there has been a steady erosion of laboratory skills taught in school science, and this is of significant concern to industry and universities.

Our final objective is to promote a more coherent national system of STEM education by both supporting initiatives which increase collaboration across the system and informing government policy through targeted research and advice.

STRENGTHENING THE TECHNICIAN WORKFORCE

Our starting point for ensuring a strong technician workforce has been to support efforts to develop a common framework of professional registration standards for technicians working in all STEM-related sectors. Developing such a framework should help ensure qualifications are developed that give individuals the skills they need in industry, allow employers to appoint technicians confident in their recruits' skills, and see individuals gain a significant advantage in the labour market. Combined, this should increase the status and number of technicians, ensuring the UK workforce can meet the future needs of our economy.

Although technician registration has existed in engineering for many years, only a small proportion of technicians currently choose to become registered. This year we took a significant step towards addressing this issue. With our support, the Engineering Council and a number of professional bodies have undertaken a major review of the registered engineering technician (EngTech) scheme, and work is now under way to ensure the number of EngTechs increases significantly over the coming decade.

We are also supporting the Science Council and the science professional bodies to develop new vocational pathways into and through the science profession. Good progress has been made over the past year. The Science Council has run a successful pilot of the two newly-developed professional registers, Registered Science Technician (RSciTech) and Registered Scientist (RSci), and the professional bodies are optimistic that increasing numbers of technicians will join the registers in the coming years. As the pilot evolves into a full national programme, we will be supporting our partners to turn this early potential into a flourishing registration scheme that is understood and valued by employers. Our support for professional registration also extends to the IT sector, and we have recently agreed to support the British Computer Society to develop a new Registered IT Technician scheme which will be launched in 2015.

Alongside these initiatives with the professional institutions, we have been working hard over the past year to spread the message about technician registration more widely. To this end we are delighted to be supporting a Unionlearn initiative which aims to identify and remove the barriers to registration that can sometimes exist for technicians in the workplace. Similarly, the HEaTED programme, which supports technicians working in higher education, has had another successful year and, with our continued support, is now promoting training routes for university technicians that lead directly to registration.

As ever, the policies implemented by the government of the day continue to impact on the way we approach our work. It has therefore been encouraging to see our research, and a number of the specific policy ideas we have developed, begin to influence policymakers. In particular, we have been working with the government to ensure that its reforms to the apprenticeships system will allow technician registration to become an intrinsic part of all relevant apprenticeships. This could have a major impact on the number of registered technicians in the workforce, while also helping to assure the quality of science, engineering and IT apprenticeships.

With measures to secure the future expansion of technician registration now taking shape, we are increasingly turning our attention to Further Education. The FE sector has a crucial role to play in both the initial training and continued up-skilling of technicians. In the coming year we will be examining the FE workforce's composition and professional development requirements. Once we have a clearer picture of the needs of the sector, we hope to work with the new Education and Training Foundation and other partners to explore how Gatsby resources might best be directed to supporting FE lecturers.

27,000

More than 27,000 curriculum resources are now available at the National STEM Centre.

SUPPORTING SCHOOL SCIENCE

We have long supported initiatives which encourage high-quality practical work in school science. This year the pace and scale of government reforms proposed for the education system have lent urgency to our work in this area. Our policy work has extended from the formal - responding to government consultations on reforming GCSEs and school accountability - to the informal – hosting roundtable meetings with exam boards and school leaders and working with the Wellcome Trust to advise Ofqual and the Council for Science and Technology on the assessment of practical work in schools.

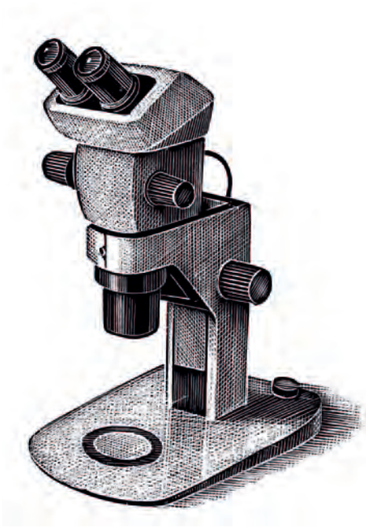
Research we commissioned from the Institute of Education and the University of York into better assessment of practical work in science has been particularly effective in providing evidence for our policy work. In line with our recommendations, the Department for Education has proposed that new science GCSEs must include 10% direct assessment of practical skills. We will be monitoring how these and other policy proposals develop, and will scrutinise what impacts they have in schools.

In addition to seeking to influence the national policy agenda, we also aim to provide targeted support at the school level. The 'Get Set Demonstrate' campaign was launched in November 2012 with a search for new ideas for exciting science demonstrations, six of which have been made into high-quality, video-based resources which will form the backbone of a 'National Demo Day' in Spring 2014. Furthermore, we have supported the development of five 'buying guides' to help school laboratory technicians make informed decisions about high-cost equipment, and funded STEMNET to put 40 STEM Ambassadors through bespoke training to help them deliver enlivening practical activities in classes and after-school clubs.

Finally, although our major initiatives to increase the number of high-quality physics and chemistry teachers have concluded, we still take a keen interest in teacher supply issues. We continue to work closely with the Institute of Physics and Royal Society of Chemistry on this agenda, including supporting their development of an online subject knowledge testing tool. We are also supporting Teach First to develop a programme to recruit more physics, chemistry and mathematics teachers, and we continue to offer advice to the National College for Teaching and Leadership on teacher supply policy.

Right: STEM Ambassadors and STEM clubs make maximum use of practical work to enhance student engagement in science.

> OF THE MANY NATIONAL INITIATIVES THAT ARE DEVELOPED TO SUPPORT EDUCATION, ONLY A MINORITY CONSISTENTLY RAISE YOUNG PEOPLE'S ASPIRATIONS AND ATTAINMENT



Above: In December 2013 we approved an extension to our programme of projects aimed at strengthening science practical work in schools and colleges.

SUPPORTING A COHERENT NATIONAL SYSTEM OF STEM EDUCATION

Of the many initiatives that are developed to support education, only a minority consistently raise young people's aspirations and attainment. Bringing together schemes with similar aims and approaches offers greater potential for sustainable outcomes. To this end we support activity that builds collaboration across the STEM education landscape.

We funded the creation of the National STEM Centre in York – home to the UK's largest collection of high-quality STEM curriculum materials, which offer inspiration and guidance for teachers and many others involved in STEM education. This year the Centre increased its holding to more than 20,000 physical and 7,000 digital resources, providing an invaluable central reference point for curriculum development.

We have supported The Big Bang Fair - which brings together a number of science and enegineering competitions and is the UK's biggest single celebration of science and engineering for young people - since its outset. This year a record 65,000 visitors came to the Fair in ExCeL, London.

In our work informing government policy, we continue to support the SCORE and ACME initiatives, which aim to improve communication between government and the science and mathematics education communities. Across the year, we have also commissioned research and responded to formal consultations in fields where we have expertise, publishing the results on our website.

AFRICA

PROMOTING ECONOMIC DEVELOPMENT IN EAST AFRICA THAT BENEFITS POOR PEOPLE THROUGH SUPPORT TO THE GROWTH AND SUSTAINABILITY OF KEY SECTORS

We have funded, designed and run programmes in Africa since 1985, with the overall aim of driving sustainable economic growth to create jobs and raise incomes for poor people.

We are currently focusing on achieving this by funding and implementing programmes in East Africa that aim to transform an entire market sector by bringing stakeholders together to tackle all its underlying constraints, whether along the value chain, across supporting markets or in the surrounding policy environment.

We initiate, design and run programmes, targeting high-potential, competitive sectors where growth could benefit large numbers of poor people and where the pre-conditions for change - such as private sector momentum and a degree of political support - are in place. We are working in the Tanzanian cotton and textile sector, the tea sectors in Tanzania and Rwanda, and forestry sectors across East Africa.

You can find more information on these programmes on our website. Notable developments in 2012/13 are highlighted over the following pages.

> THERE IS EXCITING POTENTIAL TO TRANSFORM THE FORESTRY SECTOR

DEVELOPING A VISION FOR THE EAST AFRICAN FORESTRY SECTOR

Over the past 15 years we have worked to transfer clonal forest technology and expertise to East Africa by developing public-private partnerships and commercial nurseries in Kenya, Uganda and Tanzania. These nurseries have supplied more than 25 million fast-growing tree varieties across the region to date.

While this work will help accelerate production, the regional forestry sector faces numerous other challenges and these are becoming ever more critical. Private forestry is unable to keep pace with demand for timber and fuel-wood, leading to the mining of natural forests and severe deforestation. Weak regulation heightens the problem, with unfair competition from the unsustainable exploitation of natural forests constraining the development of a sustainable charcoal sub-sector and commercial forestry opportunities. A rising population, economic growth, industrialisation and increased agricultural expansion into forested areas are contributing to make these issues worse.

However, this also means there is exciting potential to transform the forestry sector – promoting its sustainable growth, ensuring large and small-scale growers can exploit compelling opportunities in wood and energy markets, and creating knock-on environmental, social and economic benefits.

We have undertaken detailed research across East Africa to understand the specific challenges and opportunities, leading us to initially focus on Tanzania. We have partnered with the UK's Department for International Development to create an independent institution - the Forestry Development Trust - to work with the public and private sectors to drive a long-term programme ultimately aimed at transforming the sector. This will seek to:

– Increase smallholder planting and employment in sustainable private forestry;

– Raise net incomes for the sector's smallholders;

– Increase the supply of higher-value wood products and energy from sustainable sources; and

– Ensure quality services and industry functions are provided sustainably.

At the same time we are exploring the opportunities for similar work in Uganda and Kenya, potentially building into a regional programme.

FORGING INNOVATIVE PARTNERSHIPS IN THE RWANDAN TEA SECTOR

In 2011 we expanded our partnership with the Wood Family Trust in tea sector development from Tanzania to Rwanda by launching the Imbarutso Project. Imbarutso, meaning "catalyst" in Kinyarwanda, is working with government, factories and farmers to bolster the sector's competitiveness and ensure that smallholders benefit from its growth.

Rwandan tea farmers were some of the lowest-paid in the region, earning 25 per cent of the made tea price compared with the 75 per cent earned by Kenyan farmers. This is largely because Kenyan farmers own their own processing factories and have developed greater efficiency and quality on farms and in factories. Therefore, in late 2011 when the government announced it was privatising two tea factories, we saw an important opportunity to transform the sector.

We entered a competitive bidding process and bought the Mulindi and Shagasha factories on behalf of local farmers. While there are clear dangers and examples of failure in farmer-owned enterprises, we have contracted the Kenya Tea Development Agency (KTDA) to serve as the professional management agent for the factories. KTDA manages a large number of Kenyan factories on behalf of smallholders, representing more than 600,000 farmers and producing about 12 per cent of the world's black tea.

In Rwanda, KTDA will initially staff the key management positions and be responsible for advising farmers; transporting, processing and marketing leaf; and training locals to aid the transition to 100 per cent Rwandan-staffed factories.

We will fully exit and transfer our shares over to the farmers when the investment has been repaid through profits and the smallholders have met certain criteria on management, governance and transparency, leaving in place professionally-run factories fully-owned by smallholders.

This approach should greatly raise the incomes of the farmers involved. Moreover, it allows KTDA to explore markets outside Kenya and spread its expertise regionally. Most significantly, if successful it potentially provides a model for the privatisation of other factories and the development of new sites, both in Rwanda and beyond.

RESPONDING TO CHALLENGES IN THE TANZANIAN COTTON AND TEXTILE SECTOR

Our Tanzania Cotton and Textile Development Programme aims to raise the yields of more than 400,000 smallholders while catalysing downstream industries.

Following three years of pilots and policy reform engagement, stakeholders approved the restructuring of the entire industry for the 2011/12 season around contract farming – addressing the key constraint of farmers' lack of finance for inputs by ensuring that only ginners who invested in smallholders would be licensed to buy, sell and export cotton. These arrangements saw more than 290,000 farmers receive inputs on credit, contributing to a record crop.

Despite this success, political support faltered and the arrangements were not renewed for the 2012/13 season. Tanzania's production for the season fell by over 40%. Fluctuations are to be expected in any crop, but we believe the fall has undoubtedly been worsened by the fact that the contract farming model has been forced to retreat to a protected geographical zone where supportive ginners implement it on a voluntary basis. As a result, only 30-40,000 farmers received inputs on credit, with most other farmers unable to purchase pesticides – crucial for securing reasonable production.

25 million

Nurseries we have established in Kenya, Uganda and Tanzania have supplied more than 25 million fast-growing tree varieties across the region to date.

The season has provided harsh lessons to stakeholders and the programme. Ginners and senior levels of government now recognise the need for arrangements that support farmer investment. Meanwhile, we have been given a stark reminder that transforming entire sectors promises high rewards but at high risks. As a private foundation and funder-implementer, we have the flexibility to adapt and be patient and pragmatic.

As such, although political support for contract farming remains ambiguous, rather than retreat from the setback of the last year, we are working with legitimate stakeholders to rebuild support with the aim of stabilising the sector's governance and rolling-out contract farming to as many regions as possible for the 2013/14 season. Helping Tanzanian stakeholders secure sector-wide implementation of contract farming will be enormously challenging, but we believe it necessary to truly transform the sector and benefit its farmers.

PROMOTING ECONOMIC DEVELOPMENT IN MOZAMBIQUE

We support the investment company AQUIFER to catalyse economic and social development in Mozambique by creating sustainable agri-businesses that stimulate industrialisation. AQUIFER ultimately 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., which owns three main subsidiaries: rice processor and distributor Moçfer Indústrias Alimentares (MIA); fresh produce grower and exporter Companhia do Vandúzi; and Mozseeds, which aims to bring high quality seed to tens of thousands of farmers across Mozambique.

In early 2013, catastrophic floods hit the province of Gaza, including Chokwe, where MIA and Mozseeds were based. More than 300,000 people were displaced and the impact on infrastructure, farmlands and livelihoods was devastating. Our attention turned to providing emergency support for humanitarian relief.

After careful analysis we have found, regrettably, that the costs, timescales and risks involved in rebuilding the businesses in Chokwe on a sustainable, commercial footing outweigh any potential developmental impact. Therefore Mozseeds will relocate to Chimoio, alongside Vandúzi, to continue its mission of creating the market demand to stimulate the development of a private sector seed industry in Mozambique.

Meanwhile, rice operations will be scaled back to concentrate solely on research and development efforts, ensuring that the legacy of seven years' work in this area is protected and can benefit other rice-focused initiatives, both in Mozambique and across East Africa.

PUBLIC POLICY

SUPPORTING INDEPENDENT RESEARCH ORGANISATIONS WHICH PROVIDE EVIDENCE-BASED ADVICE TO GOVERNMENT AND CITIES

Our grant-making in public policy focuses on two organisations - the Institute for Government and the Centre for Cities - both founded by David Sainsbury. We believe that practical, non-partisan thinking can make a real contribution to improving the performance of government and cities.

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 the Institute for Government and the Centre for Cities.

INSTITUTE FOR GOVERNMENT

The Institute for Government works with all three main political parties in Westminster and senior civil servants in Whitehall to promote more effective government. It is a registered charity and provides impartial, evidence-based advice and training, drawing on best practice and research in government, academe and business from around the world.

In one major project in 2013 it analysed all available data to examine Whitehall's effectiveness, publishing the findings in Whitehall Monitor 2013 alongside recommendations for improving the accessibility of relevant information. It will continue to publish analysis on a regular basis via a new web portal, consolidating its findings into an annual report examining Whitehall's size, shape and performance.

Other recent reports addressed topics including: civil service capability; government's approach to public service markets; the accountability of ministers and the civil service; financial leadership; and lessons for government in delivering major projects derived from the London 2012 Olympics. The Institute also provided research and support to the LSE Growth Commission for its report on how to improve infrastructure decisions in the UK.

High-profile events hosted by the Institute this year included discussions with Minister for the Cabinet Office Francis Maude MP and the Head of the Civil Service Sir Bob Kerslake on the progress of civil service reform, and with Lord Heseltine on his independent report to government on creating the conditions for growth.

The Institute also developed two event series – one on business and government, and one called 'Big Thinkers', which hosts talks by people whose ideas about improving the effectiveness of government are being debated in the UK and internationally.

Above: The Centre for Cities' significant work across 2012/13 saw it awarded the 'One to Watch' accolade at the Prospect Think Tank of the Year Awards for 2013.

CENTRE FOR CITIES

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

The Centre's significant work across 2012/13 saw it awarded the 'One to Watch' accolade at the Prospect Think Tank of the Year Awards for 2013, while its growing reputation as a thought leader in urban economic policy saw the government choose it as one of three organisations leading the 'What Works Centre for Local Economic Growth' – a new independent research centre that will gather, evaluate and disseminate evidence on the policy interventions that have successfully promoted local economic growth.

This year the Centre also launched the first ever comprehensive study of Small and Medium Sized Enterprises across all of Britain's urban areas, while its annual Cities Outlook report made a major contribution to the UK housing debate. Alongside this, the Centre has also published major research examining the future of local government finance and the role that urban development funds can play in driving growth.

It continues to run an extensive programme of events, and has recently worked with policymakers and practitioners in cities including Manchester, Glasgow, Sunderland, Newcastle, Bristol and Leeds. It has also engaged directly with the Cabinet Office and the Office of the Deputy Prime Minister. In the coming years the Centre will focus on developing its evidence base further to continue supporting cities across the UK to drive economic growth.

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 and Henry Moore.

Robert was knighted for service to the arts in 1967, and in 1973 he and Lisa gifted 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).

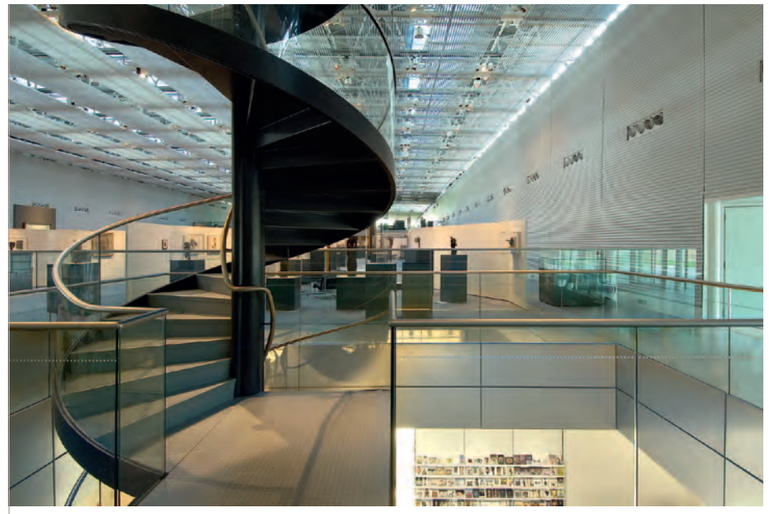
We continue to support SCVA and two other institutions founded by Robert and Lisa at UEA, as well as a small number of other organisations and initiatives we have long relationships with, as they seek ways to make inspiring art accessible to new generations.

SAINSBURY CENTRE FOR VISUAL ARTS

This year the SCVA has mainly focused on the final phases of major development works, including renovating space at the east end of the Centre, providing more space to display permanent collections, and creating a large suite of temporary exhibition galleries.

The new galleries were launched in 14 September 2013 with a major exhibition displaying the best art of Norfolk and Suffolk throughout history. The "Masterpieces: Art and East Anglia" exhibition brought together more than 250 pieces, including paintings, sculptures, jewellery and examples of innovative design. Pieces ranged from the King John Cup (c. 1325) - seen as one of the oldest and finest specimens of English secular medieval cups - to the Lotus 72 car – one of the most remarkable and successful designs in Formula 1 history.

In October 2013, Lord Foster, the architect of SCVA, delivered the second Robert Sainsbury lecture as part of UEA's 50th anniversary celebrations.



250

The "Masterpieces: Art and East Anglia" exhibition brought together more than 250 pieces, including paintings, sculptures, jewellery and examples of innovative design.

Above: Sainsbury Centre for Visual Arts.

Below: Chamber Orchestra of Europe photographed in Lisbon.

HENRY MOORE AT TATE BRITAIN

We were pleased to support the redevelopment of two galleries at Tate Britain dedicated to the work of Henry Moore. The galleries, which opened in May 2013, present around 30 works and focus on the story behind the Henry Moore collection at Tate and his large public commissions. The display includes film, photographs, maquettes, drawings and large-scale sculptures such as Recumbent Figure, 1938 – the first Moore to enter Tate's collection in 1939.

CHAMBER ORCHESTRA OF EUROPE

We continue to support the acclaimed Chamber Orchestra of Europe, which brings together almost 60 musicians from Europe, all with parallel careers as soloists, national orchestra principals and teachers.

Highlights from this year included European tours to Italy, Luxembourg and Germany with conductor Herbert Blomstedt and pianist Emanuel Ax, and to Italy and France with conductor Semyon Bychkov, violinist Lisa Batiashvili and cellist Johannes Moser.

The orchestra also performed all of Brahms' symphonies at the Alte Oper in Frankfurt with Bernard Haitink, and worked under Lorenza Borrani with pianists Pierre-Laurent Aimard, Tamara Stefanovich and Nenad Lecic to perform a rarely-heard all-Mozart programme, including his challenging Concerto for three pianos.

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