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REFLECTING ON
THE 50TH YEAR OF
GATSBY

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INTRODUCTION

BY LORD SAINSBURY OF TURVILLE

Settlor of the Gatsby Charitable Foundation



Last year we celebrated the 50th anniversary of Gatsby. On the 17th March 1967, I walked into the office of our formidable family solicitor, Ethel Wix, and wrote out a cheque for £5 to constitute Gatsby's start-up fund. I had no idea back then of the amazing paths Gatsby would lead me down, the astonishing variety of talented people I would meet through its work, and the rich sense of fulfillment it would give me and my wife throughout our lives.

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I named Gatsby after my favourite book, *The Great Gatsby* by F. Scott Fitzgerald. People often say it is a surprising name, as they associate Gatsby with glitz and glamour. But to me, the novel is not about ostentatious wealth or the fabulous parties Jay Gatsby threw – it is about having a vision and pursuing that vision. Fitzgerald writes that Gatsby had “an extraordinary capacity for hope”, and I wanted the charitable foundation to reflect this.

Later, the narrator of the book says that the better future the characters had pursued “eluded us then”. But he goes on to say that “that’s no matter – tomorrow we will run faster, stretch out our arms farther. . . . And then one fine morning—”. This sense of doggedly pursuing a vision and striving ever harder to achieve it – even in the face of challenges and disappointments – is extremely important to the philosophy we have developed at Gatsby.

Below: Susie Sainsbury (right) and Georgina Ferry, author of *A Better World is Possible – The Gatsby Charitable Foundation and Social Progress*.

Over 50 years of running faster and stretching out our arms farther, the dedicated people who have helped me run the foundation and the projects we have supported have achieved a great deal. Inevitably, we have also occasionally stumbled. Foundations can take risks and innovate in ways that are very difficult for government, and I strongly believe they should play this role. However, you have to be prepared to fail if you are really looking to move the agenda forward. At Gatsby, we believe such failures can be extremely valuable – helping us test assumptions, learn about what is possible, and change course towards eventual success.

To mark Gatsby’s half-centenary, we commissioned a book to explore our failures, celebrate our successes, and reflect on the lessons we have learned. *A Better World Is Possible – The Gatsby Charitable Foundation and Social Progress* by Georgina Ferry also sets out our approach to philanthropy, and I hope the book will inspire and help others to use their charitable giving to try and make the world a better place.

While this has certainly been a year of reflection for Gatsby, it has also been one of action, with numerous highlights across all our areas of focus.



PLANT SCIENCE

In the 1980s, my great friend Roger Freedman highlighted to me that the way plant science research was funded in the UK was frustrating efforts to take full advantage of innovations in the sector. Scientists were spending too much time scrabbling for grants in a harsh funding environment, incentivising a focus on safety-first projects that promised only incremental advances in the science.

Roger and other advisors presented an alternative vision where talented people – rather than individual projects – were funded and given the freedom, resources and timespans to undertake truly daring and innovative work. Inevitably, failure rates would be high, but the failures would inform future efforts. The eventual successes would push the boundaries of the science forward.

As such, Gatsby founded The Sainsbury Laboratory (TSL) at the University of East Anglia. Over almost three decades, TSL has more than fulfilled that initial vision, becoming an exceptionally influential, world-leading institute on plant pathogens.

This year, TSL developed a new strategy and vision based on an iterative cycle that takes scientific findings from the laboratory to the field and vice-versa to guide advances in disease control. This approach aims to ensure sustainable food security in the face of climate change and emerging crop diseases.



Above: Professor Nick Talbot FRS is the new Executive Director of The Sainsbury Laboratory.

A new position of Executive Director has been created to lead TSL, and I am delighted that Professor Nick Talbot has been appointed to the role. Nick has given invaluable advice to Gatsby over many years, and I am looking forward to seeing his impact on this remarkable institute.

NEUROSCIENCE

The success of the Gatsby Computational Neuroscience Unit (GCNU) is also a story of extraordinary individuals taking full advantage of the resources and freedoms we have been able to offer them. One such individual is Professor Peter Dayan. GCNU's original Director, Geoffrey Hinton, brought Peter with him to help found the unit in 1998, and Peter succeeded him as Director in 2002.



Above: Professor Peter Dayan FRS was awarded the Brain Prize in 2017. Credit: Thomas S.G. Farnetti/Wellcome.

Peter led GCNU with distinction for over 15 years, developing the unit into one of the world's key centres for theoretical neuroscience and machine learning. I would again like to record my gratitude to him for his service following his decision to step down as Director in late 2017, and my congratulations on his joint-award in 2017 of The Brain Prize, which recognises scientists who have made an outstanding contribution to neuroscience.

I am very pleased that we have found a worthy successor as Director in Professor Maneesh Sahani. Maneesh has long been a member of the Gatsby family, having first joined GCNU as a Senior Research Fellow after completing his PhD in 1999. It is exceptionally pleasing that someone who has seen the unit's development first-hand over so many years will be leading it into the future.

EDUCATION

Many government projects are bound by three-year public spending cycles. But Gatsby's experience suggests that if you are going to change something significant, you probably need at least ten years of concerted effort. Foundations therefore have a vital role to play in keeping items on the agenda, gradually building the case for change over many years.

One example of this is career guidance, which we first began looking at in 2010. Two years later, we commissioned Sir John Holman to undertake international research into pragmatic actions that could improve career guidance in the UK. Sir John's final report in 2014 outlined eight benchmarks of good career guidance, which we subsequently tested in a pilot with schools and colleges in North East England. The results from the pilot showed that the Gatsby Benchmarks provide an ambitious framework that works for schools, employers and, most importantly, young people and their families. I am delighted that the Government has now put the Benchmarks at the heart of its national Careers Strategy. Much work remains to be done – not least in supporting schools and colleges to implement the Benchmarks. But the tenacity of Sir John, and the whole team involved, over many years means we are now much closer to a system that raises aspirations and shows young people – whatever their background – all the options that are open to them.

Meanwhile, we continue working to support the Government in implementing the reforms to technical education that were set out in the 2016 report of the Independent Panel on Technical Education, which I chaired. The reforms include the introduction of new post-16 qualifications – T-levels – but are far more ambitious than simply creating new qualifications. Taken together, the reforms represent an ambitious programme of systemic change that may take a decade to be fully realised, but that will deliver a technical education system for England that is truly world-class.

ECONOMIC DEVELOPMENT IN AFRICA

We also take a long-term approach to our work to accelerate economic growth in East Africa. Too often development programmes (including some of Gatsby's own initial efforts) have seen their role as solving static problems. Programmes have assessed issues, addressed them and then walked away. On returning 10 years later there is often little to find. Previous successes have ebbed away; once thriving initiatives have collapsed.

This is because the political, social, environmental and economic context is always changing – those that thrive do so because they can adapt and innovate in this changing context. Therefore, in our current work to transform whole sectors – such as cotton in Tanzania – we are aiming to see such sectors become resilient – equipped with the underlying capabilities and governance to ensure they not only thrive now, but are able to dynamically adapt to overcome challenges and grasp new opportunities in the future.



Above: Workers in the Tanzanian cotton sector.

This requires a patient, long-term approach – building trust between stakeholders as well as the capacity of key institutions to deliver their mandates, alongside mechanisms to keep them accountable to those they represent.

None of this is simple, and long timeframes are often required. But if resilience can be achieved in key sectors, we can help East African countries accelerate growth, create jobs, raise incomes and reduce poverty for the long-term.

PUBLIC POLICY

In 2007 I was commissioned to review the Government's science and innovation policies. So much of innovation policy is about translating academic research and discovery into practical applications that boost economic growth and social wellbeing. Yet, frustratingly, much academic research on what works in innovation policy is itself not being translated into practical action.

To help address this, last year we helped establish the Policy Links Unit – a not-for-profit knowledge transfer unit that aims to help governments develop effective industrial innovation policies. Policy Links provides education and consulting services grounded in the latest academic research to address the needs of officials and civil servants working in the fields of science, technology and innovation policy.



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Policy Links has very quickly established a global reputation within the field, and was unable to respond to all the requests for its services in its first year of operations. We have extended our support to allow the unit to expand, and I look forward to seeing the contribution it can make in this vital area.

THE ARTS

My wife Susie has played a hugely important role in Gatsby, and our work to support The Arts reflects not only my parents' legacy in the visual arts, but Susie's deep knowledge and passion across music and theatre.



Above: Performance of *This is the Hour* at the Susie Sainsbury Theatre.

She has made a major contribution to the cultural life of the country, working across an extraordinary number of organisations, including both the Royal Shakespeare Company and the Royal Academy of Music.

Susie has served on the Academy's governing body for 20 years, and recently has been comprehensively involved in the feasibility, fundraising and development of a new theatre and recital hall for the Academy.

Both Susie's Backstage Trust and Gatsby have supported the project, and I am very proud that the Academy's stunning new theatre is named after Susie, recognising the energy, enthusiasm, passion and knowledge she has brought to this and many other projects, and her great contribution to the lives of many young musicians, actors and directors over several decades.

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. Now in the middle of its second five-year research cycle, the Laboratory has a highly collaborative and interdisciplinary research environment that draws on molecular, cellular, whole plant, computational, and population biology approaches to investigate how plants develop.

Two new research group leaders recently joined SLCU. Dr Edwige Moyroud investigates the mechanisms for pattern formation in petals at the molecular, cellular, biophysical and ecological levels. The colourful patterns on the petals of flowering plants are key to attracting pollinators and, as such, participate directly in reproductive success. Professor Giles Oldroyd studies the signalling and developmental processes in plants that allow mutualistic interactions with mycorrhizal fungi and nitrogen-fixing bacteria. The long-term aim of his research is to broaden the range of crop plant host species that can accommodate nitrogen-fixing bacteria, to help deliver more sustainable and secure food production systems.

SLCU continues to contribute to the greater plant science and agricultural technology community in East Anglia. As part of the CambPlants Hub, SLCU is participating in an effort to broker connections between academia and industry, to more effectively translate research into business outcomes. In the first instance, this will focus on the potato and its value chain to identify improvement opportunities and to engage the research base to tackle them.

The Laboratory has continued to build its set of modular activities and outreach talks, as well as holding wider conversations about the role of science in society and the public perception of science. SLCU's ability to work closely with the Gatsby Plant Science Education Programme, the University Herbarium, and the Botanic Garden allows it to host a much larger number of groups of pupils than would otherwise be possible.

THE GATSBY PLANT SCIENCE EDUCATION PROGRAMME (GPSEP)

GPSEP aims to make a demonstrable difference to the teaching and learning of plant science at all ages in the UK, engaging and inspiring the next generation of plant scientists through projects in schools and higher education. The programme is overseen by SLCU and the Cambridge University Botanic Garden.

Through the Science and Plants for Schools (SAPS) project, GPSEP works to strengthen plant science education by supporting teachers to bring plant science to life for all pupils. The project continues to work with over 80% of Initial Teacher Education centres, delivering engaging, plant-based teaching resources to the trainers of student science teachers. Nearly 1,000 teachers and school technicians were supported through SAPS practical activities at the Association for Science Education conferences in 2017 and 2018.

Working with curriculum designers and capitalising on work to include plant disease in the GCSE core curriculum, SAPS distributed a series of posters to schools in England, highlighting the important area of plant science.

The higher education side of GPSEP seeks to nurture bright students in post-16 education with an interest in bioscience to become the next generation of leading plant science researchers. Its Summer School project helps undergraduates discover plant science through an intensive week of talks from leading scientists, career sessions, eye-opening practicals and thought-provoking discussions with researchers and peers. A review of the project in 2017 reiterated the impact it makes in increasing interest in plant science in the undergraduates that attend. The GPSEP team are now working to reinforce the engagement and enthusiasm for plant science of the alumni after the Summer School.

Below: SLCU researchers share the excitement of plant science with young attendees of the Cambridge Science Festival.

Opposite page: Undergraduates exploring the anatomy of plants as part of the cell biology practical at the Gatsby Plant Science Summer School.



THE GATSBY PLANT SCIENCE NETWORK

The Gatsby Plant Science Network consists of Gatsby-funded undergraduates, postgraduates, postdocs and alumni, with mentors chosen from UK universities with teaching and research interests in plant science.

The Network meeting in Oxford in September 2017 was attended by around 80 members. Sainsbury PhD students gave talks and Sainsbury undergraduate students presented posters on work from their summer placements. The evening lecture was given by the chemist Professor Dame Carol Robinson, whose inspirational talk was entitled *Changes of State and Mind*.

This year's training event took place in Cambridge during Easter and was attended by 26 students. The programme included a lecture from broadcaster/journalist Tom Heap, and a careers discussion with two Gatsby alumni: Barbara Fleck, who works in intellectual property, and Matt Hodges, who works for Oxford Biotrans – a university spin-out company that produces high-value chemicals using patented enzyme technology.

In 2017 a Sainsbury PhD Studentship was awarded to Siegfried Leher to investigate magnesium maintenance and regulation with Professor Dale Sanders at the John Innes Centre.

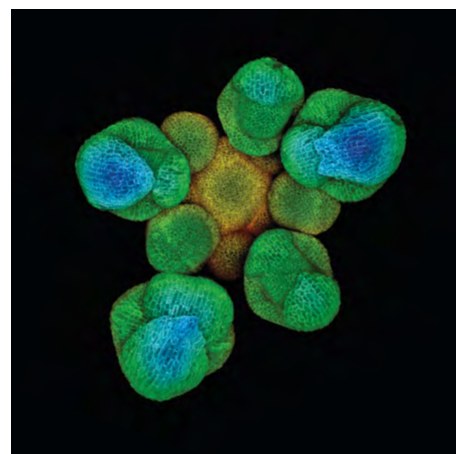
THE SAINSBURY LABORATORY, NORWICH (TSL)

TSL focuses on understanding how plants defend themselves against the microbes that cause disease, and how microbes manipulate host plants and cause disease.

After almost three decades, TSL has built an outstanding international reputation for scientific excellence. Four TSL scientists – Professors Jonathan Jones, Sophien Kamoun, Cyril Zipfel, and Dr Joe Win – were named in the 2017 Highly Cited Researchers List compiled by Clarivate Analytics. Furthermore, we are very pleased to congratulate Sophien Kamoun on his recent election as a Fellow of the Royal Society.

Building on this success, the Laboratory now charts an ambitious and innovative future. A new strategic vision seeks to further strengthen TSL's position as a global institute for plant health that focuses on fundamental and translational research to tackle diseases affecting crop production worldwide. This new vision will be enabled by an even closer partnership with the University of East Anglia and other research institutes present on the Norwich Research Park, alongside the Two Blades Foundation.

We are thrilled that Professor Nick Talbot has been appointed as Executive Director of TSL to take forward and deliver the new strategy. He is currently the Deputy Vice-Chancellor for Research and Impact at the University of Exeter, and a world-renowned expert in molecular plant pathology, with a particular interest in how fungal pathogens cause disease. Professor Talbot has been an invaluable plant science advisor to Gatsby for many years and has been involved in the success of several of our research programmes. We look forward to him joining TSL in autumn 2018.



We are extremely grateful to Professor Cyril Zipfel, the current Head of Laboratory, who has provided expert leadership and guidance during the development of TSL's new strategic plan and governance structure. He recently took up a position at the University of Zurich and we are very pleased that he will maintain his affiliation with TSL and make regular visits to oversee an industry-funded project aiming to identify new receptors that recognise pathogens and investigate how to deploy these receptors to improve crop resistance.

The Laboratory continues to make crucial discoveries and to engage with the public and policy-makers:

- The Kamoun Group revealed that many immune receptors in plants act in concert with proteins called NRCs, forming a complex network that may explain the robustness of plant immune signalling.
- The Jones Group conducted a successful field trial of blight-resistant GM potatoes in Norwich. The lead researcher, Dr Marina Pais, took part in the Royal Society MP/scientist pairing scheme with Norman Lamb, chair of the Parliamentary Science and Technology Committee, offering a good opportunity to discuss public acceptance of GM foods and the challenges facing the scientific community post-Brexit.

Above: Dr Benoit Landrein at SLCU investigates the chemical and physical mechanisms during plant development that allow plants to acquire their definite and robust shape.

Left: Observing characteristics as part of the plant identification practical at the Gatsby Plant Science Summer School.





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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 durable disease resistance and promotes their deployment in agriculture worldwide, focusing particularly on developing countries.

In 2017, 2Blades initiated a new collaboration with the BecA-ILRI hub in Nairobi, Kenya – a centre of life science excellence for the continent. As part of this new partnership, 2Blades appointed Dr Dieuwertje van der Does to advance projects on disease-resistant crops for smallholder farmers and to forge a link between 2Blades, the BecA-ILRI Hub, and TSL.

In January 2018, 2Blades added support to Professor Sir David Baulcombe at Cambridge University, who is working with scientists in East Africa to develop a new solution to Maize Lethal Necrosis Disease, a serious threat to maize production in the region.

In March 2018, 2Blades completed a partnership with DuPont-Pioneer (now Corteva Agriscience) on Asian Soybean Rust. During the five-year programme, 2Blades delivered new genes for resistance to this damaging disease. Corteva will advance the resistance into commercial varieties.

2Blades has made significant progress on a major project supported by the Gordon and Betty Moore Foundation. This multi-site programme across Europe and the US seeks to define the building blocks of the plant immune system. The analysis focuses on crop plants and their wild relatives in three important plant families: the Solanaceae (tomatoes, potatoes); Triticeae (wheat, barley); and Brassicaceae (mustard greens, cabbage, turnips, canola). The data is freely available as an open access resource to aid the plant science community in answering questions about the evolution of disease resistance.

Above: Staff and their families at the annual SLCU social barbecue.

NEUROSCIENCE



ADVANCING KNOWLEDGE IN EXPERIMENTAL AND THEORETICAL NEUROSCIENCE

One of the most exciting challenges of the 21st century is to understand how the brain performs the computations that directly underpin our behaviour. Our view, shared by many, is to work towards this by harnessing the efforts of a dynamic and multi-disciplinary group of scientists with a common interest in the workings of the brain. We are partnering with the Wellcome Trust (Wellcome) and University College London to do just that in the form of the Sainsbury Wellcome Centre for Neural Circuits and Behaviour – a research centre where scientists are using state-of-the-art techniques to investigate how circuits in the brain process information to create neural representations and guide behaviour.

In further efforts to achieve our aims in neuroscience, Gatsby has also developed several innovative collaborative programmes around the world. In addition, we convene and support cutting-edge research meetings and symposia, and invest in education, outreach and sector development programmes.

Above: Hands-on practical training in modern cutting-edge techniques during a course of the CAJAL Advanced Neuroscience Training Programme.

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Opposite page: The Mrcic-Flogel lab at SWC uses fluorescence-based tracing methods to reveal the diversity of projections and connections of brain cells.

SAINSBURY WELLCOME CENTRE FOR NEURAL CIRCUITS AND BEHAVIOUR (SWC)

SWC is a research centre that will eventually house around 200 scientists and support staff investigating how circuit function underlies different behaviours and contributing to our understanding of how the brain works.

We are very happy that Professor Tom Otis has joined SWC as Chief Scientific Officer. He was previously Professor and Chair of the Neurobiology Department at the University of California, Los Angeles, before joining Roche to head a team of 50 scientists responsible for early discovery research in psychiatry and neurodevelopmental disorders. Part of his role at SWC will be to help coordinate strategy, operations and technology transfer activities. Professor Otis will also direct a small research group, embedded within the Mrcs-Flogel lab, that will investigate cerebellar-cortical circuits and related behaviours.

The fit-out of the laboratory spaces on the third and fourth floors of the building was completed in early 2018 to accommodate newly-recruited experimental groups. The group of the Director, Professor Thomas Mrcs-Flogel, is investigating how the neural circuit organisation relates to the computations that support sensory and behavioural function. The aim of Dr Sonja Hofer's research is to understand how different environments and contexts can modulate sensory responses and influence how information is interpreted. Dr Marcus Stephenson-Jones' group works on how representations of the world in the brain are processed to give rise to critical aspects of goal-directed behaviour, such as motivation and choice.

SWC has launched a Resident Scholar Programme to bring eminent scientists from around the world to the SWC for short periods to collaborate with its scientists. The programme will support prominent systems neuroscientists who complement work at SWC. Dr Claudia Clopath, a theoretician from Imperial College London who uses computational approaches to address questions of learning and memory, is the first visiting scholar.

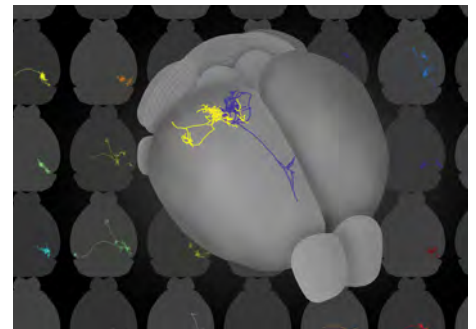
SWC has initiated an annual public lecture for local school pupils and residents, journalists, and scientists. Sir David Attenborough gave the inaugural lecture in December 2016 with a talk entitled *Beauty and The Beasts*, focussed on the aesthetic sensation in birds. At the end of 2017, Professor Frans de Waal of Emory University in the US gave a fascinating lecture on animal emotions that explored reconciliation, consolation, self-distinction and empathy in a wide range of species.

We are extremely pleased that the design (by Ian Ritchie Architects) and construction of SWC have both been recognised with a high number of awards, including: 2016 LEAF Awards for Best Façade Design and Engineering as well as Overall Winner; 2016 BCI Awards Major Building Project of the Year (over £50M); 2017 RICS Awards (London) Design Through Innovation as well as Project of the Year; 2017 Galvanizing Awards Duplex Award; and 2018 German Design Award Excellent Communications Design – Architecture.

GATSBY COMPUTATIONAL NEUROSCIENCE UNIT (GCNU)

This year marks GCNU's 20th anniversary. Gatsby founded the unit to bring together a critical mass of theoreticians focussing on the computational theories of perception and action in neural and machine systems.

We strongly congratulate Professor Peter Dayan on being awarded the Lundbeck Foundation's The Brain Prize in 2017 with Professors Ray Dolan (UCL) and Wolfram Schultz (Cambridge) for their analysis of how the brain recognises and processes reward. Later in 2017, Professor Dayan stepped down as Director after approximately 15 years at the helm of GCNU. We are extremely grateful for his leadership during this period that made GCNU a key global centre for theoretical neuroscience and machine learning. We also congratulate Professor Dayan on his recent appointment as a Fellow of the Royal Society.



We are happy to announce that Professor Maneesh Sahani has been appointed as the new Director. Following this, we awarded additional support to create a Data and Algorithms Centre that will provide expertise and support for robust and scalable implementation of the advanced algorithms developed in the unit. There will also be an exciting programme of prestigious senior postdoctoral fellows, designed explicitly to link GCNU scientists to their experimental SWC colleagues and promote the theory-experiment interplay that will help move neuroscience to new levels of discovery and understanding.

THEORETICAL NEUROSCIENCE AT COLUMBIA UNIVERSITY

Since 2005 we have supported research activity at the Centre for Theoretical Neuroscience at Columbia under the direction of Professor Larry Abbott.

The centre has moved to the recently-opened Zuckerman Institute, allowing for extensive interaction within the theory group as well as facilitating greater collaboration with the co-located experimental groups. The new, larger building has afforded additional space to the centre. To capitalise on this opportunity, we have provided additional funding – matched by Columbia – to support the recruitment of two new junior faculty members during 2018. The faculty will bring new ideas and expertise to help contribute to Columbia's interactive environment for bringing theoretical approaches to neuroscience.



CAJAL ADVANCED NEUROSCIENCE TRAINING PROGRAMME

We have formed a strategic partnership with the Federation of European Neuroscience Societies and the International Brain Research Organisation to develop the CAJAL Advanced Neuroscience Training Programme. This aims to play a major role in developing a new generation of scientists that are able to use novel technologies to tackle important open questions in neuroscience.

The CAJAL courses, hosted and organised by the Bordeaux Neurocampus and the Champalimaud Centre for the Unknown in Lisbon, offer cutting-edge, hands-on intensive training on a number of key topics in neuroscience. Topics include developmental neurobiology, neuroinflammation, computational neuroscience, advanced imaging and recording methods, and behaviour and neural systems.

Each course is attended by about 20 international, early-career scientists and lasts two or three weeks, with the timetable typically being split between lectures to provide the theoretical foundation of the techniques, and sufficient practical experience to enable course alumni to establish these methods when they return to their laboratories. Visiting faculty provide keynote lectures and spend time with the attendees.

TECHNOLOGY DEVELOPMENT – NEUROPIXEL PROBES

Since 2013 a consortium of UCL (with grant funding from Gatsby and Wellcome), the Howard Hughes Medical Institute, and the Allen Institute for Brain Science have collaborated with imec, a research institute in Belgium, to develop and manufacture state-of-the-art nano-electronics devices for detecting the activity of hundreds of neurons simultaneously.

This technology development challenge has required a unique approach – namely an international partnership of scientists and engineers across Europe and the USA in academia, private institutes, industry and foundations, all collaborating and interacting on a regular basis.

The successful development phase culminated in a publication in the high-profile journal *Nature* in November 2017.

Prototype probes have also been shared with Gatsby grantees and other key scientists, which has created a groundswell of interest and excitement in the community.

Since the start of 2018, the model to be commercialised has been tested and finalised, and will be released in the second half of the year. Several Gatsby-supported activities, such as SWC and the CAJAL courses, will provide training workshops.

PSYCHIATRY CURRICULUM REVIEW AT RCPSYCH

In partnership with Wellcome, we have given a grant to the UK's Royal College of Psychiatry (RCPsych) to review and overhaul the content of the postgraduate curriculum for psychiatry to include neuroscience and technologies relevant to brain and mental health disorders.

Over the past 18 months, RCPsych has engaged more than 1,800 stakeholders across the UK to ensure the new syllabus is relevant and reflective of the latest neuroscientific innovations. They have organised annual conferences as flagship events to highlight and promote the role of neuroscience within contemporary psychiatry, as well as initiating neuroscience in psychiatry networks and 'Brain Camp' events for training, teaching and support in neuroscience-related topics.

RCPsych are also updating their online training resources to reflect the new syllabus and stronger neuroscience themes.

The project has drawn much interest from medical students and junior doctors across the UK, which may help to increase recruitment into psychiatry as a speciality.

The next steps are to continue building a critical mass of neuroscience educators in psychiatry, as well as looking at the impacts of an updated syllabus in terms of knowledge acquired by new trainees and its role in patient care and experience.

Above right: The O'Keefe lab at SWC designed and developed a novel honeycomb maze to allow systematic analysis of decisions made during spatial navigation.

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Opposite page: Zara Allardyce, a Research Technician at SWC, supported research in the group of Professor Troy Margrie on the cellular logic of sensory circuits. Credit: Grant Smith.



STANFORD OPTOGENETICS MOONSHOT FOR AUTISM

We have made a six-year grant to Professor Karl Deisseroth at Stanford University to discover the mechanisms of autism brain dynamics with a view to proposing therapies.

Autism spectrum disorder (ASD) lags far behind other fields of medicine or psychiatry in deep understanding because the causality and specificity of modern basic neuroscience methods have not been used to investigate the underlying regulation of the ASD brain state. Compounding this problem, there is also a lack of quantitative patient-specific measurements of ASD function relevant to symptoms.

The Deisseroth group recently identified precise interventions in circuit activity that helped to decrease autism-related behaviour in the rodent adult brain. Gatsby support will enable them to build on this by using methods that allow brain-wide synchronous tracking, combined with control of activity, to resolve relationships among multiple brain-wide projections and cell populations for particular behaviours. These large-scale, focused recordings will help reveal the mechanisms that affect brain excitatory and inhibitory balance in ASD, how the effects of imbalance are transmitted to downstream circuitry, and how precise interventions may correct circuit dynamics in autism.

Cracking this neural code will allow Professor Deisseroth and colleagues to begin to design and create novel, safe, effective and precision therapies to have a transformative impact on the treatment landscape for ASD.

SCIENCE AND ENGINEERING EDUCATION



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

For over 30 years, Gatsby has championed improving science, technology, engineering and mathematics (STEM) skills by developing innovative programmes and informing national policy. Over this time, we have built a legacy of successful programmes, from supporting novel approaches to initial teacher training, teacher professional development and the delivery of A-level further maths, to, more recently, prompting an overhaul of career guidance and informing major reform of the technical education system.

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IMPLEMENTATION
OF T-LEVELS



Our work in education is structured around five focus areas:

- technical education reform – developing projects and supporting partners in their work towards achieving a coherent technical education system in England;
- the supply of STEM skills in the workforce – commissioning research to inform national policy and promoting greater recognition of the importance of technicians to modern society;
- career guidance – seeking to ensure that all schools and colleges are able to deliver world-class career guidance for all their students;
- science and maths in schools – advocating for engaging practical science and working to ensure a guaranteed supply of specialist teachers entering and remaining in the profession; and
- business education for engineers – supporting the Sainsbury Management Fellowship bursaries scheme and the Engineers in Business Fellowship.

Left: Dhanisha, a laboratory technician at the University of Newcastle who featured in the Technicians Make it Happen campaign.

Below: Students from Greenfield Community College (GCC) learning from employers as part of GCC's involvement with the Gatsby career pilot.

TECHNICAL EDUCATION REFORM

Generally, young people and their parents have a good understanding of the academic pathways and options available beyond the age of 16. The A-level route, and what it leads to, is clear and straightforward. In contrast, our current technical education system is complex, with confusing paths for progression and limited information about which qualifications employers value.

In 2016, the government set out the most significant reforms to technical education for a generation, having accepted all the recommendations of the Independent Panel on Technical Education, chaired by David Sainsbury. Gatsby continues to work alongside government and other stakeholders to support these important developments.

Technical education in England will now be built around 15 clear routes to skilled employment. The routes – including construction, health and science, catering and hospitality, and legal, finance and accounting – will encompass apprenticeships and classroom-based technical education, including the new T-level qualifications for 16 to 18-year olds which will be rolled out nationally from 2020.

Each T-level is being designed to meet employer-set standards, to bring technical education in line with the skills employers need. To ensure that learners who choose a classroom-based route also

gain experience of the workplace, each T-level will include a substantial industry placement. This combination will result in those who have completed a T-level being highly valued in their chosen industry and fully prepared for the world of work.

It is also important that young people choosing a technical pathway, as well as adults already in work, can see clear progression pathways to higher levels of technical education, especially at levels 4 and 5 (just below level 6 undergraduate degrees). We are working closely with the Department for Education and other partners to understand how best to create a straightforward national system of qualifications at these levels that have genuine currency in the labour market because they meet the needs of employers.

All of these systemic reforms will bring large changes to the curriculum of further education (FE) institutions, where a large proportion of technical education is delivered. Much of our current work focuses on ensuring the FE sector will have suitably qualified teachers, appropriate training facilities and access to robust evidence on local and national labour markets. As part of this work, 2018 will see Gatsby launch a set of online resources for trainee FE teachers, developed with the University of Huddersfield.

We are also working with local decision-makers, including Local Enterprise Partnerships, City Regions and Combined Authorities, to encourage coherent planning for the implementation of technical education in every local area. Intelligence gathered from this work, and our accompanying international visits, will be disseminated over the next two years.

We are delighted that the first Institutes of Technology (IoTs) will be announced by government in early 2019. Gatsby first presented the idea of IoTs to ministers in 2014, so we were pleased to see the Prime Minister announce, in January 2017, £170 million for their creation. IoTs will marshal the expertise and energy of employers, FE institutions and higher education providers to deliver world-class higher level technical education.



STEM SKILLS IN THE WORKFORCE

Technicians are the backbone of the UK economy. They are the driving force behind many of the UK's biggest companies, as well as some of the most innovative. Gatsby launched the Technicians Make it Happen (TMiH) campaign in 2016 to challenge outdated notions of who technicians are and the work they do. The campaign has since profiled more than 50 technicians, working in a diverse range of workplaces, including the NHS, the BBC, Caterpillar, Toyota and Microsoft.

In September 2017, TMiH unveiled a new exhibition at New Scientist Live. The exhibition stand has since appeared at national events including the Skills Show and the Big Bang Fair, reaching tens of thousands of young people, teachers and parents with its message. As the new national technical education system is rolled out from 2020, the TMiH campaign will be an important channel in highlighting the variety of rewarding technical careers on offer.

The past year also saw the launch of the Technician Commitment, an initiative for the university and research institute community, supported by Gatsby and led by a steering group of sector bodies. Institutions joining the commitment pledge to ensure visibility, recognition, career development and sustainability for technicians in higher education and research. In less than 12 months, over half of all UK universities have signed up to the Commitment, including 22 of the 24 Russell Group universities. Alongside this, we also continue to work with professional bodies to support the professional registration of technicians in IT, the sciences and engineering.

GOOD CAREER GUIDANCE

Our work in promoting the importance of good career guidance continues to go from strength to strength. We are delighted that the eight benchmarks of best practice outlined in Sir John Holman's Good Career Guidance report have now been widely accepted across schools, education organisations, employers and government.

In December 2017, the government released a new careers strategy for England, which adopted the Gatsby Benchmarks as the central organising framework for the delivery of the country's career guidance. New statutory guidance closely followed, stipulating that by the end of 2020 all maintained secondary schools and colleges are expected to be meeting the benchmarks. We are now working alongside key stakeholders to ensure that schools and colleges are provided with the support and guidance they need to reach this target.

Our pilot of the benchmarks with schools and colleges in the North East is now in its final evaluation phase. Results from the first two years have shown a significant shift in achievement towards reaching the benchmarks. In September 2015 none of the 16 pilot schools and colleges achieved more than three benchmarks. After two years, all of the schools and colleges fully achieved at least four benchmarks, with three schools achieving all eight. We continue to work with the North East LEP to share lessons learnt from the pilot.

SCIENCE AND MATHS IN SCHOOLS

Critical to developing interest and skills in science at school is hands-on experience of experiments and other practical techniques. In September 2017, we published Sir John Holman's Good Practical Science report. The report explored how school practical science is delivered in countries where it is done well, and looked at how schools in England perform in comparison. We are now working with partners to embed the report's advice into the everyday practice of science departments, focusing on enabling schools to take a purposeful and well-planned approach to their practical lessons.

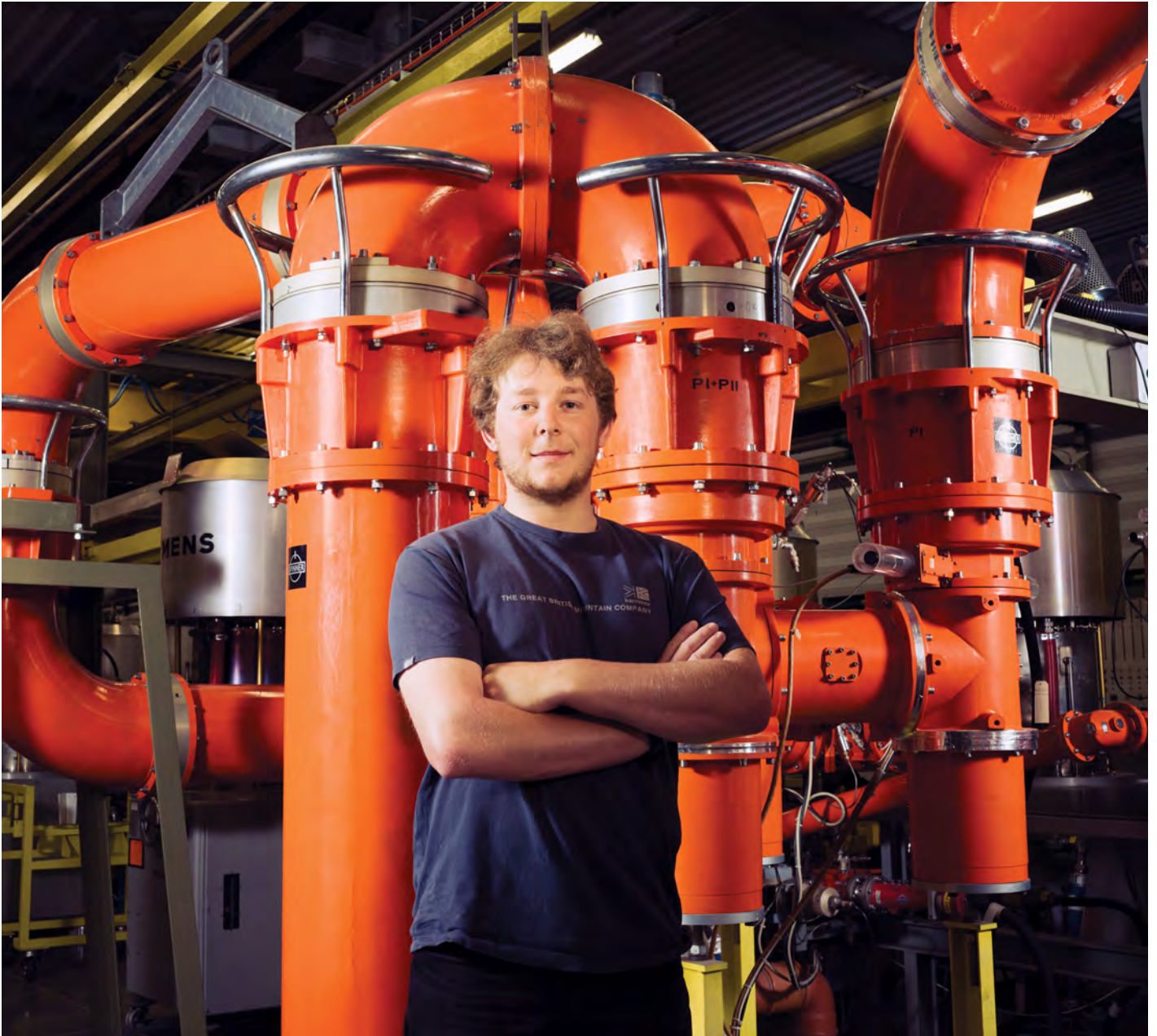
The past year has also seen us continue our longstanding work in ensuring the supply and training of specialist teachers and school technicians, with February 2018 seeing the publication of two Gatsby-commissioned reports focused on the salaries of subject specialist science teachers. We have also worked with 'TeacherTapp', an application that collects data on teachers' opinions, to help build a picture of teachers' attitudes towards policies and working practices.

Finally, we continue to support a small number of national initiatives which aim to bring coherence to what can sometimes be a cluttered STEM education landscape. These include: the Big Bang Fair, that brings together the myriad of STEM prizes and events under one umbrella; the National STEM Learning Centre, which houses the UK's largest collection of physical and online resources to support the teaching of STEM subjects; and a programme to support schools and colleges around the country to establish and develop STEM Clubs.



Left: Helen, a teaching technician at the University of Sheffield, speaks to visitors at the Big Bang Fair 2018. Over 75,000 people attended the fair in Birmingham.

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Opposite page: Morgan, an electrical technician from the UK working at CERN on the Technician Training Experience programme, who was profiled by the Technicians Make it Happen campaign earlier this year.



£500,000

The annual commitment of the Sainsbury Management Fellowships scheme.

BUSINESS EDUCATION FOR ENGINEERS

Each year the Sainsbury Management Fellowships (SMF) scheme, supported by Gatsby, provides up to ten bursaries of £50,000, encouraging outstanding, early-career engineers to study for an MBA at a top international business school. Since it started over thirty years ago, the scheme has enhanced the careers of more than 300 engineers, enabling them to take on high-profile positions in industry and to start innovative companies. On graduation, SMF bursary holders gain access to a unique alumni support network, featuring high-level business and networking events, and mentoring and career support.

The SMF bursary scheme is managed by the Engineers in Business Fellowship (EIBF), a charity established to promote the importance of business education for those in the engineering profession. We are supporting EIBF to explore other targeted initiatives to deliver against this aim, including piloting business competitions aimed at undergraduate engineering students and recent graduates.

AFRICA



ACCELERATING INCLUSIVE AND RESILIENT GROWTH IN EAST AFRICA

Gatsby has worked to create jobs, raise incomes and reduce poverty in Africa since 1985. We are currently focused on accelerating inclusive and resilient economic growth in East Africa by demonstrating how key sectors – such as cotton in Tanzania – can be transformed.

We fund and implement programmes that look to catalyse and influence large-scale and lasting change in priority sectors, helping them to become competitive, inclusive and resilient. Resilient sectors have the institutions, incentives and capabilities in place to dynamically adapt to new challenges and opportunities so they can thrive in the long-term – independent of external support.

Beyond directly implementing programmes, we are building and supporting local organisations dedicated to sector transformation. We also aim to share what we have learned with others who are trying to promote economic growth and reduce poverty.

We have established Gatsby Africa – an English charitable company limited by guarantee with branches in Tanzania and Kenya – to implement our Africa programmes.

You can find more information about our portfolio on our website. We introduce some of our initiatives in the following pages.

Above: We support the Forestry Development Trust, which is dedicated to transforming the Tanzanian commercial forestry sector.

DEVELOPING THE TANZANIAN FORESTRY SECTOR

Tanzania is home to some of Africa's most favourable growing conditions for numerous forestry value chains, including sawn timber, poles, veneer and paper. Such commodities are vital for economic growth, supporting construction and rural electrification. Small-scale forestry also has great poverty reduction potential. It is an investment instrument for those without bank accounts, helps secure land tenure and diversifies income streams.

There is growing momentum in the sector in the Southern Highlands, where more than 60,000 growers operate. But current productivity of the 325,000 planted hectares is low. There is significant land available for more planting, while research shows productivity can be more than doubled with the correct planting material and improved establishment and management practices. More and better quality raw material could then act as the catalyst for further investment in downstream processing activities, driving structural transformation in the economy.

In 2013 we partnered with the UK government's Department for International Development (DFID) to create an independent institution – the Forestry Development Trust (FDT) – to work with the public and private sectors to drive a long-term programme ultimately aimed at transforming the sector.

FDT is working to:

- Support Tanzania to develop a long-term tree improvement strategy – leading to sustained domestic production of improved planting material suited for local conditions and informed by market demand.
- Improve services delivered to tree growers – including seed, contractor, valuation and extension services that help growers implement best silviculture practices, decide which markets to target, and get the best possible returns on their investments.
- Facilitate more competitive and inclusive wood product markets – including improving incomes for growers at harvest by promoting new technologies and better coordination, including on marketing.
- Nurture a conducive enabling environment that allows commercial forestry to flourish – enabling industry associations and public forestry institutions to improve coordination, policy and long-term planning.

33%

of tree improvement activities in Tanzania were funded by industry in 2017/18 – up from 5% in the previous year.

In its first five years, FDT has focused on increasing the quality of the raw material planted and the productivity of current players in the Southern Highlands (particularly small private growers). Notable recent achievements have included facilitating a private seed company, with no previous experience in forestry, to import and distribute improved seed in the sector, and demonstrating the commercial potential of tree improvement research, to the extent that in 2017/18 33% of tree improvement activities were funded by industry – up from 5% in the previous year.

As momentum builds, FDT will increasingly focus on interventions supporting improved market access for growers and enhanced utilisation of wood – ideally using these initiatives to drive better practices in wood production, and therefore the uptake of improved seedlings and practices made available from FDT's early work.

Forestry, by its nature, is a sector where significant change and impact takes a long time, but the current signs are encouraging – suggesting a sector on a positive trajectory.

SUPPORTING A LOCAL ORGANISATION TO TRANSFORM KENYAN SECTORS

Although the Kenyan economy has grown over the past 10 years and certain markets – such as banking and telecommunications – have brought benefits to poor people, many key sectors, particularly in agriculture, have lagged behind. In these sectors, growth has stalled, or had little impact on the vast majority of people.

Despite this, Kenya has huge potential to structurally transform. It is the economic powerhouse of the region and has commercial vibrancy, entrepreneurial spirit and a deep pool of talent. The press, education system and certain government ministries are relatively strong, and the new constitution, professionalisation of ministries and decentralisation to new county structures are providing opportunities for good leaders to make progress.

Left: A farmer from the Rift Valley of Kenya whose maize yields increased as a result of soil testing and using lime to reduce soil acidity thanks to a KMT intervention.



In 2012, DFID and Gatsby partnered to support the evolution of the independent Kenya Gatsby Trust into an organisation focused on sector transformation. The renamed Kenya Markets Trust aims to lead the agenda on transforming key economic sectors to ensure large-scale wealth creation and poverty reduction in Kenya.

Its portfolio of programmes in livestock, water and agricultural inputs/seed covers some of the country's biggest and most important sectors. Livestock alone accounts for 10–13% of Kenya's overall GDP, and employs 10 million pastoralists in the vulnerable Arid & Semi-Arid Land (ASAL) regions. The significant potential of the agricultural inputs/seed sector is shown by the fact Kenya's average fertiliser use in 2012 was 44kg per hectare (just over a quarter of that in India), while less than half of Kenya's cropland is cultivated using certified seed. Furthermore, interventions in the water sector are critical – just 55% of Kenyans have access to clean and safe drinking water, and with coverage growing at an average of 1% per year, the Sustainable Development Goal target of 100% coverage by 2030 currently looks unattainable.

KMT's work in these sectors has impacted more than 300,000 households to date, and programmes are starting to show early signs of transformative changes, with successes including:

- Adoption of climate smart commercial service delivery models in the water sector by several county governments;
- Formation of a livestock product development and marketing board to crowd in private investment, plus development of index-based commercial insurance for pastoralists;
- Work to improve retail practices with seven input distributors, which has resulted in 150,000 farmers accessing quality products and information on their correct use.

300,000

KMT's work in the livestock, water and agricultural inputs/seed sectors has impacted more than 300,000 households to date.

Transformation of these sectors would deliver significant impact. Crucially though, KMT could deliver even greater impact in the long-term by influencing the debate on economic development in Kenya, and ensuring greater scrutiny and focus on improving markets to benefit poor people across the country. We will therefore continue to support KMT to implement its portfolio of programmes and to gradually build its credibility and evidence base so it can shape the dialogue on inclusive growth in Kenya.



MARKING THE ACHIEVEMENTS OF TANZANIA GATSBY TRUST AND OLIVE LUENA

2017 marked the 25th anniversary of Tanzania Gatsby Trust (TGT). We established TGT in 1992 through work by our Senior Advisor Laurence Cockcroft and Ibrahim Seushi – a Partner at PwC, entrepreneur and prominent supporter of grassroots development initiatives in Tanzania, including the Mwanga Community Bank.

Their aim was to establish a Tanzanian entity that could support small business development – particularly more informal micro-entrepreneurs, as they saw a gap in provision, given most government and NGO support at the time was going to group activities. Gatsby set up similar entities in Cameroon, Uganda and Kenya in the same period.

Ibrahim became the first Chair of TGT, which focused its first initiatives in Mwanga, Zanzibar and Mtwara. TGT initially struggled under its first set of managers, but when Olive Luena took over as CEO, her dynamism, energy, passion and commitment quickly transformed the organisation.

Olive founded the East Africa Grantmakers Association, is a trustee of the East Africa Centre for Philanthropy, and was founding Secretary-General of the Tanzania Association of NGOs. She was international president of the World Conference of Religion and Peace, and a nominee for the Africa Hunger Prize. Pope John Paul II appointed her to the Vatican Pontifical Council of the Laity in 1990. She has also had several Presidential appointments.

Under her leadership, TGT thrived, not only supporting many thousands of small business owners to become successful individually, but also establishing community banks, setting up a national microfinance bank, building market places and technology incubators, and establishing supply networks for the Tanzanian tourism industry.

TGT also played a crucial role as an incubator for our programmes when Gatsby's focus in Africa began to evolve towards sector development in 2007. Ibrahim, Olive and many other TGT staff helped ensure Gatsby understood the challenges in these complicated sectors, and they used their networks and skills to help us navigate the political landscape.

Given the growing scale of our sector programmes, we have now established a branch of Gatsby Africa in Tanzania to manage them, separating them from TGT. TGT – now renamed Tanzania Growth Trust – continues to fund and manage its own programmes independent of Gatsby. We are extremely proud of all that it has achieved for small businesses in Tanzania.

We are sad to see Olive retire from TGT after her decades of service, and would once again like to record our immense gratitude for her tireless work and impassioned commitment to all Gatsby has done in Tanzania. We are very pleased that Olive will continue supporting our work in the country in a personal capacity, and wish her the best of luck with the new trust that she has founded to support the education of girls in Tanzania.

Above: Olive Luena and a TGT beneficiary.

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Opposite page: A nursery worker in the Tanzanian forestry sector.



PUBLIC POLICY



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

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

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 and policy-making.

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. 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 explore what makes national innovation systems effective at translating new science and engineering ideas into technologies, industries and economic wealth.

More recently, we also helped to establish the knowledge transfer unit Policy Links, which provides education and consulting services grounded in the latest academic research to address the needs of officials and civil servants working in the fields of science, technology and innovation policy.

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 last year has been an exceptionally busy and fascinating time for government in the United Kingdom. Well-established challenges include how to improve public services at a time of tight national finances, how to tackle persistent problems with regional imbalances and within the housing market, and how to raise educational standards, productivity, real wages and social mobility. On top of those, the Government has also had to grapple with Brexit.

Right: Nick Clegg takes questions from the audience during his conversation with IfG Director Bronwen Maddox.

Opposite page: The International Metro Mayor Summit in December 2017 was convened by the Centre for Cities to bring together metro mayors from the UK and USA for a series of meetings and events. Credit: Inclusive Digital Ltd.

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IN THE UNITED
KINGDOM

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The Institute's work during the last year has focused on helping government be more effective in devising and implementing solutions. For example, it has looked at:

- how policy-makers can use evidence, experience and models better in making decisions;
- the management, professional skills and accountability of the civil service;
- the devolution of power to UK nations, regions and cities; and
- how the Government can devise and implement new arrangements after leaving the EU.

The Institute also continued to provide high-level advice, seminars and reports as part of professional development for ministers, advisers, senior officials and select committees.

As in previous years, the Institute published many reports and blogs, including another edition of the 'Whitehall Monitor Annual Report' (a data-driven analysis of government), plus commentaries on the Brexit process, infrastructure and digital government, as well as a tracker looking at government performance.

The Institute also ran a number of successful events, including around Brexit and outsourcing.



CENTRE FOR CITIES

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

In May 2017 the first six metro mayors in the UK were elected. The Centre has championed this policy for 12 years, and its significant role was acknowledged both publicly and privately by prominent national politicians including Communities Secretary Sajid Javid, Business Secretary Greg Clark, Minister for the Northern Powerhouse Jake Berry, and former Treasury Minister Lord Jim O'Neill. The Centre's significant contribution to this policy area was also recognised at the Prospect Think Tank of the Year awards. In December, the Centre organised a three-day summit bringing together the UK mayors with their counterparts from comparable US cities. The Centre has established itself as the first port of call for insights about the metro mayors, and its online FAQs have received over 30,000 hits since launch; the page had 10,000 visits in the week of the elections alone.

During 2017 the Centre published over 30 research and policy-based outputs, including briefings on key economic policies such as the industrial strategy, productivity, housing and skills. The Centre's evidence-based rationale for prioritising more investment in intra-city transport was recognised in the Autumn Budget, with the announcement of the £1.7bn Transforming Cities Fund to improve transport links and promote growth within city regions. 50% of the fund will be allocated to the six mayoral regions, further demonstrating their importance.

The Centre's annual flagship publication, *Cities Outlook*, had a Brexit focus in 2017. As well as providing the definitive annual economic health check on the UK's 63 biggest urban areas, this year's report included analyses of cities' key export markets, highlighting which will be most affected by Brexit. The launch event was heavily oversubscribed, and the report received extensive media coverage, including from the Financial Times, Daily Telegraph and BBC News.



£1.7bn

Amount of the Transforming Cities Fund announced to improve transport links and promote growth within city regions.

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.

We provided support to Cambridge University to establish a new endowed post, the Babbage Professorship of Technology and Innovation Policy. The first holder of the position, Dr Eoin O'Sullivan, is also the Director of CSTI. The Babbage Fellowship has facilitated longer term, strategic planning for CSTI's research activities, expanding both the size of the group and the level of engagement with UK policy-makers and agency officials.

CSTI dedicated significant effort over the last year to refining and aligning its research agenda with aspects of the UK's new Industrial Strategy that was launched in November 2017. During the consultation period, CSTI took part in a variety of workshops and other events, and this period saw increasing awareness by policy-makers and agency officials of the need for greater technical understanding of sector value chains, industrial innovation institutions and emerging technology innovation infrastructures. CSTI's evolving research agenda is well-placed to respond to this need.

An important aspect of CSTI's agenda will be to share its knowledge and expertise on emerging technology R&D programmes and interagency coordination with key stakeholders within the UK Research & Innovation agency (UKRI). An early example of CSTI research in this area is a project (funded by a research grant from Research England, now part of UKRI) that is analysing UKRI and central government databases to create novel integrated evidence bases for policy-makers and practitioners working on university-industry knowledge exchange.

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 IN ITS FIRST YEAR,
 POLICY LINKS
 CONVENE
 A NUMBER
 OF TRAINING
 WORKSHOPS,
 DELIVERED
 COMMISSIONED
 INTERNATIONAL
 BENCHMARKING
 REPORTS, AND
 PROVIDED
 CONSULTANCY
 SERVICES TO A
 NUMBER OF HIGH-
 PROFILE CLIENTS

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A new research focus for 2018 will be Technology and Innovation Centres around the globe. CSTI will study intermediate R&D institutes, comparable with UK Catapult centres. As well as more carefully characterising and comparing the missions and functions of such institutes, and their distinctive roles within national innovation systems, this work will also involve detailed analyses of: technical workforce development, industrial intelligence gathering (e.g. technology roadmapping and benchmarking), and technology demonstration facilities (e.g. pilot lines, test beds, and 'living labs').

POLICY LINKS

Policy Links is the knowledge transfer unit of CSTI, also based at IfM in Cambridge. The unit has been established as a not-for-profit innovation policy consultancy with the aim of helping governments develop more effective industrial and innovation policies. Policy Links offers education and consultancy activities based on the latest academic thinking and the study of international best practice to address the needs of officials and civil servants working in the fields of science, technology and innovation policy.

Policy Links officially began operations in January 2017. Over the course of its first year, it convened a number of training workshops, delivered commissioned international benchmarking reports, and provided consultancy services to a number of high-profile clients.

Policy Links has already positioned itself successfully in the UK market, establishing strong partnerships with key stakeholders including the Department for Business, Energy & Industrial Strategy; the Science and Innovation Network; and the High Value Manufacturing Catapult. The team have also developed a portfolio of strategic projects including a study carried out to identify innovation partnerships in the potato industry for the CambPlants Hub, which includes the Sainsbury Laboratory in Cambridge and Agri-Tech East.

Policy Links also works at an international level, with clients including government departments and agencies in Brazil, Canada, Ireland, South Africa, and Trinidad and Tobago. The unit has also developed strong working relationships with multilateral organisations such as the United Nations Industrial Development Organisation, the Inter-American Development Bank, and the World Economic Forum.

In early 2018, we provided additional support to Policy Links to increase operational capacity, particularly to respond to short-notice evidence requests and to organise more client-led workshops and international events. Among other deliverables, the expanded team aims to create a comprehensive Innovation Policy Training Handbook incorporating all the bespoke course material produced to date to support capability building in the UK civil service.



Left: Miatta Fahnbulleh, Chief Executive of the New Economics Foundation, speaks at an IfG event on democratising economics.

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 Opposite page: Centre for Cities launched its 10th annual Cities Outlook report in London's City Hall in January 2017.

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

We continue to support SCVA and other arts institutions founded by Robert and Lisa at UEA.

We have long relationships with a small number of other organisations and initiatives, and we continue supporting these as they seek ways to make inspiring art accessible to new generations. Supported organisations include the Chamber Orchestra of Europe, the Royal Shakespeare Company, the Royal Academy of Music, and Columbia University.

ROYAL ACADEMY OF MUSIC

This year sees the Royal Academy of Music's new facilities open at its Marylebone Road home. One of the most significant building and renovation projects in the Academy's near 200-year history has transformed the spaces for Academy students to rehearse, perform and record music at the highest level.

Gatsby, the Backstage Trust and many other contributors have funded the development of the new facilities, which include: the 309-seat Susie Sainsbury Theatre; the 100-seat rooftop Angela Burgess Recital Hall; 14 refurbished practice rooms; five new percussion suites; a jazz studio; and a new audiovisual recording room.

The new theatre has been named after Susie Sainsbury, in recognition of her critical contribution to the lives of young musicians, actors and directors over many decades, as well as her role as Deputy Chair of the Academy, serving on the Governing Body for 20 years. The theatre, built on the site of the original Sir Jack Lyons Theatre, has a reconfigured auditorium and a balcony, fly tower and wings. This increases capacity by 40%. Ian Ritchie's ingenious design delivers world-class stage and recording facilities in an adaptable theatre suitable for all forms of opera and musical theatre productions.

The second space, the Angela Burgess Recital Hall, was built on top of the theatre and provides one of the best-quality small recording studios in London. The 100-plus seats are entirely flexible and the space can be adapted to accommodate recording sessions, rehearsals, masterclasses and performances.

The merits of the project have already been recognised with several awards: 2018 RIBA London Building of the Year Award, 2018 RIBA Award and 2018 RICS London Tourism and Leisure Award.

After two years spent touring external venues, Royal Academy Opera and the Royal Academy Musical Theatre Company returned home this spring. The opera company opened the theatre on Monday 12th March 2018 with Jonathan Dove's *Flight*.

SAINSBURY CENTRE FOR VISUAL ARTS

2018 is the 40th anniversary of SCVA, and the centre's radical design is being celebrated with an exhibition called *SUPERSTRUCTURES: The New Architecture 1960-90*. The exhibition tells the story of post-war architecture's fascination with new technology, lightweight structures, pioneering building techniques and innovative engineering solutions. It features drawings, media and iconic models of works by Norman Foster (who designed SCVA), Richard Rogers, Renzo Piano, and Michael and Patty Hopkins.



Last year, Her Majesty The Queen lent 60 of her own Fabergé pieces to SCVA's exhibition *The Russia Season: Royal Fabergé and Radical Russia*, which was visited by more than 22,000 people.

The Queen also visited the groundbreaking exhibition *Fiji: Life & Art in the Pacific*, which featured a ceremonial whale tooth, or tabua, which was presented to her on her first visit to Fiji in 1953. The exhibition, with more than 270 works, was the most comprehensive about Fiji ever assembled, and was opened by the President of Fiji.

SCVA continues to install pieces to create a sculpture park across the 320 acres of natural and built environment at the University of East Anglia. Three sculptures from Sir Anthony Gormley's ongoing series *Another Time* were added in 2017, and three from Lynn Chadwick's *Crouching Beasts* series were added in May 2018.

Upcoming exhibitions for 2018 include a spectacular staging of Brian Clarke's stained glass screens throughout the building, and a large-scale thematic exhibition of the work and influences of Dame Elisabeth Frink.

Above: *Beast Alerted I* by Lynn Chadwick outside the SCVA.

Left: The Susie Sainsbury Theatre at the Royal Academy of Music.

Opposite page: Performance of *This is the Hour* at the Susie Sainsbury Theatre.



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 last year included critically acclaimed concerts with conductor Bernard Haitink pairing Mozart symphonies with works by Mahler, Wagner and Schumann, including at the BBC Proms in London, the Concertgebouw in Amsterdam, the Lucerne Festival and the Luxembourg Philharmonie. The orchestra also collaborated for the first time with Chinese pianist Yuja Wang, and performed a concert tour with Sir András Schiff directing the orchestra from the keyboard.

Below: Yannick Nézet-Séguin conducts the Chamber Orchestra of Europe in rehearsals.

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Opposite page: Performer at the new 100-seat Angela Burgess Recital Hall at the Royal Academy of Music. Credit: Adam Scott.

New projects included concerts at the Louis Vuitton Foundation with Renaud Capuçon, and the Musika-Musica Festival in Bilbao with Matthias Pintscher. The orchestra appeared elsewhere in Europe with distinguished conductors and soloists such as Nicholas Collon, Kristian Bezuidenhout, Alina Ibragimova, Jean-Guihen Quayras, Isabelle Faust, Anna Lucia Richter, Christian Gerhaher, Eva-Maria Westbroek and Piotr Anderszewski.

The orchestra also made its first ever trip to the United Arab Emirates for concerts at the Dubai Opera with Robin Ticciati and violinist Christian Tetzlaff, and a first visit to the Lotte Concert Hall in Seoul, South Korea, for two concerts featuring Leonidas Kavakos as both violinist and conductor.

The recordings of Mozart's late operas on Deutsche Grammophon continue under the direction of Yannick Nézet-Séguin, with the release of *La Clemenza di Tito* in the summer following last year's performances in Baden-Baden.

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THE ORCHESTRA
MADE ITS FIRST
EVER TRIP TO THE
UNITED ARAB
EMIRATES AND A
FIRST VISIT TO THE
LOTTE CONCERT
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