

---

REVIEW  
2020 | 2021



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.

---

## CONTENTS

INTRODUCTION	02
PLANT SCIENCE	06
NEUROSCIENCE	10
EDUCATION	14
ECONOMIC DEVELOPMENT IN AFRICA	18
PUBLIC POLICY	22
THE ARTS	26

# INTRODUCTION BY LORD SAINSBURY OF TURVILLE

Settlor of the Gatsby Charitable Foundation



The COVID-19 crisis over the past two years has been unprecedented. Each of us has had to make changes on both a personal and professional level. The negative impacts on society have been deep and wide-ranging, with public services and community groups stretched to the limit. I believe that private foundations, free of restrictions and with quick decision-making, have an important role in helping to tackle these challenges. In response Gatsby released new funding outside of its usual grant categories to help to mitigate and address the impact of the pandemic in the UK.

Gatsby made two major grants to help with rapid responses. The first was to the Trussell Trust to support running food banks nationwide. Disruptions to supply chains, the impact of COVID-19 on volunteers, and an anticipated rise in demand for their services as a result of economic hardship required a major and rapid response. The second was to the National Emergencies Trust (NET) to support their Coronavirus Appeal. The NET was set up to make certain that in these circumstances funds are directed to the areas most in need in the country.

Very little was known about the clinical implications and the fundamental biology of the coronavirus causing the pandemic. It was clear there was a great need for high-quality scientific research, but funding mechanisms are often slow in normal times. Along with many other philanthropists, I supported Fastgrants.org, an organisation that coordinated the rapid deployment of funds to provide more than 170 grants to researchers working on COVID-19. The scientific research community supported by Gatsby also responded to the challenges facing the country. The highly-skilled researchers at the Sainsbury Laboratory in Norwich volunteered in the testing effort at the Norfolk and Norwich University Hospital, as well as provided expertise for the development of rapid diagnostic tools.

“  
GATSBY RELEASED  
NEW FUNDING  
OUTSIDE OF ITS  
USUAL GRANT  
CATEGORIES TO  
HELP TO MITIGATE  
AND ADDRESS  
THE IMPACT OF  
THE PANDEMIC  
IN THE UK  
”

The third sector performed a crucial role in the coronavirus response, but the national lockdown vastly impacted their operations and business model. New Philanthropy Capital (NPC), a think tank and consultancy for the social sector, advised the Government on its initial response to the impact of COVID-19 on the charity sector. To build on this, Gatsby has provided funding to NPC for their Efficiency and Innovation programme to support fundraising charities to be more innovative and efficient to help them survive during and after the coronavirus crisis.

Finally, I am immensely proud that all the major organisations that Gatsby supports managed to keep their operations going in reasonably good shape, and where they had relevant skills deployed them effectively to help deal with the crisis.



Above: The Institute for Government, in collaboration with the Health Foundation, co-organised a conference session in September 2021 to explore the long-term health and social care funding challenges after the COVID-19 pandemic. Panellists were (from left to right) Anita Charlesworth (Health Foundation), Dr Gemma Tetlow (Institute for Government), Graham Atkins (Institute for Government), Sarah Neville (Financial Times) and Justin Madders MP.

## THE ARTS

The UK's arts sector has been devastated by the lockdown and COVID restrictions. We therefore provided additional funds to the Chamber Orchestra of Europe.

It is great that the Sainsbury Centre for Visual Arts developed an online programme of activities to maintain accessibility of their collections to the public during the lockdown.

Gatsby also made a significant contribution towards the major refurbishment project of the auditorium of the Cambridge Arts Theatre that will allow them to expand their artistic offerings and secure a truly sustainable long-term future for the Theatre.

“  
THE UK'S ARTS  
SECTOR HAS BEEN  
DEVASTATED BY  
THE LOCKDOWN  
AND COVID  
RESTRICTIONS  
”

## PUBLIC POLICY

The UK manufacturing community moved with remarkable speed and agility to respond to numerous urgent challenges resulting from the spread of COVID-19. For example, there was the repurposing of their production capabilities to address healthcare needs such as personal protective equipment. It is important to capture how manufacturers responded and any lessons learnt. To this end, Gatsby has supported the Institute for Manufacturing at the University of Cambridge to produce a number of case studies on this.

In collaboration with Centre for Cities, I authored a report in early 2021 on levelling up the UK's regional economies, made even more challenging due to COVID. The Centre has a wealth of research, covering topics including cities' use of technology to tackle the pandemic, the impact of lockdowns on labour markets, and roles for local government and Metro Mayors.

I am delighted that Gatsby funding has enabled the creation and launch of the *UK Innovation Report* by Policy Links and colleagues in Cambridge. This has assembled in a single place all relevant data and indicators on innovation and industrial performance. It will be updated each year to remain a reliable source of information to assist policymakers.



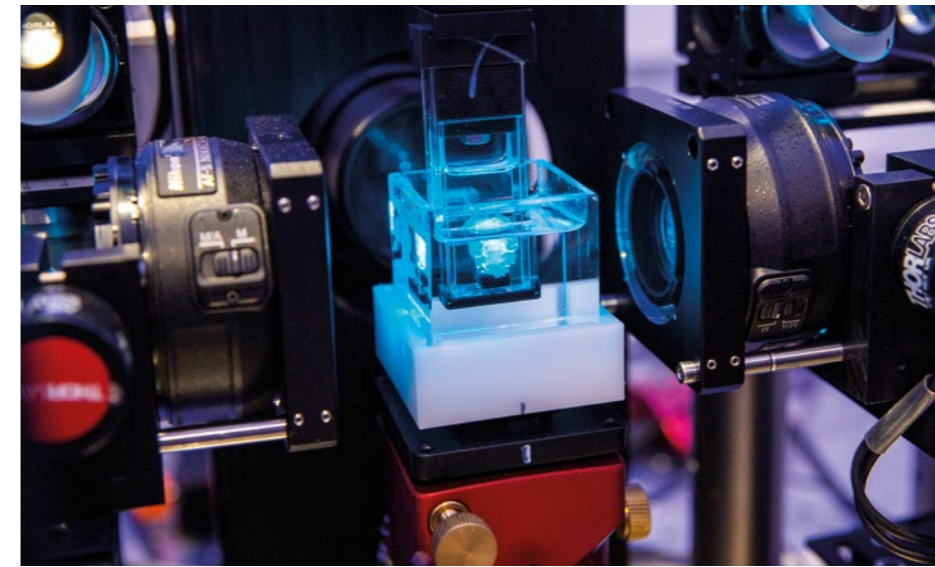
Above: Andrew Carter, Chief Executive of the Centre for Cities (top middle) chairs an online panel discussion in March 2021 on levelling up the UK's regional economies with (clockwise from top right) Lord David Sainsbury, Elena Magrini (senior analyst at the Centre for Cities, currently on secondment to the West of England Combined Authority), Andy Street (Mayor of the West Midlands) and Dan Jarvis MP (Mayor of South Yorkshire and MP for Barnsley Central).

## ECONOMIC DEVELOPMENT IN AFRICA

In East Africa, Gatsby works to help more people benefit from economic growth by creating jobs, raising incomes and building opportunities. To achieve this, there is a focus on the transformation of priority sectors – such as aquaculture, commercial forestry and textiles – with the potential for large-scale social impact.

Working with governments, the private sector and other actors, Gatsby seeks to drive globally competitive sectors which are resilient and benefit large numbers of people. A long-term view helps ensure sectors are equipped with the capacity to dynamically adapt, seize opportunities and manage shocks in the future.

COVID-19 underscored the critical importance of resilience as pandemic-related restrictions majorly disrupted the global trading system and local markets, resulting in Africa suffering its worst recession in half a century. I'm proud of how the programmes quickly intervened to protect promising firms and share first-hand sector information with decision-makers. While I'm pleased that the sectors supported have survived the crisis and that the region could even benefit from the consequent diversification of supply chains, it reaffirms Gatsby's long-term approach to ensure the right institutions and mechanisms are in place to help sectors thrive.



## NEUROSCIENCE

My philanthropic support of scientific research has always taken an extended view, as I do not think much can be achieved by short, one-off projects. It also means the supported researchers can pursue higher-risk opportunities. The Sainsbury Wellcome Centre and the Gatsby Computational Neuroscience Unit (GCNU) are driving innovation through multidisciplinary working groups. This genuinely exciting approach is bringing together neuroscientists, engineers, data scientists and industry to design solutions for answering the most interesting questions about how the brain works.

Almost a quarter of a century ago, Gatsby set up GCNU at University College London to create a critical mass in the burgeoning field of theoretical neuroscience and machine learning. A recent quinquennial review highlighted that the Unit is one of the top centres in the world and continues to go from strength to strength. My life-time advisor and friend, Dr Roger Freedman, was responsible for shaping our programmes in plant science and neuroscience. To mark this, the Unit will award annually the *Roger Freedman Prize for Outstanding Contribution* to the trainee that makes the most impact on the research, culture and community of the Unit.

## PLANT SCIENCE

The Sainsbury Laboratory in Cambridge has now been operating for just over a decade. A recent comprehensive five-year review noted the quality of the science and the combinations of different disciplines to tackle fundamental plant science questions. The external review panel felt this is a testament to the power of Gatsby's long-term vision and support, and the Laboratory leadership's implementation of that vision. Funding has been renewed and I look forward to the outputs and accomplishments to come.

Gatsby's approach of flexible core funding has helped existing grantees and their activities. Both Sainsbury Laboratories reopened in summer 2020 with reduced occupancy for social distancing. Despite this, they have remained extremely productive with new group leaders arriving. PhD students and post-doctoral researchers on fixed-term projects have had, where required, additional funding provided to minimise the impact of lockdown and delays on their scientific findings and their future careers in research.



## EDUCATION

Gatsby continues to work alongside government and partners to reform technical education, and create a high-quality education system that provides all learners with access to the skills and knowledge required for skilled occupations.

In 2020, we celebrated the launch of T-levels – new two-year technical qualifications designed to meet the needs of industry and prepare students for work, further training, or study. Over the last 18 months, we also saw the announcement of the first 31 digital Higher Technical Qualifications at levels 4 and 5 with employer and government endorsement; and the continued progress of Institutes of Technology (IoTs) – innovative collaborations between Further Education colleges, universities and employers to provide learners with the skills and knowledge to take advantage of the latest technologies and processes.

Such advancements have been made all the more remarkable by the fact they have been delivered by colleagues and partners against such a challenging backdrop.

I would like, as in previous years, to thank the brilliant team who run the Gatsby Charitable Foundation. They have done an excellent job in maintaining momentum over the past two years in extremely difficult circumstances, helping new and existing Gatsby grantees to work, adapt and deliver on their funded projects during the coronavirus crisis. The wise advice and help of the Gatsby Trustees are as always much appreciated.

David Sainsbury  
Settlor

David Sainsbury  
Settlor

Top: A MesoSPIM microscope at the Sainsbury Wellcome Centre, built by Head of Microscopy, Dr Rob Campbell, allows researchers to work both at high resolution and high speed to image an entire mouse brain in five minutes.

Bottom: Mark-Jave Bautista, Tantawat Nardwattanawong and Vidyashree Shivakumaraswamy (from left to right) are recipients of David Sainsbury Scholarships for the inaugural class of 2021 for the new MSc programme in Global Plant Health led by the Sainsbury Laboratory in Norwich.

## 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.

Above: Fertilised organ of the umbrella liverwort *Marchantia polymorpha* with yellow spore capsules, taken by PhD student, David Hoey. The Schornack group at SLCU studies how diverse plants are living together with microbes.

Right: Computer modelling by Henrik Åhl, PhD student in the Jönsson Group at SLCU, shows flux magnitudes and directions for the plant hormone auxin involved in initiation sites for flower organs.

#### SAINSBURY LABORATORY CAMBRIDGE UNIVERSITY (SLCU)

The aim of SLCU is to develop an integrated understanding of the regulatory mechanisms underlying plant growth and development. Having opened a decade ago, 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 are constructed.

In mid-2020, it was announced that Professor Dame Ottoline Leyser FRS, then Director of SLCU, had been appointed the new CEO of UK Research and Innovation (UKRI), the national funding agency investing in science and research in the UK. The Gatsby Trustees warmly congratulate Professor Leyser on her new appointment and wish to express their appreciation and gratitude for her seven years of leadership of SLCU that fostered a creative, productive and inclusive interdisciplinary research centre. To build on these strengths, the Trustees are very pleased that Professor Henrik Jönsson, previously SLCU Associate Director, was appointed as the new Director from the end of June 2020.

Two new David Sainsbury Career Development Fellows recently joined the Laboratory. Dr Chris Whitewoods' group will combine computational modelling with genetic and developmental analysis to investigate how plants coordinate intricate internal patterning to produce leaves that are exquisitely adapted to their function. Dr Renske Vroomans' group will use mathematical models to simulate millions of years of plant evolution and how the accumulation of mutations leads to new organs. This will give a broader understanding of the evolutionary design principles behind plant development.

SLCU ran a very successful Plant Taskmaster outreach programme targeted at families who were home-schooling during the COVID pandemic, involving fun plant science-related challenges and live *Chat with a Scientist* online broadcasts. As part of the Cambridge Festival, SLCU launched a citizen science project called The Great British Liverwort Hunt. Over 50 participants from across the UK were sent a liverwort collecting kit with clear

instructions on how to identify and collect specimens, and these are being used by the group led by Dr Sebastian Schornack to study the resistance/susceptibility to pathogens and how this differs within the same species from different regions.

We carried out a five-yearly comprehensive review of the Laboratory in June 2021. The international review panel felt the quality of the science was outstanding with a very strong and effective balance of experimental work with theory and modelling, with many collaborations between groups of different expertise. The established culture of openness and inter-group collaboration remains highly admirable. Following this very successful review, we renewed core funding for a further five-year research cycle from January 2022.

#### THE SAINSBURY LABORATORY, NORWICH (TSL)

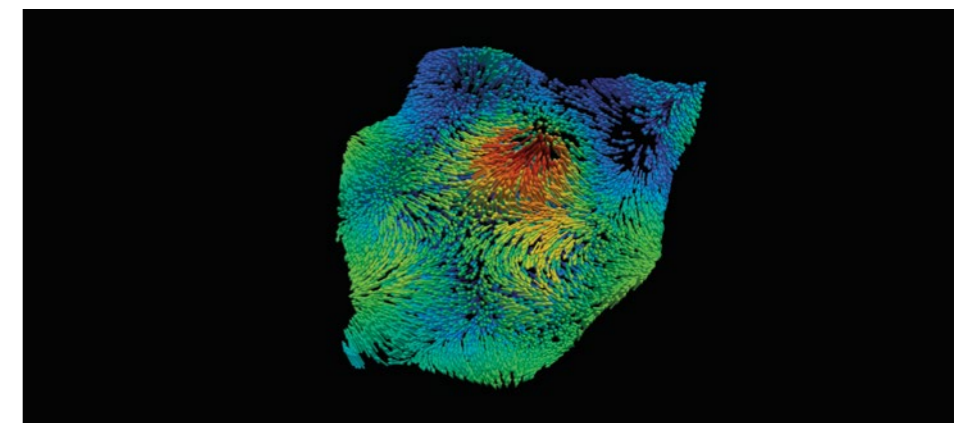
Since 1987 Gatsby has supported TSL to focus on understanding how plants defend themselves against disease-causing microbes, and on how these microbes manipulate host plants to cause disease. Over these 35 years, TSL has built an outstanding international reputation for scientific excellence.

In the 2019/20 academic year, there were an impressive 115 publications. Professors Jonathan Jones FRS, Sophien Kamoun FRS and Cyril Zipfel were named in the 2021 Highly Cited Researchers list. This means a total of six TSL members have been named in the list of the top 1% most highly cited scientists during the last four years (Professors Jones, Kamoun, Zipfel and Talbot, and Drs Win and Robatzek). With 12,475 citations last year, TSL remains one of the most highly cited research institutions in the world in any discipline.

A new senior group leader, Professor Wenbo Ma, arrived in late 2020. Her group investigates the virulence function and evolution of pathogen effectors, so as to increase understanding of the mechanisms underlying plant immunity and microbial pathogenesis. She brings expertise in cutting-edge molecular technologies including genome editing and RNA interference, and in 2021 she won the Ruth Allen Award of the American Phytopathological Society for outstanding contributions in molecular plant pathology.

Recent advances at TSL include the discovery that plant immunity requires two-step detection of invading microbes, and this leads to a robust immune response producing protection from disease. These fundamental discoveries provide key information about how resistant crop varieties could be engineered in future. TSL scientists are also studying the developmental biology of fungal pathogens that cause some of the most devastating plant diseases such as the blast fungus. Field testing of new rice blast-resistant varieties is under way in sub-Saharan Africa, based on this work.

TSL has launched a new MSc programme in Global Plant Health with a focus not only on the fundamental science underpinnings, but also agricultural technology, knowledge transfer and business practices. The first intake of students arrived in October 2021, including three new David Sainsbury International Scholars from India, Thailand and the Philippines. TSL has also produced content for a Massive Online Open Course (MOOC) in Global Challenges in Plant Health to expand its outreach and wider engagement. Through both courses, TSL aims to encourage the next generation of young scientists into molecular plant pathology research, associated plant disease epidemiology, and policymaking.



## THE GATSBY PLANT SCIENCE NETWORK

Gatsby further supports UK excellence in plant science through a suite of activities overseen by the Gatsby Plant Science Advisors. The network consists of Gatsby-funded undergraduates, postgraduates, postdocs and alumni, with mentors chosen from UK universities with teaching and research interests in plant science.

Two Sainsbury PhD students started their four-year research training in autumn 2020. Giovanni Giuriani at Glasgow will investigate a novel mechanism of UV-B photoreceptor signalling, while Maude Grenier at Edinburgh will research autumn plant phenology responses to a warming Arctic. Two more students started in late 2021: Katie Long will look at carpel development to engineer novel variation for improved wheat yields at the John Innes Centre; and William Davis will research the circadian regulation of inter-individual variability in gene expression at SLCU.

The annual training weekend for PhD students moved completely online in late March 2021. Sessions included: drafting papers, presenting posters and writing grant applications; how to maximise benefit from conferences and placements; and communicating research to the public. An engaging plenary talk was given by David Flanders, CEO of Agrimetrics, which is enabling agri-food organisations to realise the value trapped in their data.



## THE GATSBY PLANT SCIENCE EDUCATION PROGRAMME (GPSEP)

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

The COVID pandemic required GPSEP to pivot quickly to continue to deliver its activities. The Gatsby Plant Science Summer School is for first-year bioscience undergraduates, and in June 2020 was adapted to a condensed online version to deliver a remote webinar-style event. Whilst the in-person practical sessions were unable to take place, 117 students received a range of plenary lectures from leaders in the academic field, public sector and private companies. Students stayed with the same plenary tutors in small groups during breakout sessions for all three days to help foster a sense of 'teamship' in a virtual setting to maximise the value of the Q&A, Careers Panel and Next Steps sessions. This online approach was well received by students – surveys showed that 82% of alumni enrolled on a course module with plant science in their second undergraduate year, with 72% saying the summer school had influenced this choice. The 2021 edition was again

online, with the numbers of places expanded to double the capacity, and additional sessions added such as new workshops to capture the essentials from the previous in-person practical sessions.

During lockdown restrictions, the majority of teachers and students were navigating distance learning. The Science & Plants for Schools (SAPS, saps.org.uk) website provided a supportive presence for teachers and technicians. A section was launched with resources suitable for remote learning; this new page had more than 6000 views over the past year. There was an increase of 60% in subscribers to the SAPS YouTube channel, as videos are particularly useful for remote teaching scenarios. In March 2021 the team ran the first online SAPS Train the Trainer session for twenty Initial Teacher Education tutors and technicians drawn from ten teacher training institutions. Usually a face-to-face two-day event, this course was converted into an effective and engaging practical-focussed online workshop. Boxes of carefully curated, appropriate and safe practical kit were mailed to attendees. Delegates joined instructors in practical plant science activities remotely over two morning sessions. This ambitious hybrid approach was very successful as a training model and greatly appreciated by the attendees.

# 82%

Summer school alumni selecting a course module involving plant science in their second undergraduate year.

## 2BLADES CONTINUED TO ENGAGE A GLOBAL CONSORTIUM TO DEVELOP DURABLE RESISTANCE TO WHEAT STEM RUST, A CATASTROPHIC DISEASE OF WHEAT AND SIGNIFICANT THREAT TO FOOD SECURITY

### THE TWO BLADES FOUNDATION (2BLADES)

Gatsby provides core support to the 2Blades Foundation, a charitable organisation that supports the development of crops with durable disease resistance and promotes their deployment in agriculture worldwide, with a particular aim to benefit developing countries.

2Blades continued to engage with a global consortium to develop durable resistance to wheat stem rust, a catastrophic disease of wheat and significant threat to food security. This has focused on combining multiple resistance genes delivered as cassettes into wheat, and the resulting wheat lines were tested in field trials at the University of Minnesota. The results published in Nature Biotechnology demonstrated that inserting a stack of five resistance genes into a single genome location of common wheat led to exceptional resistance to stem rust, unmatched and unattainable by conventional breeding.

2Blades was awarded a grant from the Agriculture and Food Research Initiative of the US Department of Agriculture to isolate resistance genes from wild emmer wheat in collaboration with scientists at Kansas

State University, the University of Minnesota and the John Innes Centre. The genes identified will further enhance 2Blades' world-leading resource of rust resistance genes. Cassettes of these genes will move towards application in partnership with CIMMYT, the global wheat breeding organisation.

2Blades has continued to support the work of Dr Marc Ghislain and colleagues at CIP (International Potato Centre) in Kenya and in collaboration with Uganda's National Agricultural Research Organisation and other organisations in East Africa. Field trials and data collection for deregulation of a popular regional potato variety engineered with a resistance gene stack against late blight are at an advanced stage.

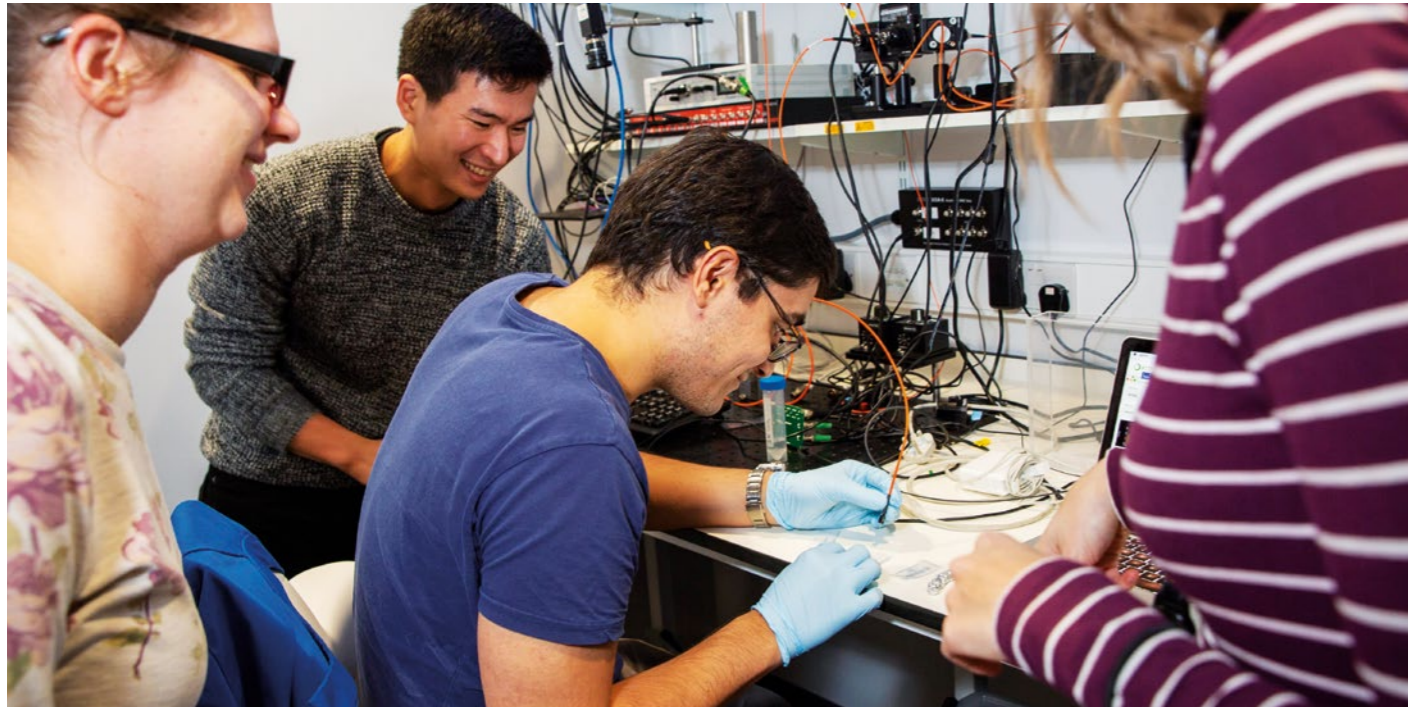
In collaboration with the University of Minnesota, an economic assessment of the top seven wheat diseases is in progress. A related report has been initiated with the International Food Policy Research Institute to provide data on the nutritional and health impacts of plant disease, using wheat rust as an example. These reports will be shared with policymakers, research organisations and funders to demonstrate the strong case for investing in solutions for crop disease to help achieve food security.



Opposite page: Dr François Nédélec, a group leader at SLCU, is studying cell morphogenesis and developmental biology and has developed a simulation engine to look at the interactions of filaments inside the living cell with the myriad of associated activities.

Right: Kelly Robinson, a PhD student working in the 2Blades Group at the Sainsbury Laboratory in Norwich, is investigating wild crop relatives for sources of resistance genes to create more durable crops.

# 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 strategy harnesses the efforts of a dynamic and multi-disciplinary group of scientists with a common interest in the workings of the brain. To this end, we are partnering with Wellcome and University College London (UCL) on the Sainsbury Wellcome Centre – a scientific research centre using state-of-the-art techniques to investigate how brain circuits process information to create representations and guide behaviour.

Gatsby has also developed several innovative and collaborative programmes around the world. In addition, we support cutting-edge research meetings, and invest in training, outreach and sector development programmes.

Above: PhD students at the Sainsbury Wellcome Centre in the Akrami, Carandini (SWC Affiliate at UCL) and Mrsic-Flogel research groups prepare materials and equipment for experiments to explore how computation in neural circuits gives rise to flexible, complex behaviour.

Opposite page: The Margrie group at SWC investigates the multisensory integration in circuits in the cerebral cortex. This light microscopy image taken by senior research fellow, Dr Mateo Velez-Fort, shows the brain cells (red) that carry head motion information and project to the primary visual processing area of the brain receiving inputs (green) from the vestibular balance system.

### SAINSBURY WELLCOME CENTRE FOR NEURAL CIRCUITS AND BEHAVIOUR (SWC)

SWC is a research centre at UCL which will house about 200 scientists and support staff investigating how brain circuit function underlies behaviours.

SWC has initiated its first Strategic Project led by a multi-disciplinary working group designed to solve challenges which cannot be tackled by individual labs. It brings together group leaders from SWC and the Gatsby Computational Neuroscience Unit (GCNU), external collaborators, data scientists, engineers and industrial partners. This project will develop a technical platform for studying naturalistic foraging behaviour in rodents with long-term neural recordings. Sub-groups are working on the hardware, software and data analysis requirements of the project.

A new group leader, Dr Ann Duan, joined the SWC faculty in summer 2021. Dr Duan's lab at SWC will combine theory-motivated behavioural paradigms with modern experimental and analytical tools to conduct large-scale, cellular-resolution investigations of neural circuit mechanisms for flexible decision-making. In particular, she aims to understand how decision-making is modulated by internal and environmental variables, such as risk preference and competitive/cooperative social interaction.

Building upon his fundamental scientific research at SWC, group leader Dr Andy Murray, has started a new business venture, Sania Therapeutics. This will develop adeno-associated virus serotypes to transmit genes to spinal neurons, with implications for treatment of neuromuscular conditions.

Gatsby is committed to enhancing research and promoting a positive research culture that champions inclusivity and equity of opportunity. To explore the impact of childcare or other dependant-related costs on Equity, Diversity and Inclusion (EDI), we recently awarded targeted and progressive positive action to promote increased diversity among early-career researchers (PhD students and post-docs) and support the transition to independent faculty member. The Early Career Carer Support Fund will allow SWC and GCNU to gather data to understand whether a dependant supplement helps to promote EDI.

### GATSBY COMPUTATIONAL NEUROSCIENCE UNIT (GCNU)

Gatsby founded the GCNU at UCL over two decades ago to bring together a critical mass of theoreticians focussing on the computational theories of perception and action in neural and machine systems.

Dr Andrew Saxe has started as a joint GCNU-SWC group leader, a new position for applied machine learning

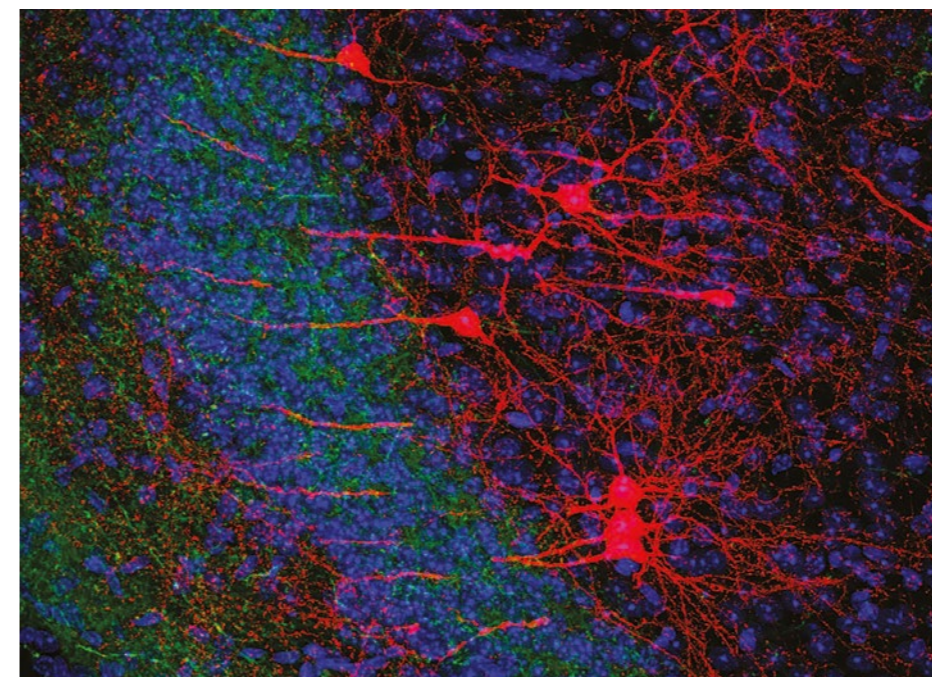
research in neuroscience that will further link GCNU and SWC. Dr Saxe's research focuses on computational principles governing the dynamics of learning in biological systems, ultimately aiming to build a bridge from changes at the level of synapses and neurons to changes at the level of performance and behaviour.

In October 2020, GCNU and SWC students jointly organised a symposium on *Neural Interfaces for Neurobiological Insights* to explore how Brain-Machine Interfaces can help investigate the possibilities and constraints of neural function. The event included talks from leading academics and tech companies, and was attended by approximately 500 people from all over the world.

In March 2021, a joint GCNU-SWC postdoctoral fellow, Dr Grace Lindsay, published her first book entitled *Models of the Mind: How physics, engineering and mathematics have shaped our understanding of the brain*. It provides a comprehensive introduction into the field of computational neuroscience, and the role that mathematics plays in helping us understand the brain.

A group of students from the Unit initiated a week-long series of conversations and critical presentations examining past and current issues around race in science. This led GCNU to consider activities to begin to address the wider EDI agenda, including mentoring (such as guidance on course selection and internships) for school and undergraduate students from under-represented groups, with the aim of encouraging them to move towards fields like Computational Neuroscience, Computer Science or Machine Learning.

A major review of the Unit took place in September 2021, led by an independent panel of international experts from academia and industry. They reviewed the recent efforts and outputs of the Unit and plans for the future. The panel felt the Unit remains a world leader and its influence in the field belies its relatively small size, felt through its cutting-edge research, the strong training of its PhD students and post-docs, and the impact of its alumni in both academia and industry. Following this very successful review, we renewed core funding for a further research cycle from November 2021.



### THEORETICAL NEUROSCIENCE AT COLUMBIA AND HEBREW UNIVERSITIES

Our support in the area of theoretical neuroscience and machine learning also includes two other world-class centres as part of an on-going partnership with GCNU. These are the Centre for Theoretical Neuroscience at Columbia University in the USA, and the Gatsby Programme in Theoretical Neuroscience at the Safra Centre for Brain Sciences (ELSC) at the Hebrew University in Israel. The downtime for experimentalists caused by closing of laboratory spaces during the first COVID lockdown meant the centres were able to form new and more meaningful collaborations, because experimentalists working from home focussed on analysing existing data and planning new experiments.

A virtual annual meeting of the tricentre group of GCNU, ELSC and Columbia took place in June 2021. The group looks forward to meeting again in mid-2022 to continue conversations and explore new collaborations. They plan to provide an additional opportunity at this meeting for early-career researchers in the three centres to lead workshops on the latest challenges for theorists and computationalists in key areas such as deep learning, behaviour and cognition.

### NEUROMATCH

We supported the inaugural and second editions of Neuromatch Academy (NMA) in 2020 and 2021. COVID created an enormous gap in the training prospects of the early career scientists. NMA pioneered offering a fully online three-week global summer school for computational neuroscience aimed at undergraduates, graduates and post-docs interested in the topic. NMA 2020 consisted of a virtual army of 200 volunteers, 250 faculty mentors, 200 Teaching Assistants, and 1700 students from across 65 countries. NMA 2021 expanded the core NMA to 3300 students, as well as added NMA-DL, a new three-week immersive deep learning course. NMA has the potential to become a key training programme for early career researchers and is particularly meaningful because, thanks to its online nature, it enables participation for community members who traditionally do not have the financial capacity or institutional support to attend in-person summer schools.

# 3,300

Students on a fully online three-week global summer school for computational neuroscience.

### CAJAL ADVANCED NEUROSCIENCE TRAINING PROGRAMME

We are partnering with Federation of European Neuroscience Societies, International Brain Research Organisation, Champalimaud Foundation and Bordeaux Neurocampus to support the continued development of the CAJAL programme, a dedicated neuroscience advanced training facility. The course offerings (totalling 27 courses and 500 students over the past four years) have been refined as well as expanded. The established calibre of the programme and fully international faculty have highlighted to the wider neuroscience community the availability of excellent Europe-based training courses, which are beginning to rival the highly respected equivalent courses in the USA.

In the last year, some hands-on courses had to be cancelled due to COVID. The CAJAL Executive worked with SWC and GCNU to incubate kit-based training that could be posted out to participants, with online instructions and group tutorials. This course, entitled *The Last Black Box*, provided a foundation for experimentalists beginning a PhD or switching discipline. The very successful pilot course introduced neuroscience concepts, data acquisition and analysis, and machine learning by guiding the students through the hands-on construction of a robot.

We recently renewed support for a further six-year period to help CAJAL consolidate strengths and develop further directions that will expand the reach and sustainability of the courses to ensure their future long-term impact on advanced training in neuroscience.

Left: Dr Lea Duncker (now a postdoctoral researcher at Stanford University in the USA) and Dr Ricardo Pio Monti (now a research scientist at Facebook Reality Labs) discuss their research at the Gatsby Computational Neuroscience Unit.

Opposite page: Researchers at the Sainsbury Wellcome Centre carrying out investigations into brain function. Dr Takahiro Kanamori (Mrsic-Flogel lab) and Dr Dulcie Vousden (Hofer lab; now at DataKind UK) prepare brain tissue samples to run on a PCR machine (left panel); Kamakshi Dadhwal, visiting student in the Hofer group prepares electrodes for recording brain electrical activity (right panel).



### STANFORD OPTOGENETICS MOONSHOT FOR AUTISM (SOMA)

This project group at Stanford University under the direction of Professor Karl Deisseroth aims to elucidate the mechanisms of autism brain dynamics and to resolve relationships among multiple brain-wide projections and cell populations for defined behaviours. The group has already perfected and applied a range of molecular tools to target particular cell types based on anatomy or activity patterns during natural behaviour. This has enabled cutting-edge recordings simultaneously across many brain areas to look at the complexity of social behaviour. SOMA found that brain-wide interactions defining self, other and their inter-relationships are key for social behaviour. They found a desynchronisation pattern that may explain the mysterious and clinically important state of dissociation. This work suggests a fundamental mechanism for the assembly and disassembly of the self and its boundaries, with key implications for understanding the basic principles enabling social interaction.

Technologically, they have developed an alignment of anatomy and molecular datastreams to allow insight into social processes in health and disease at the single-cell level. This new device combines the necessary fluidics, mechanics and control systems, all integrated with optical microscopes to permit the team to find cell-specific targets for therapeutic social opportunities.

This work will ultimately help the Deisseroth group to create novel and effective therapies which will have an impact on the treatment landscape for Autism Spectrum Disorder.

### BRITISH NEUROSCIENCE ASSOCIATION (BNA)

We are providing support to the BNA to implement a new strategy aiming to reposition itself as a powerful force supporting UK neuroscience. In 2020, BNA partnered with SWC to launch its *Building Bridges Between: Industry and Academia* (BBB) initiative that aims to foster collaboration between neuroscientists in industry and academia for information exchange through workshops and networking. There was a scene-setting webinar with Sir Mene Pangalos, Executive Vice-President R&D at AstraZeneca in autumn 2020. At the fully online 2021 BNA Festival of Neuroscience conference, a BBB workshop entitled *How to improve translation between industry and academia in neuroscience?* was chaired by Professor Tom Otis, SWC Chief Scientific Officer, who previously led early drug development for neurodevelopmental disorders and psychiatry at Roche. He was joined by four leaders and innovators in industry-academia partnerships: Sir Mene Pangalos, AstraZeneca; Dr Eva Loth, Kings College London; Dr Justin Bryans, LifeArc; and Dr John Huxter, Transpharmation. Through BBB, BNA continues to increase industry members as well as to involve the



commercial sector in the Association's key campaign around research reproducibility and replicability, *Credibility in Neuroscience*, because to achieve culture change it is essential to include the whole neuroscience landscape. BNA's ongoing aim is to increase and broaden membership with a wider range of activities to ensure it is truly representative and relevant to everyone in neuroscience, including those in the private sector, the clinic and in wider society.

“

IT IS ESSENTIAL TO INCLUDE THE WHOLE NEUROSCIENCE LANDSCAPE TO ACHIEVE CULTURE CHANGE

”





## EDUCATION



### STRENGTHENING TECHNICAL EDUCATION AND SKILLS IN THE UK BY DEVELOPING AND ENABLING INNOVATIVE PROGRAMMES AND INFORMING NATIONAL POLICY

Gatsby's work in education continues to focus predominantly on securing systemic change by influencing national education policy. We take an analytical and evidence-based approach and seek always to offer timely, unambiguous, and pragmatic advice to policymakers that articulates solutions rather than just problems. Our priority areas of policy interest are the reform of technical education, career guidance, and the supply of science teachers.

We also continue to promote greater recognition of the importance of technicians to modern society, by showcasing the diverse range of technician jobs available and the education and training pathways that lead to them.

Above: Baldeep Bramrah started his career at Reaction Engines as a Technician Apprentice. The Technicians Make it Happen (TMiH) campaign illustrates the opportunities technician careers can provide with a series of case studies from a range of industries. Credit: Leonora Saunders

#### TECHNICAL EDUCATION REFORM

Technical education creates strong opportunities for young people entering the world of work; for adults seeking to upskill and reskill throughout their careers; and for employers developing their workforce. Gatsby continues to work alongside the Department for Education (DfE) and key partners as we move towards a coherent system of technical education in England that offers clear, well-understood pathways to skilled employment or further study.

Achieving this goal requires collaboration between national and local government, Further Education (FE) institutions and employers, and we have worked with local decision-makers in several places to support and encourage coherent planning of technical education. At the national level, the Government must oversee a framework for qualifications that enable people to develop the knowledge and skills which will see them flourish in future employment.

Apprenticeships and new qualifications – both T-levels and Higher Technical Qualifications – are now underpinned by occupational standards that are written and maintained by employers. Gatsby continues to carry out research to understand how the quality of the English apprenticeship system can be improved. In 2021, we published research on apprenticeships which highlighted the role employers play in ensuring high-quality training happens in the workplace as well as off the job.

T-levels are new, two-year technical qualifications shaped by employers to meet industry needs, that include appropriate English, maths, and digital content. A T-level also includes an extended industry placement, a common element of study programmes for young people in countries with strong technical education systems. The introduction of industry placements within T-levels ensures that students in England also have this valuable opportunity to develop and practise their technical and wider employability skills in a workplace. We are working with partners, including the Association of Colleges, Local Government Association, and NHS Trusts to support the establishment and sharing of good practice for placements.

We are also working with several partners to publish materials that provide employers with a clear picture of the education landscape, and the opportunities that reformed technical education offers them.

Implementing high-quality technical education needs teachers with both appropriate industry experience and teaching expertise. We have commissioned research to improve understanding of teaching roles in FE to inform the design of teacher training opportunities, and are also working with the OECD to understand teacher training for technical education in other countries.

#### HIGHER TECHNICAL EDUCATION REFORM

There is a significant demand for high-level skills in the workforce, particularly among adults needing to upskill or change careers. Unlike many other countries, the education system in England is largely focused on meeting this demand through three-year Bachelor's degrees. Working closely with Gatsby, the DfE has been developing proposals for a high-quality system of higher technical education: courses and qualifications at levels 4 and 5 which are focused on employer needs in technical occupations. In July 2020, the DfE announced a series of reforms aimed at raising the profile and uptake of Higher Technical Qualifications (HTQs), primarily through an opt-in approval process being managed by the Institute for Apprenticeships and Technical Education (IfATE). In June 2021, IfATE announced the first 31 Level 4 and 5 digital courses that had been approved by their employer panels and earned the right to use a Government-endorsed quality mark. Construction, Health and Science qualifications were submitted for HTQ approval over summer 2021, and Engineering and Manufacturing qualifications (among others) will follow in 2022.

Among the first trailblazers offering these HTQs will be Institutes of Technology (IoTs) – collaborations between FE colleges, universities and employers, specialising in providing higher technical education in STEM in England. Announced in 2019, the first wave of twelve IoTs have been backed by £170 million of Government investment to fund industry-standard facilities and equipment. Low-carbon technology and digital skills are at the forefront for many, with the North East IoT opening a new Engineering, Advanced Manufacturing and Motor Vehicle suite with state-of-the-art electric car training rigs and the West of England IoT launching a £3 million Advanced Digital Academy equipped with a cyber attack and defence room. A second wave of IoTs will soon extend the reach and impact of these specialist collaborations, offering progression routes for young people with T-levels, providing flexible training for adults in work, and supporting local employers to take advantage of innovative technologies and processes.

Having first presented the idea of IoTs to the Government in 2014, we are pleased they are opening to great acclaim across the country and are committed to supporting their success. Since spring 2020, Gatsby has provided support to the IoT Network, establishing an infrastructure for sharing good practice and catalysing partnerships, and providing a conduit for stakeholder engagement. In August 2021 we launched a website ([www.institutesoftechnology.org.uk](http://www.institutesoftechnology.org.uk)) aimed at showcasing the IoTs as a group of world-class institutions at the forefront of higher technical education and training, and enabling employers and other major stakeholders to easily find the IoT they might want to work with. Over the coming year a new communications campaign will run across the whole Network, with each IoT contributing their unique stories as part of a shared drive towards greater engagement with employers and young people. The next wave of IoTs will be inducted into the Network, supporting what will become a significant number of FE colleges, universities and employers in England committed to STEM higher technical education.



#### STEM SKILLS IN THE WORKPLACE

We have continued to work with BCS (the Chartered Institute for IT), and the Science Council to support the professional recognition of technicians and give their occupations the status they deserve.

One area of our work particularly impacted by the pandemic was the Technicians Make it Happen (TMIH) campaign. Usually, over the course of a year we showcase the work and value of technicians at events across the country, reaching an audience of 200,000+ young people. However, for 2020 and 2021, the campaign's activity has been almost exclusively on its digital and social media platforms.

From the ventilator challenge to the race for a vaccine, technicians have been front and centre of national and global efforts. We endeavoured to reflect this in Technicians Make it Happen's content as we used its social media channels and website to shine a light on individual technicians behind the headlines. TMIH's audiences continue to engage with its meaningful and informative content, with just over four and half million engagements with social media content recorded as of November 2021.

The pandemic has delayed the roll-out of what is perhaps the most high-profile project to date in our education work. From autumn 2022, *Technicians: The David Sainsbury Gallery* in London will be a permanent interactive exhibition

space at the Science Museum, which we hope will inspire the next generation of technicians. It was formally announced in September 2021, though collaboration and planning between curators and designers at the Museum and the Gatsby education team was under way long before the pandemic. The Gallery will be supported by a new digital technician careers resource Gatsby is developing, and this will sit on our [www.technicians.org.uk](http://www.technicians.org.uk) site, also being updated to coincide with the Gallery launch.

In 2020, the High Value Manufacturing Catapult (HVMC) published *Manufacturing the Future*; a report based on Gatsby-funded international visits to understand how other countries ensure that their technical education systems can respond to innovation. We subsequently supported the HVMC to carry out foresighting work in advanced manufacturing, which led to the DfE making a £2 million grant to the HVMC to enable it to work with IoTs to create courses to support the upskilling of the manufacturing workforce. In 2021, the foresighting work was highlighted in the Government's Innovation Strategy with a recommendation that Gatsby should expand foresighting beyond advanced manufacturing.

During this time, we also commissioned research looking at the role that FE colleges can play in the innovation ecosystem. This research has been well-received, with Innovate UK looking

to build on it to understand how colleges could support the diffusion and adoption of innovation. The DfE-funded College Business Centres also recognise that FE has a part to play in supporting innovation.

With Gatsby support, in 2020 SkillsBuilder published the Universal Framework for Essential Skills. The framework was created with support from Chartered Institute of Personnel and Development; Business in the Community; the Confederation of British Industry; the Careers & Enterprise Company and others. It will hopefully enable much smoother transitions from education to employment by promoting a common understanding of the essential skills that employers value.

2020 also saw Gatsby agreeing to further support the Technician Commitment, an initiative that seeks to create a culture where technical careers in universities and research institutions are better recognised, supported, and developed. The impact of the Commitment – from the groundwork it laid in helping to secure almost £5 million of funding (including a £3 million Research England grant) to research and develop training and support for technical pathways within research and HE, to the publication of reports such as assessing the impact of the pandemic on the technical community – has surpassed expectations and continues to transform how technicians in HE and research are seen and treated.

“  
CAREER GUIDANCE  
HAS NEVER BEEN  
MORE IMPORTANT  
FOR YOUNG PEOPLE  
AS THEY DECIDE  
THEIR NEXT STEPS  
FOLLOWING THE  
COVID-19 PANDEMIC

”

#### GOOD CAREER GUIDANCE

Career guidance has never been more important for young people as they decide their next steps following the COVID-19 pandemic. In response, Gatsby invested in research with headteachers to monitor the impact on careers guidance following the dramatic disruption to education, finding a heartening commitment to career guidance and the Good Career Guidance from senior leaders, but concerns about being able to maintain levels of support to their students. We also worked with the Careers & Enterprise Company to develop guidance for schools and colleges on how to continue to deliver career guidance when learners are at home.

In July 2021, the Government renewed its commitment to the Gatsby Benchmarks, continuing to embed the framework at the heart of the new statutory guidance for schools and colleges, and Ofsted strengthening their emphasis on career guidance in their inspection framework. Despite the challenges of the pandemic, schools and colleges continued to make good progress towards the Benchmarks with over 270 now achieving all eight Benchmarks, more than double the number in 2019. Published evidence now

tells us that in institutions meeting all the Benchmarks, students are 13% more likely to be in education, employment or training when they leave school.

Gatsby has continued its pioneering research in the careers field, including: the views of schools, colleges, and young people on the information they receive about academic and technical qualifications; the role of labour market information in career decision-making; and career guidance support for adults.

Our work to support parents and carers to help their children make informed decisions about their future has gone from strength to strength. The *Talking Futures* programme has been successfully piloted and a national communications campaign, along with a partnership with The Careers & Enterprise Company to work directly with schools and colleges, will be growing in 2022 and beyond.

#### SCIENCE AND MATHS IN SCHOOLS

Over the last twenty years, Gatsby has worked with Government and other partners to improve the quality and quantity of science specialist teachers in secondary schools, recognising that well-qualified and motivated specialists are key to providing a high-quality science and maths education. We remain interested in the role of salary and early-career retention payments in teacher recruitment and retention. In early 2021, we published a report with Education Policy Institute (EPI) looking at local pay reform and research examining different models for setting teacher pay which was of particular relevance following the COVID-19 pandemic.

For the last three years, we have worked with SchoolDash and Teacher Tapp to monitor recruiting activity in English secondary schools. This work enabled us to make a series of recommendations to Government following the first lockdown in 2020, to ensure that teachers were not lost from the profession.

#### BUSINESS EDUCATION FOR ENGINEERS

Since 1987, the Sainsbury Management Fellowships (SMF) scheme has provided bursaries to enable exceptional, early-career engineers to study for an MBA at a world-class business school. Ten bursaries of £50,000 are awarded each year and a vibrant alumni association organises networking events and mentoring opportunities for previous awardees. The SMF scheme is managed by the Engineers in Business Fellowship, an organisation we also support to run other activities to strengthen business education for engineers. These include a competition for undergraduates and recent graduates in which teams compete to produce a compelling business plan for an engineering-based product.

Claire Cormie, a Laboratory Technician Apprentice at the Sanger Institute.

—  
Opposite page: Engineering students at Birmingham City University, a key partner in Greater Birmingham and Solihull Institute of Technology (IoT). Institutes of Technology (IoTs) are a group of world-class institutions at the forefront of higher technical education and training.



# ECONOMIC DEVELOPMENT IN AFRICA



## ACCELERATING INCLUSIVE AND RESILIENT ECONOMIC GROWTH IN EAST AFRICA

Gatsby has worked to create jobs, raise incomes and build opportunities for people in Africa since 1985. We are currently focussed on helping more people benefit from economic growth in East Africa.

This will require economic transformation – growth with depth that will radically change economies, lead to leaps in productivity, and offer large numbers of people pathways out of poverty.

To help achieve this we deliver programmes that look to catalyse large-scale and lasting change in priority sectors, such as commercial forestry in Kenya. We aim to transform such sectors so they are competitive, inclusive and resilient – capable of evolving and adapting independently to future risks and opportunities.

Through the direct implementation and support of programmes in East Africa, we are building long-term capacity on the ground dedicated to this mission. We also aim to share what we are learning with others who are trying to promote inclusive economic growth.

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 on our website, with some initiatives profiled on the following pages.

Above: George Ouma, a rice farmer, broadcasts fertiliser on his farm in Ahero, Kisumu County, Kenya.

– Opposite page: A team prepare to capture fish at a farm in Kenya.

### SUPPORTING ECONOMIC SECTORS IN EAST AFRICA THROUGH THE COVID-19 CRISIS

The outbreak of COVID-19 resulted in Africa experiencing its worst economic recession for half a century. In East Africa, major industries – like textiles and tourism – were significantly disrupted or brought to a standstill for months, which resulted in large-scale job losses and significant damage to the region's macroeconomic fundamentals. It is estimated as many as 30 million people across the continent were pushed into extreme poverty over the course of 2020, with the crisis disproportionately affecting those with less education, fewer assets, and more informal jobs.

# 30m

It is estimated as many as 30 million people across the continent were pushed into extreme poverty over the course of 2020.

As an initial response to COVID-19, the teams at Gatsby Africa – together with our partners at Kenya Markets Trust (KMT) and Msingi – sought to understand the impact of the pandemic and the specific needs of the economic sectors we support. This involved close engagement with governments and the donor community, as well as listening to our partners in the private sector. While we regularly updated sector players across our portfolio with relevant data to support decision-making, in some cases we provided specific assistance to help protect businesses and workers.

– COVID-19 triggered a liquidity crisis in Kenya's water sector, as customers became unable to pay their dues to utilities companies. Our partner KMT was at the heart of efforts to gather evidence, convene stakeholders, and design an emergency response plan. This was endorsed by the sector and the Water Service Trust Fund, which used the plan to successfully secure emergency funding from the World Bank.

– Given that aquaculture is a promising yet relatively nascent sector in East Africa, the pandemic posed an existential threat to the region's small- and medium-sized fish farms, which were heavily affected by market restrictions and the rapid decline in demand. To enable high-potential farms to sustain their fish stocks amid plummeting sales, our partner Msingi developed an emergency response programme and directly supported farms across the region with finance and technical advice. Indeed, the team successfully helped businesses survive and maintain a level of biomass which has set a strong foundation for future growth.

– The pandemic sent a shockwave through the global textiles industry, exposing the extent to which brands depend on supply chains emanating from Asia. In East Africa, it is estimated 25,000 jobs were lost in the first six months of the crisis, as factories were forced to close, supply lines dried up and apparel sales collapsed. In response, Msingi undertook an industry-wide COVID-19 impact survey and shared the valuable first-hand information with government policymakers, donor organisations and investors to help coordinate much-needed recovery support across the region. Moreover – in the wake of the pandemic – Msingi has recognised an opportunity to promote East Africa and has stepped up its engagement with international buyers and factories, as industry players are expressing a growing interest in geographically diversifying their portfolios.

In positive news, the health impact in East Africa has proven less severe than in other geographies and the region's economies are showing signs of recovery, as global restrictions ease and the vaccine rollout builds momentum. However – while we are confident the sectors we support will come through the pandemic – the crisis has exposed how important it is to ensure sectors are developed with resilience in mind, a central theme of our work over many years. Indeed, it is clear that East Africa does not just need economic growth: the region needs to grow labour-intensive sectors that are both competitive and capable of independently responding to risks and opportunities over the short-, medium- and long-term.



## ENABLING THE TRANSFORMATION OF SECTORS IN KENYA

For over a decade, Gatsby Africa has supported the evolution of KMT, a local organisation that aims to lead the agenda on transforming key economic sectors in Kenya and ensuring large-scale wealth creation and poverty reduction. With programmes in Kenya's water, agricultural inputs and livestock sectors, and a footprint which spans the country's 47 counties, the organisation has improved the livelihoods of over a million households and created roughly 300,000 jobs to date, establishing itself as a valued and credible partner of the government and private sector.

Despite the outbreak of COVID-19 and the recent volatility in donor funding, the organisation has continued to make impressive progress across its portfolio.

It is clear Kenya's water sector is in urgent need of support: while 40% of the country's population does not currently have access to safe drinking water, the demand for water in Kenya is set to significantly outstrip availability over the next decade, owing to rapidly changing climate patterns, demographic growth and the pressures of industrialisation. Working in partnership with the government, utilities companies and industry associations, KMT has helped introduce an array of innovations and regulations in the sector, which have enhanced the sustainability of provision in rural and urban areas; stemmed water losses; and facilitated greater access to safe drinking water. These innovations include the use of metering, GIS mapping tools and data management systems by utilities companies – as well as the deployment of delivery models which blend rural community ownership with private sector participation. More recently – and in close partnership with the Ministry of Water & Irrigation – KMT has been involved with developing a long-term roadmap for the sector's transformation, capable of inspiring alignment among its many stakeholders.

While agriculture is at the heart of the Kenyan economy – accounting for a third of GDP and providing livelihoods for 80% of the population – the sector is falling short of its potential, in part owing to smallholders' inability to access yield-enhancing agricultural inputs and



extension services. Over the years, KMT has sought to address this critical constraint via an array of impactful interventions, which include introducing scratch labelling technology to reduce the incidence of counterfeit seeds (from 40% to just 10%); inspiring greater public-private collaboration to shorten the time it takes to certify seeds (from 6 weeks to 14 days); partnering with pioneer inputs firms – like Toyota Tsusho and Yara – to produce, promote and distribute crop-specific fertiliser in Kenya; piloting scalable and sustainable extension models; and building the domestic market for agricultural lime. Given that soil acidity affects 65% of the country's limited arable land, KMT has advocated strongly for greater investment in granulated lime in Kenya and – following the presentation of the commercial opportunity at a recent sector-wide roundtable – the team secured the interest of six manufacturers, including Omya International (a world leader).

While Kenya is home to one of Africa's largest livestock herds, the country remains a net importer of meat and its trade deficit is growing. Fragmentation and inefficient practices are resulting in low levels of production and yielding meat which is of relatively poor quality and 10% more expensive than elsewhere in East Africa. In a bid to integrate the tens of millions of pastoralists into the formal value chain and modernise the sector, KMT has adopted a comprehensive approach, which has involved:

- the promotion of animal healthcare services at farm level – as well as more sustainable and productive rearing techniques;
- the trialling of aggregation models – like feedlots and ranches – which help pastoralists access markets and derive more value from their herds;
- the development of cold chains and the institution of stronger meat safety standards and traceability requirements in processing and retail environments, which is increasingly being demanded by consumers;
- and the establishment of sector-wide platforms and forums to enable greater coordination between the government, regulators, industry associations and pastoralists groups.

KMT is generating strong momentum in this critical sector and is being recognised as an influential partner: as well as supporting the State Department for Livestock with the successful launch of a National Livestock Policy, the team has been invited to advise on an industry masterplan, which aims to galvanise stakeholders and set out how the sector could be transformed, responding to new market opportunities while managing the threat posed by environmental challenges.

# 300,000

KMT has created roughly 300,000 jobs to date.

“  
WE REACHED  
A SET OF  
CONCLUSIONS  
WHICH WE BELIEVE  
WILL HELP US TO  
DELIVER AGAINST  
OUR AMBITIOUS  
MISSION  
”

## REFINING OUR FOCUS

At the mid-point of our Gatsby Africa ten-year strategy (2015–2025), we reflected on changes in the external environment, progress to date and the trajectory of the portfolio – as well as considering any refinements. We reached a set of conclusions which we believe will help us to deliver against our ambitious mission.

- There remains an urgent need for economic transformation and inclusive growth in East Africa. While most countries in the region have recorded strong growth rates in recent decades, this growth has been narrowly concentrated and characterised by volatile boom and bust cycles – as a result, inequality has worsened, and widespread poverty persists. Adding further pressure, populations are growing, urbanisation is accelerating, and the climate is changing. Drawing on years of experience in East Africa and adopting a long-term, holistic and politically-engaged approach, we aim to partner with government and the private sector and help catalyse the transformation of high-potential sectors, capable of creating jobs at scale and durably improving the livelihoods of millions.

– We plan to transition from supporting eight sectors to six sectors in the coming years. This will enable us to scale up efforts in the remaining sectors, ensuring sufficient technical expertise and credibility to convene influential partnerships and drive transformative initiatives. Combining an ability to intervene and engage politically at a national level with an ability to engage stakeholders and attract large-scale investment on a regional basis, our programmes will be more flexible and in a stronger position to respond to risks and opportunities. This refined portfolio will be better insulated from the volatility associated with co-funding arrangements, which reached new highs amid the COVID-19 crisis.

– We are committed to enhancing our ability to share our learning by investing more resources in this area in future. We recognise the potential value of capturing what is working and what is not, and sharing this with other stakeholders. Indeed, our experiences could help inform the approach of governments in East Africa as they endeavour to stimulate inclusive growth in other sectors, as well as influencing how other development actors and financial institutions approach economic development.



Left: A herd of young bulls undergo finishing at a feedlot on Borana Ranch, Laikipia County, Kenya.

– Opposite page: Zablon Alenga enjoys a glass of clean and safe drinking water. He manages the Muhanda Water Project, which is supported by KMT in Western Kenya with the aim of improving water service delivery.

## PUBLIC POLICY



### SUPPORTING INDEPENDENT RESEARCH ORGANISATIONS WHICH PROVIDE EVIDENCE-BASED ADVICE TO POLICYMAKERS

Whilst holding the post of Minister of Science and Innovation in the UK Government at the turn of the century, David Sainsbury noticed that both politicians' and civil servants' efforts to deliver activities were often held back by slow and outmoded processes in relation to policymaking. While this machinery could be somewhat improved from within Government, he felt that impartial, independent organisations would be best placed to keep such reform on the agenda on an ongoing basis.

After leaving office, David Sainsbury started the Institute for Government as the leading think tank working to make government more effective. The Institute shares a philosophy with another independent non-partisan research organisation set up by David Sainsbury, the Centre for Cities, whose mission is to help UK cities realise their economic potential.

Gatsby also supports three connected activities based at Cambridge University's Institute for Manufacturing. The Centre for Science, Technology & Innovation Policy, Policy Links and the Babbage Policy Forum, which under the shared banner of Cambridge Industrial Innovation Policy, operate at the intersection of science, technology, innovation and industrial competitiveness.

Above: UK civil servants and policy officials attend a training programme designed by Policy Links and CSTI.

Opposite page: The Institute for Government hosted an online panel discussion in September 2021 on *Moving ministers: what makes a good reshuffle?* with (clockwise from top-left) Katy Balls (The Spectator), Salma Shah (former Special Adviser to Sajid Javid MP), Lord George Young (former Chief Whip) and Ben Riley-Smith (Daily Telegraph).

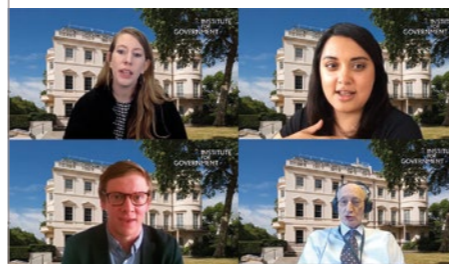
### INSTITUTE FOR GOVERNMENT

The Institute for Government works with the main political parties in Westminster, senior civil servants in Whitehall, and officials and politicians across 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.

In relation to the COVID-19 pandemic, the Institute has undertaken research on decision-making at the centre of government, how scientific advice has been used in policymaking, and the measures introduced to support the UK economy (comparing with the response of other countries), as well as calling for a public inquiry to allow government to learn lessons from this exceptional period.

The Institute has maintained a focus on the Government's agenda for civil service reform. A successful conference in summer 2020 was followed by reports on the relocation of civil servants, the structure of the service, and the relevance of digital technology for policymaking. A further conference was held in autumn 2021, focusing on the constitutional basis of the service.

The Institute's net zero project outlines how government should organise itself to achieve the 2050 target, and prompted discussions with many arms of government and the voluntary sector in the run-up to the COP26 conference. Two related projects identified lessons for the UK from the efforts of other countries to incorporate evidence into transport and energy policymaking.



The Institute's devolution team has focused on the devolved, mayoral and local elections, many of which were delayed from 2020 due to the pandemic. Influential reports on the operation of the Sewell Convention and the Barnett Formula have sparked interest in the UK Parliament and across the devolved nations. In late 2021, the Institute launched a major review of the UK Constitution, in partnership with the Bennett Institute for Public Policy at Cambridge University.

### 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 early 2020, the Centre shifted its focus to tracking and researching the economic impact of COVID-19 across the UK's largest cities and towns. Publicly-accessible data trackers were launched covering case numbers, city and town centre footfall and spend, unemployment, furlough and job postings. City leaders have found this real-time analysis extremely valuable in understanding the impact on their areas, and planning for the re-opening and recovery of their economies. The Centre for Cities has released over 100 briefings, blogs, podcasts and research reports about COVID-19, covering topics including cities' use of technology to tackle the pandemic, the effects of Eat Out to Help Out, the impact of lockdowns on labour markets, and analysis of the furlough scheme.

Levelling up has always been a key theme for the Centre, and one that is of even greater importance given the uneven impact of the pandemic. Working with the Connected Places Catapult, the Centre analysed which of Britain's cities and largest towns have the most potential to harness extra public R&D funding and



convert it into wider local economic growth. This analysis will continue to be valuable for years to come as investment decisions are made. Devolution of powers and resources will also be key. In September 2020, the Centre published new research, setting out how the Government should use its levelling-up white paper to re-organise and simplify local government. They published a report in May 2021 setting out why Metro Mayors should be given more powers over skills, housing, transport and innovation to improve the prosperity of their areas.

To inform the Comprehensive Spending Review in late 2021, the Centre set out how the Government could deliver on key parts of its domestic agenda. A report on *Building Back Better* from COVID-19 explored why, how and where jobs were created across the UK during the 2013 to 2019 'jobs miracle' and why this matters for places' economic prosperity. For reaching net zero, the Centre published research in July 2021 on decarbonising the city, particularly in housing, planning and public transport. In addition to its large body of work on levelling up over the last year, the Centre is working on comparing the public transport systems of UK and European large cities, which will be published in 2022.

Above: Andrew Carter, Chief Executive of the Centre for Cities (top right) chairs an online panel discussion in June 2021 on *Building Back Better* with (clockwise from bottom right) Abi Brown (Leader of Stoke-on-Trent City Council), Tracy Brabin (Mayor of West Yorkshire) and Andy Burnham (Mayor of Greater Manchester).

**CENTRE FOR SCIENCE, TECHNOLOGY & INNOVATION POLICY (CSTI)**  
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.

As well as academic publications in journals for innovation economics, technology management, and policy, CSTI researchers also produced studies and briefing notes for key UK stakeholders. In the context of the UK Government's commitment to the development of a new funding agency – announced in February 2021 as the Advanced Research & Invention Agency and modelled on the US Advanced Research Projects Agency (ARPA) – CSTI developed a programme of activities aimed at better explaining the ARPA-model and characterising the research and innovation challenges where ARPA-like agencies have been most effective. As part of this work, CSTI submitted a policy briefing note to the House of Commons Science & Technology Committee inquiry into 'a new UK research agency'. Invited policy seminars on the new model were given

to a variety of UK innovation policy stakeholders, with CSTI also providing informal advice on ARPA (and alternative models, eg Bell Labs) to policy advisors in 10 Downing Street. CSTI also arranged an international roundtable workshop comparing international lessons and practices from ARPA-like agencies in early 2021. A PhD student is studying mission-oriented challenge programmes, with a focus on the life sciences sector.

CSTI continues to develop its research agenda related to regional innovation policy, exploring academic and policy collaborations. New work in this area will build on CSTI research on R&D diffusion dynamics within regional innovation ecosystems. This will explore, in more depth, the role of intermediate research and innovation institutes in translating university-based research into capabilities underpinning regional economic value capture opportunities. This research will explore how intermediate institutes help provide (or develop) critical research and innovation resources and competences necessary to support a complete innovation pathway within a regional economy. This work will also investigate the importance of the configuration of regionally-clustered industrial value chains in shaping potential innovation pathways for regional economic value capture.

“  
AN IMPORTANT  
FOCUS OF CSTI'S  
RECENT RESEARCH  
HAS BEEN ON THE  
RELATIONSHIPS  
BETWEEN  
TECHNOLOGY,  
MANUFACTURING  
AND SECTOR  
POLICIES  
”



Left: The Institute for Government, in collaboration with the Royal Society and Imperial College London, co-organised a conference session in September 2021 on preparing for future challenges and how can government best use science. Panellists were (from left to right) Chi Onwurah MP, Sir Mark Walport (Royal Society), Ayesha Hazarika (Political Commentator), Tom Sasse (Institute for Government), Professor Lord Richard Layard (London School of Economics) and Professor Mary Ryan (Imperial College London).



#### POLICY LINKS

The Policy Links unit is a not-for-profit consultancy unit that works with governments and international organisations to develop effective industrial innovation policies. The Unit offers consultancy services and capacity-building programmes based on the latest academic thinking and the study of international best practice.

Policy Links continues to strengthen collaborations with the UK Government and associated agencies. The Unit produced a series of rapid response studies for the Department for Business, Energy and Industrial Strategy (BEIS) to inform manufacturing policy responses to COVID-19, and offered evidence to the House of Commons International Trade Committee inquiry on the impact of COVID-19 on trade of manufactured goods. Policy Links collaborated with Innovate UK to inform future international collaborations in advanced manufacturing and the Made Smarter digitalisation programme. The Unit also delivered a bespoke capacity-building programme for policy stakeholders from BEIS, HM Treasury and devolved administrations.

In February 2021, together with CSTI, the Unit produced and launched the first edition of the *UK Innovation Report*, a new study that benchmarks the UK's industrial and innovation performance in a global context. While numerous sources of data on the topic of innovation exist, the *UK Innovation Report* aims to make a distinctive contribution by bringing

together, in a single place, innovation and value-added indicators in a concise and accessible format. In doing so, the report seeks to demonstrate the value of combining different types of datasets to facilitate policy discussions on innovation and industrial performance – and the interplay between them. There are ongoing plans to update the data annually to make it an authoritative source of the information for all policy stakeholders.

Outside of the UK, Policy Links strengthened its collaborations with international organisations such as the Inter-American Development Bank with projects in the Caribbean, and the United Nations Development Programme to inform manufacturing development policies in Cambodia. Findings from the Policy Links report 'Innovate Indonesia', produced for the Asian Development Bank, were presented to Indonesia's Minister of Research and Technology and the British Chamber of Commerce in Indonesia. Articles based on the Unit's work were featured in newsletters and websites of the World Economic Forum and the United Nations Industrial Development Organisation.

Above: Dr Carlos López-Gómez, Head of Policy Links, introduces session one on manufacturing and industrial systems for the two-day capacity building programme in March 2020 on Manufacturing and Industrial Innovation for the UK's Department for Business, Energy and Industrial Strategy.

#### BABBAGE POLICY FORUM

The Babbage Forum aims to provide a unique network and symposia within which to develop novel thinking and insights at the interface of economics, engineering and management to inform and underpin industrial policies for economic competitiveness and growth.

The network is a group of leading international economists, engineers and operations academics and practitioners. Babbage symposia have highlighted the need for better integrated disciplinary foundations for the development of policy in the areas of technology, innovation and manufacturing. They paid particular attention to the role of manufacturing and its accelerating evolution in response to changing technologies and global structures. Issues of productivity, competitiveness and leadership have also been addressed.

We recently provided renewed support for a second phase of Babbage activities. The opportunity now exists to build 'practical' tools, processes, guidelines and case studies for policymakers and politicians. This will include a new dedicated Principal Industrial Research Fellow to develop and deliver these materials. There will also be efforts to build the international community of early-career scholars and practitioners by providing a platform for the next generation of leaders to explore multi-disciplinary, practice-oriented work and to act as a reference community for policymakers.

## 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.

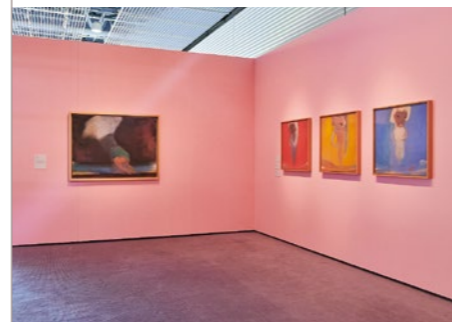
We continue to support SCVA, and other arts institutions founded by Robert and Lisa at UEA.

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 and the Royal Academy of Music.

### SAINSBURY CENTRE FOR VISUAL ARTS

SCVA recently appointed a new Director, Jago Cooper, who was previously the Head of the Americas section at the British Museum and Director of the Santo Domingo Centre of Excellence for Latin American Research. David Sainsbury and the Trustees would like to express their gratitude to the outgoing Executive Director, Paul Greenhalgh, for his excellent leadership of the Centre for over a decade, and to Ghislaine Wood, who has been such a careful and dedicated Acting Director in steering the Centre through these uncertain times.

Despite the pandemic, the Centre has achieved a remarkable range of activity this year. Four major new exhibitions opened in Norwich, while the international touring programme saw shows travel to Los Angeles, New York and Madrid. The Centre lent 93 works, helping to foster knowledge of the collection worldwide. Three important new sculptures took up residence in the Sculpture Park, which has fast become a tremendous amenity for the campus, city and region, providing a place of escape and sanctuary. Over 4,000 school and college students visited the galleries before lockdown and after, and the Learning Team produced a dazzling range of online engagement activities for all ages. The autumn saw the launch of the new website, which massively increased the Centre's ability to connect with visitors, bringing exciting new content and stories into people's homes and allowing them to enjoy the collections, albeit remotely!



Above: Leiko Ikemura exhibition, ©Leiko Ikemura, photo Andi Sapey.

Above right: Sir Simon Rattle rehearsing with the COE at the Berlin Philharmonie (October 2020), photo COE Archives.

Opposite page: Anthony Caro, Goodwood Steps 1996, ©Barford Sculptures, photo Andy Crouch.



### 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.

COE managed to undertake two tours at the beginning of 2020, through Hungary, the Netherlands, Italy and Belgium, performing works by Fauré, Mozart, Chopin and Stravinsky, as well as performances at the Mozartwoche in Salzburg, Austria, and a series of Divertimenti by Mozart. Then, due to the pandemic, the Orchestra was unable to perform together again until October 2020 and many prestigious concerts had to be cancelled, including two celebratory projects to mark Beethoven's 250th birthday and the Bravo Vail! Festival in Colorado, USA.

During the time the Orchestra was unable to tour, the team focussed its energy on producing a critically acclaimed boxset of archive recordings of all of the Schubert Symphonies conducted by Nikolaus Harnoncourt in the late '80s. They also launched a podcast – Interlude – with Simon Mundy, who interviewed Orchestra members past and present, together with some of its artistic partners, thereby enhancing COE's visibility and ethos internationally, as well as promoting its future concerts and new releases.

In October 2020, the Orchestra was able to perform two concerts at the Berlin Philharmonie with Sir Simon Rattle and violinist Vilde Frang, albeit with a reduced audience and social restrictions in place. As a result of these concerts, a substantial tour has been scheduled for 2022 with Sir Simon at the helm, and the Orchestra has been awarded a three-year residency at the Esterhazy Palace in Eisenstadt from 2022.

The first half of 2021 brought further cancelled performances, a particular blow to the COE in its 40th anniversary year, so the team focussed on two new releases from archive recordings, which will be released in January 2022, and instead of an anniversary concert at Merchant Taylors' Hall in London, it celebrated on Zoom with speeches, a quiz, and various guest appearances by international members past and present.

By the end of July 2021, the COE were once again able to perform in Europe, travelling to Rheingau Musik Festival and undertaking six performances at the *Summit of Strings*, led by violinist Ben Gilmore and featuring soloists from the prestigious Kronberg Academy. In other positive news, the COE will be the first orchestra in residence at the Academy's new venue, the Casals Forum, when it opens in September 2022, and two more tours are planned before the end of 2021; one concert at Bordeaux with pianist Piotr Anderszewski, and two in Germany with Sir Andras Schiff.



# £7.8m

The Theatre Artists Fund has raised over this amount to date.

## THEATRE ARTISTS FUND

The Theatre Artists Fund is a new recipient of Gatsby funding, which provides critical support for theatre workers and industry freelancers across the UK in need of urgent financial assistance due to the devastating impact of COVID-19 on the theatre sector. The Fund, started in July 2020 and spearheaded by Sir Sam Mendes, has raised over £7,800,000 to deliver over 7,000 emergency grants towards living costs and signposting to mental-health support, with 56% of grants going to recipients outside of London. By supporting freelance professionals now, the Fund will ensure that hundreds of theatres across the UK can depend on a workforce to be available when needed. The aims of the Fund are to enable artists, both experienced and emerging, to remain in their careers; champion diverse groups more vulnerable to financial hardship; encourage fresh talent into the creative industry, and to ensure theatre can continue to improve communities and learning.

Above: Visitor in Leiko Ikemura exhibition, ©Leiko Ikemura, photo Andi Sapey

## CAMBRIDGE ARTS THEATRE

Gatsby is also supporting The Cambridge Arts Theatre as it undergoes a major refurbishment of its auditorium. This thriving regional showcase, established in 1936 by the economist and founding member of the Arts Council John Maynard Keynes, has helped launch the careers of theatrical luminaries such as Sir Ian McKellen and Sir Sam Mendes, and celebrated many significant milestones, from Margot Fonteyn dancing her first *Swan Lake* to Harold Pinter's premiere of *The Birthday Party*. It is the playhouse of choice in the region, with regular visits from companies including The National Theatre, English Touring Opera, and Shakespeare's Globe.

Despite a part-rebuild in the 1990s, the Theatre is now in critical need of attention due to a fundamental problem with the circulation of audiences around the building and lack of effective bar and catering spaces.

The works will include major changes and improvements to the fabric of the auditorium, including new seating, a redesigned balcony, and seating configuration to improve sight lines and audience comfort. There will be improvements to allow for a wider range of programming choices; improved acoustics; a new technical infrastructure to replace its outdated and worn-out equipment, and more environmentally friendly and energy-efficient air-conditioning and lighting systems. These significant upgrades will ensure the future survival of the Theatre and its artistic outreach in the region.



The Gatsby Charitable Foundation  
The Peak, 5 Wilton Road, London SW1V 1AP  
T +44 (0)20 7410 0330 F +44 (0)20 7410 0332 [www.gatsby.org.uk](http://www.gatsby.org.uk)

Registered Charity number 251988