



John Innes Centre

Unlocking Nature's Diversity



2020 / 2021

ANNUAL REPORT

Contents

| | |
|--|-------|
| Message from our Director | 03 |
| About the John Innes Centre | 04 |
| Our Vision | 06 |
| Science highlights | 08 |
| EDESIA: Plants, Food and Health | 11 |
| Organisational achievements | 12 |
| Healthy people | 14 |
| Awards and honours | 15 |
| Working with industry | 16 |
| New ventures | 17 |
| BRIGIT – stakeholder engagement and citizen science | 18 |
| Engagement goes virtual | 19 |
| New appointments and fellowships | 20 |
| Future plans | 22 |
| Trustees' Report including the Strategic Report | |
| Introduction to the Annual Report | 24 |
| Charitable objective | 25 |
| Financial Review | 26 |
| Stakeholder Engagement Statement | 27 |
| Risk Assessment and Management | 28 |
| Structure, Governance and Management | 29-34 |
| Independent Auditor's Report | 35 |
| Financial Statements | 37-57 |
| Charity Information | 58 |

Message from our Director

Over the last year, we have lived through a stark demonstration of our collective vulnerability and how interconnected the world is. But this year's events also showed us the power of partnerships, and what can happen when people come together to develop solutions to global challenges.

Whether looking at a national scale, at the collaborative research and clinical response from academia and industry, or more locally, at the way organisations such as the John Innes Centre have continued to function throughout the pandemic, we can all be proud of what we can achieve when we all work together.

Despite the challenges, here at the John Innes Centre we have continued to make progress in our efforts to generate fundamental knowledge of plants and microbes and apply this to benefit agriculture, the environment and human health. Indeed, there are some real achievements to celebrate as we look back at the year.

In collaboration with The Sainsbury Laboratory, we launched our new joint vision, Healthy Plants, Healthy People, Healthy Planet, or HP³. It is an ambitious plan to use the power of plant and microbial science to overcome pressing global challenges.

We also launched new strategic partnerships, including a new collaboration with the Alan Turing Institute to enhance the ways machine-learning and artificial intelligence are applied to life-science research. This is a novel partnership across the Norwich Research Park brings together expertise in plant science and social sciences at the Norwich Institute of Sustainable Development.

In addition, we recruited new Group Leaders studying exciting topics across plant and

microbial science, such as the evolution of plant defences and floral scents, antibiotic-producing bacteria and the genetic diversity of peas, and we welcomed our first cohort of students on a new Wellcome-funded PhD programme, which aims to advance understanding of plant-based nutrition from crop to clinic.

But I also want to look beyond our research. I have always been firmly committed to the people at the John Innes Centre, and this year it has been more important than ever to keep our staff healthy and connected during the pandemic and to find ways to support each other. I am proud of our staff and students for the way they came together over the last year. Everyone has given their time and insights to ensure we can keep each other safe, and shown such resilience while our work continued.

It has also been vital to stay connected more widely over this time, and many of our activities moved online. From our busy programme of public engagement activities with schools, to running the first national Xylella Awareness Week, together with a citizen science project to encourage the public to hunt for spittlebugs, we found ways to ensure we remained connected to the wider world.

2020 demonstrated the key role science plays in developing solutions to global challenges. But it also showed us what can be achieved when research is focused on overcoming a global challenge.



Professor Dale Sanders FRS
Director of the John Innes Centre

■ ■ I am proud of our staff and students for the way they came together over the last year ■ ■

About the John Innes Centre

The John Innes Centre (JIC) is a world-leading international centre of excellence in plant science and microbiology.

Our mission is to generate knowledge of plants and microbes through fundamental research and to use this knowledge to benefit agriculture, the environment, human health and well-being. We train excellent scientists for the future and engage with policy makers and the public.

Our joint strategy with The Sainsbury Laboratory, Healthy Plants, Healthy People, Healthy Planet (HP³) outlines our vision for delivering a safer, healthier and more sustainable future through the power of plant and microbial science.



We are home to over
40 RESEARCH GROUPS
working on a variety
of plant and microbial
science research projects.

In collaboration with our
**WORLD-LEADING
ACADEMIC PARTNERS**

we are uniquely positioned to lead the
fundamental scientific advances needed to address
three intertwined, era-defining challenges:



**FEEDING
THE
WORLD**



**GLOBAL
HEALTH
THREATS**



**CLIMATE
CHANGE**



We are a diverse organisation with an
INTERNATIONAL WORKFORCE

58% from the UK, 16% from the EU27 and 26% from the rest of the world. Our staff come from 36 countries around the world.



We provide world-class
POSTGRADUATE EDUCATION
in plant science and microbiology as part of our mission to train the scientific leaders of the future. At any one time, we are training around 100 PhD students.

We are proud to have been the
FIRST INDEPENDENT INSTITUTION

to be awarded the Athena SWAN Gold Award in 2017, in recognition of our work to address equality in science.

We were a founding signatory to the
TECHNICIAN COMMITMENT

and are committed to embedding a culture where all staff across the organisation are supported and developed.

Research and Innovation

#1

The John Innes Centre ranked as the top plant science research organisation worldwide, based on citations between 2008 and 2017.

When assessed by a panel of independent experts, our strategic programmes achieved the highest ranking in BBSRC's Institute Assessment Exercise in 2016, and the mid-term review in 2019.

Since 2014, we've spun out seven companies and attracted four businesses to Norwich.

Funding and Impact

In 2020/21, the John Innes Centre had a total **INCOME OF £50.3 MILLION** and our total expenditure was **£46.1 MILLION**.

Our expenditure on our charitable activities was **£45 MILLION, or 97%**, of our total spend. This includes research, research infrastructure, and research support.

FOR EVERY £1 invested in the John Innes Centre, **£14 IS GENERATED** for the wider **UK ECONOMY**.

Healthy Plants, Healthy People, Healthy Planet

Harnessing the power of plants and microbes for a sustainable future

In June 2020, we launched a joint new vision with The Sainsbury Laboratory: Healthy Plants, Healthy People, Healthy Planet (HP³). It is an ambitious plan to address three critical challenges facing the planet to secure a safer, healthier and more sustainable future through the power of plant and microbial science.

The three challenges are: feeding the world, combatting global health threats and meeting the challenge of climate change.

"HP³ is a collaborative call to action to start to provide the solutions so desperately needed in a world with a rapidly changing climate, facing massive losses in biodiversity, a growing global population to feed and the urgent need to decarbonise agricultural practices," said Professor Dale Sanders.

HP³ outlines our plans to establish

a world-leading hub for UK plant and microbial science and to accelerate progress in tackling these major global challenges with the very best plant and microbial science laboratory infrastructure anywhere in the world. By integrating advances in genetics, genomics, structural biology, live-cell imaging and computational biology we will unlock new levels of understanding and strengthen the position of the UK as a global leader in plant and microbial science.

We are now working with The Sainsbury Laboratory and UKRI-BBSRC to secure funding for new research facilities to provide the world-class research environment needed to enable us to realise this exciting and ambitious vision for HP³.

Find out more about our vision at hp3.org

■ ■ The critical mass of world-leading researchers, facilities and technical expertise will allow us to advance ground-breaking discovery research, enhance knowledge creation and deliver high levels of scientific, societal and economic impact ■ ■

Professor Dale Sanders FRS

Science Highlights

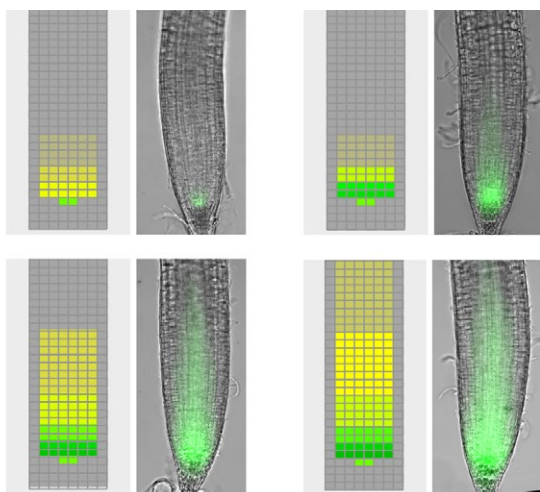
Slow growth is the key to long-term cold sensing

Professor Dame Caroline Dean, Professor Martin Howard and colleagues have discovered a new temperature-sensing mechanism in plants that can hold long-term memory of the cold.

Plants have to interpret temperature fluctuations over time to align their growth and development with the seasons. This study found that in warmer weather when plants grow more quickly, and cells multiply, the amount of a key protein NTL8, becomes diluted. In contrast, in cooler temperatures plants grow more slowly and NTL8 becomes more concentrated, accumulating over time.

The combination of genetic experiments to identify the key proteins involved, and mathematical modelling to show the key role of growth-dependent dilution, highlights the fantastic synergy when experimental approaches are combined with computational modelling. The findings will be useful for understanding how plants, as well as other organisms, sense fluctuating long-term environmental signals.

+ *Nature* DOI: [10.1038/s41586-020-2485-4](https://doi.org/10.1038/s41586-020-2485-4)



NTL8 (green and yellow) becomes diluted as plants grow quickly



Parasitoid wasp and cabbage stem flea beetle
Credit: Anna Jordan (JIC)

Parasitic wasp discovery could offer chemical-free pest control for farmers

Researchers found that a species of parasitic wasp could provide farmers with a chemical-free way of controlling a major crop pest.

Anna Jordan discovered the wasps in colonies of cabbage stem flea beetles – a prominent UK pest that feeds on oilseed rape. Working with Dr Rachel Wells and Professor Steve Penfield the team discovered that the beetles had been infected by *Microctonus brassicae*, a parasitic wasp that lays eggs within the beetles' bodies, killing them after the wasp larvae emerge.

In controlled conditions, the presence of sufficient numbers of the wasps led to the collapse of the beetle colonies, raising the possibility that *Microctonus brassicae* could be employed to protect a range of crops prone to attack by the cabbage stem flea beetles.

+ *Entomologia Experimentalis et Applicata*
DOI: [10.1111/eea.12910](https://doi.org/10.1111/eea.12910)

Bacteria can tell the time

Humans have internal daily clocks and so do other animals and plants. Research reveals that non-photosynthetic bacteria also have them, answering a long-standing biological question that could have implications for the timing of drug delivery, biotechnology, and how we develop timely solutions for crop protection.

Biological clocks, or circadian rhythms, are molecular rhythms that allow cells to tell the time of day. Previous studies have shown that photosynthetic bacteria, which require light to make energy, have biological clocks. In this study, the researchers

detected free-running circadian rhythms in the non-photosynthetic soil bacterium *Bacillus subtilis*. "Our study opens doors to investigate circadian rhythms across bacteria. Now that we have established that non-photosynthetic bacteria can tell the time, we need to find out the processes that cause these rhythms and understand why having a rhythm provides bacteria with an advantage," said Professor Antony Dodd.

Further studies can build on this to investigate whether time of day could be important for bacterial infection and treatment, and whether industrial biotechnological processes can be optimised by taking the time of day into account.



Soil bacterium *Bacillus subtilis*

+ *Science Advances*
DOI: [10.1126/sciadv.abe2086](https://doi.org/10.1126/sciadv.abe2086)

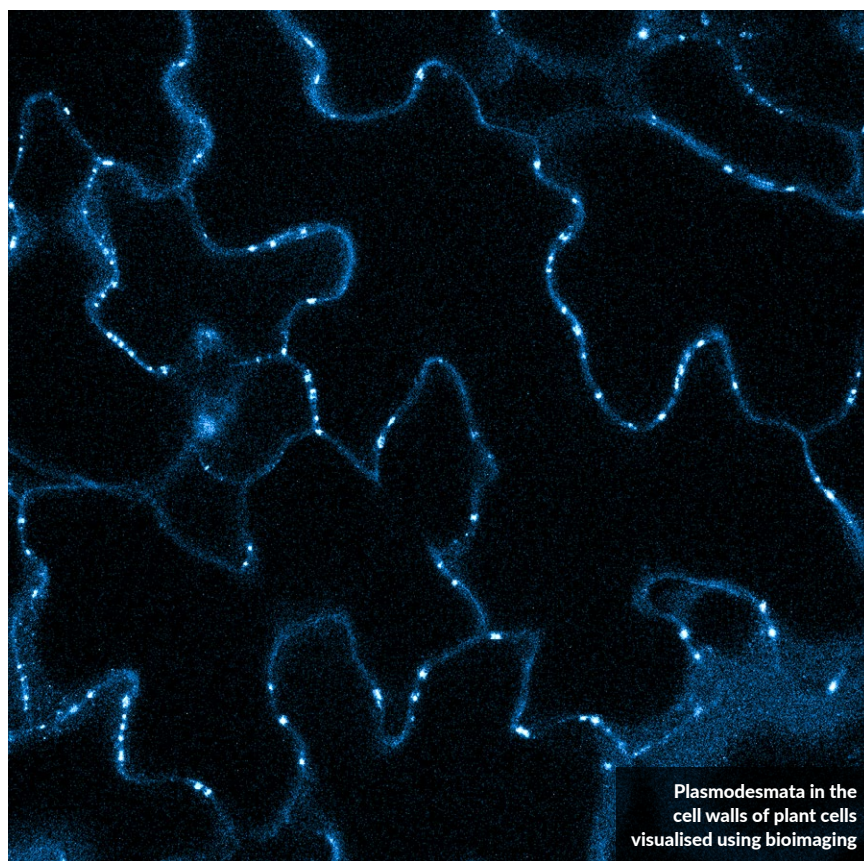
New understanding of how plant cells isolate in response to threat

A team led by Dr Christine Faulkner uncovered more about the mechanism plant cells use to isolate themselves when faced with pathogens. When a cell perceives a threat, such as an invading fungus or bacteria, plasmodesmata – the tunnel-like connections that allow molecules to move between cells – close over and the cells are temporarily isolated.

The team used bioimaging approaches to investigate the proteins involved in this process of cellular self-isolation. They used a material called chitin from the cell wall of fungus to trigger an immune response and found that it triggered a different response in the membranes that line the plasmodesmal tunnels compared to that in the membranes that surround the cell body.

Having specific signalling in the plasmodesmal part of the cell membrane suggests that processes requiring cell-to-cell connectivity are regulated independently of immune response, raising questions over whether there is a critical requirement for cells to balance connectivity and resource exchange with a protective mechanism imposed by isolation.

+ PNAS DOI:10.1073/pnas.1907799117



Plasmodesmata in the cell walls of plant cells visualised using bioimaging



Wheat has a large complex genome, 6x larger than the human genome

Landmark study generates first genomic atlas for worldwide wheat

A collaborative international research team has created the most comprehensive atlas of wheat genome sequences ever reported. The 10+ Genome Project collaboration, which involved more than 95 scientists, sequenced the genomes of 15 wheat varieties from around the world, detailing where important genes can be found.

Professor Cristobal Uauy and colleagues defined blocks across the genome called haplotypes – blocks of genes that are co-inherited together and selected by breeders in search of new crop lines with desirable traits. The atlas enables scientists and breeders to quickly find influential genes for improved yield, pest resistance and other important traits and could catalyse a new era of wheat discovery.

+ Nature DOI: 10.1038/s41586-020-2961-x



Tomatoes enriched with Parkinson's disease drug, L-Dopa

GM tomatoes offer affordable source of Parkinson's disease drug

Researchers have developed genetically modified (GM) tomatoes enriched in the Parkinson's disease drug L-DOPA, which could become a new, affordable source of the essential medicine. The team, led by Professor Cathie Martin, modified the tomato fruit by introducing a gene responsible for the synthesis of L-DOPA in beetroot, where it functions in the production of the pigments betalains.

The next step is to create a production pipeline where L-DOPA is extracted and purified into the pharmaceutical product. The work has implications for developing nations, where access to pharmaceuticals is restricted, and may offer benefits for people who suffer adverse effects from chemically synthesised L-DOPA.

+ Metabolic Engineering DOI: 10.1016/j.ymben.2020.11.011

Gene editing produces tenfold increase in superbug-slaying antibiotics

Researchers in Professor Matt Hutchings' and Professor Barrie Wilkinson's groups used genome editing to make a new strain of bacteria that produce high quantities of superbug-targeting antibiotics. Formicamycins are promising and powerful antibiotics and, under laboratory conditions, superbugs like MRSA do not become resistant to them. The bacteria *Streptomyces formicae* produce these antibiotics in small quantities. In this study Dr Rebecca Devine used CRISPR/Cas9 genome-editing technology to create a new strain of *Streptomyces formicae* bacteria that produce ten times more formicamycins.

"We will use the over-producing strain to purify enough formicamycins to figure out their mode of action, how they kill superbugs such as MRSA, and why these superbugs don't become resistant. This is vital to their further development as antibiotics," said Professor Hutchings.



+ *Cell Chemical Biology*. DOI: [10.1016/j.chembiol.2020.12.011](https://doi.org/10.1016/j.chembiol.2020.12.011)

Wrinkled 'super pea' could be added to foods to reduce diabetes risk

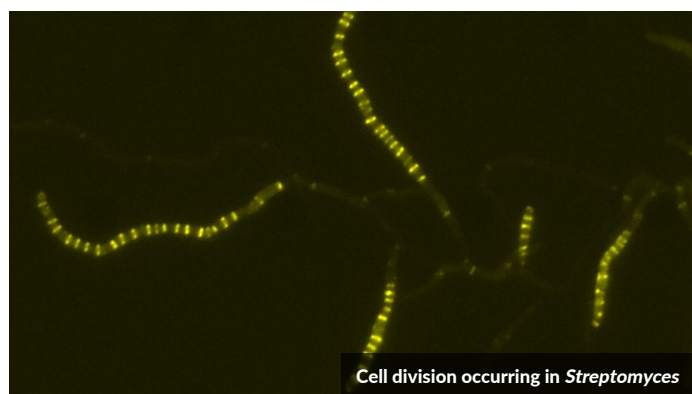
Professor Claire Domoney and colleagues, in collaboration with Imperial College London and the Quadram Institute, found that a type of wrinkled 'super pea' may help control blood sugar levels and could reduce the risk of developing

Type 2 diabetes. Using pea lines from our Germplasm Resource Unit, the researchers found that unlike regular, smooth peas, wrinkled peas contain higher amounts of 'resistant starch', which takes longer for the body to break down. Using healthy volunteers, the researchers found that, compared to eating smooth peas, the wrinkled peas led to significantly lower sugar spikes.

The researchers are now planning further studies involving volunteers with early-stage Type 2 diabetes. This will also involve a major pea-breeding programme with help from industry partners to develop more 'super peas' with the resistant starch.



+ *Nature Food* DOI: [10.1038/s43016-020-00159-8](https://doi.org/10.1038/s43016-020-00159-8)



Uncovering a critical factor in the assembly of cell-division machinery in bacteria

To grow and proliferate, bacteria must divide. Central to this process is FtsZ, a protein that assembles into a ring-like structure known as the Z-ring. For most bacteria, the Z-ring is essential for building the cell-division machinery and for the synthesis of a dividing wall that allows the bacteria to physically separate.

Previously, there was little understanding of the mechanisms for Z-ring assembly in a group of bacteria that includes several that are medically and industrially relevant, such as *Mycobacterium tuberculosis*, which causes tuberculosis (TB), or the prolific antibiotic producer, *Streptomyces*. Using a combination of biochemical analyses and live-cell imaging, researchers in Dr Susan Schlimpert's group identified a novel cell-division protein called SepH, which directly interacts with the cell-division machinery and regulates the assembly of Z-rings in *Streptomyces*. Further research could identify strategies to inhibit this interaction and prevent cell division, which would be of particular interest in the treatment of TB.

+ *eLife* DOI: [10.7554/eLife.63387](https://doi.org/10.7554/eLife.63387)

An Achilles' heel for wheat rust infection

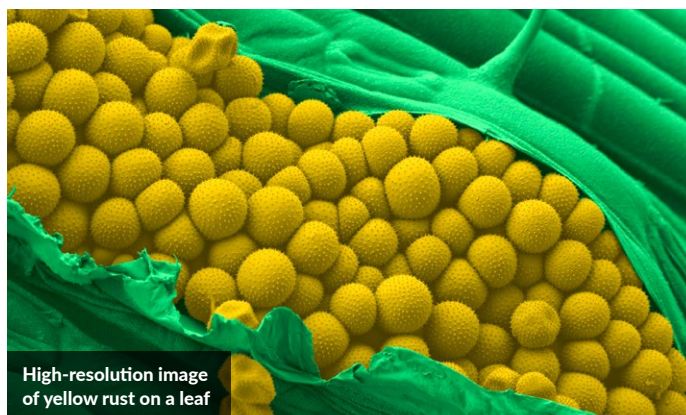
Researchers from the Dr Diane Saunders' group have found a gene in wheat that acts to promote rust fungal infection, and that disrupting it provides resistance to two of the most economically damaging diseases of wheat worldwide – yellow rust and stem rust.

As rust fungi attack, they turn on and off particular genes in wheat to prevent the plant from defending itself. When successful, this stops the plant from killing the invading fungus and ultimately leads to severe plant disease.

Researchers identified one wheat gene they called TaBCAT1 that was turned on early during a successful yellow-rust infection. Deleting this gene in wheat mutants severely reduced infection, suggesting its important role in rust fungi causing disease.

Dr Pilar Corredor-Moreno, said: "We were amazed to see that removing just this one gene in our mutant plants caused them to alert their defence responses even before they were under attack. This likely helped the plants to give a much speedier defence response, curtailing rust infection before it even had a chance to start."

+ *The Plant Cell* DOI: [10.1093/plcell/koab049](https://doi.org/10.1093/plcell/koab049)



EDESIA: Plants, Food and Health

In autumn 2020, the first cohort of students started on a new Wellcome-funded PhD programme at the John Innes Centre

The EDESIA: Plants, Food and Health PhD programme will advance understanding of plant-based nutrition from crop to clinic, initiating a step-change in nutritional research in the UK and addressing diet-related illness, which costs billions globally.

Around three million people in the UK are estimated to be malnourished, with two billion worldwide experiencing deficiencies of essential micronutrients deemed 'hidden hunger'. The programme puts plants at the heart of nutrition and aims to create a new generation of nutritionists.

The EDESIA programme pioneers a multidisciplinary approach to plant-based nutritional research, drawing on expertise from across the Norwich Research Park. This pioneering approach also extends to its pledge to provide support post-studentship, helping to bridge the gap between industry and academia.

EDESIA addresses several UN sustainable-development goals in hunger, poverty, inequality, responsible consumption patterns and climate action. The EDESIA students will work to unravel the complex interrelationship between plant-based foods, metabolism, the gut microbiota and health outcomes.



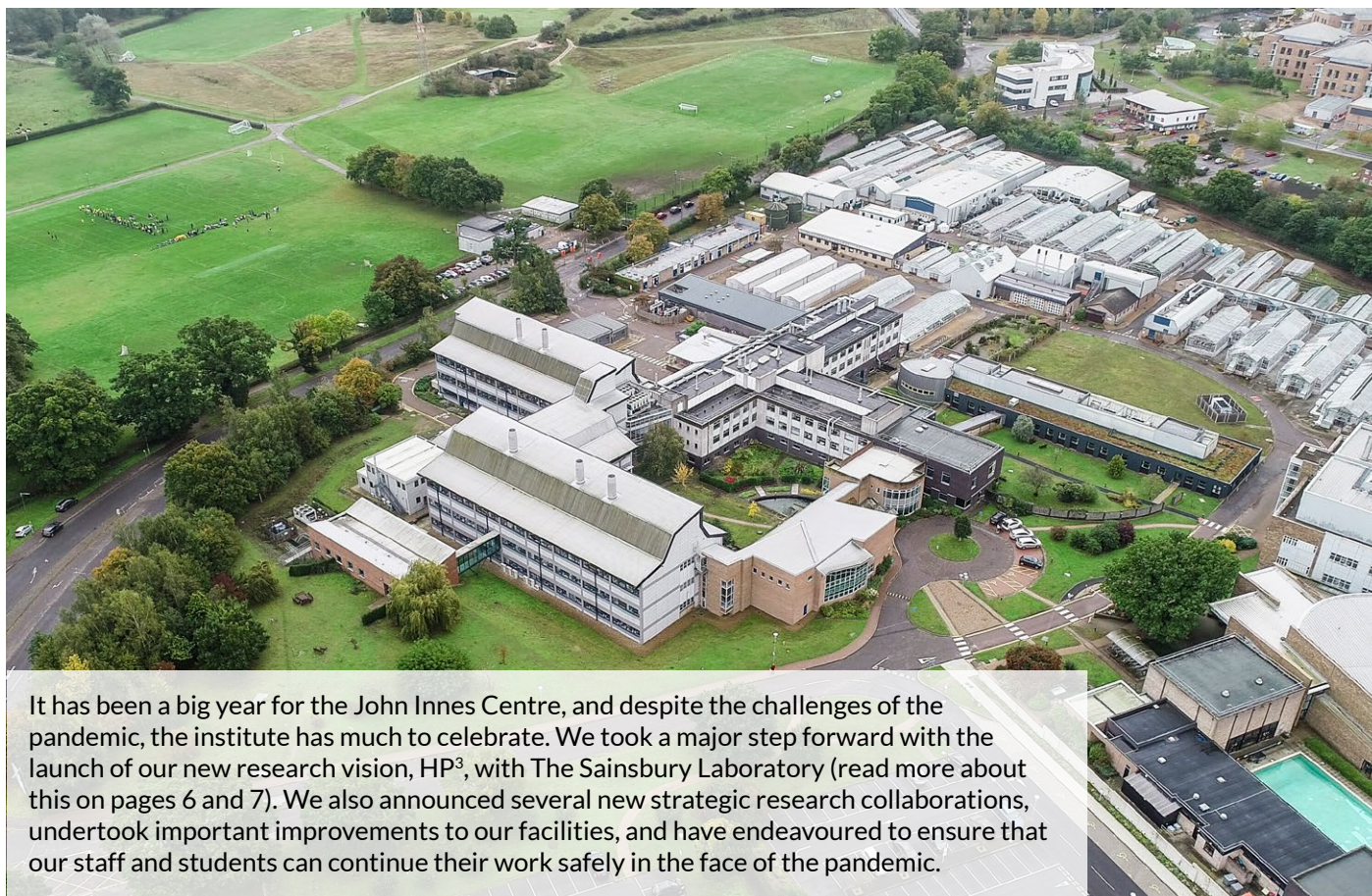
Yvie Morgan is one of five students who started in the autumn of 2020



Funded by Wellcome, 25 EDESIA PhD students will begin projects at the Norwich Research Park over the next five years, part of a Wellcome initiative to support 23 new PhD programmes across health science.



Organisational achievements



It has been a big year for the John Innes Centre, and despite the challenges of the pandemic, the institute has much to celebrate. We took a major step forward with the launch of our new research vision, HP³, with The Sainsbury Laboratory (read more about this on pages 6 and 7). We also announced several new strategic research collaborations, undertook important improvements to our facilities, and have endeavoured to ensure that our staff and students can continue their work safely in the face of the pandemic.



**Norwich Institute
Sustainable Development**

A world-leading institute to foster sustainable development
through transdisciplinary research and innovation

Launch of the Norwich Institute for Sustainable Development

In February 2021, a new UK centre of excellence was set up by partners at the Norwich Research Park to improve global food security, which is threatened by climate change. The Norwich Institute for Sustainable Development (NISD) will focus on developing solutions to enable farmers to build resilience to variable rainfall, drought and extreme weather events.

The NISD is supported by the John Innes Foundation and brings together expertise in plant science at the John Innes Centre and in social sciences at the University of East Anglia's School of International Development.

■ ■ The new centre at the Norwich Research Park involves researchers from the John Innes Centre, UEA, Quadram Institute, Earlham Institute and The Sainsbury Laboratory ■ ■



Major funding award to modernise horticultural facilities

A £5.1m project to modernise our horticultural facilities was funded by UKRI-BBSRC in the autumn of 2020. The investment allowed us to build new Controlled Environment Rooms (CERs) for our plant and microbial experiments, offering precise control of environmental factors such as light, temperature and humidity. The upgrade also improved the containment measures required for experiments that investigate plant pathogens and for growing genetically modified plants.

■ ■ The new infrastructure's LED lighting, wastewater treatment and rainwater harvesting will bring a reduction in utility costs of around £116,000 a year ■ ■

Norwich recognised in UK Plant Science Research Strategy

In March 2021, the UKRI-BBSRC published a new research strategy for plant science, outlining clear goals for research and innovation involving plants and microbes over the next ten years and calling for investment in world-class infrastructure.

The strategy emphasises the unique role that plant science research must play in safeguarding the future of our planet, and in addressing a range of global challenges – including tackling climate change, ensuring a sustainable food supply and protecting biodiversity.

The plant science research strategy recognises real investment opportunities in Norwich by highlighting the critical role HP³ will play in successfully delivering the strategy and ensuring a world-class research base. By developing a world-leading hub for plant and microbial science, the John Innes Centre and The Sainsbury Laboratory will provide a national resource, helping to accelerate progress in tackling these major global challenges.

Authored by Professor Jane Langdale CBE FRS of the University of Oxford, the strategy follows extensive consultation with members of the research and innovation community.

■ ■ This strategy embeds pioneering plant science at the heart of the UK science and innovation landscape. It will be indispensable in guiding the research community as it seeks to address the global challenges that lie ahead ■ ■

Professor Dale Sanders FRS



Healthy people at the John Innes Centre

Meeting and overcoming challenges like climate change, feeding the world and safeguarding human health relies on creating and nurturing talent, and providing those people with a safe, open, inclusive and welcoming research environment

We strive to increase the diversity of our workforce, and for everyone to feel invested in the science, in themselves and their colleagues. We're committed to the development of all our staff and students and to providing equal opportunities that encourage flexible working, career development and work-life balance.

With the Covid-19 pandemic impacting the way we interact and work together, staff and students across the JIC have adapted remarkably and shown resilience, enabling the institute to remain open and our research to continue. A huge range of staff and students have created and delivered an astonishing number of activities to encourage engagement and to look after our well-being.

Alongside a wide range of people who have contributed to making the institute a safe and inviting place to work, the Wellbeing and Mental Health group has played a key role during this time by providing new resources, regular messages about mental health and training new mental health first aiders.



Healthy people to me means happy people. People who are passionate about their science and respectful to their colleagues

Dr Carole Thomas, Head of the Directorate and lead on Equality, Diversity and Inclusion

This group aims to raise awareness and understanding of well-being and mental health issues, as well as engagement in them, and works to promote and develop on-site resources. Ultimately, the group strives to build an inclusive and welcoming community and reminds people that they are not alone.

In 2020, we set up a Racial Equality and Ethnic Diversity (REED) working group. REED is chaired by Dr Ricardo Ramírez González, a post-doctoral scientist and the Race and Ethnicity Equality and Diversity Champion.

Building on the success of the 2018-2020 Technician Commitment action plan, we launched our 2021-23 action plan outlining how we will continue to embed the values of the Technician Commitment in the institute. It outlines actions in eight areas, including continuing to increase awareness of technical roles at the JIC.



Dr Ricardo Ramírez González

There are approximately 200 technical staff at the John Innes Centre



Data: 2018 - 2020



57 technicians have PhDs

Technicians are authors on 45% of scientific papers published



Awards and honours



Professor Dame
Caroline Dean FRS

Trio of honours for Professor Dame Caroline Dean FRS

Last year, Professor Dean was presented with some of the world's most prestigious scientific awards, including the Royal Society Royal Medal in recognition of her work over her 30-year career.

Professor Dean and her research group have elucidated molecular mechanisms underlying seasonal

timing and the epigenetic basis of vernalisation – the process by which plants delay flowering until they have experienced a period of prolonged cold. The Royal Medals are awarded on behalf of the Queen each year and have been issued annually since 1825. Previous recipients have included Francis Crick, Mary Lyon

and Fred Sanger.

The medal was the third major honour received by Professor Dean in 2020. She received the Wolf Prize for Agriculture in January 2020 and was elected to the American Academy for Arts and Sciences as an International Honorary Member in the class of biological sciences.



Professor Dale
Sanders FRS

Anna Backhaus – Jeanie Borlaug-Laube Women in Triticum (WIT) Award

Anna Backhaus was one of five early-career scientists selected from around the world to receive the WIT Award for 2020.

Her research is focused on the genetic networks in control of early spike development in wheat, trying to understand how developmental decisions are encoded in the crop's genome. Her PhD supervisor, Professor Cristobal Uauy said: "Anna has a deep-rooted motivation and passion to make an impact in the world through her research. She embodies the next generation of crop scientists."



Anna Backhaus

Prestigious Chinese award for collaboration

In January 2021, Director of the John Innes Centre, Professor Dale Sanders FRS, received the Chinese Academy of Science (CAS) International Science and Technology Cooperation Award.

The prestigious annual award rewards outstanding international contributions to long-term cooperation with CAS. Professor Sanders was instrumental in

setting up and continuing the development of the Centre of Excellence for Plant and Microbial Science (CEPAMS), a collaboration between the John Innes Centre and CAS.

A leader in the field of plant ion signalling and mineral nutrition, he has obtained important results in the study of calcium channels, membrane transporters, cell signalling and ion homeostasis.

Dr Shannon McKie – Gregory Paul Lenardo Basic Science Award

The Gregory Paul Lenardo Basic Science Award is given once a year for discoveries in fundamental cellular, molecular or genetic processes using model systems that advance scientific understanding of biological processes in higher organisms.

In December 2020, Dr McKie received this award for her studies of the biochemical and biophysical characterisation of topoisomerase VI, which functions to detangle DNA, from the archaeal species *Methanosarcina mazei*, to gain a deeper understanding of this enzyme's activity.

Her PhD supervisor, Professor Tony Maxwell, said, "Shannon was a truly outstanding PhD student who worked on fundamental aspects of the archaeal enzyme DNA topoisomerase VI, and, in so doing, revealed key features of its physiological role in plants and plasmodial parasites."



Dr Shannon McKie

Working with industry

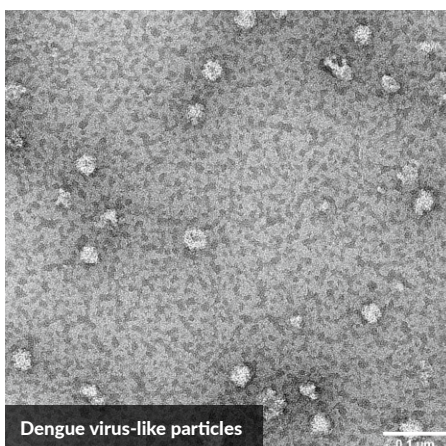
The knowledge generated by the John Innes Centre has led to many innovative and practical solutions to global challenges. This is the result of ground-breaking research, combined with activities to develop specific and applied scientific solutions. Over the past five years we have enhanced translation and application through collaborations, start-ups, spin-outs, licence agreements and inward investment.

A first step to plant-made dengue virus vaccines

John Innes Centre researchers have used plants to produce virus-like particles (VLPs) of the dengue virus, in a first step towards a novel vaccine. Dengue is a pathogenic mosquito-borne virus that causes approximately 390 million infections per year.

The team in Professor George Lomonosoff's group worked in collaboration with Leaf Expression Systems, one of our spin-out companies, to produce VLPs of dengue virus serotype 1, one of four distinct variations of the virus. VLPs are authentic mimics of the virus, containing the protein coat but without the infectious material. This protein coat is enough to train the immune system to respond to the virus without causing an infection. Using plants to produce these valuable molecules could offer an affordable and low-tech solution to vaccine development.

The researchers used a variety of tobacco (*Nicotiana benthamiana*) to transiently express dengue VLPs using technology pioneered at the John Innes Centre by Professor Lomonosoff. After extraction and purification, the VLPs were shown to stimulate an immune response to the virus in experiments on mice. Further work will focus on improvements to the methods and extraction of VLPs and on trying to replicate this for the other serotypes of dengue virus.



Dengue virus-like particles



Infiltrating *Nicotiana benthamiana*

Is vertical farming the future of agriculture?

Vertical farming has the potential to revolutionise agriculture, allowing us to grow crops in a sustainable and less environmentally damaging way.

To make vertical farming more productive and sustainable we have teamed up with Bristol-based start-up LettUs Grow, an indoor vertical agriculture company. It is engineering novel indoor farm hardware and software to grow a variety of crops using aeroponics.

LettUS Grow has recently sponsored a PhD studentship through the UKRI-BBSRC Norwich Research Park Doctoral Training Partnership with John Innes Centre group leader Professor Antony Dodd. This project will study the role of circadian rhythms in regulating crop production in vertical farms. Understanding the interaction between the circadian clock of suitable crops and these artificial growing environments will be a valuable step to boosting productivity while reducing costs.

Early findings are helping LettUs Grow to optimise growing protocols and hardware applications, to reduce energy and water use, and thereby improve the carbon footprint and ultimately lead to more sustainable farms.



New ventures at the John Innes Centre



Quantitative Plant Biology

John Innes Centre launches academic journal, *Quantitative Plant Biology*

In June 2020, we partnered with Cambridge University Press to launch a new open-access journal: *Quantitative Plant Biology* (QPB).

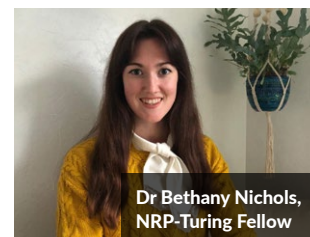
QPB is designed to provide an interdisciplinary forum for high-quality research on ground-breaking discoveries and predictions in plant science, and a dedicated home for research that applies techniques such as data mining and analysis, mathematical modelling and machine learning to plant biology.

The new journal welcomes research from across the spectrum of fundamental, applied and societal plant research; from across all biological scales – molecular through to cellular and organismal though to population; and based on data from laboratories, fieldwork and citizen science.

New Turing Institute collaboration to bring the best in AI to Norwich Research Park

A collaboration with the Alan Turing Institute, launched in September 2020, has a vision to enhance the ways machine learning and artificial intelligence are applied to life-science research. Biological research is increasingly data rich and the collaboration aims to identify new ways to exploit this information and accelerate advances in understanding.

The Norwich Research Park-wide collaboration with the Alan Turing Institute is supporting six year-long research posts, including one based at the John Innes Centre, working together in a cross-institute cohort to expand the application of machine learning and artificial intelligence.

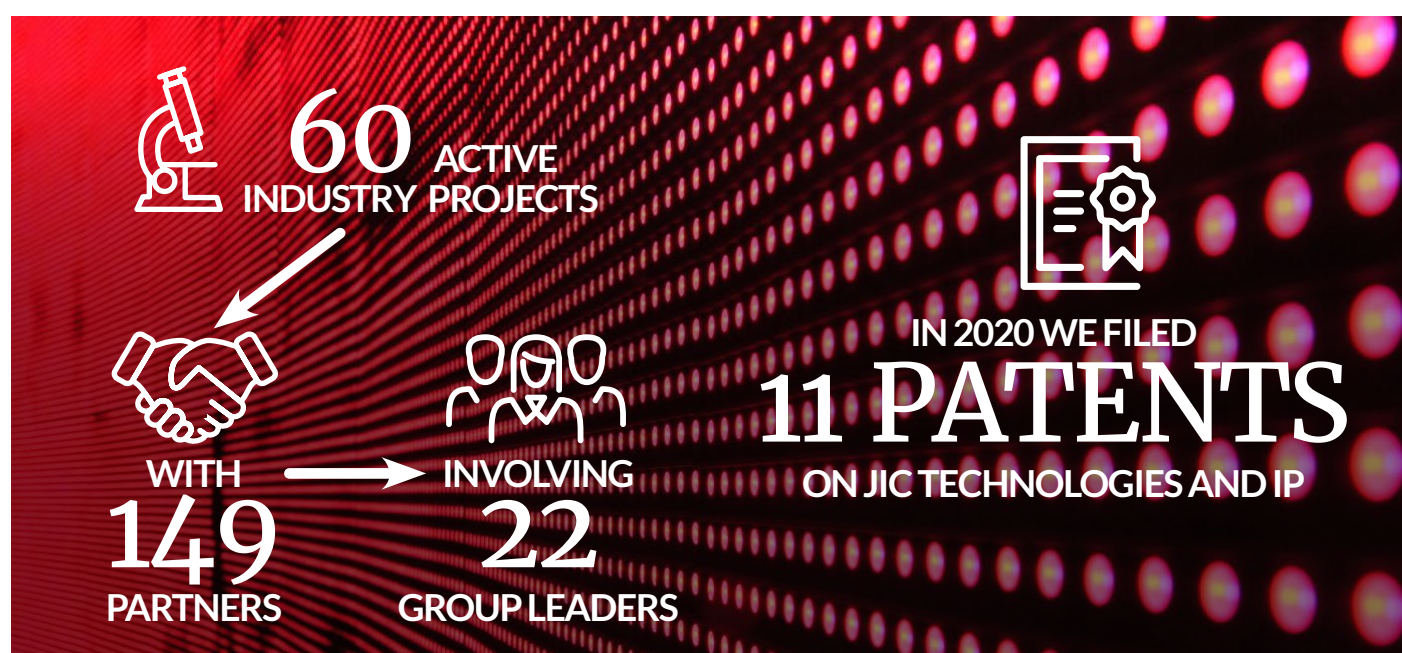


Dr Bethany Nichols,
NRP-Turing Fellow

New biobank to preserve UK soil microbial biodiversity

October 2020 marked the launch of a new partnership to establish the UK Crop Microbiome Cryobank. The five-year initiative will use state-of-the-art cryo research techniques to preserve important crop microbiome samples from different soil types across the UK to safeguard future research and facilitate sustainable production of the UK's six major food crops, including barley, oats, oil-seed rape, potato, sugar beet and wheat.

The John Innes Centre joins CABI, which is leading the project, along with researchers from Rothamsted Research and Scotland's Rural College (SRUC). This team will develop a 'Noah's Ark' of UK microbes from crop systems and this will form the first publicly available resource of its kind anywhere in the world.



BRIGIT – stakeholder engagement and citizen science

Funded by UKRI's Strategic Priorities Fund, with support from Defra and the Scottish Government, the BRIGIT programme has delivered some exciting new activities this year.



BRIGIT, a UK-wide consortium of 12 organisations led by the John Innes Centre, builds the UK's capability to prevent the establishment of vector-borne plant pathogens and to increase our preparedness to respond should they be introduced.

The consortium studies *Xylella fastidiosa*, a bacterial pathogen that is not present in the UK but is an emerging threat in southern Europe and has devastated olive trees in Italy.

Over the past two years, through the project, the consortium has worked closely with key stakeholders and the public to share knowledge, collect data and raise awareness of the disease.

We're all going on a bug hunt – citizen science project gathers key data

From 2019 through to 2021, the BRIGIT programme ran a citizen science project to collect information about the frothy blobs of cuckoo spit that appear on plants in late spring. Over three seasons, more than 12,000 spittlebug sightings were submitted to the project.

Cuckoo-spit is produced by spittlebug nymphs as protection against predators and to prevent them drying out and is associated with the arrival of spring. Spittlebugs, also known as froghoppers, emerge from those frothy protective havens to feed as adults on a wide range of plants and trees.

The data collected during the spittlebug hunt feeds into the BRIGIT programme, aiming to map and understand the distribution of these xylem-feeding insects in the UK. This data also helps scientists to model the spread of *Xylella fastidiosa* in hypothetical situations, supporting the UK Government's planning and preparation for potential incursions of vector-spread plant diseases in the future.



Xylella-infected olive trees in Puglia, Italy. Credit: Dr Steven White, CEH

Xylella Awareness Week – engaging with key stakeholders

In March 2021, the BRIGIT consortium delivered the UK's first Xylella Awareness Week – a week of activities to engage key stakeholders and the public in the findings and outcomes of the research. The four-day virtual event engaged with key groups of stakeholders, including inspectors from the Plant Health and Seeds Inspectorate (PHSI) of the Animal and Plant Health Agency (APHA), business owners in the horticulture trade sector, professionals and volunteers at botanic gardens and in environmental groups, and members of the public.

Workshops tailored to each group shared information about *Xylella fastidiosa*, its symptoms, host plants and insect vectors, as well as finding out what information would be useful for these groups in the future. Surveys, Q&A sessions and polls indicated that all groups would like access to insect identification and geography databases.

Engagement goes virtual

2020 became the year that events went virtual. We took this as an opportunity to widen participation in our public and school engagement events, inviting schools nationwide to join our Year 10 science camp and Women of the Future events.



In 2020, our flagship event for Year 10 girls moved online and we curated 30 videos from 45 women working in STEM subjects. This new video directory has proved popular, having had well over 3,000 views. On 27 November, schools joined two one-hour Q&A sessions with women in STEM.



Innes Lecture 2020: the 1925 Scopes Monkey Trial: why did so many people hate evolution?

The 2020 Innes Lecture told the story of the Scopes Monkey Trial and highlighted key themes in the public reactions. Professor Joe Cain, a historian of science in the 19th and 20th centuries, gave a fantastic virtual talk, which was followed by a lively question and answer session.

In 1925, an American school teacher was put on trial for teaching evolution. This was global news and an important moment in the ever-changing relationship between science and religion. Why have so many people – over two centuries and around the world – hated evolution?

This talk is available on the John Innes Centre YouTube channel at youtube.com/JohnInnesCentre

PHYTOPIA exhibition: 21-30 August 2020

In August 2020, we became a content partner for the Science Gallery Bengaluru's first digital exhibition PHYTOPIA, which explored the past, present and future of plants.

PHYTOPIA was an online exhibition that brought together engineers, scientists, designers, artists, chefs and biohackers to explore plants and experiment beyond the kitchen, the lab and the farm. Scientists from the John Innes Centre took part in the exhibition, giving lab tours and taking part in question and answer sessions online.

To view online, visit bengaluru.sciencegallery.com/phytopia



New appointments and Fellowships

Dr Kelsey Byers

Group Leader

Dr Kelsey Byers joined the John Innes Centre in August 2020. She studies the evolution and diversification of floral scent at a wide range of scales, from genus-wide evolutionary patterns to floral-scent evolution of pairs of species with different pollination systems.

She is also investigating how floral scent genes evolve in natural populations. Flowers use many traits to influence animal pollinator visitation, including colour, shape and scent. By making sure that the 'right' pollinators visit in the right way, plants can ensure that their pollen is successfully transferred. At its core, Kelsey's research focuses on the evolution of floral scent in different flowering-plant species.



Dr Philip Carella

Group Leader

Dr Phil Carella joined the John Innes Centre in August 2020. His research aims to better understand how the diversity of land plants defend against pathogen infection. Using evolutionarily insightful model plants, Phil's group will investigate widely conserved and lineage-specific aspects of plant defence that will inform future efforts to protect plants from harmful pathogens.

The overarching theme of their research is to explore and understand the evolution of plant defence – in particular, understanding how the critically important plant defence pathways of crops were first established when plants colonised land, and how these have evolved across distantly related plants.

Professor Matt Hutchings

Group Leader

The Matt Hutchings group joined the John Innes Centre in August 2020. The group works on the specialised metabolites made by *Streptomyces* species and closely related actinomycete bacteria, which are used to produce more than half of all known antibiotics.

Matt's group is particularly interested in the chemical ecology of these bacteria and their natural products. For example, antibiotic-producing actinomycete bacteria interact with insects and plants and protect them against infection by pathogenic bacteria and fungi in return for food and housing.



Dr Sanu Arora

Group Leader

Dr Sanu Arora joined the John Innes Centre as a John Innes Foundation-supported Group Leader in November 2020. Her group will explore the natural diversity of the *Pisum* (pea) species for environmental resilience. The demand for pea protein is expected to grow exponentially in the coming years. This is at odds with the highly volatile yield of pea as a crop.

Sanu's research works to understand the genetic basis underlying the causes of this uncertainty, with the objective of achieving yield stability. Her research will start by looking for genetic sources of resistance to devastating diseases of pea (root rots, powdery and downy mildews), against which the current control strategies are not particularly effective.

Dr Eva Sharpe

Head of Strategic Engagement

In December 2020, Dr Eva Sharpe joined as our Head of Strategic Engagement. This new role, embedded in the directorate, will facilitate and build new and existing relationships with a variety of our external audiences, including funders, policy makers, partners and the public.

A biochemist by background, Eva left lab research to move into science policy and communications. Initially, she will focus on developing our policy and public affairs approach – to help ensure that our research discoveries deliver impact and that policy decisions are informed by scientific evidence. She is also leading our stakeholder engagement activities around our plans to take forward the HP³ vision.



Dr Jay Biernaskie

Daphne Jackson Fellow

Dr Jay Biernaskie returns to research after a two-year break. His Fellowship project is titled: *Testing alternative designs for cooperative and productive wheat crops*.

The aim of Jay's research is to understand how to shift crops from a competitive state to a more cooperative and productive state. He is interested in special cases where natural selection will have favoured cooperation, especially among the genetically identical components of large individual plants (e.g. multiple stems from the same wheat plant).



CEPAMS link strengthened by Royal Society-Newton Advanced Fellowship

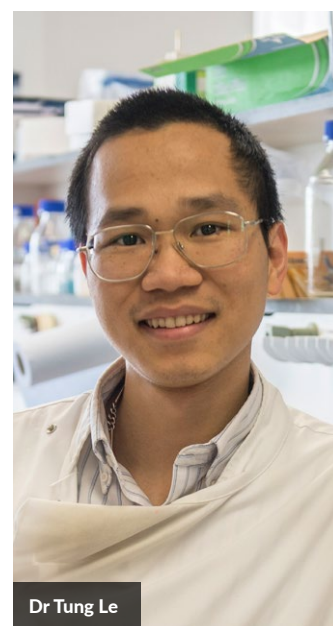
A Chinese-UK collaboration investigating medicinally important compounds in plants has been further strengthened by Royal Society funding awarded in May 2020.

Dr Evangelos Tassis, CEPAMS Group Leader based in Shanghai, has been awarded a Royal Society-Newton Advanced Fellowship. His group works to determine how plants make structurally diverse chemical compounds. The two-year fellowships allow leading researchers to develop their career through training and collaboration and to establish long-term and sustainable links with UK research institutions.

The Advanced Fellowship supports collaboration between Evangelos and Professor Cathie Martin FRS. Their research aims to identify the compounds with anticancer activity from barbed skullcap and how plants synthesise them.



Dr Dmitry Ghilarov



Dr Tung Le

John Innes Centre research attracts global health charity funding

Two talented early-career scientists have won £2.5m funding from the global health charity Wellcome, to carry forward their influential research at the John Innes Centre.

Dr Dmitry Ghilarov is the recipient of a five-year Wellcome Sir Henry Dale Fellowship, an award jointly funded by the Royal Society. Dmitry is due to begin the fellowship-funded post at the John Innes Centre in September 2021.

Dr Tung Le receives a Wellcome five-year Investigator Award, designed to support independent researchers addressing some of the most important questions in science. Tung's research focuses on understanding bacterial chromosome structure and its impact on DNA replication and segregation.



Future plans

The next 12 months will be a crucial period for the John Innes Centre as we bring in a new Chair of the Governing Council, complete our quinquennial submission for the BBSRC's Institute Assessment Exercise, and adapt to changes in the workplace following the pandemic

Recruiting a new Chair of Governing Council

In March 2021, Dr Will West reached the end of his tenure as Chair of the JIC's Governing Council. Current Trustee Director Dr Deborah Keith has taken on the role in an interim capacity while a search is underway to appoint a successor. The new Chair will take leadership of the John Innes Centre's governance, working closely with the Director and management to continue to deliver our excellent and impactful research. They will take up this role at an exciting point, as we take forward our ambitious plans to deliver our new research vision, Healthy Plants, Healthy People, Healthy Planet (HP³) while building on our recovery from the pandemic.

Developing our research strategy in preparation for the next Institute Assessment Exercise

As a BBSRC strategically funded institute, the John Innes Centre takes part in an Institute Assessment Exercise (IAE) every five years as part of our funding renewal. Due to the pandemic, the IAE submission date has been delayed. In preparation for our submission, we are engaging staff in developing detailed plans for our research over the next five years within Institute Strategic Programmes.





■ ■ The critical mass of world-leading researchers, facilities and technical expertise will allow us to advance ground-breaking discovery research, enhance knowledge creation and deliver high levels of scientific, societal and economic impact ■ ■

Bidding for major new infrastructure to become a plant and microbial science hub

We have reached the next stage of our joint application with The Sainsbury Laboratory and UKRI-BBSRC, which will secure funding for new research facilities to provide a world-class research environment and support delivery of our ambitious scientific vision outlined in HP³. In June 2021, the John Innes Centre and The Sainsbury Laboratory were awarded £1m to progress plans to develop a world-leading plant and microbial science hub on the Norwich Research Park. The funding will enable the next stage of design development for the new infrastructure, allowing us to submit our outline business case to HM Treasury later this year.

Supporting people and culture

Working with our staff and students, we will continue to embed a vibrant, inclusive and diverse culture. We plan to refresh our approach to internal communications, engagement and recognition. We also plan to develop new actions to support our Athena Swan Gold Award renewal and to deliver our new Technician Commitment action plan. We will consider what we have learnt from our experiences during the pandemic and how we may need to adapt to long-term changes in the workplace post-Covid-19.

Strategic partnership in wheat research

Over the year we will strengthen our existing partnerships and collaborations, including formalising our strategic collaboration with the International Maize and Wheat Improvement Center (CIMMYT). The new partnership will build on our successful joint-research achievements and aims to harness state-of-the-art technology to find solutions for the world's wheat farmers and consumers. Partnership activities will include collaborative research projects, staff and student exchanges, exchange of materials and data, joint capacity-building programmes and shared connections to the private sector.

Trustees' Report including the Strategic Report

The Board of Trustees of the John Innes Centre (Governing Council) presents its Annual Report and Financial Statements for the year ended 31 March 2021. The Annual Report provides details of the John Innes Centre's objectives, achievements, scientific and financial performance in the year, future plans, risk management and its governance and management structure.

About us

The John Innes Centre (JIC) is a world-leading international centre of excellence in plant science and microbiology. Our mission is to generate knowledge of plants and microbes through fundamental research. We use this knowledge to benefit agriculture, the environment, human health and well-being, to train excellent scientists for the future and to engage with policy makers and the public. Find out more about the JIC on pages 4 and 5, and pages 16 to 19 outline a range of our work with industry, public engagement and our new ventures.

Our strategy

Healthy Plants, Healthy People, Healthy Planet (HP³) is our strategy for achieving a safer, healthier and more sustainable future through the power of plant and microbial science. Read about our vision, HP³ on pages 6 and 7.

In collaboration with world-leading academic partners we are uniquely positioned to lead the fundamental scientific advances needed to address three intertwined, era-defining challenges: feeding the world; combating global health threats and climate change.

Delivery

To date the knowledge generated by the John Innes Centre has resulted in many innovative and practical solutions to global challenges. This is the result of ground-breaking research, combined with collaboration to develop specific and applied scientific solutions. We have addressed societal problems and aided economic development in the UK and globally.

The task of the Governing Council is to ensure that the John Innes Centre retains its position as the key national and international centre of scientific excellence in plant and microbial science.

A selection of our science highlights are shown on pages 8, 9 and 10, and our recent organisational achievements can be found on pages 12 and 13.



Deborah Keith
Interim Chair – April 2021 to September 2021

Charitable objective

The charity's object is the advancement of education in agriculture, horticulture and biotechnology world-wide by undertaking research and disseminating the results of such research, and training research scientists.

Key Performance Indicators

JIC's key performance indicators are:

- submission levels and success rates for research grant proposals;
- publications in relevant scientific journals;
- recruitment and retention of high quality staff and students;
- annual research income vs. budget; and
- unrestricted reserves vs. budget.

Details of publications and recruitment in the year are provided in the Achievements and Highlights section.

Details of grant submissions, success rates, research income and reserves are provided in the Financial Review.

Going Concern

The financial statements have been prepared on a going concern basis which the Trustees consider to be appropriate for the following reasons:

The Trustees have prepared cash flow forecasts for the period to March 2026 which indicate that, taking account of reasonable possible downsides and the anticipated impact of COVID-19 on the operations and its financial resources, the Institute will have sufficient funds to meet its liabilities as they fall due for that period.

The Institute is reliant on its strategic programme funding from BBSRC, which was £16.8m in the year (2020: £13.7m). BBSRC has confirmed continued strategic funding of £13.2m for the year to March 2022 plus provisional funding at this level for a further year to March 2023 subject to the next government spending review. The Institute fully expects its funding for the year to March 2023 to be confirmed in late 2021 based on feedback from BBSRC.

Like most research organisations, the Institute's activities have been impacted by Covid-19 measures. From late March 2020 until early-May 2020, the Institute's facilities were closed to all staff and students, except for essential work and activity supporting Covid-19-related testing and research. During this period, JIC staff and students have been able to operate effectively from home and, with facilities being re-opened progressively since then, the Institute has been able to successfully maintain its research programmes and projects with minimal financial impact. The Institute has considered the potential financial impact of continued restrictions for the next 12 months, including the potential for a further lockdown. Taking into account experience to date, business continuity arrangements and financial projections, the Institute considers the risk of a significant financial impact from Covid-19 to be low.

The Institute has prepared income, reserves and cash flow forecasts to March 2026. The forecasts indicate that the Institute will have significant cash headroom over the period, with cash balances of at least £30m for the 12 months from the signing date of this Annual Report.

Consequently, the Trustees are confident that the Institute will have sufficient funds to continue to meet its liabilities as they fall due for at least 12 months from the date of approval of the financial statements and therefore have been prepared the financial statements on a going concern basis.

Financial Review

Income

Total incoming resources for the year were £50.3m (2020: £48.1m). The increase in the year was due to additional BBSRC strategic and capital grant funding. Income excluding capital funds was £40.7m (£40.3m).

An analysis of grant income by principal sponsor is included in the notes to the financial statements. JIC's principal sponsor is the Biotechnology and Biological Sciences Research Council (BBSRC), which contributed 76% of total incoming resources (2020: 74%). Other major sources of funding were the European Union and charitable organisations.

Expenditure

Recurrent expenditure for the year amounted to £46.1m (2020: £44.7m). Staff costs accounted for £16.8m (36%) (2020: £16.7m; 37%) of expenditure.

Fundraising

JIC does not carry out any significant fundraising activities.

Net Movement in Reserves

JIC recorded a net increase in unrestricted reserves of £1.8m (2020: £1.5m). Restricted reserves increased by £7.0m (2020: £1.4m) principally due to £9.6m of capital funding (2020: £7.5m).

Subsidiaries and Related Parties

Subsidiary companies contributed an operating profit of £19,000 (2020: £96,000), while JIC's share of associates' results was a loss of £144,000 (2020: profit of £228,000). The share of associates' results in the year relates to JIC's 33% interest in Plant Bioscience Limited and 45% interest in Leaf Systems International Limited ("LSI").

Capital expenditure

Capital expenditure in the year was £9.4m (2020: £6.0m). Investment has continued from the previous year in state-of-the-art scientific equipment, energy-efficient plant infrastructure, well-found laboratory equipment and enhanced plant growth facilities.

Cash

Group cash at March 2021 was £45.2m (2020: £41.1m). JIC deposits its cash with UK registered financial institutions that meet its credit rating policy and subject to agreed counter-party limits. Investment income from cash deposits in the year was £163,000 (2020: £354,000), down on last year due to lower deposit rates.

Reserves position

Total group reserves increased by £8.9m in the year to £118.8m (2020: £2.9m to £109.9m).

Restricted reserves increased by £7.0m to £90.9m. Reserves of £9.3m relate to restricted designated capital reserves in connection with funding received from BBSRC to be used for future capital projects. Reserves of £0.1m relate to restricted designated general reserves in respect of ring-fenced strategic funding from BBSRC. The remaining £81.5m of restricted reserves relate to the value of fixed assets.

Unrestricted reserves increased by £1.8m in the year to £27.9m (2020: £26.1m), principally due to additional BBSRC strategic grant funding. Reserves of £12.6m relate to unrestricted designated reserves for planned capital and strategic investments. The remaining unrestricted reserves include general reserves of £7.3m and fixed assets reserves of £8.0m.

Reserves policy

JIC's reserves are held to support financial solvency, manage uncertainty and fund future activities. The level of reserves required by JIC is therefore determined by reference to:

- Future operational and capital expenditure requirements in the March 2026 Business Plan;
- Potential financial risks identified in the Business Plan and Risk Register;
- Potential funding required for strategic investments not included in the Business Plan;
- Working capital / liquidity requirements.

Unrestricted reserves that have been designated by the Governing Council for specific purposes are shown in separate designated reserves. At March 2021, £12.6m of unrestricted reserves were designated for planned capital and strategic investments (2020: £9.5m).

General unrestricted reserves at March 2021 were £7.3m, above the minimum general reserves target of £6.0m set by the Governing Council.

Grant proposals and awards

During the year, JIC researchers submitted grant proposals with a sponsor value of £45.3m (2020: £33.7m) and were awarded grants with a value of £11.4m (2020: £13.0m). The success rate for grant awards in the year was 25% by value (2020: 39%).

Stakeholder Engagement

– Section 172 Statement

The Trustee Directors consider that the decisions they have made during the financial year have satisfied the requirements of s172(1) of the Companies Act 2006 and that they have acted in good faith to promote the success of JIC as a whole, and in doing so having regard to the stakeholders and matters outlined in s172(1).

The Governing Council has the ultimate responsibility for the strategy of JIC and delivery of its charitable objectives. The table below sets out JIC's most significant stakeholders, why they are considered important and how the Institute engages.

| Stakeholders | Why they are important | How we engage with them |
|--|--|---|
| Our staff and students | <ul style="list-style-type: none"> ● We are committed to providing a supportive, inspirational and dynamic environment for our staff and students to meet future scientific and societal challenges. ● We value the diversity of our staff, and are committed to the creation of a positive environment which is fair, welcoming and inclusive and where everyone is treated with dignity and respect. ● We are committed to the development of all our staff and students and providing equal opportunities that encourage flexible working, career development and work-life balance. | <ul style="list-style-type: none"> ● During the year, regular communications to employees have been provided on matters affecting them, including factors affecting the Charity's progress, and have been consulted on decisions that impact them. ● All groups of staff and students have representation on the Inclusivity & Diversity Committee that meets 4 times a year to ensure an inclusive research culture ● Students' progress is monitored on a regular basis and employees undertake an annual appraisal where their training needs, work-life balance and career development are discussed. |
| Our members | <ul style="list-style-type: none"> ● JIC's corporate members are UK Research and Innovation (UKRI); John Innes Foundation (JIF) the University of East Anglia (UEA). Our members are key strategic partners that oversee our delivery against charitable objectives. | <ul style="list-style-type: none"> ● The Members each nominate one Governing Council member and appoint one "observer" to attend Governing Council meetings, enabling them to participate in key decisions. ● An Annual Members' meeting is held to review progress against objectives. |
| Norwich Research Park | <ul style="list-style-type: none"> ● JIC is one of 4 independent, world-class research institutes based at the Norwich Research Park. The Institutes work closely together to create a unique centre of excellence in plant and microbial sciences, big data science and genomics, and food and health. | <ul style="list-style-type: none"> ● The Institute Directors of the 4 institutes meet regularly to discuss common strategic and operational matters. ● JIC, the other Institutes, UKRI, UEA, JIF and the N&NU Hospital Trust are members of Anglia Innovation Partnership LLP, an organisation established to promote collaborative solutions to global challenges in food and health. |
| UK Research and Innovation | <ul style="list-style-type: none"> ● JIC is strategically funded, along with 7 other institutes, by the Biotechnology and Biological Sciences Research Council (BBSRC), part of UKRI. BBSRC supports JIC via strategic 5-year funding programmes, competitively won project grants and capital funding for infrastructure and technology investments. | <ul style="list-style-type: none"> ● UKRI nominates a Governing Council member and appoints an "observer" to attend Governing Council meetings. ● JIC holds regular meetings with BBSRC to review and progress of the Institute's mission and science programmes, including strategic and financial plans. |
| Research partners | <ul style="list-style-type: none"> ● JIC is an international centre of plant and microbial research. Our success is built on our collaborations and our international outlook. ● JIC is home to a range of state-of-the-art facilities and technology platforms to support scientists across the UK. | <ul style="list-style-type: none"> ● An extensive programme of engagement with our new collaborative vision, Healthy Plants, Healthy People, Healthy Planet (HP3) is ongoing and involves discussion, input and views from stakeholders from industry, government and research partners, locally, nationally and internationally. JIC has strategic partnerships with research and academic institutions in the UK and worldwide, including Europe, China, Africa, Brazil and India. |
| Industry | <ul style="list-style-type: none"> ● JIC works closely with industry and the private sector to provide access to our capabilities, and to deliver sophisticated interdisciplinary research and product development at pace. | <ul style="list-style-type: none"> ● JIC maintains a dialogue with industry, with regular consultations and knowledge exchange. ● JIC supports industry through collaborative and sponsored research and access to its facilities and platform services. JIC is proactive in identifying and responding to industry need. ● JIC protects its innovations and promotes their commercialisation and adoption by Industry. ● JIF nominates an industry representative as an "observer" to attend Governing Council meetings. ● See p16. |
| Community & the environment | <ul style="list-style-type: none"> ● Public views are at the heart of our research strategy and engaging with the public is an important part of our mission statement. | <ul style="list-style-type: none"> ● JIC staff and students are trained in public engagement and communications and are supported to attend events, use digital media and to discuss and engage the public with our research. Examples of this can be seen on p16-19. ● JIC hosts and attends community events – online, locally and nationally, to showcase, debate and discuss the nature of our research. ● JIC scientists are engaged in policy discussions at a national level surrounding the use of genetic technologies for crop improvement. ● JIC is investing heavily in more energy efficient facilities to reduce utilities consumption and waste. |
| Suppliers | <ul style="list-style-type: none"> ● JIC seeks to maintain and develop strong, open, collaborative relationships with our supply chain. | <ul style="list-style-type: none"> ● JIC holds regular meetings with suppliers about purchasing relationships and ethical behaviours such as adherence to Modern Slavery principles. |

Risk Assessment and Management

Governing Council is responsible for ensuring there are effective and adequate risk management and internal control systems in place, and confirm that the major risks to which the Institute is exposed have been reviewed and procedures established to manage those risks. The Audit Committee agrees an annual risk-based internal audit plan which covers major risks identified by management and Trustees. It receives reports from internal auditors on the effectiveness of internal controls, progress against the internal audit plan and progress on recommendations made in reports. Governing Council reviews a full risk report annually, including a 'heat map' tracking major risks. The Science and Impact Advisory Board (SIAB) assess the science quality and vision section of the risk register.

Principal risks and uncertainties

| Risk area | Description of Risk | Management of Risk |
|--|---|---|
| Future BBSRC research funding | <ul style="list-style-type: none"> BBSRC strategic funding is reduced as a result of poor performance or public sector spending pressures. | <ul style="list-style-type: none"> Regular monitoring of scientific performance, including consideration from the Science and Impact Advisory Board. Regular communication with BBSRC to report performance and ensure strategic alignment of research programmes. Monitoring of performance of competitive grant submissions. |
| Staff retention and recruitment | <ul style="list-style-type: none"> JIC is unable to retain or attract suitably skilled staff to enable it to sustain its scientific performance. In addition to scientific impact, this risk area could also have an impact on the level of funding the institute is able to attract. | <ul style="list-style-type: none"> Strategy and action plans in place, overseen by Strategic Human Resources Group. Career development programmes in place to support high potential staff. Recruitment strategy and processes in place, including attractive support arrangements. |
| COVID-19 | <ul style="list-style-type: none"> Loss of research activity due to staff becoming ill, or not being able to attend work due to the COVID-19. Loss of income or additional costs incurred as a result of the impact of Covid-19 on activity. Failure of supply chain. | <ul style="list-style-type: none"> Building has been reopened subject to strict H&S/risk management protocols. Business Continuity Group established to implement policies and oversee arrangements. UKRI funding received to mitigate impact on grants and studentships. |
| Estates | <ul style="list-style-type: none"> JIC's ageing estate facilities do not adequately support the delivery of its scientific objectives. Funding is inadequate to sustain and improve facilities necessary to support scientific objectives. Estates maintenance and infrastructure costs are too high, threatening long-term financial sustainability and the competitiveness of JIC's science. | <ul style="list-style-type: none"> Plans for Next Generation Infrastructure are being developed to replace ageing buildings with flexible research infrastructure capable of integrating multidisciplinary teams and harnessing developments in technology. Regular communication with BBSRC on Estates Strategy and potential funding requirements. Facilities management systems enhanced. Continued investment in energy efficiency. |
| Technology investment | <ul style="list-style-type: none"> JIC is unable to keep pace with developments in technology underpinning its science. Funding is inadequate to sustain and improve technology facilities. | <ul style="list-style-type: none"> 5-year investment plan developed. Funding opportunities identified and pursued for technology investments. |
| Compliance with sponsor funding requirements | <ul style="list-style-type: none"> JIC fails to comply with sponsor grant requirements resulting in a material financial impact. | <ul style="list-style-type: none"> JIC undertakes regular reviews of its grant compliance processes for sponsors and the UKRI internal auditors. |
| Major site incident | <ul style="list-style-type: none"> A major incident disrupts scientific research programmes or administrative systems | <ul style="list-style-type: none"> Business Continuity and Disaster recovery plans in place and tested periodically. Review of compliance with health & safety and relevant regulations from government agencies and internal auditors. Insurance arrangements in place. |
| Impact of leaving EU | <ul style="list-style-type: none"> JIC is not able to access EU programme funding or participate in EU research collaborations. JIC is not able to recruit or retain researchers from EU member countries. | <ul style="list-style-type: none"> Regular dialogue with BBSRC and other key stakeholders on risks and emerging issues with respect to potential changes in arrangements. JIC has established strategic collaborations with European partners outside of formal funding frameworks. |

Structure, Governance and Management

Members

The Members of JIC are:

- UK Research and Innovation – Biotechnology and Biological Sciences Research Council ("BBSRC");
- John Innes Foundation ("JIF"); and
- University of East Anglia ("UEA").

The Members each have the right to nominate one governing council member and appoint one "observer" to attend Governing Council meetings. Details of member appointments are provided in the table below. The Members are all guarantors of JIC, a company limited by guarantee and a registered charity, of an amount not exceeding £1, and for a year after resignation.

Organisation and governance

JIC is incorporated in the England and Wales and is a company limited by guarantee (registered number 00511709) and a registered charity (number 223852). JIC is governed by its Memorandum and Articles of Association, adopted 27 September 2011, and its Institute Grant Agreement with BBSRC by whom it is strategically funded.

Governing Council (Board of Trustees)

The Governing Council comprises of at least the Chair, three science and three non-science Trustees. The Trustees who served during the year and up to the date of signing these financial statements were as follows:

| Trustees | Appointment status | Role | Changes during period |
|----------------------------------|--------------------|-------------|----------------------------|
| <i>At date of Annual Report:</i> | | | |
| Sir T Hughes-Hallett | Independent | Chair | Appointed 1 September 2021 |
| Prof J C Murrell | UEA appointment | Science | - |
| Ms J K Midura | Independent | Non-science | - |
| Dr D J Keith | Independent | Science | - |
| Mr R J Maskell | Independent | Non-science | - |
| Prof N J Talbot | Independent | Science | - |
| Mr J H Innes | Independent | Non-Science | - |
| Prof J P Armitage | BBSRC appointment | Science | Appointed 20 October 2020 |
| Dr J Vincent | JIF appointment | Science | Appointed 21 July 2020 |
| <i>Served during the year:</i> | | | |
| Dr W H L West | Independent | Chair | Resigned 31 March 2021 |
| Mr K R Norman | JIF appointment | Non-science | Resigned 3 June 2020 |
| Prof O Leyser | BBSRC appointment | Science | Resigned 3 June 2020 |

The Governing Council has the ultimate responsibility for the strategy of JIC. Strategy is developed under advice from SIAB and the JIC Strategy Committee.

The Governing Council is supported by an Audit Committee to oversee financial management and risk and a Remuneration Committee to consider senior staff remuneration. The full Governing Council meets five times a year, the Audit Committee twice a year and the Remuneration Committee at least once a year and otherwise as required.

The Governing Council is also supported by a Science and Impact Advisory Board which comprises international experts in science and application of science, chaired in the year by Prof Judith Armitage.

The Science and Impact Advisory Board is responsible for providing strategic and scientific advice to the Director of JIC and the Governing Council on issues relevant to the JIC's Mission and Science Programme. This includes ensuring that the JIC Science Programme maximises JIC's potential for knowledge transfer, outreach and engagement with research users, stakeholders and the general public in addition to helping in the identification and development of new scientific funding opportunities to support the development of the JIC Science Programmes.

Recruitment, induction and training of Trustees

Governing Council vacancies are advertised as necessary. The Institute will also approach individuals thought to have the right skills.

New Governing Council members are invited to spend time with members of the Executive Team. This is a chance to learn about the Institute and identify opportunities to get more involved with JIC's work.

In addition to the five formal meetings, all Trustees receive regular presentations from JIC's scientists and briefings on key issues facing the organisation.

Trustee remuneration

None of the Trustees received any remuneration in the year in respect of their role as trustee directors.

Key Management Personnel

The Trustees delegate management of the day to day activities of the charitable company to the Director of the Institute, Prof Dale Sanders, and the executive Strategy Committee.

Strategy Committee

JIC's executive Strategy Committee advises the Director at strategic and operational levels on major issues that affect the Institute with respect to research, appointments, new initiatives, business plan and infrastructure, particularly where such issues involve more than one of these areas.

Its membership is as follows:

- Director (Chair);
- Institute Strategic Programme Leaders;
- Heads of Departments Representative;
- Finance Director;
- Head of HR;
- Head of Research Grants & Contracts;
- Head of International Strategy and Partnerships;
- Head of Commercialisation;
- Head of Strategic Engagement;
- Capital Projects Manager;
- Head of Directorate;
- Faculty Representative Group Leader.

Strategy Committee is supported by a number of other executive committees and groups including: Research Committee; Finance Committee; Heads of Departments Committee; KEC Strategy Committee; Strategic HR Committee; Inclusivity & Diversity Committee; and Health & Safety Committee.

Employees

JIC is a dynamic, multinational community of about 400 scientists and post graduate students. JIC's reputation for scientific excellence is international and it attracts some of the best scientists and brightest students internationally. JIC is committed to the training of the next generation of scientists. Activities include an undergraduate summer school (jointly with The Sainsbury Laboratory and Earlham Institute) that gives students the unique opportunity to spend the summer on site. There are two different routes to a PhD: the prestigious rotation studentships and the NRP Doctoral Training Programme. We host Post-Doctoral scientists and independent Fellows from around the world.

JIC staff that joined before 1 October 2011 were employed by BBSRC up to 1 October 2017, when they transferred employment to the Institute under TUPE.

Transferred employees retain their membership of the Research Councils Pension Scheme (RCPS), where applicable, with JIC becoming an admitted employer in the scheme. The RCPS is a defined benefit scheme funded from annual grant-in-aid on a pay-as-you-go basis. The RCPS Pension Scheme is a multi-employer scheme and JIC is unable to identify its share of the underlying assets and liabilities. JIC therefore accounts for the scheme as if it were a wholly defined contribution scheme. As a result, the amount charged to the income and expenditure account represents the contributions payable to the scheme in respect of the accounting period. Liabilities for the payment of future benefits are the responsibility of the RCPS and accordingly are not included in these Financial Statements.

JIC has recruited all new staff from October 2011 on its own terms and conditions, covering basic pay and allowances, contractual payments, tax, NI, pension contributions and redundancy. Such staff are eligible to join a defined contribution scheme.

Equality and Diversity

It is the Charity's policy to provide equal opportunities to job applicants and employees of any race, nationality, ethnic origin, marital status, religion or belief, gender, disability, sexual orientation, age or employment status. The Charity does not condone or tolerate any form of discrimination in its recruitment or employment practices. All employees and applicants are treated on merit, fairly, with respect and dignity, recognised as individuals and valued for the contribution they make, provided fair and equal access to training, development, reward and progression opportunities and are accountable for the impact of their own behaviour and actions. All the Charity's policies follow these principles.

JIC is aware of its statutory duty to support the employment of disabled persons where possible, both in recruitment and by retention of employees who become disabled whilst in the employment of the charitable company, as well as generally through training and career development.

In 2017, JIC became the first research institute to be awarded a 'Gold' Athena SWAN award. The Athena SWAN charter recognises and celebrates good practice in recruiting, retaining and promoting women in science, technology, engineering, maths and medicine (STEMM) in higher education.

This award recognises JIC's culture that embraces the principles of flexibility that provide for family-friendly working practices, while at the same time demonstrating a commitment to career advancement for all employees.

JIC's ability to attract the best researchers and students internationally creates a vibrant, dynamic and intellectually nurturing environment for both training and scientific discovery and is a primary driver of our scientific effectiveness. JIC recognises the value of a diverse workforce and, although Athena SWAN is focused on gender equality, we believe that a fair and equitable working environment is key to both a productive workforce and delivery of JIC strategy, and that initiatives put in place to address gender inequality ultimately benefit all staff. JIC is a member of Stonewall Diversity champion programme.

During the year, regular communications to employees have been provided on matters affecting them, including factors affecting the Charity's progress, and they have been consulted on decisions affecting them.

Related Parties

Subsidiaries

JIC's subsidiaries in the year were as follows:

- John Innes Enterprises Limited (contract research);
- Norwich Biosciences Limited (intellectual property management);
- Norwich Research Limited (dormant);
- JIC NRP Capital Limited (dormant).

Associates

JIC's associates in the year were as follows:

- NBI Partnership Limited;
- Plant Bioscience Limited;
- Leaf Systems International Limited.

NBI Partnership Limited

JIC has a 25% interest in NBI Partnership Limited ("NBIP"). NBIP supplies support and administrative services to JIC and the three other research organisations based on the Norwich Research Park (Quadram Bioscience Institute, Earlham Institute and The Sainsbury Laboratory). NBIP fully recharges its costs to the four research organisations and accordingly it generates no profit or loss.

Plant Bioscience Limited

JIC owns one third of the share capital of Plant Bioscience Limited ("PBL"). PBL manages the intellectual property rights of the charitable company and other organisations.

Leaf Systems International Limited

JIC owns 45% of the voting share capital and at 31 March 2021 had invested £1,630,000 in non-voting share capital of Leaf Systems International Limited ("LSI"). LSI is a commercial research & development company specialising in the expression and production of proteins, metabolites and complex natural products.

JIC has agreed to provide LSI with a loan facility of £112,500, which is repayable between December 2020 and December 2022. As at 31 March 2021, £75,000 was drawn down by LSI (2020: £nil). The loan has been provided on an arm's length basis and interest is payable on the loan at a rate of 2.5% pa.

BBSRC

BBSRC is a member of the charitable company.

JIC is strategically funded, along with seven other institutes, by BBSRC. BBSRC supports JIC via strategic 5-year funding programmes, competitively won project grants and capital funding for infrastructure and technology investments. The principal terms and conditions under which BBSRC provides its funding are set out in the Institute Grant Agreement. Key conditions include:

- BBSRC and the Institute shall meet at least annually to review and discuss the implementation and progress of the Institute's business, including strategic and financial plans.
- The Institute shall submit a draft Business Plan, covering a period of at least five years, for discussion.
- The Institute will demonstrate appropriate plans for the maintenance, renewal and development of the estate through a rolling 10 year Institute Estates Strategy covering capital projects, long term and routine maintenance.

BBSRC is part of UK Research and Innovation (UKRI), an organisation that brings together the UK's seven research councils.

John Innes Foundation

The John Innes Foundation ("JIF") is a member of the charitable company. JIC occupies land and buildings which are owned by JIF, with the principal research buildings leased at a peppercorn rent. In addition, JIF also sponsors the training of a number of students. Studentship grants in the year were £390,000 (2020: £381,000). Further details are provided in note 23 to the financial statements.

Anglia Innovation Partnership LLP

JIC is a member of Anglia Innovation Partnership LLP through its 100% subsidiary, JIC NRP Capital Limited. Anglia Innovation Partnership LLP is responsible for the management and development of the Norwich Research Park (NRP) estate and for the furtherance of the NRP Enterprise Vision.

JIC is entitled to receive a share of certain profits generated by Anglia Innovation Partnership LLP, however it has no liability for losses or in the event of insolvency. Anglia Innovation Partnership LLP has not yet generated any profits.

University of East Anglia

University of East Anglia ("UEA") is a member of the charitable company. The majority of PhD students at JIC are registered with UEA.

Energy and Carbon reporting

GHG emissions and energy use data

| | Units | 2020/21 | 2019/20 |
|---|-------------------------|---------------|---------------|
| Emissions from combustion of gas (Scope 1) | tCO ₂ e | 8,834 | 8,923 |
| Emissions from combustion of fuel for transport purposes (Scope 1) | tCO ₂ e | 8 | 22 |
| Emissions from purchase of electricity (Scope 2). Location based grid factors. | tCO ₂ e | 1,708 | 1,849 |
| Market based electricity Scope 2 emissions (renewable electricity contract) | tCO ₂ e | 854 | 1,849 |
| Emissions from generation of electricity that is consumed in a transmission and distribution system for which the company does not own or control (Scope 3) | tCO ₂ e | 147 | 159 |
| Emissions from business travel in rental cars or employee - owned vehicles where company is responsible for purchasing the fuel (Scope 3) | tCO ₂ e | 0.2 | 1 |
| Total gross CO₂e based on above | tCO₂e | 10,698 | 10,954 |

| | | | |
|--|--|------------|------------|
| Energy consumption used to calculate above emissions | kWh | 55,415,203 | 56,545,069 |
| Intensity Metric | m ² Building area | 39,997 | 39,997 |
| Intensity Ratio | tCO ₂ /m ² Building area | 0.267 | 0.274 |

Methodology

JIC has followed the 2019 HM Government Environmental Reporting Guidelines. Emissions factors used are tonnes of CO₂ equivalent and data has been calculated using the 2020 UK Government's Conversion Factors for Company Reporting.

Scope 1 emissions relate to on-site gas usage and emissions from Company owned vehicles. Scope 2 emissions relate to on-site imported electricity usage. Scope 3 emissions relate to grey fleet and electricity transmissions and distribution losses.

The primary source for calculating energy consumption are the supplier invoices. Electricity is supplied to other companies on site, this electricity consumption is monitored using sub meter readings and deducted from the total site power usage to calculate JIC electricity consumption only.

JIC operates three CHP engines. The proportion of the JIC power and heat usage generated from the CHP's has been calculated. To be able to do this, the measured heat and power efficiencies of the engines have been used to calculate the fuel input associated to the energy outputs.

Energy management

Operational efficiency and improvements are a key part of JIC's strategy in all activities and operations and JIC is committed to responsible energy consumption.

During the financial year, JIC has continued to monitor and reduce its energy usage and associated carbon dioxide emissions and the following are some of the major improvements that have achieved:

- Replacement of the main twin burner boiler installed in 1985 with a new more efficient boiler.
- Ongoing programme to upgrade shell and tube heating calorifiers with plate heat exchangers and upgrading of the associated BMS controls.
- Work has continued to upgrade the BMS controls across the site to improve efficiencies.
- Replacement of two HV 1250KVA transformers each 25 years old, with new modern Wilson Super Low Loss Amorphous Tier 2 2021 ECO Design.

Due to the COVID-19 pandemic, there was less activity on site resulting in a small reduction in electricity usage. There was also less business travel due to travel restrictions in place.



Statement of responsibilities of the trustees of John Innes Centre in respect of the Trustees' Annual Report and financial statements

The trustees are responsible for preparing the Trustees' Annual Report and the financial statements in accordance with applicable law and regulations.

Company law requires the trustees to prepare financial statements for each financial year. Under that law they have are required to prepare the group and parent company financial statements in accordance with UK Accounting Standards and applicable law (UK Generally Accepted Accounting Practice), including FRS 102 The Financial Reporting Standard applicable in the UK and Republic of Ireland.

Under company law the trustees must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the group and charitable company and of the group's excess of income over expenditure for that period. In preparing each of the group and charitable company financial statements, the trustees are required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable UK Accounting Standards have been followed, subject to any material departures disclosed and explained in the financial statements; and
- assess the group's and the charitable company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern; and
- use the going concern basis of accounting unless they either intend to liquidate the group or the charitable company or to cease operations, or have no realistic alternative but to do so.

The trustees are responsible for keeping adequate accounting records that are sufficient to show and explain the charitable company's transactions and disclose with reasonable accuracy at any time the financial position of the charitable company and enable them to ensure that its financial statements comply with the Companies Act 2006. They are responsible for such internal control as they determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error, and have general responsibility for taking such steps as are reasonably open to them to safeguard the assets of the group and to prevent and detect fraud and other irregularities.

The trustees are responsible for the maintenance and integrity of the corporate and financial information included on the charitable company's website. Legislation in the UK governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Insurance disclosure

The Institute maintains liability insurance for its Trustees, with an annual aggregate cover limit for all claims against them in that capacity. The Trustees have also been granted a qualifying third party provision under section 233 of Companies Act 2006. Neither the Institute's indemnity nor insurance provides cover in the event that a trustee is proved to have acted fraudulently or dishonestly.

Public benefit

The Trustees are satisfied they have complied with their duty in section 4 of the Charities Act 2011 to have due regard to public benefit guidance published by the Charities Commission. Based on this guidance, and as described in this Trustees' report, the Trustees believe the activities of JIC to be charitable in nature.

Disclosure of information to auditor

The trustees confirm that:

- so far as each trustee is aware, there is no relevant audit information of which the Company's auditor is unaware, and
- the trustees have taken all the steps that they ought to have taken as directors in order to make themselves aware of any relevant audit information and to establish that the Company's auditor is aware of that information.

Independent auditor

Larking Gowen LLP have been appointed as auditors and a resolution has been passed by the Board, concerning their appointment as auditors.

Approval of the Trustees' report

The Trustees' Report and Strategic Report were approved by Governing Council on 16 December 2021.



Dr D J Keith, Interim Chair

Independent Auditor's report

To the Members of John Innes Centre

Opinion

We have audited the financial statements of John Innes Centre (the 'parent charitable company') and its subsidiaries (the 'group') for the year ended 31 March 2021 which comprise the Consolidated Statement of Financial Activities, Consolidated and Charitable Company Balances Sheets, Consolidated Statement of Cash Flows and Notes to the Accounts, including significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 The Financial Reporting Standard applicable in the UK and Republic of Ireland (United Kingdom Generally Accepted Accounting Practice).

In our opinion the financial statements:

- give a true and fair view of the state of the group's and parent charitable company's affairs as at 31 March 2021, and of the group's incoming resources and application of resources, including its income and expenditure, for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the group and parent charitable company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to going concern

In auditing the financial statements, we have concluded that the trustees' use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the group's or parent charitable company's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

Our responsibilities and the responsibilities of the trustees with respect to going concern are described in the relevant sections of this report.

Other information

The other information comprises the information included in the trustees' annual report, other than the financial statements and our auditor's report thereon. The trustees are responsible for the other information contained within the annual report. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon. Our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the course of the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether this gives rise to a material misstatement in the financial statements themselves. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the trustees' report (incorporating the strategic report and the directors' report) for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the strategic report and the directors' report have been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception

In the light of the knowledge and understanding of the group and parent charitable company and its environment obtained in the course of the audit, we have not identified material misstatements in the strategic report and the directors' report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept by the parent charitable company, or returns adequate for our audit have not been received from branches not visited by us; or
- the parent charitable company's financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit.

Responsibilities of trustees

As explained more fully in the trustees' responsibilities statement set out on page 34, the trustees (who are also the directors of the parent charitable company for the purposes of company law) are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the trustees determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the trustees are responsible for assessing the group's and parent charitable company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the trustees either intend to liquidate the group or parent charitable company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

We have been appointed auditor under the Companies Act 2006 and report in accordance with this Act.

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect material misstatements in respect of irregularities, including fraud. The extent to which our procedures are capable of detecting irregularities, including fraud, is detailed below.

Due to the field in which the group operates, we identified the areas most likely to have a direct material impact on the financial statements as compliance with UK tax legislation, UK accounting standards, UK charity law and the Companies Act 2006. In addition, we considered the provisions of other laws and regulations which whilst not having a direct impact on the financial statements, are fundamental to the group's ability to operate including health and safety; employment law, and compliance with various other regulations relevant to the conduct of the group's operations.

Our approach to identifying and assessing the risk of material misstatement in respect of irregularities, including fraud and non-compliance with laws and regulations, included the following:

- Enquiries with management about any known or suspected instances of non-compliance with laws and regulations, accidents in the workplace, potential litigation or claims and fraud;
- Reviewing legal and professional fees to confirm matters where the group engaged lawyers during the year;

- Reviewing financial statement disclosures and tax matters, and testing to supporting documentation to assess compliance with applicable laws and regulations;
- Reviewing board minutes and any relevant correspondence with external authorities;
- Challenging assumptions and judgements made by management in their significant accounting estimates, particularly in relation to the recognition of grant income and the valuation of leasehold land and buildings; and
- Auditing the risk of management override of controls, including through testing journal entries and other adjustments for appropriateness, and evaluating the business rationale of any significant transactions outside the normal course of business.

Due to the inherent limitations of an audit, there is a risk that we will not detect all irregularities, including those leading to a material misstatement in the financial statements or non-compliance with regulation. This risk increases the more that compliance with a law or regulation is removed from the events and transactions reflected in the financial statements, as we will be less likely to become aware of instances of non-compliance. The risk is also greater regarding irregularities occurring due to fraud rather than error, as fraud involves intentional concealment, forgery, collusion, omission or misrepresentation.

A further description of our responsibilities is available on the Financial Reporting Council's website at: <https://www.frc.org.uk/Our-Work/Audit/Audit-and-assurance/Standards-and-guidance/Standards-and-guidance-for-auditors/Auditors-responsibilities-for-audit/Description-of-auditors-responsibilities-for-audit.aspx>. This description forms part of our auditor's report.

Use of our report

This report is made solely to the charitable company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the charitable company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the charitable company and the charitable company's members as a body, for our audit work, for this report, or for the opinions we have formed.



Anders Rasmussen FCA (Senior Statutory Auditor)

for and on behalf of Larking Gowen LLP
Chartered Accountants
Statutory Auditors
Norwich

16 December 2021

Consolidated statement of financial activities

For the year ended 31 March 2021

Incorporating an income and expenditure account

| | Note | Unrestricted funds £000 | Restricted general funds £000 | Restricted capital funds £000 | Total 2021 £000 | Total 2020 £000 |
|--|------|----------------------------|----------------------------------|----------------------------------|--------------------------------|-----------------------|
| Income | | | | | | |
| <i>Income from charitable activities</i> | | | | | | |
| Grant income | | - | 36,867 | - | 36,867 | 36,241 |
| Capital and maintenance grants | | - | 1,228 | 8,326 | 9,554 | 7,824 |
| Other charitable income | | 829 | - | - | 829 | 668 |
| <i>Income from other trading activities</i> | | | | | | |
| Trading income | | 462 | - | - | 462 | 331 |
| Rental income | | 64 | - | - | 64 | 368 |
| <i>Investment income</i> | | 170 | - | - | 170 | 361 |
| Share of operating result of associates | 12 | - | - | - | - | 228 |
| Other income | | 2,322 | - | - | 2,322 | 2,093 |
| Total income | 2 | 3,847 | 38,095 | 8,326 | 50,268 | 48,114 |
| Expenditure | | | | | | |
| Charitable activities | 3 | (3,575) | (35,169) | (6,219) | (44,963) | (43,898) |
| Raising funds | 3 | (393) | - | - | (393) | (442) |
| Trading expenditure | 3 | (443) | - | - | (443) | (235) |
| Other resources expended | 3 | (200) | - | - | (200) | (164) |
| Share of operating result of associates | 12 | (144) | - | - | (144) | - |
| Total expenditure | | (4,755) | (35,169) | (6,219) | (46,143) | (44,739) |
| Net income for the year | | (908) | 2,926 | 2,107 | 4,125 | 3,375 |
| <i>Transfers and revaluation</i> | | | | | | |
| Capital transfers | 20 | (395) | (111) | 506 | - | - |
| Other transfers | 20 | 3,111 | (3,111) | - | - | - |
| Gains/(Loss) on revaluation of tangible fixed assets | 10 | - | - | 4,730 | 4,730 | (504) |
| Net income and net movement in funds for the year | | 1,808 | (296) | 7,343 | 8,855 | 2,871 |
| Funds brought forward | | 26,097 | 344 | 83,486 | 109,927 | 107,056 |
| Funds carried forward | 20 | 27,905 | 48 | 90,829 | 118,782 | 109,927 |

The Consolidated Statement of Financial Activities ("SoFA") includes all gains and losses recognised in the year. All incoming resources and expenditure relates to continuing activities.

The notes on pages 40 to 57 form part of these financial statements.

Consolidated and charitable company balance sheets

As at 31 March 2021


| | Note | Group 2021 £000 | Group 2020 £000 | Company 2021 £000 | Company 2020 £000 |
|--|------|-----------------------|-----------------------|-------------------------|-------------------------|
| Fixed Assets | | | | | |
| Tangible assets | 10 | 87,918 | 81,735 | 88,155 | 81,989 |
| Intangible assets | 11 | - | 12 | - | 12 |
| Investments | 12 | - | - | 1 | 1 |
| <i>Investments in associates</i> | | | | | |
| Share of total assets | | 3,664 | 3,944 | - | - |
| Share of total liabilities | | (2,014) | (2,395) | - | - |
| | 12 | 1,650 | 1,549 | - | - |
| Total fixed assets | | 89,568 | 83,296 | 88,156 | 82,002 |
| <i>Current assets</i> | | | | | |
| Stocks | 13 | 258 | 266 | 258 | 266 |
| Debtors | 14 | 17,438 | 9,864 | 17,392 | 9,765 |
| Cash at bank and in hand | 15 | 45,215 | 41,112 | 45,010 | 40,821 |
| | | 62,911 | 51,242 | 62,660 | 50,852 |
| <i>Current liabilities</i> | | | | | |
| Creditors: amounts falling due within one year | 16 | (33,413) | (24,327) | (33,400) | (24,270) |
| Total net current assets | | 29,498 | 26,915 | 29,260 | 26,582 |
| Total assets less current liabilities | | 119,066 | 110,211 | 117,416 | 108,584 |
| Provisions for liabilities and charges | 18 | (284) | (284) | (284) | (284) |
| Total net assets | 19 | 118,782 | 109,927 | 117,132 | 108,300 |
| The funds of the charity | | | | | |
| <i>Unrestricted funds</i> | | | | | |
| Fixed assets reserve | 20 | 7,994 | 9,834 | 6,344 | 9,305 |
| Designated capital reserve | 20 | 12,645 | 9,488 | 12,645 | 9,488 |
| General reserve | 20 | 7,266 | 6,775 | 7,028 | 6,442 |
| Total unrestricted funds | | 27,905 | 26,097 | 26,017 | 25,235 |
| <i>Restricted funds</i> | | | | | |
| General reserve | 20 | 48 | 344 | 48 | 344 |
| Fixed assets reserve | 20 | 57,742 | 51,749 | 57,980 | 50,984 |
| Designated reserves | 20 | 9,255 | 10,024 | 9,255 | 10,024 |
| Revaluation reserve | 20 | 23,832 | 21,713 | 23,832 | 21,713 |
| Total restricted funds | | 90,877 | 83,830 | 91,115 | 83,065 |
| Total Charity funds | | 118,782 | 109,927 | 117,132 | 108,300 |
| Capital employed | 20 | 118,782 | 109,927 | 117,132 | 108,300 |

A separate income and expenditure account has not been presented for JIC as this is exempted by Section 408 of the Companies Act 2006. The profit after tax of JIC was £8,832,000 (2020: £2,202,000).

The financial statements on pages 37 to 57 were approved by the Governing Council on 16 December 2021 and were signed on its behalf by:

Dr D J Keith, Interim Chair

Company registration number: 00511709



Consolidated statement of cash flows

For the year ended 31 March 2021

| | Total 2021 £000 | Total 2020 £000 |
|--|-----------------------|-----------------------|
| Cash flows from operating activities | | |
| Net income and net movement in funds for the year | 8,855 | 2,871 |
| Share of operating result of associates | 144 | (228) |
| Revaluation of tangible fixed assets | (4,730) | 504 |
| Net income for the year | 4,269 | 3,147 |
| Interest receivable | (170) | (361) |
| Depreciation and amortisation | 5,645 | 5,507 |
| Impairment of investment | (245) | 1,079 |
| Impairment of land | 819 | - |
| Capital grants receivable | (8,326) | (7,499) |
| Loss on disposal of tangible assets | 1,449 | 13 |
| Decrease/(Increase) in stocks | 8 | (52) |
| Increase in debtors | (7,574) | (2,972) |
| Increase in creditors | 9,086 | 2,229 |
| Net cash provided by operating activities | 4,961 | 1,091 |
| Cash flows from investing activities: | | |
| Interest received | 170 | 361 |
| Purchase of tangible assets | (9,381) | (6,011) |
| Investment in associate | - | (350) |
| Capital grants received | 8,326 | 7,499 |
| Proceeds from sale of tangible assets | 27 | 80 |
| Net cash (used in)/ provided by investing activities | (858) | 1,579 |
| Change in cash and cash equivalents in the reporting period | 4,103 | 2,670 |
| Cash and cash equivalents at the beginning of the period | 41,112 | 38,442 |
| Total cash and cash equivalents at the end of the year | 45,215 | 41,112 |

The movement in net debt for the current and prior year is identical to the movements in cash flow set out above.

The notes on pages 40 to 57 form part of these financial statements.

Notes to the accounts

1. ACCOUNTING POLICIES

a. Basis of preparation

The group financial statements have been prepared under the historical cost convention and applicable accounting standards. They have also been prepared in accordance with Accounting and Reporting by Charities; Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS102) – (Charities SORP (FRS102)), the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS102) and the Companies Act 2006.

The principal accounting policies adopted in these financial statements, which have been consistently applied, are as follows:

b. Basis of consolidation

The consolidated financial statements incorporate the financial statements of JIC and all its subsidiary undertakings in accordance with Financial Reporting Standard ("FRS") 102 "Accounting for Subsidiary Undertakings", and associated entities which are accounted for using the equity method.

Associates are entities over which JIC has significant influence but not control. Under the equity method, the investment is initially recognised at cost, and the carrying amount is increased or decreased to recognise JIC's share of the profit or loss of the associate after the date of acquisition. JIC's share of post-acquisition operating result is recognised in the statement of financial activities. Determination is made at each balance sheet date whether there is any evidence that the investment in the associate is impaired. If this is the case, the amount of impairment is calculated as the difference between the recoverable amount of the associate and its carrying value, and this amount is recognised adjacent to share of operating result of associates in the statement of financial activities.

JIC is one of four members of NBI Partnership Limited ("NBIP"). The group accounts for NBIP as an associate, although in practice the company makes no profit or loss and has net assets of NIL, therefore has no impact on the Group financial statements.

The financial statements of all group undertakings and associates are made up to 31 March 2021.

A separate income and expenditure account has not been presented for JIC as this is exempted by Section 408 of the Companies Act 2006. The surplus of JIC was £8,832,000 (2020: £2,202,000).

c. Going concern

The Trustees have prepared cash flow forecasts for the period to March 2026 which indicate that, taking account of reasonable possible downsides and the anticipated impact of COVID-19 on the operations and its financial resources, the Institute will have sufficient funds to meet its liabilities as they fall due for that period.

The Institute is reliant on its strategic programme funding from BBSRC, which was £16.8m in the year (2020: £13.7m). BBSRC has confirmed continued strategic funding of £13.2m for the year to March 2022 plus provisional funding at this level for a further year to March 2023 subject to the next government spending review. The Institute fully expects its funding

for the year to March 2023 to be confirmed in late 2021 based on feedback from BBSRC.

Like most research organisations, the Institute's activities have been impacted by Covid-19 measures. From late March 2020 until early-May 2020, the Institute's facilities were closed to all staff and students, except for essential work and activity supporting Covid-19-related testing and research. During this period, JIC staff and students have been able to operate effectively from home and, with facilities being re-opened progressively since then, the Institute has been able to successfully maintain its research programmes and projects with minimal financial impact. The Institute has considered the potential financial impact of continued restrictions for the next 12 months, including the potential for a further lockdown. Taking into account experience to date, business continuity arrangements and financial projections, the Institute considers the risk of a significant financial impact from Covid-19 to be low.

The Institute has prepared income, reserves and cash flow forecasts to March 2026. The forecasts indicate that the Institute will have significant cash headroom over the period, with cash balances of at least £30m for the 12 months from the signing date of this Annual Report.

Consequently, the Trustees are confident that the Institute will have sufficient funds to continue to meet its liabilities as they fall due for at least 12 months from the date of approval of the financial statements and therefore have been prepared the financial statements on a going concern basis.

d. Income

Charitable grant income represents grants received and receivable in the year from outside granting bodies.

Grants that provide core funding are recognised in the year in which entitlement passes. Grant funding received to train students and undertake research is recognised in the year in which the obligation is fulfilled. Grant funding is released to match expenditure incurred during the year together with any related contributions towards overhead costs.

Other charitable income represents non-grant revenue from providing scientific research services to other academic institutions and other services. Revenue is recognised in the year in which the obligation is fulfilled.

Trading income, which includes rent, other letting income and other income, relates to the non-charitable services undertaken by Norwich Biosciences Limited and John Innes Enterprises Limited, subsidiary companies of JIC, and is recognised in accordance with the terms of the contracts entered into, reflecting the point at which the obligations of the companies have been satisfied.

Investment income relates to interest receivable from treasury deposits and related party loans. The interest is recognised in the year in which it is earned.

Other income includes site infrastructure charges, UEA tuition fee income and miscellaneous income. Revenue is recognised in the year in which the obligation is fulfilled.

1. Accounting Policies (continued)

Capital grants are recognised when entitlement passes, which is typically on receipt. Where capital funding includes terms and conditions that must be met before there is unconditional entitlement, the grant income is recognised as those conditions are met, which usually results in capital funding being recognised to match the capital costs incurred.

e. Expenditure

Charitable activity expenditure represents the full cost of the research performed. It includes the cost of direct staff, consumable stocks and indirect costs apportioned on the basis of use.

Raising funds represents the cost of obtaining funds for research. The cost of obtaining funds includes an estimate of the time/salary cost of project leaders preparing and reviewing grant application forms.

Governance costs represent the necessary cost of compliance with statutory and constitutional requirements and any other costs which are not direct charitable expenditure.

Support costs have been allocated to charitable activity expenditure, costs of generating funds and governance costs based upon activity or headcount as indicated in note 4 to the financial statements.

Other expenditure relates to expenditure maintaining capital assets that does not meet the capitalisation policy.

Trading expenditure relates to the costs of undertaking the non-charitable services performed by subsidiary companies of JIC, and is recognised in the period in which it is incurred.

f. Restricted funds

Where research at JIC is funded by grants with conditions attached to them, these are shown as restricted. Capital grants received and receivable together with other restricted funds received and receivable and used to purchase tangible assets are included within restricted funds.

From April 2018 the strategic programme grants from the UK Research and Innovation - Biotechnology and Biological Sciences Research Council ("BBSRC") are shown as restricted.

A restricted fixed assets reserve has been established representing the net book value of fixed assets purchased from capital grants.

Restricted reserves include a designated capital reserve of £9,255,000 (2020: £10,024,000) in connection with funding received from BBSRC, which is to be used on future capital projects to be agreed with BBSRC.

g. Unrestricted funds

Research grants that do not contain conditions for the final receipt of funds have been treated as unrestricted. Funds received for non-specified purposes have also been included as unrestricted.

A fixed assets reserve has been established within unrestricted reserves representing the net book value of fixed assets funded from unrestricted reserves.

Unrestricted reserves that have been designated by the Governing Council for specific purposes are shown in separate designated reserves.

h. Capital transfers

A transfer from unrestricted to restricted reserves equal to the depreciation charge for assets purchased from unrestricted reserves is made as a capital transfer.

i. Other Transfers

A transfer from restricted to unrestricted reserves is made following the completion of performance conditions in connection with restricted non-capital grant activity.

j. Revalue depreciation transfer

A transfer from the restricted fixed asset reserve to the revaluation reserve is made in relation to the differences in the historic cost and revalued depreciated costs.

k. Designated capital transfers

A transfer from the unrestricted general reserve to the unrestricted designated reserve is made in relation to the expenditure which had been designated by Governing Council for use in the financial projections to March 2026.

l. Centre funded capital

Capital expenditure funded from unrestricted reserves is shown as a transfer from the unrestricted designated capital reserve or general reserve to the unrestricted fixed asset reserve.

m. Tangible assets and depreciation

Tangible assets are shown at cost or valuation less accumulated depreciation. The cost of tangible assets is their purchase cost, together with any incidental costs of acquisition. Depreciation is calculated using the straight line method to write off the cost or valuation of assets, less any estimated residual value, over their estimated useful lives at the following rates:

Leasehold land and buildings – over lease term or useful life, if shorter;

Freehold land – not depreciated;

Freehold buildings – estimated economic life;

Plant, machinery and equipment – estimated economic life;

Scientific equipment – 5 to 15 years straight line;

Computer equipment – 3 years straight line;

Motor vehicles – 4 years straight line;

Combined heat and power scheme – 20 years straight line.

The leasehold buildings have been depreciated over their estimated economic life. The Trustees have determined that land is not subject to depreciation. Assets in the course of construction are not depreciated until the asset is in full use.

JIC includes in its financial statements leasehold land and buildings owned by third parties, which it occupies and enjoys through extended peppercorn leases, at their fair value. The Trustees consider that in substance, the risks and rewards of ownership of the assets have passed to the Institute, and as such follow a policy of recognising the assets on the balance sheet reflects its continuing occupancy of these assets for the foreseeable future.

1. Accounting Policies (continued)

n. Revaluation of tangible fixed assets

Leasehold land and buildings are revalued by an external surveyor on a depreciated replacement cost basis every five years. The valuation is updated in the interim period using indexation tables. Gains on revaluation are credited to the revaluation reserve. Losses, except in cases of a clear consumption of economic benefit, are charged to the operating result for the period, to the extent they are not offset by previous gains. In cases of a clear consumption of economic benefit, losses are charged to unrestricted or restricted reserves as applicable, irrespective of whether they are offset by previous gains.

o. Intangible fixed assets and amortisation

Computer Software development costs are recognised as intangible fixed assets at cost less amortisation and any provision for impairment. Intangible assets are amortised over the estimated life of the asset acquired less any residual value.

Amortisation is calculated to write off the cost or valuation less the estimated residual value of intangible assets by equal instalments over their estimated useful economic lives as follows:

| | |
|-------------------|--------------|
| Computer Software | 3 to 5 years |
|-------------------|--------------|

Intangible assets under construction are not amortised until the asset is in full use.

p. Fixed asset investments

The consolidated balance sheet includes the group's share of each associate's gross assets and liabilities. The share of each associate's net income is reported in JIC's consolidated statement of financial activities.

q. Stocks

Stocks are stated at the lower of cost and net realisable value. Provision is made, where necessary, for slow moving or obsolete stock.

r. Debtors

Debtors are non-interest bearing and are stated at their nominal value, as reduced by appropriate allowances for estimated irrecoverable amounts.

Included in debtors is a loan (£75k) provided to LSI, which is repayable between December 2020 and December 2022. The loan has been provided on an arm's length basis and interest is payable on the loan at a rate of 2.5% pa.

s. Cash balances held as grant co-ordinator

Cash balances held on behalf of the European Union in the charitable company's capacity as grant co-ordinator are included within cash on the charitable company's balance sheet, and are disclosed in note 24 to the financial statements.

t. Trade creditors

Trade creditors are non-interest bearing and are stated at their nominal value.

u. Loans

Loans are stated on the balance sheet at amortised cost.

v. Provisions

A provision is recognised in the financial statements where there is a legal or constructive obligation to transfer economic benefit to a third party.

w. Staff and Pensions

JIC staff that joined before 1 October 2011 were employed by BBSRC up to 1 October 2017, when they transferred employment to the Institute under TUPE.

Transferred employees retain their membership of the Research Councils Pension Scheme (RCPS), where applicable, with JIC becoming an admitted employer in the scheme. The RCPS is a defined benefit scheme funded from annual grant-in-aid on a pay-as-you-go basis. The RCPS Pension Scheme is a multi-employer scheme and JIC is unable to identify its share of the underlying assets and liabilities. JIC therefore accounts for the scheme as if it were a wholly defined contribution scheme. As a result, the amount charged to the income and expenditure account represents the contributions payable to the scheme in respect of the accounting period. Liabilities for the payment of future benefits are the responsibility of the RCPS and accordingly are not included in these Financial Statements.

JIC has recruited all new staff from October 2011 on its own terms and conditions, covering basic pay and allowances, contractual payments, tax, NI, and liabilities for pension contributions and redundancy. Such staff are eligible to join a defined contribution scheme.

x. Termination benefits

Redundancy payments are recognised as a liability and an expense only when the event is demonstrably committed to by either: a. termination of the employment of an employee or group of employees before the normal retirement date, or b. provision of termination benefits as a result of an offer made in order to encourage voluntary redundancy.

y. Operating leases

Rental costs are charged to the statement of financial activities on a straight line basis over the life of the lease.

z. Foreign currency transactions

The functional and reporting currency is pounds sterling. Transactions in foreign currencies are recorded at the rate of exchange ruling at the date of the transaction. Assets and liabilities denominated in foreign currencies are translated at year end exchange rates. All gains and losses are taken to the statement of financial activities in the year to which they relate.

aa. Financial instruments

Financial assets and financial liabilities are recognised upon becoming a party to the contractual provisions of the instrument.

The group only enters into basic financial instrument transactions that result in financial assets and liabilities such as trade and other accounts receivable and payable.

bb. Judgements in applying accounting policies and key sources of estimation

Preparation of the financial statements require management to make significant judgements and estimates. The items in the financial statements where these judgements and estimates have been made include:

- Depreciation, which has been charged in line with the accounting policy above. The amount of depreciation charged and net book value of the assets is included in Note 10.

- Leasehold land and buildings are held at a revalued amount. The valuation is performed by an external surveyor on a depreciated replacement cost basis every five years. The valuation is updated in the interim period using indexation tables.

2. Analysis of Incoming Resources

| | Research activities | Student activities | Other activities | Total 2021 | Research activities | Student activities | Other activities | Total 2020 |
|--|------------------------|-----------------------|---------------------|-----------------------|------------------------|-----------------------|---------------------|-----------------------|
| | £000 | £000 | £000 | £000 | £000 | £000 | £000 | £000 |
| Grant income | | | | | | | | |
| BBSRC | 25,660 | 3,229 | - | 28,889 | 24,435 | 3,315 | - | 27,750 |
| Other government departments | 924 | 78 | - | 1,002 | 959 | 104 | - | 1,063 |
| European Union | 2,773 | 63 | - | 2,836 | 2,937 | 43 | - | 2,980 |
| Industrial partners | 615 | 37 | - | 652 | 161 | 169 | - | 330 |
| John Innes Foundation | 170 | 390 | - | 560 | 136 | 381 | - | 517 |
| Other charities | 1,999 | 116 | - | 2,115 | 1,946 | 505 | - | 2,451 |
| Universities | 59 | 7 | - | 66 | 23 | 12 | - | 35 |
| Other grants | 743 | 4 | - | 747 | 1,063 | 52 | - | 1,115 |
| Total grant income | 32,943 | 3,924 | - | 36,867 | 31,660 | 4,581 | - | 36,241 |
| Capital and maintenance grants | | | | | | | | |
| BBSRC | | | | | | | | |
| Capital expenditure | 9,554 | - | - | 9,554 | 7,824 | - | - | 7,824 |
| Total capital grants | 9,554 | - | - | 9,554 | 7,824 | - | - | 7,824 |
| Other charitable income | | | | | | | | |
| Scientific services | - | - | 564 | 564 | - | - | 449 | 449 |
| Miscellaneous income | - | - | 265 | 265 | - | - | 219 | 219 |
| Total other charitable income | - | - | 829 | 829 | - | - | 668 | 668 |
| Trading income | | | | | | | | |
| John Innes Enterprises Limited | - | - | 442 | 442 | - | - | 253 | 253 |
| Norwich Biosciences Limited | - | - | 20 | 20 | - | - | 78 | 78 |
| Total trading income | - | - | 462 | 462 | - | - | 331 | 331 |
| Rental income | | | | | | | | |
| Conferencing Facilities | - | - | (3) | (3) | - | - | 241 | 241 |
| Hill House | - | - | 67 | 67 | - | - | 127 | 127 |
| Total rental income | - | - | 64 | 64 | - | - | 368 | 368 |
| Investment income | | | | | | | | |
| Interest receivable on cash deposits | - | - | 163 | 163 | - | - | 354 | 354 |
| Interest receivable on loan to related party | - | - | 7 | 7 | - | - | 7 | 7 |
| Total investment income | - | - | 170 | 170 | - | - | 361 | 361 |
| Income from investment in associates | - | - | - | - | - | - | 228 | 228 |
| Total associates income | - | - | - | - | - | - | 228 | 228 |
| Other generated income | | | | | | | | |
| Site infrastructure recharges | - | - | 805 | 805 | - | - | 935 | 935 |
| Other | - | - | 1,517 | 1,517 | - | - | 1,158 | 1,158 |
| Total other generated income | - | - | 2,322 | 2,322 | - | - | 2,093 | 2,093 |
| Total income | 42,497 | 3,924 | 3,847 | 50,268 | 39,484 | 4,581 | 4,049 | 48,114 |

- Grant income of £36,867k (2020: £36,241) is all restricted general funds.
- Capital grants of £9,554k (2020: £7,824k), £1,228k (2020: £325k) is restricted general funds and £8,326k (2020: £7,499k) is restricted capital funds
- Other charitable income of £829k (2020: £668k), £829k (2020: £668k) is unrestricted funds.
- In both periods all trading and investment income is unrestricted.

3. Analysis of Resources Expended

| | Note | Research activities £000 | Student activities £000 | Other activities £000 | Total 2021 £000 | Research activities £000 | Student activities £000 | Other activities £000 | Total 2020 £000 |
|---|------|-----------------------------|----------------------------|--------------------------|----------------------------|-----------------------------|----------------------------|--------------------------|--------------------|
| Direct charitable expenditure: | | | | | | | | | |
| Staff costs | | 13,490 | - | - | 13,490 | 13,318 | - | - | 13,318 |
| Direct costs | | 11,925 | 4,071 | - | 15,996 | 11,097 | 4,534 | - | 15,631 |
| Depreciation and impairment | | 6,219 | - | - | 6,219 | 6,586 | - | - | 6,586 |
| Governance costs | 4 | - | - | 51 | 51 | - | - | 59 | 59 |
| Support costs | 4 | 6,947 | 2,260 | - | 9,207 | 6,796 | 1,508 | - | 8,304 |
| Expenditure on charitable activities | | 38,581 | 6,331 | 51 | 44,963 | 37,797 | 6,042 | 59 | 43,898 |
| Raising funds | 4 | - | - | 393 | 393 | - | - | 442 | 442 |
| Trading expenditure | | - | - | 443 | 443 | - | - | 235 | 235 |
| Other resources expended | | - | - | 200 | 200 | - | - | 164 | 164 |
| Share of operating result of associates | | - | - | 144 | 144 | - | - | - | - |
| Total expenditure | | 38,581 | 6,331 | 1,231 | 46,143 | 37,797 | 6,042 | 900 | 44,739 |

Included within expenditure is restricted general expenditure of £35,169k (2020: £35,939k), and restricted capital resources expended (depreciation) of £6,219k (2020: £6,586k). All other expenditure is unrestricted.

| Analysis of governance costs | Total 2021 £000 | Total 2020 £000 |
|-------------------------------------|----------------------------|--------------------|
| Staff costs | 15 | 23 |
| Travel costs | - | 4 |
| Other costs | 36 | 32 |
| Total governance costs | 51 | 59 |

4. Allocation of Support Costs, Governance and Raising Funds

| | Research activities £000 | Student activities £000 | Raising funds £000 | Governance costs £000 | Total £000 | Basis of Allocation |
|--------------------------------------|-----------------------------|----------------------------|-----------------------|--------------------------|-----------------------|---------------------|
| Governing Council and SIAB | - | - | - | 15 | 15 | Headcount |
| Lab management | 393 | 128 | - | - | 521 | Headcount |
| Institute management | 552 | 181 | - | - | 733 | Headcount |
| Scientific services | 561 | 183 | - | - | 744 | Headcount |
| Facilities management and utilities* | 3,610 | 1,181 | - | - | 4,791 | Headcount |
| Finance and Purchasing* | 502 | 164 | - | - | 666 | Headcount |
| Computing and Library* | 581 | 190 | - | - | 771 | Headcount |
| Human Resources* | 262 | 86 | - | - | 348 | Headcount |
| Contracts services* | - | - | 300 | - | 300 | Activity |
| Other support services | 486 | 147 | 93 | 36 | 762 | Activity |
| Total support costs 2021 | 6,947 | 2,260 | 393 | 51 | 9,651 | |
| Governing Council and SIAB | - | - | - | 27 | 27 | Headcount |
| Lab management | 410 | 91 | - | - | 501 | Headcount |
| Institute management | 425 | 94 | - | - | 519 | Headcount |
| Scientific services | 3 | 1 | - | - | 4 | Headcount |
| Facilities management and utilities* | 4,005 | 889 | - | - | 4,894 | Headcount |
| Finance and Purchasing* | 545 | 121 | - | - | 666 | Headcount |
| Computing and Library* | 632 | 140 | - | - | 772 | Headcount |
| Human Resources* | 285 | 63 | - | - | 348 | Headcount |
| Contracts services* | - | - | 300 | - | 300 | Activity |
| Other support services | 491 | 109 | 142 | 32 | 774 | Activity |
| Total support costs 2020 | 6,796 | 1,508 | 442 | 59 | 8,805 | |

* includes services supplied by NBI Partnership Limited (see note 23).

5. Taxation

John Innes Centre ("JIC") is considered to pass the tests set out in Paragraph 1 Schedule 6 Finance Act 2010 and therefore it meets the definition of a charitable company for UK Corporation tax purposes. Accordingly, the Charity is potentially exempt from taxation in respect of income or capital gains received within categories covered by Chapter 3 Part 11 Corporation Tax Act 2010 or Section 256 of the Taxation of Chargeable Gains Act 1992, to the extent that such income or gains are applied exclusively to charitable purposes.

The trading activities of the subsidiary companies are subject to corporation tax; however profits in the year are gifted to the charitable company resulting in a £nil (2020: £nil) tax charge payable.

Unutilised losses of £79,000 (2020: £79,000) have been carried forward within the subsidiary companies for offset against future taxable profits. A deferred tax asset has not been recognised due to uncertainty over utilisation of these losses.

6. Operating Surplus

Operating surplus is stated after charging/(crediting):

| | Total 2021 | Total 2020 |
|---|-----------------------|---------------|
| | £000 | £000 |
| Audit services: | | |
| Fees payable to the charitable company's auditors for the audit of charitable company and consolidated financial statements | 25 | 25 |
| Fees payable for the audit of the charitable company's subsidiaries pursuant to legislation | 4 | 4 |
| Depreciation and amortisation | 6,464 | 5,507 |
| Impairment of investment in associate | (245) | 1,079 |
| Loss on disposal of tangible assets | 1,449 | 13 |
| Hire of plant and equipment | 64 | 54 |
| Rent of land and buildings | 50 | 21 |
| (Profit)/Loss on foreign exchange translations | 124 | (7) |

7. Net Income from Trading Activities of Subsidiaries

| Profit and loss account | John Innes Enterprises Limited | Norwich Biosciences Limited | Total 2021 | John Innes Enterprises Limited | Norwich Biosciences Limited | Total 2020 |
|--------------------------------------|--------------------------------------|-----------------------------------|-----------------------|--------------------------------------|-----------------------------------|-----------------------|
| | £000 | £000 | £000 | £000 | £000 | £000 |
| Turnover | 442 | 20 | 462 | 253 | 78 | 331 |
| Cost of sales | (443) | - | (443) | (208) | (27) | (235) |
| Gross profit | (1) | 20 | 19 | 45 | 51 | 96 |
| Administrative expenses | - | - | - | - | - | - |
| Operating profit | (1) | 20 | 19 | 45 | 51 | 96 |
| Interest received | - | - | - | - | - | - |
| Operating profit for the year | (1) | 20 | 19 | 45 | 51 | 96 |

In addition to the above, £123,914 (2020: £225,742) in Gift Aid was paid to the charitable company in the year.

8. Remuneration of Members of the Governing Council

None of the members of the Governing Council received any remuneration from the group during the current or prior year for their duties as Trustees.

There were no attendance expenses incurred by trustees whilst carrying out their duties during the year (2020: 3 trustees, £421).

9. Employee Information

The monthly average number of persons employed by or deployed to the group and charitable company during the year, analysed by category, was as follows:

| Group and charitable company | 2021 Number | 2020 Number |
|--------------------------------|----------------|----------------|
| Scientific | 347 | 354 |
| Office management and services | 28 | 38 |
| Total | 375 | 392 |

The aggregate payroll costs of these persons were:

| Group and charitable company | Note | 2021 £000 | 2020 £000 |
|------------------------------|------|---------------|---------------|
| Wages and salaries | | 13,356 | 13,300 |
| Redundancy costs | | 14 | 95 |
| Social security costs | | 1,387 | 1,307 |
| Other pension costs | 22 | 2,019 | 2,016 |
| Total | | 16,776 | 16,718 |

An analysis of the number of staff who fall within staff cost bands (excluding pension cost) from £60,000 upwards is provided below:

| Group and charitable company | 2021 Number | 2020 Number |
|------------------------------|----------------|----------------|
| £60,000 - £69,999 | 14 | 14 |
| £70,000 - £79,999 | 6 | 6 |
| £80,000 - £89,999 | 9 | 8 |
| £90,000 - £99,999 | 8 | 5 |
| £100,000 - £109,999 | 3 | 4 |
| £110,000 - £119,999 | 2 | 2 |
| £120,000 - £129,999 | 2 | 1 |
| £130,000 - £139,999 | 1 | - |
| £150,000 - £159,999 | 1 | 1 |
| £180,000 - £189,999 | 1 | 1 |
| Total | 47 | 42 |

The number of staff with emoluments greater than £60,000 who were also members of the Research Councils' Pension Schemes was twenty-five (2020: twenty-three). Seventeen staff (2020: Twelve) with emoluments greater than £60,000 are members of a defined contribution pension scheme.

Staff that joined prior to 1 October 2011 were employed by BBSRC up to 1 October 2017, when these employees transferred employment to the Institute under TUPE. Transferred employees retain their membership of the Research Councils Pension Scheme, where applicable, with JIC becoming an admitted employer in the scheme.

Staff that joined after 1 October 2011 are employed under JIC terms & conditions.

The key management personnel of the parent charity, JIC, comprise of the Trustees and the members of the strategy committee.

The key management personnel of the group comprise those of the charity and the key management personnel of the wholly owned subsidiaries, John Innes Enterprises Ltd, Norwich Biosciences Ltd, Norwich Research Ltd and JIC NRP Capital Ltd. All the subsidiaries key management personnel are the same as the parent company. No staff costs were recharged in respect of this. The employee costs (salaries, social security costs and pension costs) of the key management personnel for the group and charitable company were £1,568,098 (2020: £1,487,433).

10. Tangible Assets

| Group | Freehold land and buildings £000 | Long leasehold land and buildings £000 | Plant, machinery and equipment £000 | Assets under construction £000 | Total £000 |
|--|---|--|---|---|-----------------|
| Cost/Valuation | | | | | |
| At 1 April 2020 | 3,769 | 68,902 | 38,426 | 3,094 | 114,191 |
| Transfers | - | 625 | 1,969 | (2,594) | - |
| Additions | - | 597 | 4,682 | 4,102 | 9,381 |
| Revaluation | - | (7,548) | - | - | (7,548) |
| Disposals | - | (2,196) | (299) | (34) | (2,529) |
| At 31 March 2021 | 3,769 | 60,380 | 44,778 | 4,568 | 113,495 |
| Accumulated Depreciation | | | | | |
| At 1 April 2020 | - | 9,938 | 22,518 | - | 32,456 |
| Charge for the year | 819 | 3,096 | 2,537 | - | 6,452 |
| Revaluation | - | (12,278) | - | - | (12,278) |
| Disposals | - | (756) | (297) | - | (1,053) |
| At 31 March 2021 | 819 | - | 24,758 | - | 25,577 |
| Net book value at 31 March 2021 | 2,950 | 60,380 | 20,020 | 4,568 | 87,918 |
| Net book value at 31 March 2020 | 3,769 | 58,964 | 15,908 | 3,094 | 81,735 |
| Charitable company | | | | | |
| | Freehold land and buildings £000 | Long leasehold land and buildings £000 | Plant, machinery and equipment £000 | Assets under construction £000 | Total £000 |
| Cost/Valuation | | | | | |
| At 1 April 2020 | 3,769 | 69,166 | 38,426 | 3,094 | 114,455 |
| Transfers | - | 625 | 1,969 | (2,594) | - |
| Additions | - | 597 | 4,682 | 4,102 | 9,381 |
| Revaluation | - | (7,575) | - | - | (7,575) |
| Disposals | - | (2,196) | (299) | (34) | (2,529) |
| At 31 March 2021 | 3,769 | 60,617 | 44,778 | 4,568 | 113,732 |
| Accumulated Depreciation | | | | | |
| At 1 April 2020 | - | 9,948 | 22,518 | - | 32,466 |
| Charge for the year | 819 | 3,113 | 2,537 | - | 6,469 |
| Revaluation | - | (12,305) | - | - | (12,305) |
| Disposals | - | (756) | (297) | - | (1,053) |
| At 31 March 2021 | 819 | - | 24,758 | - | 25,577 |
| Net book value at 31 March 2021 | 2,950 | 60,617 | 20,020 | 4,568 | 88,155 |
| Net book value at 31 March 2020 | 3,769 | 59,218 | 15,908 | 3,094 | 81,989 |

Assets under construction represent capital items which are not yet in full economic use.

JIC includes in its financial statements land and buildings owned by third parties, which it occupies and enjoys through extended peppercorn leases, at their full value. The Trustees consider that in substance, the risks and rewards of ownership of the assets have passed to the Institute, and as such a policy of recognising the assets on the balance sheet reflects its continuing occupancy of these assets for the foreseeable future.

The group and charitable company's leasehold land and buildings were revalued by an external surveyor (Powis Hughes Chartered Surveyors, RICS) on a depreciated replacement cost basis at 31 March 2021.

Leasehold land and buildings on an historical cost basis would be recorded at a net book value of £36,248,000 (2020: £39,506,000).

All of the charitable company's assets at 31 March 2021 are used for direct charitable purposes.

11. Intangible Assets

| Group and Charitable company | Software development | Total |
|--|----------------------|------------|
| | £000 | £000 |
| Cost | | |
| At 1 April 2020 | 147 | 147 |
| Additions | - | - |
| At 31 March 2021 | 147 | 147 |
| Accumulated Depreciation | | |
| At 1 April 2020 | 135 | 135 |
| Charge for the year | 12 | 12 |
| At 31 March 2021 | 147 | 147 |
| Net book value at 31 March 2021 | - | - |
| Net book value at 31 March 2020 | 12 | 12 |

12. Investments

Subsidiaries

The following are the operating subsidiary undertakings in which the charitable company has an interest:

| Subsidiary Undertaking | Registration Number | Country of registration | Principal activity | Class and percentage of shares held |
|--------------------------------|---------------------|-------------------------|---|-------------------------------------|
| John Innes Enterprises Limited | 02549904 | England | Contract research | 100% ordinary shares |
| Norwich Biosciences Limited | 03076575 | England | Management of intellectual property | 100% ordinary shares |
| Norwich Research Limited | 02814101 | England | Dormant | 100% ordinary shares |
| JIC NRP Capital Limited | 06145922 | England | Member of Anglia Innovation Partnership LLP | 100% ordinary shares |

The registered address for all the subsidiaries is John Innes Centre, Norwich Research Park, Colney, Norwich, NR4 7UH.

The charitable company's investment in subsidiary undertakings at cost amounts to £1,248 (2020: £1,248) and accumulated impairment of £244 (2020: £244) has been recognised against cost.

JIC NRP Capital Limited is a member of Anglia Innovation Partnership LLP (formerly Norwich Research Partners LLP), which is responsible for the management and development of the Norwich Research Park (NRP) estate and for the furtherance of the NRP Enterprise Vision. The company did not trade during the year.

The net income from trading activities of the subsidiaries during the year is shown in note 7.

Associates

The charitable company has an investment in Plant Bioscience Limited ("PBL"), a company registered in England and Wales, representing 33% (2020: 33%) of the ordinary £1 issued share capital. Plant Bioscience Limited manages the intellectual property rights of the charitable company and other organisations. This company is deemed to be an associate of the group and has therefore been included in the consolidated financial statements on that basis.

The charitable company has a 25% interest in NBI Partnership Limited ("NBIP"). NBIP supplies support and administrative services to JIC and the other Norwich Institutes (Quadram Bioscience Institute, Earlham Institute and The Sainsbury Laboratory) on a not-for-profit basis. NBIP fully recharges its costs to the four research organisations and accordingly it generates no profit or loss.

The charitable company has an investment of 45% voting share capital and £1,630,000 non-voting share capital in Leaf Systems International Ltd ("LSI"). LSI is a commercial research & development company specialising in the expression and production of proteins, metabolites and complex natural products. The value of JIC's investment in LSI has been fully written down at March 2021 and March 2020 to reflect the early stage of LSI's development and current trading position.

12. Investments (continued)

Investments – Company

The movement in the value of investments during the year was as follows:

| | Total 2021 | Total 2020 |
|---|-----------------------|---------------|
| | £000 | £000 |
| Valuation | | |
| At beginning of year | 1 | 1,281 |
| Acquisition | - | 350 |
| Impairment | - | (1630) |
| At end of year | 1 | 1 |
| Historical cost | | |
| As at 1 April 2020 and 31 March 2021 | 1,631 | 1,631 |

Investments – Group

The Group's share of the operating results of associates was as follows:

| Group | Leaf Systems International £000 | Plant Bioscience Limited £000 | Total 2021 £000 | Leaf Systems International £000 | Plant Bioscience Limited £000 | Total 2020 £000 |
|-------------------------------------|--|--|--------------------------------|--|--|-----------------------|
| Associates, share of: | | | | | | |
| Turnover | 207 | 1,007 | 1,214 | 205 | 1,727 | 1,932 |
| Operating (loss)/profit | (212) | 215 | 3 | (254) | 457 | 203 |
| Movement in opening balance | (33) | (114) | (147) | 69 | (44) | 25 |
| Share of result for the year | (245) | 101 | (144) | (185) | 413 | 228 |

The Group's investment in associates is represented as follows:

| Group | Leaf Systems International Limited £000 | Plant Bioscience Limited £000 | Total 2021 £000 | Leaf Systems International Limited £000 | Plant Bioscience Limited £000 | Total 2020 £000 |
|--|---|--|--------------------------------|---|--|--------------------------------|
| <i>Associates: Share of net assets</i> | | | | | | |
| At beginning of year | - | 1,549 | 1,549 | 914 | 1,136 | 2,050 |
| Additions | - | - | - | 350 | - | 350 |
| Impairment provision | 245 | - | 245 | (1,079) | - | (1,079) |
| Share of result for the year | (245) | 101 | (144) | (185) | 413 | 228 |
| At end of year | - | 1,650 | 1,650 | - | 1,549 | 1,549 |
| <i>Represented by:</i> | | | | | | |
| Share of total assets | 1,503 | 2,161 | 3,664 | 1,486 | 2,458 | 3,944 |
| Share of total liabilities | (1,503) | (511) | (2,014) | (1,486) | (909) | (2,395) |
| Share of net assets | - | 1,650 | 1,650 | - | 1,549 | 1,549 |

The Trustees consider the value of investments included in the financial statements to be supported by their underlying assets.

13. Stocks

| | Total 2021 £000 | Total 2020 £000 |
|-------------------------------|-----------------------|-----------------------|
| Group and charitable company | | |
| Raw materials and consumables | 258 | 266 |
| Total | 258 | 266 |

There is no material difference between the valuation of stock and its replacement cost.

14. Debtors

| | Note | Group 2021 £000 | Group 2020 £000 | Company 2021 £000 | Company 2020 £000 |
|--|------|-----------------------|-----------------------|-------------------------|-------------------------|
| <i>Grants receivable:</i> | | | | | |
| from government bodies | 23 | 6,332 | 2,049 | 6,332 | 2,049 |
| from other sources | | 2,614 | 2,366 | 2,614 | 2,366 |
| Trade debtors | | 873 | 1,267 | 816 | 1,261 |
| Amounts owed by subsidiary undertakings | | - | - | 42 | 32 |
| Amounts owed by other related parties | 23 | 1,253 | 782 | 1,253 | 782 |
| Other debtors | | 467 | 1,060 | 436 | 958 |
| Prepayments and accrued income | | 5,899 | 2,340 | 5,899 | 2,317 |
| Total amounts falling due within one year | | 17,438 | 9,864 | 17,392 | 9,765 |

Grants receivable from government bodies includes £4,544,189 in relation to capital funding receivable from BBSRC (2020: £642,509).

15. Cash at Bank and in Hand

| | Group 2021 £000 | Group 2020 £000 | Company 2021 £000 | Company 2020 £000 |
|--------------|-----------------------|-----------------------|-------------------------|-------------------------|
| Cash at bank | 45,212 | 41,109 | 45,007 | 40,818 |
| Cash in hand | 3 | 3 | 3 | 3 |
| Total | 45,215 | 41,112 | 45,010 | 40,821 |

16. Creditors: Amounts Falling Due within One Year

| | Note | Group 2021 £000 | Group 2020 £000 | Company 2021 £000 | Company 2020 £000 |
|--|------|-----------------------|-----------------------|-------------------------|-------------------------|
| <i>Grants received in advance:</i> | | | | | |
| from government bodies | 23 | 5,640 | 5,163 | 5,640 | 5,163 |
| from other sources | | 6,028 | 5,061 | 6,016 | 5,038 |
| Trade creditors | | 4,792 | 3,053 | 4,791 | 3,052 |
| Amounts owed to subsidiary undertakings | | - | - | - | 20 |
| Amounts owed to other related parties | 23 | 1,274 | 1,109 | 1,274 | 1,109 |
| Other creditors | | 2,304 | 2,557 | 2,304 | 2,557 |
| Taxation and social security | | 361 | 350 | 361 | 350 |
| Accruals and deferred income | | 13,014 | 7,034 | 13,014 | 6,981 |
| Total amounts falling due within one year | | 33,413 | 24,327 | 33,400 | 24,270 |

17. Reconciliation of Movement in Grants Receivable

| Group and charitable company | Note | Total 2021 £000 | Total 2020 £000 |
|---|------|-----------------------|-----------------------|
| Grants receivable | 14 | 8,946 | 4,415 |
| Grants received in advance | 16 | (11,668) | (10,224) |
| Net grants received in advance | | (2,722) | (5,809) |
| Net grants received in advance at beginning of year | | (5,809) | (7,561) |
| Grant monies received during the year | | (43,334) | (42,313) |
| Grant money released to SOFA during the year | | 46,421 | 44,065 |
| Net grants received in advance | | (2,722) | (5,809) |

18. Provisions for liabilities and charges

| Group and charitable company | Total 2021 £000 | Total 2020 £000 |
|--|-----------------------|-----------------------|
| Restructuring provision at beginning of year | 284 | 284 |
| Charge in the year | - | - |
| Utilised | - | - |
| Provision at end of year | 284 | 284 |

The restructuring provision relates to future compensation payments due under the redundancy scheme in connection with the restructuring of science programmes and the administration and support functions. Although the restructuring provision has not been discounted, it is stated at the present value of future amounts payable since inflationary increases linked to the redundancy settlements have similarly been excluded from the provision.

19. Analysis of Net Assets Between Funds

| | Fixed assets £000 | Net current assets £000 | Creditors over one year and provisions £000 | Total 2021 £000 |
|----------------------------|-------------------------|----------------------------------|--|--------------------------------|
| Group | | | | |
| <i>Unrestricted:</i> | | | | |
| Fixed assets reserve | 7,994 | - | - | 7,994 |
| Designated capital reserve | - | 12,645 | - | 12,645 |
| General | - | 7,550 | (284) | 7,266 |
| <i>Restricted:</i> | | | | |
| General reserve | - | 48 | - | 48 |
| Fixed assets reserve | 57,742 | - | - | 57,742 |
| Designated capital reserve | - | 9,255 | - | 9,255 |
| Revaluation reserve | 23,832 | - | - | 23,832 |
| Net assets | 89,568 | 29,498 | (284) | 118,782 |
| Charitable company | | | | |
| <i>Unrestricted:</i> | | | | |
| Fixed assets reserve | 6,344 | - | - | 6,344 |
| Designated reserves | - | 12,645 | - | 12,645 |
| General | - | 7,312 | (284) | 7,028 |
| <i>Restricted:</i> | | | | |
| General reserve | - | 48 | - | 48 |
| Fixed assets reserve | 57,980 | - | - | 57,980 |
| Designated reserves | - | 9,255 | - | 9,255 |
| Revaluation reserve | 23,832 | - | - | 23,832 |
| Net assets | 88,156 | 29,260 | (284) | 117,132 |

19. Analysis of Net Assets Between Funds (Continued)

| | Fixed assets £000 | Net current assets £000 | Creditors over one year and provisions £000 | Total 2020 £000 |
|----------------------------|-------------------------|----------------------------------|--|-----------------------|
| Group | | | | |
| <i>Unrestricted:</i> | | | | |
| Fixed assets reserve | 9,834 | - | - | 9,834 |
| Designated capital reserve | - | 9,488 | - | 9,488 |
| General | - | 7,059 | (284) | 6,775 |
| <i>Restricted:</i> | | | | |
| General reserve | - | 344 | - | 344 |
| Fixed assets reserve | 51,749 | - | - | 51,749 |
| Designated capital reserve | - | 10,024 | - | 10,024 |
| Revaluation reserve | 21,713 | - | - | 21,713 |
| Net assets | 83,296 | 26,915 | (284) | 109,927 |
| Charitable company | | | | |
| <i>Unrestricted:</i> | | | | |
| Fixed assets reserve | 9,305 | - | - | 9,305 |
| Designated reserves | - | 9,488 | - | 9,488 |
| General | - | 6,726 | (284) | 6,442 |
| <i>Restricted:</i> | | | | |
| General reserve | - | 344 | - | 344 |
| Fixed assets reserve | 50,984 | - | - | 50,984 |
| Designated reserves | - | 10,024 | - | 10,024 |
| Revaluation reserve | 21,713 | - | - | 21,713 |
| Net assets | 82,002 | 26,582 | (284) | 108,300 |

The unrestricted fixed assets reserve relates to the net book value of fixed assets purchased from unrestricted funds. The restricted fixed assets reserve relates to the net book value of fixed assets purchased from capital grants.

The designated capital reserves are not endowment funds. The unrestricted designated capital reserve relates to funds designated by Governing Council for use in relation to planned capital investments in the financial projections to March 2022. The restricted capital reserve relates to funding received from BBSRC to be used in connection with future estates rebuild costs with the agreement of BBSRC.

The restricted general reserve relates to ring fenced strategic funding received from BBSRC. This funding has performance conditions attached and is transferred to the general reserve once the conditions have been met.

20. Analysis of Funds Movements

| | Unrestricted fixed assets | Unrestricted designated capital | Unrestricted general | Restricted general | Restricted fixed assets | Restricted designated capital | Revaluation reserve | Total 2021 |
|---|---------------------------------|---------------------------------------|-------------------------|-----------------------|-------------------------------|-------------------------------------|------------------------|----------------|
| | £000 | £000 | £000 | £000 | £000 | £000 | £000 | £000 |
| Group | | | | | | | | |
| At 1 April 2020 | 9,834 | 9,488 | 6,775 | 344 | 51,749 | 10,024 | 21,713 | 109,927 |
| Total income and expenditure for the year | - | - | (908) | 2,926 | 2,107 | - | - | 4,125 |
| Associates | (144) | - | 144 | - | - | - | - | - |
| Revaluation of tangible assets | - | - | - | - | - | - | 4,730 | 4,730 |
| Revalue depreciation transfer | - | - | - | - | 2,611 | - | (2,611) | - |
| Capital transfers | (755) | - | - | (111) | 866 | - | - | - |
| Designated capital transfers | - | 360 | - | - | (660) | 300 | - | - |
| Centre funded capital | (941) | (535) | 1,476 | - | 1,069 | (1,069) | - | - |
| Other transfers | - | 3,332 | (221) | (3,111) | - | - | - | - |
| At 31 March 2021 | 7,994 | 12,645 | 7,266 | 48 | 57,742 | 9,255 | 23,832 | 118,782 |
| Charitable company | | | | | | | | |
| At 1 April 2020 | 9,305 | 9,488 | 6,442 | 344 | 50,984 | 10,024 | 21,713 | 108,300 |
| Total income and expenditure for the year | - | - | (659) | 2,916 | 1,845 | - | - | 4,102 |
| Revaluation of tangible assets | - | - | - | - | - | - | 4,730 | 4,730 |
| Revalue depreciation transfer | - | - | - | - | 2,611 | - | (2,611) | - |
| Capital transfers | (2,020) | - | - | (111) | 2,131 | - | - | - |
| Designated capital transfers | - | 360 | - | - | (660) | 300 | - | - |
| Centre funded capital | (941) | (535) | 1,476 | - | 1,069 | (1,069) | - | - |
| Other transfers | - | 3,332 | (231) | (3,101) | - | - | - | - |
| At 31 March 2021 | 6,344 | 12,645 | 7,028 | 48 | 57,980 | 9,255 | 23,832 | 117,132 |

20. Analysis of Funds Movements (Continued)

| | Unrestricted fixed assets | Unrestricted designated capital | Unrestricted general | Restricted general | Restricted fixed assets | Restricted designated capital | Revaluation reserve | Total 2020 |
|---|---------------------------------|---------------------------------------|-------------------------|-----------------------|-------------------------------|-------------------------------------|------------------------|----------------|
| | £000 | £000 | £000 | £000 | £000 | £000 | £000 | £000 |
| Group | | | | | | | | |
| At 1 April 2019 | 9,693 | 8,344 | 6,554 | 230 | 52,871 | 8,038 | 21,326 | 107,056 |
| Total income and expenditure for the year | - | - | 1,607 | 627 | 913 | - | - | 3,147 |
| Associates | 228 | - | - | - | - | - | - | 228 |
| Revaluation of tangible assets | - | - | - | - | - | - | (504) | (504) |
| Revalue depreciation transfer | - | - | - | - | (891) | - | 891 | - |
| Capital transfers | (842) | - | - | - | 842 | - | - | - |
| Designated capital transfers | - | - | - | - | - | - | - | - |
| Centre funded capital | 755 | (674) | (81) | - | - | - | - | - |
| Other transfers | - | 1,818 | (1,305) | (513) | (1,986) | 1,986 | - | - |
| At 31 March 2020 | 9,834 | 9,488 | 6,775 | 344 | 51,749 | 10,024 | 21,713 | 109,927 |
| Charitable company | | | | | | | | |
| At 1 April 2019 | 9,389 | 8,344 | 6,104 | 230 | 52,667 | 8,038 | 21,326 | 106,098 |
| Total income and expenditure for the year | - | - | 1,727 | 627 | 352 | - | - | 2,706 |
| Revaluation of tangible assets | - | - | - | - | - | - | (504) | (504) |
| Revalue depreciation transfer | - | - | - | - | (891) | - | 891 | - |
| Capital transfers | (842) | - | - | - | 842 | - | - | - |
| Designated capital transfers | - | - | - | - | - | - | - | - |
| Centre funded capital | 758 | (674) | (84) | - | - | - | - | - |
| Other transfers | - | 1,818 | (1,305) | (513) | (1,986) | 1,986 | - | - |
| At 31 March 2020 | 9,305 | 9,488 | 6,442 | 344 | 50,984 | 10,024 | 21,713 | 108,300 |

The revalue depreciation transfers have been made to reflect differences in the historical cost and revalued depreciation costs.

Capital transfers relate to fund movements in connection with fixed assets and depreciation; ensuring assets are appropriately reflected in separate reserves.

The designated reserve transfer relates to costs incurred in the year that have been set against the designated strategic reserve.

Centre funded capital transfers relate to capital expenditure funded from the unrestricted designated capital reserve and general reserve.

Where research at JIC is funded by grants with performance conditions attached to them these are shown in the Restricted general fund. When the conditions have been met the remaining contribution to core funding is transferred to general reserves, shown in other transfers above.

21. Commitments

| | Total 2021 | Total 2020 |
|--|---------------|---------------|
| | £000 | £000 |
| Group and charitable company | | |
| Capital commitments at the end of the financial year for which no provision has been made: | | |
| Contracted | 7,388 | 2,231 |
| Amounts due under other operating leases for plant and machinery: | | |
| Expiring in less than one year | 39 | 41 |
| Expiring between one and two years | 36 | 36 |
| Expiring between two and five years | 51 | 80 |
| | 126 | 157 |

22. Pension Schemes

JIC staff that joined before 1 October 2011 were employed by BBSRC up to 1 October 2017, when they transferred employment to the Institute under TUPE.

Transferred employees retain their membership of the Research Councils Pension Scheme (RCPS), where applicable, with JIC becoming an admitted employer in the scheme. The RCPS is a defined benefit scheme funded from annual grant-in-aid on a pay-as-you-go basis. The RCPS Pension Scheme is a multi-employer scheme and JIC is unable to identify its share of the underlying assets and liabilities. JIC therefore accounts for the scheme as if it were a wholly defined contribution scheme. As a result, the amount charged to the income and expenditure account represents the contributions payable to the scheme in respect of the accounting period. Liabilities for the payment of future benefits are the responsibility of the RCPS and accordingly are not included in these Financial Statements. The employer contribution rate during the year was 26% (2020: 26%).

JIC employees that joined after 30 September 2011 are eligible to join a defined contribution scheme.

The total pension charge for the year was £2,018,661 (2020: £2,016,424), with outstanding contributions at the year-end of £85,997 (2020: £83,849).

23. Related Party Transactions

BBSRC

JIC is strategically funded by BBSRC. Grants received from BBSRC are detailed in note 2. At 31 March 2021, BBSRC owed JIC £1,683,074 (2020: £1,830,332).

During the year BBSRC paid JIC £nil (2020: £232,155) compensation for redundancy and salary costs incurred in restructuring and £6,447 (2020: £182,586) for other costs.

In April 2018, BBSRC became part of UK Research and Innovation (UKRI), a new organisation that brings together the UK's seven research councils, Innovate UK and Research England.

Plant Bioscience Limited

PBL is 33% directly owned by JIC. PBL has been accounted for as an associate within the consolidated financial statements. Services provided to JIC by PBL in the year to 31 March 2021 amounted to £22,468 (2020: £60,771). During the year, PBL paid JIC £38,194 (2020: £37,215) in rent and £81 (2020: £567) for other costs. At 31 March 2021, PBL owed JIC £nil (2020: £nil) and JIC owed PBL £nil (2010: £6,134).

Leaf Systems International Limited

JIC has invested £1,630,000 in the non-voting share capital of Leaf Systems International Limited. LSI has been accounted for as an associate within the consolidated financial statements. JIC paid LSI £41,808 (2020: £89,556) for services in the year ended 31 March 2021. JIC has provided a short-term loan to LSI. Interest is payable on the loan at 2.5%. At 31 March 2021, JIC had a loan balance with LSI of £75,000 (2020: £nil).

During the year, LSI paid JIC £10,529 (2020: £21,714) for costs incurred by JIC on behalf of LSI. At 31 March 2021, LSI owed JIC £3,049 (2020: £2,758).

NBI Partnership Limited

JIC is one of the four guarantors of NBI Partnership Ltd ("NBIP"), a company limited by guarantee. JIC has provided short-term loans to NBIP to enable NBIP to manage its cash requirements. Interest is payable on the loan at 2% and during the year JIC charged £6,840 (2020: £6,980) in respect of interest due. At 31 March 2021, JIC had a loan balance with NBIP of £342,000 (2020: £349,000).

JIC was charged £4,544,642 (2020: £4,495,308) for services by NBIP under a cost sharing agreement. As at 31 March 2021, JIC owed NBIP £570,160 (2020: £406,676). NBIP paid JIC £57,863 (2020: £53,858) for services and, as at 31 March 2021, NBIP owed JIC £7,804 (2020: £8,538).

Anglia Innovation Partnership LLP (formerly NRP LLP)

JIC is a member of Anglia Innovation Partnership LLP through its 100% subsidiary, JIC NRP Capital Limited. Anglia Innovation Partnership LLP is responsible for the management and development of the Norwich Research Park (NRP) estate and for the furtherance of the NRP Enterprise Vision. During the year, JIC received services totalling £18,445 (2020: £1,046), and was charged £81,292 (2020: £144,253) for estate costs. As at 31 March 2021, JIC owed AIP LLP £144,253 (2020: £81,292).

JIC invoiced Anglia Innovation Partnership LLP for services totalling £76,013 (2020: £129,202). As at 31 March 2021 Anglia Innovation Partnership LLP owed JIC £15,306 (2020: £nil).

23. Related Party Transactions (continued)

University of East Anglia

UEA is a member of the charitable company and it nominates one Governor to the Governing Council.

The majority of PhD students carrying out research at JIC are registered with UEA. During the year UEA provided student services of £732,359 (2020: £452,186) and other services amounting to £151,194 (2020: £56,835) to JIC. At 31 March 2021, JIC owed UEA £490,840 for student fees and other costs (2020: £548,259) and £66,575 for other services (2020: £65,769).

During the year, JIC received £625,588 (2020: £417,811) in student payments from UEA and provided £344,370 (2020: £182,881) of other services. At 31 March 2021, UEA owed JIC £752,134 (2020: £391,152) for student fees and services.

John Innes Foundation

JIF is a member of the charitable company and it nominates one Governor to the Governing Council of JIC. The following transactions took place during the year:

| | Total 2021 £000 | Total 2020 £000 |
|--------------------------------------|--------------------------------|-----------------------|
| <i>Paid to JIC:</i> | | |
| Grants for studentships | 390 | 381 |
| Grants for research project | 92 | 107 |
| Contribution to salary costs | 12 | 19 |
| Contribution to women of the future | 2 | 2 |
| Contribution to field trials station | 64 | 8 |
| | 560 | 517 |

At 31 March 2021, JIF owed JIC £57,485 (2020: £30,692) and JIC owed JIF £2,005 (2020: £nil).

John Innes Enterprises Ltd

JIE Ltd is the wholly owned trading subsidiary of JIC. JIE undertakes contract research, research services and consultancy.

During the year, JIC invoiced JIE for services and other costs totalling £339,149 (2020: £139,300) and JIE invoiced JIC for costs totalling £46,426 (2020: £50,181). In addition, JIE made a gift aid payment to JIC of £30,118 (2020: £198,939). As at 31 March 2021, JIE owed JIC £41,773 (2020: £32,402).

Norwich Biosciences Ltd

Norwich Biosciences Ltd is the wholly owned trading subsidiary of JIC. NBL manages intellectual property on behalf of JIC. During the year NBL paid JIC a gift aid payment of £93,796 (2020: £26,803).

24. Cash Held as Grant Co-Ordinator

JIC holds cash of £1,251,087 (2020: £1,157,004) on behalf of various institutes in its capacity as project co-ordinator on a number of projects. JIC acts as an intermediary only and does not control the risks and rewards associated with the cash. An equal balance is held in other creditors.

25. Ultimate Parent Undertaking and Controlling Party

The Trustees consider that there is no ultimate parent undertaking and controlling party. JIC is the parent undertaking of the smallest and largest group of undertakings to consolidate these financial statements.

26. Contingent Liability

JIC receives grant income from funding bodies, such as the BBSRC and the European Union, that routinely undertake retrospective financial audits of costs claimed. Such audits may from time to time give rise to adjustments to grant income receivable. No general provision is made for such potential audit adjustments in the financial statements.

Charity information

Directors and Trustees

| | |
|----------------------|--|
| Sir T Hughes-Hallett | Chair – Governing Council |
| Dr D J Keith | |
| Mr J H Innes | Chair – Audit Committee |
| Mr R J Maskell | |
| Ms J K Midura | Chair – Remuneration & Nominations Committee |
| Prof J C Murrell | |
| Prof N Talbot | |
| Prof J P Armitage | Chair – Science and Impact Advisory Board |
| Prof J Vincent | |

Director of the Institute Prof D Sanders

Key Management Personnel

Prof D Sanders
 Prof M Banfield
 Prof C Domoney
 Prof B Wilkinson
 Dr C Thomas
 Mr C Darby
 Prof G Moore
 Prof L Ostergaard
 Prof A Maxwell
 Mr D Foreman
 Mr B Morrison
 Ms A O'Halleron
 Dr S Aspland
 Dr E Sharpe
 Mr J Tebbutt

Registered charity number 223852

Registered company number 00511709

Registered office and principal office of the charity

Norwich Research Park
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 Norwich
 NR4 7UH

Independent auditor

Larking Gowen LLP
 Chartered Accountants and Statutory Auditors
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Bankers

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Solicitors

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