

SUSTAINABLE DEVELOPMENT GOALS

Annual Report 2023



INTRODUCTION FROM THE VICE-CHANCELLOR

Tackling the complex global challenges of our time demands scientific excellence and impactful collaboration and I am proud that you will find examples of both throughout this year's Sustainable Development Goals report – covering our contributions from the global to the national, and from the local to our work in campus.

While the scale of the sustainability challenges facing our society can seem daunting, this report offers insights into how the expertise of our scientists, researchers, teachers and partners is creating positive change around the world by empowering people, reducing inequalities and providing opportunities.

The scope of these improvements is incredibly broad and include human and animal health welfare, justice, education, industry and technology, filtering through our society.

So, I am delighted that our University is successfully bridging the gaps between science and practice and that this is reflected in the Times Higher Education (THE) University Impact Rankings.

During the period covered by this report, Surrey secured its best-ever position of 46th in the THE Impact rankings, a rise of nine places in the global system which assesses universities' performance against the UN Sustainable Development Goals (SDGs).

This improvement maintains our strong global position and elevates us to ninth in the UK – an achievement which demonstrates the breadth and depth of expertise within our Institutes for Sustainability and People-Centred AI, all our schools, and companies on our Surrey Research Park.

The importance and prestige of the THE Impact rankings is reflected in their rate of growth, with over 450 institutions joining in 2023/24.

This year's standings acknowledge Surrey's continued strength in many areas, including Reduced inequalities (SDG 10), Sustainable cities and communities (SDG 11), and Partnerships (SDG 17) and in so doing, they recognise Surrey's multidisciplinary capabilities.

This ethos exists at the heart of our Institute for Sustainability and its Innovation Hub, which is pioneering new ways to address sustainability by promoting collaboration to develop and fast-track sustainable solutions.

It is also captured in the award-winning short film 'Remember the Future', which won Best Environmental Film at the Cannes World Film Festival and picked up six further awards on the film festival circuit.

Professor Lorenzo Fioramonti, founding director of the Institute for Sustainability and Nathalie Hinds, Director of Institute Operations, Innovation and Partnerships collaborated with Jon Weinbren, Programme Director for Surrey's MA in Film, Animation and Digital Arts within Surrey's Department of Music and Media, to create a film which provides a message of hope - that sustainability is not just about science and statistics, but also about people and behaviour.

This message is one that is practised across our campus – starting with the holistic education our teachers provide for our students. More broadly, sustainability touches all areas of the University, from procurement to energy saving and energy creation initiatives.

I am delighted, in particular, to see the continued growth of LEAF (Laboratory Efficiency Assessment Framework), an accreditation scheme that aims to help improve sustainable practices in our labs, and Green Impact, which aims to support sustainable practices for all our people.

Furthermore, our University has a proud record of collaborating with local government and university partners to address issues that matter to our Surrey communities, so I was delighted to recently sign a new Civic Agreement. This initiative will address local needs, drive innovation, and create a more inclusive and resilient Surrey by 2030, ensuring that no-one is left behind and that everyone has a voice.

Listening to the ideas and contributions of our University community helped to forge our next strategy, Vision 2041, which aims to elevate Surrey to a top-15 UK university and one that is rated within the top 100 in the world by the time of our 150th anniversary in 2041.

This ambition can only be achieved with sustainability at its core – by achieving sustainable growth in our academic endeavour, by creating a sustainable environment for our students to thrive in, and by expanding our existing interdisciplinary institutes and leveraging existing strengths against a broader set of global issues.

As you read this report, I encourage you to reflect and celebrate what we have achieved, and also imagine what we can achieve in the future.

Professor Max Lu
President and Vice-Chancellor

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NO POVERTY

➤ USING AI TO UNDERSTAND CHALLENGES FACED BY WOMEN FARMERS IN SUB-SAHARAN AFRICA

The University of Surrey is dedicated to harnessing the latest technology to tackle the world's big challenges. Using artificial intelligence, researchers at Surrey's Centre for Vision, Speech and Signal Processing and Surrey DataHub (a research group with its roots in the Veterinary Health Innovation Engine, vHive) have analysed vast swathes of social media posts to help understand the specific challenges faced by women farmers in sub-Saharan Africa.

This innovative approach, funded by Zoetis, has revealed the significant barriers that women farmers often encounter, including limited access to resources, discriminatory practices and inadequate disease management support. These challenges can impact on them economically and thus increase the likelihood of them living in poverty.

Surrey scientists used advanced language models to sift through large amounts of online data using Pulsar Platform™ to identify the key themes and trends.

The results have enabled a deeper understanding of women's roles, perspectives and attitudes towards livestock and poultry production, which will help policymakers and aid organisations target interventions to empower the farmers and improve their livelihoods.



ZERO HUNGER



➤ INSECT MUFFINS? FINDING ALTERNATIVE AND SUSTAINABLE PROTEIN SOURCES

A Surrey team, led by Dr Ralph Manders, is looking into the viability of insects as an alternative protein source that fulfils our dietary requirements. The project consists of 38 participants aged 18–35, 45–55 and over 65 years old who will help identify sustainable sources of dietary protein that are more environmentally friendly than traditional farming practices.

The participants are invited to eat either a milk-based muffin or one made from cricket flour. Blood samples are taken before consumption and up to four hours after. The team then examine hormone levels and lipid profiles. A stable carbon isotope tracer baked into the muffin will help researchers identify how long the body takes to digest the muffin made of cricket flour. This can be determined by how much carbon is found in breath samples provided by participants.

Although eating insects is nothing new in many parts of the world, it is gaining more interest in western countries due to increased environmental and animal welfare awareness.

“ We want to find out how much protein they contain and if our bodies can digest it quickly, making it a viable alternative to animal products. ”

”
Dr Ralph Manders

➤ PUT YOUR MONEY WHERE YOUR MOUTH IS – FEEDING OUR COMMUNITIES

Community gardens, pantries and food partnerships have become a familiar sight in our towns and cities. Using public funds to support them can, Prof Roberta Sonnino, Fellow of the Institute for Sustainability said, make or break these local initiatives using their purchasing power.

The study – ‘Food democracy and the right to the city: Re-assembling urban food environments in East-Central London’, published in *Cities* – led by Professor Sonnino, showed that many people want to make their communities healthier through more sustainable food systems. Governments and public bodies spend billions every year buying food – in some countries, over half the total budget on food. The study suggests that if the food was responsibly sourced, healthy and from local sources, the impact would be greater.

Professor Sonnino said: “Public bodies control significant budgets that can be used to help or get in the way. To give one example: the Mayor of London has promised to give local boroughs £140m for free primary school lunches this year. An investment of that size could make a significant difference by investing in locally sourced, healthy and nutritious food.”



GOOD HEALTH AND WELLBEING



► SURREY'S SPORT FOR ALL

The Sports Park Community team at the University of Surrey is providing accessible sessions for members and non-members to help remove the barriers to exercise.

With an increase in financial hardship, fewer people can afford a gym membership or specialist class, so many exercise sessions are available for free or at low cost. These include Basketball and Netball Community Hubs with pre- and post-natal classes including fitness, yoga and swimming; and specific exercise classes for the plus sizes.

► REDUCING INEQUALITIES IN MATERNITY CARE

The maternity experience of parents with learning disabilities is often poor and lacking adjustments to care, due partially to a shortage of training and resources. The University of Surrey is leading the Together Project to improve this situation.

The project has brought together parents with learning disabilities, researchers and health and social care professionals to produce resources, training and an evaluation tool to support good maternity care for those with learning disabilities.

As well as a toolkit for professionals in maternity services, the resources include a maternity passport to be held by people with learning disabilities to outline any relevant information needed by the professionals who support them. An educational film features advice and guidance from experts to support professionals working in maternity services to recognise when a parent-to-be may have learning disabilities. And people with learning disabilities have co-produced and co-delivered awareness training for student midwives.

► SURREY SUPPORTS SOUNDSCAPES AND WELLBEING WORKSHOP

Surrey's School of Psychology and the UKRI-funded project 'AI for sound' teamed up to support an international workshop. Titled 'Interdisciplinary perspectives on soundscapes and wellbeing', brought together leading experts to explore the intricate relationship between soundscapes and human wellbeing from multiple perspectives.

With 180 virtual participants and 28 in-person, the workshop tackled various aspects of soundscapes and their impact on wellbeing. Sessions included topics like the influence of birdsong on mental health, the role of sound in architectural design for improved wellbeing, and the application of AI in sound analysis for environmental conservation.



97%

OF THOSE ATTENDING OUR SESSIONS REPORT THAT THEIR PHYSICAL HEALTH HAS IMPROVED



► MITIGATING THE EFFECT OF TECHNOSTRESS IN THE WORKPLACE

Surrey's Dr Athina Ioannou, Lecturer in Business Analytics, has investigated how 'technostress' – the stress experienced due to the extended use of information communication technologies (ICTs) – affects individuals in the workplace, and how it can be mitigated by mindfulness practices.

It is estimated that workplace stress costs businesses more than 100 billion pounds every year due to decreased employee productivity, absenteeism and turnover; and high rates of employee compensation claims translating into huge monetary costs for organisations.

Dr Ioannou's study involved semi-structured interviews with ten knowledge workers to explore how mindfulness alleviates technostress within the workplace. She investigated the experiences of more mindful employees and revealed a toolkit of the underlying strategies that they use, thus shedding light on the links between mindfulness and technostress. The results will contribute towards improving employee wellbeing within organisations.



“

The diverse perspectives, interests and expertise shared by participants underscore the importance of interdisciplinary collaboration in addressing contemporary environmental and health challenges.

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Dr Sarah Payne



QUALITY EDUCATION



▶ FREE TOOLKIT TO SUPPORT EARLY CHILDHOOD MATHEMATICS

Spatial reasoning is the ability to understand the spatial properties of objects such as their size and location, and to visualise objects and problems in the mind. These skills help us stack the dishwasher, fit a sofa through a doorway, and give directions.

For young children in the classroom, those with good spatial reasoning skills are typically also better at mathematics, and positive impacts are also observed in performance in other STEM subjects. The largest effects of spatial training are seen with children from economically disadvantaged backgrounds, offering an opportunity to reduce attainment gaps.

A team from Surrey, led by Professor Emily Farran, has developed a free spatial reasoning platform to promote the use of these skills in early years and primary school children.

Surrey's spatial reasoning platform includes the Spatial Reasoning Toolkit, and a range of resources including a research summary, posters, videos and children's book lists. Professor Farran has met with senior UK policymakers and the CEO of a major international nursery provider to discuss expanding access to and accelerating usage of the resources in the toolkit.

34,879

ONLINE VIEWS OF THE TOOLKIT SINCE ITS LAUNCH

5,481

PRESENTATION ATTENDEES

113,794

X (FORMERLY TWITTER) IMPRESSIONS

▶ CONNECTING PEOPLE WITH NATURE

Surrey's Institute for Sustainability has partnered with Surrey Wildlife Trust to produce a free downloadable guide that provides an accessible strategy to integrate nature into people's lives or educational activities.

The guide, 'How to grow a relationship with nature: guide and toolkit', combines the scientific expertise of academics with the experiences and knowledge of practitioners, bridging science and practice on how to create a relationship with nature.

Dr Matteo Giusti, Future Fellow in Sustainability Science, said: "Studies have proven that almost any form of nature engagement is positive for our health and wellbeing. The guide aims to promote physical and psychological health by supporting our connection with nature ... [and] promoting nature activities that can be integrated into the curriculum."

Dr Giusti added: "The combination of social interaction and nature engagement ultimately leads to a sustainable community that is capable of taking care of nature with empathy towards plants, animals and the ecosystem that surrounds us."



▶ HIGHLIGHTING THE TRANSFORMATIVE IMPACT OF INTERPROFESSIONAL EDUCATION

The Surrey Institute of Education organised a one-day internal conference focusing on 'Learning and teaching at Surrey: Developing transferable skills and capabilities through the lens of the UN Sustainability Development Goals'.

The conference brought together academics from across the University to discuss the critical issues surrounding the development of transferable skills and their alignment with the UN Sustainable Development Goals through the lens of learning and teaching.

Participants were encouraged to consider the potential transformative impact of interprofessional education on teaching, research and sustainable wellbeing for humans and animals. The wider applicability of these skills and the value of developing a culture of collaboration were also placed at the centre of discussions.

Associate Professor Jia Doulton revealed our ambition to incorporate a spiral curriculum of authentic interprofessional learning into our Health Sciences programmes so that by the time our students reach the end of their studies they have a well-developed appreciation of collaborative practice.

▶ CHAMPIONING SUSTAINABILITY IN THE VETERINARY WORKPLACE

Surrey Veterinary School's Dr Cait Finnegan and Hannah Davies created a sustainability panel discussion to share tips and tricks for new graduates on championing sustainability when they enter the veterinary workplace.

This session was delivered in collaboration with Vet Sustain, a community interest company. Devoted to enabling and inspiring veterinary professionals in sustainability, and Investors in the Environment, an environmental accreditation scheme supporting veterinary practices in fostering sustainable change.

The panel session complements a new assignment, designed by Hannah Davies, Fellow of the Institute for Sustainability, that students have been asked to complete where they carry out a sustainability audit at one of two veterinary practices that partner with the University of Surrey for delivery of intramural rotations.

This module will encourage veterinary students to better understand how sustainability relates to the veterinary profession and what role veterinary professionals can play in contributing to the One Health and climate change agenda and a move towards net zero.

5 GENDER EQUALITY



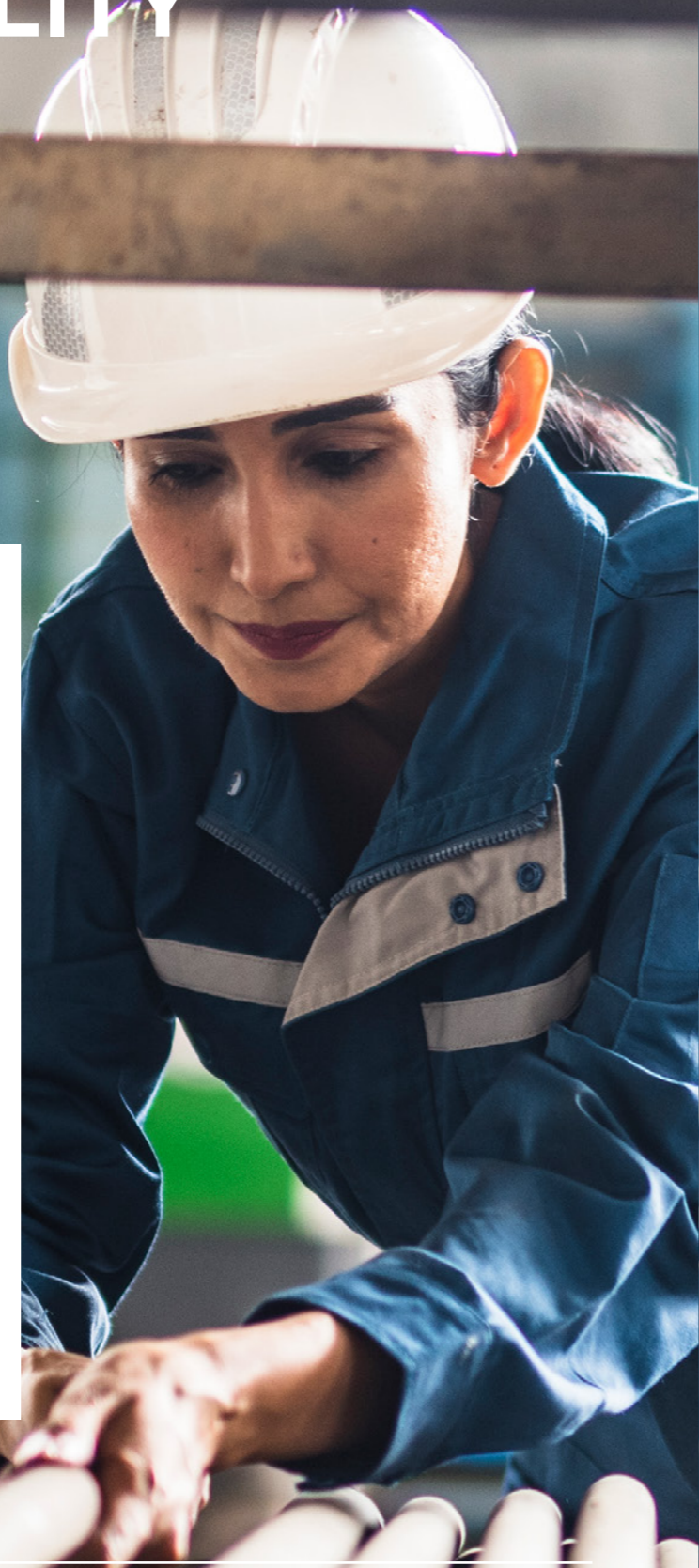
GENDER EQUALITY

▶ IMPROVING WORKPLACE CULTURE FOR ALL

An article published by the Institute for Sustainability at Surrey on International Women's Day reflected this year's theme, #inspireinclusion, and raised the profile and empowerment of all women. By inspiring inclusion, the Institute and the University can contribute to gender equality by championing it as a cultural practice that aligns with the Sustainable Development Goals.

The Institute's 'Conversations with Fellows' included details of our staff's career experiences, covering a range of exciting research as well as their experiences as women in a university environment. Each story showcased the academics' work to tackle the UN's SDGs and feature personal reflections such as Dr Sarah Golding from our School of Psychology who said: "I believe it's really important for women to have good, empathic role models and mentors, of any gender, to help aspiring academics feel safe, empowered and welcomed in academic spaces."

Supporting the empowerment of women and recognising the contributions that they make is essential to achieving gender equality.



6 CLEAN WATER AND SANITATION



CLEAN WATER AND SANITATION

▶ SHOWERING WITH EFFICIENCY

With England projected to face a water supply shortfall of 4 billion litres daily by 2050 due to population growth and climate-driven droughts and flooding, we have to find ways to reduce our water usage.

A multi-university collaborative team of researchers, including Dr Pablo Pereira-Doel, from the Institute for Sustainability at the University of Surrey, monitored 290 showers over 39 weeks, capturing 86,421 showering events, and discovered that increased water pressure was strongly associated with reduced water use. This effect can be amplified further by installing smart timers to inform users of their shower duration.

Recommendations were therefore made that higher water pressure settings in showers are considered to reduce water usage, along with the use of shower smart timers to promote awareness.



AFFORDABLE AND CLEAN ENERGY



GREENER, CLEANER ENERGY SYSTEMS

The University is involved in three new national energy research centres that will boost knowledge, create innovative green technologies and reduce demand for energy.

A £53 million investment by UK Research and Innovation (UKRI) is supporting six research centres; Surrey is involved with three of them.

Energy Demand Research Centre: Reducing energy use could help meet half of the required reductions we need to reach net zero emissions by 2050, and the University is helping ensure that disadvantaged people aren't left behind as the UK's energy demands are reduced.

Hub for Research Challenges in Hydrogen and Alternative Liquid Fuels: Surrey's Dr Qiong Cai is working with industrial and academic partners to identify how we can decarbonise transportation and heavy industry by using green hydrogen and hydrogen-based, low-carbon liquid fuels, such as ammonia.

Supergen Bioenergy Hub: Surrey's Dr Michael Short will work on the rapid digitalisation of bioenergy, creating a collection of open-source models for enhanced decision-making across the biowaste sector. Both Cai and Michael are Fellows of the Institute for Sustainability.



ENHANCING THE DURABILITY AND EFFICIENCY OF SOLID-STATE BATTERIES

Surrey researchers, in partnership with the National Physical Laboratory and University College London, have developed a new technique to make solid-state electrolytes safer and more efficient for solid-state batteries. The implications of this research are that the energy storage capabilities of batteries for use in electric vehicles and mobile devices could be improved.

The researchers found a way to manipulate the internal flow of electrons within the battery to prevent a common problem called 'lithium dendrite growth'. This problem occurs when small bits of lithium metal form in a way that can cause the battery to short-circuit or lose power. To fix this, the team created a special layer between the solid-state electrolyte and lithium metal anode that stops unwanted electrons from entering the electrolyte and causing problems – while also increasing the lifespan of the battery.

Dr Yunlong Zhao, project leader from the Advanced Technology Institute at the University, said: "The scientific community must continue to innovate quicker if the world is to develop energy storage solutions that help the UK and the world transition to net zero. One of the big challenges ahead is how we meet the demand for electric vehicles, and this new method could help confirm solid-state batteries as the right technology for this job."

UNLOCKING THE POTENTIAL OF SOLAR ENERGY

Harnessing green and cleaner energy to achieve net zero is an increasing area of interest, and research is essential to improve efficiency in these energy systems.

Perovskite-based cells are widely believed to be the next evolution of solar energy to meet the growing demand for clean energy. However, they are not as stable as traditional solar-based cells. Surrey researchers are investigating ways to stabilise these cells and make them more efficient.

Researchers at Surrey's Advanced Technology Institute have found that a tweak to the solar cells during the fabrication stage could help to regulate and reduce unwanted energy loss from the perovskite solar panels.

In other research, a team is looking into how stabilising the perovskite 'photoactive phases' – the specific part of the material that is responsible for converting light energy into electrical energy – is the key stage to extending the lifespan of perovskite solar cells. If it degrades during this phase, the solar cell will not be able to generate electricity efficiently. Therefore, stabilising the photoactive phase is a critical step in improving the longevity and effectiveness of perovskite solar cells.

BLOWING IN THE WIND – CHEAPER AND SAFER ENERGY

A review of wind energy by the University has revealed that offshore wind could have prevented the 2011 Fukushima nuclear disaster by keeping the cooling systems running and avoiding meltdown. In addition, wind farms are less vulnerable to earthquakes.

The report also highlighted that energy produced by new wind farms is much cheaper than that from new nuclear power stations. As the costs of the setting up and running wind farms has fallen, the lifetime cost of generating wind power in the UK has fallen from £160/MWh to £44MWh. This is compared to £92MWh for energy produced by Hinkley Point C nuclear power station.

Professor Suby Bhattacharya, Chair in Geomechanics, said: "What makes wind so attractive is that the fuel is free, and the cost of building turbines is falling. There is enough of it blowing around the world to power the planet 18 times over ... Wind power gives us plentiful clean energy – now we know that it could also make other facilities safer and more reliable."

BOOSTING SOLAR ENERGY CAPTURE TO HEAT OUR HOMES

A Surrey-led multi-university collaborative research team is developing solar-thermal devices that have the potential to transform how we heat our homes and generate power on a large scale.

The team have been awarded a £1.1 million grant from the Engineering and Physical Sciences Research Council.

The aim is to create new designs for surfaces that can selectively absorb sunlight while also efficiently emitting heat in the form of near-infrared radiation. The devices are different from solar cells, which typically convert sunlight into electricity, because they use sunlight to generate heat which can be converted into electricity.

TRANSITIONING TO GREENER ENERGY

Work on transitioning to renewable energy and reducing the University's demand continues. Installation of solar panels across campus significantly progressed during 2022 - 2023, with planning secured for panels to be implemented on the roof of the University's world-renowned Sports Park. Once installed, the panels will generate circa 668,000 kWh per year.

Alongside our transition towards renewable energy, the "SWITCH OFF" campaign launched - a behaviour change initiative encouraging staff and students to reduce energy usage. Throughout the year, energy saving tips were shared and over 28,000 switch off labels were implemented across campus with the aim of reducing energy use by 5–20%.



DECENT WORK AND ECONOMIC GROWTH



▶ LOOKING CLOSE TO HOME FOR SUSTAINABLE PRODUCTION

Surrey's Dr Alvina Gillani, Senior Lecturer in Marketing and Strategy, has published research looking into how extensive globalisation has presented several sustainability challenges highlighted in the United Nation's Sustainable Development Goals. These include the environmental impact of global product procurement and manufacturing and the irregular treatment of indigenous workers in low-income countries.

As a result, many firms are looking to partially or totally relocate production to their home country, known as 'reshoring'. Yet Dr Gillani looked into the under-researched aspect of the challenge – the consumers' perspective. She examined British consumers' perspectives on reshoring to the UK and sustainability.

The team found that consumers felt positively about the idea of reshoring from a sustainability perspective, but also appraised it from a global perspective, demonstrating empathy towards the host country. They also doubted corporations' motives regarding reshoring.

Participants revealed three key changes to packaging that they felt could be made to improve consumers' connectedness with reshoring and sustainability:

- Include the benefits to the local community and the environment.
- Include case studies explaining the positive impact on the environment, economy and society.
- Include a third-party labelling system that includes the environmental cost in relation to carbon footprint.



INDUSTRY, INNOVATION AND INFRASTRUCTURE

▶ PLASTIC WASTE COLLECTION – THE BEST-CASE SCENARIO

Dr Regina Frei from Surrey Business School has researched how non-household end-use plastic waste is managed, applying a cost-benefit analysis model to develop potential business cases for selective collection and mechanical recycling scenarios.

Scale is essential for plastic recycling plant development; a positive net economic balance (ranging from €5 to €537/tonne output) is achieved when at least 10,500 tonnes/year of waste is collected (fortnightly or monthly) and processed. The recycling systems become economically more effective as the processing capacity increases.

The research was focused in Ghent, Belgium, and 12 nearby municipalities. Three different collection frequencies (weekly, fortnightly and monthly) and two different mechanical recycling plant layouts (basic and advanced configuration) were considered. Data on waste quantity, composition and economic parameters were collected from real sampling from urban areas combined with information from literature.

The results indicated that it is economically attractive and crucial toward plastic sustainability to undertake selective collection and recycling of non-household end-use plastic waste.

▶ UNIVERSITY INVESTIGATES THE SOCIAL SUSTAINABILITY OF GLOBAL SUPPLY CHAINS

Dr Stelvia Matos, from our Faculty of Arts, Business and Social Sciences, has co-written a guest editorial on the social sustainability of global supply chains. The paper, published in the International Journal of Physical Distribution and Logistics, is a critical investigation into current practices and looks at how firms can transform or be reconfigured to improve social conditions and benefit wider society.

While the logistics, operations and supply chain management literature investigate actions and supply chain strategies used by firms to address a set of social issues, the impacts of intellectual outputs on real and transformative changes in the

wider society remain unclear. Current literature is focused on reporting the initiatives firms have put in place to deliver social sustainability, and on showing up the difficulties in managing them. However, little published research exists defining transformation and impact.

Dr Matos and her co-writers welcome the studies within the journal that focus on social sustainability transformation to show how current supply chain configuration can address social sustainability issues without creating harm to their economic, environmental, governance or cultural environment.



▶ FUNDING RECEIVED TO DEVELOP GREENER TECHNOLOGIES USING AI

A Surrey professor is using prestigious fellowship funding to investigate cleaner energy as well as greener solutions to manufacturing fertilisers using AI.

As well as using electrochemical technology to explore established applications like green hydrogen production and CO2 reduction, Professor Xuan will also use the prestigious, five-year, £2m Open Fellowship from the Engineering and Physical Sciences Research Council (EPSRC) to develop future, AI-driven technologies, with a particular focus on cleaner, greener fertilisers.

Professor Xuan said: “Manufacturing fertilisers to help crops grow is hugely carbon intensive, but if we can achieve a breakthrough on the difficult electrochemical reduction of nitrogen to generate ammonia, we could make significant steps to address this.

“The answer lies in AI to design complex electrochemical devices, but many existing algorithms in this area don’t offer explanations for how the AI comes to its conclusions. The relation between the inputs and outputs is a mystery, but I plan to open the ‘black box’ to find results which are reliable, explainable and transferable.”

▶ RISK TAKING AND INNOVATION TO IMPROVE THE ENVIRONMENT

Research carried out by academics at the University of Surrey has found that those companies with the dynamic capabilities to adapt products and strategies, in response to technological advancements and shifting consumer preferences, also demonstrate a greater ability to collaborate with suppliers to improve environmental practices.

The study, which involved a survey of 249 managers in multinational enterprises (MNEs) in Turkey, also found that complex environmental problems, such as initiatives to help suppliers reduce waste, can distract from long-term sustainability goals. To address this, the study proposed that MNEs should reduce risks in sustainability efforts by developing strong supplier collaborations and investing in targeted resources. These findings offer valuable insights for businesses and policymakers.



REDUCED INEQUALITIES

10 REDUCED INEQUALITIES

▶ ACCESSIBLE TRANSLATION FOR THE DEAF COMMUNITY

The internet is being made more accessible for deaf people thanks to researchers at the University of Surrey. Using generative AI, Surrey's Institute for People-Centred AI (PAI) and the University's spin-out company Signapse are developing immediately applicable tools to improve accessibility online.

Of the 7 million deaf people worldwide whose first language is sign language, 80% can't properly comprehend the spoken languages in their country, because learning a language you cannot hear is exceptionally challenging.

Backed by US\$1.5 million from Google.org, the Surrey team are developing AI research to pave the way for instant sign language translation. Automatic translation of online and offline text into real-time, photo-realistic sign language videos is within grasp as the outcome of the work, making it possible and affordable for organisations to deliver true accessibility of their websites for deaf people.

“

The lack of digital accessibility and sign language translators makes it difficult for deaf people to navigate everyday information and activities, including education, healthcare, employment and transportation ... We'll work with Signapse to boost digital inclusion, with the benefits set to spread across the whole deaf community.

”

Professor Richard Bowden

▶ IMPROVING THE SCOPE OF RESEARCH IN GENETIC SYNDROMES

A report from the University of Surrey has revealed that nearly 75% of people with Down Syndrome, Fragile X syndrome and Williams syndrome – along with those who support them – are unhappy with the current landscape of research on their condition.

The research showed that although investment in research did increase over a ten-year period, this represented less than 1% of the top three funding bodies' funding portfolio. In fact, researchers discovered that for every person with these syndromes, the UK spent only £35 on research per year, compared to £114 per person per year on UK dementia research.

In addition, funding has been mainly targeted towards basic research, with only 5% focused on treatment and interventions, 3% on services, and less than 1% on lifespan issues.

The genetic syndrome communities expressed the need for a more balanced research profile, targeting areas that are more likely to make meaningful differences to everyday lives, and in a way that is more accessible. This, it is hoped, will lead to more impactful outcomes and transformational change.

▶ SURREY RESEARCH HIGHLIGHTS INEQUALITIES IN CANCER DIAGNOSIS AND TREATMENT IN PRISONS

Researchers from Surrey have been part of a study that has revealed that patients with cancer face several barriers to diagnosis in prison. And once diagnosed, they receive significantly less treatment and lower planned care costs.

Cancer data from the National Disease Registration Service was analysed along with a series of interviews with cancer patients in prisons and prison and healthcare professionals.

The study, in collaboration with King's College London and University College London, found that compared with cancer patients in the general population, patients in prison are 28% less likely to undergo curative treatment, particularly surgery to remove tumours, and have a small but significantly increased risk of death (9%) – half of which was explained by treatment differences.

Once treatment started, it was reported that they often struggled to follow advice for managing side effects, relying instead on prison staff to respond. This impacts on their physical and emotional wellbeing.

Professor Jo Armes, Professor of Cancer Care and Lead for Digital Health at the School of Health Sciences at the University of Surrey said: "Prisons are designed to take away elements of control and choice for prisoners however this should not apply to their healthcare. With a growing and ageing prison population there is an increasing need for patients with cancer within the prison system to access equivalent care to those in the community."

▶ EXPLORING THE HOUSING NEEDS OF THE LGBTQ+ COMMUNITY

Researchers from Surrey, together with Tonic Housing, the UK's first LGBTQ+ affirmative retirement community, launched The Life House Project – a participatory theatre-based initiative to explore the unique housing and care needs of the LGBTQ+ community in London.

Many LGBTQ+ individuals face anxieties about housing and care as they age. The Life House Project aims to address these concerns by providing a platform for older adults to share their experiences and explore solutions collaboratively.

Through seven workshops and one-on-one interviews, the project creates a space for participants to use creative expression through theatre, scriptwriting and poetry.

Here they can tell their stories and highlight their specific needs and preferred forms of support.

Lecturer and lead researcher Dr Georgia Bowers at the Guildford School of Acting said: "We are particularly interested in how creative methods can support LGBTQ+ older adults to not only share their own experiences but also become advocates for themselves and the wider LGBTQ+ community. By communicating their concerns and aspirations through theatre and creative expression, we hope to ignite a conversation that leads to a more inclusive future for individuals in terms of housing and care."





SUSTAINABLE CITIES AND COMMUNITIES



▶ SUPPORTING FORGOTTEN CITIES TO TACKLE ENVIRONMENTAL DAMAGE

Professor Prashant Kumar, Director of Surrey’s Global Centre for Clean Air Research (GCARE) is principal investigator of the RECLAIM (Reclaiming Forgotten Cities) network which offers towns and cities a ‘one-stop shop’ for information and support to install green and blue infrastructure.

The network, in collaboration with the UK Centre for Ecology and Hydrology (UKCEH) will fund small projects to better understand how green and blue infrastructure can reduce the effects of flooding, heat stress, air pollution and other natural hazards. The network consists of more than 40 academic, non-academic and industrial partners and continues to grow.

Professor Kumar said: “Forgotten cities’ are smaller towns and cities with severe pockets of deprivation, which typically lack funding or political visibility. People living in deprived areas tend to suffer the most from air pollution and summer heatwaves and don’t always have access to safe green areas near their homes. These cities want to create nature-based solutions like green roofs but don’t know where to start.”

Along with establishing a diverse and global network of researchers, artists, businesses, local authorities and policymakers, RECLAIM will also take lessons from UK cities that have found innovative ways to include natural solutions in their urban infrastructure.

“

People living in deprived areas tend to suffer the most from air pollution and summer heatwaves and don’t always have access to safe green areas near their homes. These cities want to create nature-based solutions like green roofs but don’t know where to start.

”

Professor Prashant Kumar



▶ SURREY’S REGIONAL APPROACH TO COMBATTING AIR POLLUTION

The Global Centre for Clean Air Research has been working with scientists and officials in Delhi to propose a new regional approach to tackling smog.

In 60% of Indian cities, the air is over seven times more polluted than it should be. This has huge health implications. Some of this pollution comes from neighbouring rural areas – from crop burning, wood stoves or power plants. Yet measures to tackle urban smog usually ignore rural sources. Instead, they focus only on measures within the city limits.

A review co-written by Surrey’s Professor Prashant Kumar, recommends a regional approach to tackling air pollution, suggesting that better monitoring could pave the way for satellite-driven ‘smog forecasts’.



60%

OF INDIAN CITIES ARE MORE POLLUTED THAN SHOULD BE



RESPONSIBLE CONSUMPTION AND PRODUCTION



› SURREY PARTNERSHIP TO IMPROVE ANIMAL HEALTH AND WELFARE

The University of Surrey has joined ranks with other European universities and bodies to form a partnership to control infectious diseases of animals, and to promote animal welfare. Launched in 2024, the European Partnership on Animal Health and Welfare (EUPAHW) takes a One Health and One Welfare approach for societal impact.

Infectious diseases, both of terrestrial and aquatic animals, and zoonotic risks such as bird flu are addressed, together with research to improve animal welfare. EUPAHW also focuses on the prudent use of antimicrobials and ensuring that a high level of animal welfare is provided in every phase of an animal's life.

Surrey joins a diverse group of partners, including 56 leading research performing organisations and 30 funding organisations in Europe. The partnership also includes 17 three-year research projects and plans to launch research calls reaching out to additional research-performing organisations beyond the partnership.

› GLOBAL WASTE CRISIS AND THE ROLE OF INNOVATIONS BY GLOBAL CORPORATIONS

Research published in International Business and Management sheds light on how global corporations can innovate to tackle the global waste crisis and gain sustainable competitive positions.

Using two of the most prominent types of global waste crises – food and plastic wastes – Surrey's Shasha Zhao, Fellow of the Institute for Sustainability, and her co-authors discussed the dilemma of food and plastic waste and why innovations in global firms are needed to address them.

They argue that a different perspective among those firms is needed, one which conceptualises the development, dissemination and use of innovations in waste management, and one which recognises that innovations thus created contribute to advancing the creation of economic, environmental and social value.

› HARNESSING AI TO BOOST GREEN INDUSTRY

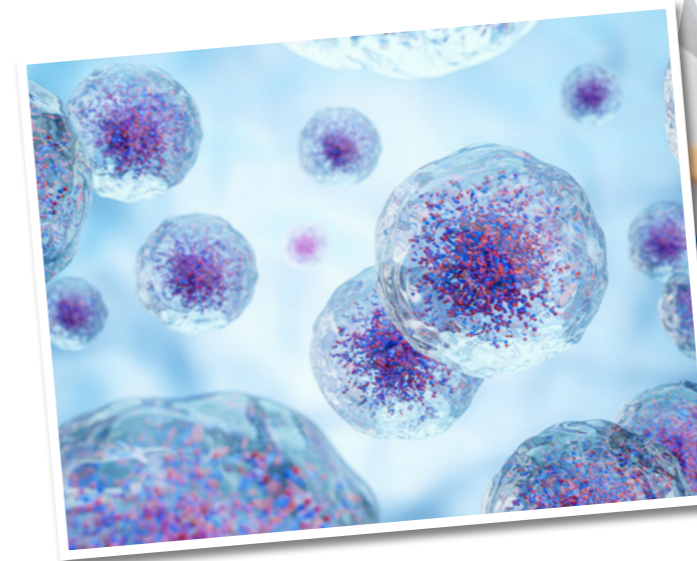
Surrey researchers are leading a project that uses AI to develop better microorganism-led processes that efficiently 'eat' products such as food waste, wastewater and animal manure to help boost the UK's green industry.

The project, funded by a £1.4 million grant by UK Research and Innovation, is investigating the impact of using different types of waste to feed anaerobic digestors, along with computational tools for site-wide optimisation.

Dr Michael Short, Principal Investigator from the University of Surrey's School of Chemistry and Chemical Engineering and Fellow of the Institute for Sustainability, said: "The challenge of complex bioreactors are their lack of predictability, exacerbated by the dynamic environment within digestors – how does each species of microbe react to different food and to the other microbes around it? But the knowledge we'll get from the data ... will start to address this uncertainty."

The UK's 650 anaerobic digestors use microbes to consume waste, predominantly from agriculture and the food supply chain, capturing the greenhouse gases which are emitted as part of that process and purifying them to create a carbon-neutral substitute for natural gas. Creating home-grown biogas like this reduces our dependency on imported fuels and protects the UK from the associated vulnerabilities.

The project aims to increase biogas yields by 20% using the same inputs, simply through the benefits of more knowledge and better predictability of reactions.



› SURREY LAUNCHES FOOD SHARE PROGRAMME AND COMMUNITY GARDEN

The University has been working to encourage responsible consumption and production of food across campus. A foodshare scheme was set up by the University's Catering Team with the aim of reducing food waste on campus. The scheme collects all leftover sandwiches and baked goods from catering outlets and distributes items to staff, students and the local community. Debbie Nottridge, Head of Catering, notes that the scheme hasn't just minimised University food waste, but has also supported 'students and staff who might need a bit of extra help with the cost of living crisis'.

The Community Garden based on Stag Hill also provides staff and students with access to fresh, free food. It gives the Surrey community a chance to learn how to grow their own fruit, vegetables and herbs responsibly. The initiative, set up by Surrey's Students Union and the University's Chaplaincy, has seen staff and students come together to re-ignite the garden – planting more fruit trees and installing beehives.

› WILL AI TRANSFORM FOOD WASTE?

Tune into our Will AI...? podcast with Dr Michael Short to explore how his research is harnessing the power of AI to turn food waste into an effective source of biofuel.





CLIMATE ACTION



▶ SPACE AND AI TO CUT RICE METHANE EMISSIONS

Much of the world's population depend upon rice as their main food stuff. However, it is also a major emitter of methane, a greenhouse gas 28 times more powerful than CO₂ (over a 100-year period).

Yet it has been shown that periodic drainages of flooded rice paddies – known as alternate wetting and drying (AWD) – can half the methane emissions while achieving significant water savings. Farmers can be rewarded with carbon credits for adopting this practice, but the integrity of this scheme has been seriously undermined by the lack of robust monitoring and verification data.

Surrey researchers, in collaboration with Mantle Labs Ltd, have developed algorithms that use satellite data and artificial intelligence for the global monitoring, reporting and verification of AWD. These algorithms allow to precisely map the extent of rice being cultivated, even under cloud cover, and to determine change of practices such as the implementations of AWD.

This algorithm has raised the interest of major carbon credit financing actors to support AWD projects and has prompted 20 rice monitoring, reporting and verification projects in China, India, Vietnam, Japan and Thailand.



▶ FIRST LABS ACHIEVE SILVER LEAF AWARD

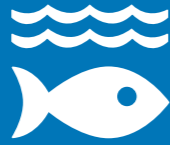
The University of Surrey's Cognitive Neuroscience Lab (CN) and Innovation for Health Lab (IFH) are the first on campus to achieve a silver LEAF accolade.

The Laboratory Efficiency Assessment Framework (LEAF) is a sustainable labs accreditation scheme initially set up by 23 universities across the UK. LEAF provides lab users with a framework to address and improve their sustainability practices.

Both Dr Phil Dean (CN) and Eddie McCarthy (IFH), have worked with their teams to action the LEAF criteria – successfully passing both the bronze and silver audit stage. They now plan to work towards gold – the highest award available with LEAF.

The LEAF scheme has been running at the University since November 2023 and aims to support labs' sustainable journeys - tackling their high energy and resource rates.

The Faculty of Engineering and Physical Sciences, and the Faculty of Health and Medical Sciences, have agreed to roll out the initiative into all labs across the University. So far 17 labs have signed up to the scheme, with 6 completing bronze and more on their way to silver.



LIFE BELOW WATER

► SURREY PROJECT SURVEYS ILLEGAL FISHING FROM SPACE

Our oceans are under threat from poor regulations and governance in countries where resources are limited to prevent and tackle illegal unreported and unregulated (IUU) fishing.

The United Nations Development Programme (UNDP) has funded a project at the Surrey Space Centre called Nereus. The project has developed a nearly real-time and automated space-based maritime surveillance solution to illegal fishing. Ship types are classified using powerful remote sensing imagery which can spot 'dark' ships which may be undertaking illegal fishing activities.

The Nereus project hopes to reduce and prevent IUU fishing and other destructive fishing practices; limit the action of large-scale fisheries in favour of the small-scale ones by means of new legal and regulatory frameworks; and propose a tool for stopping IUU in the Republic of Mauritius and support economic recovery.



LIFE ON LAND



▶ DELIVERING BIODIVERSITY NET GAIN IN CONSTRUCTION PROJECTS

Reducing the harmful impact of development on nature has become an important consideration of construction projects, especially since the Environment Act 2021 introduced the requirement to measure and deliver Biodiversity Net Gain (BNG).

This act will force all large construction projects to measure biodiversity, and ensure they leave the natural environment in a better state than it was before.

However, Laurence Cummins, from the University's Centre of Environment and Sustainability, is sceptical as to whether BNG alone will significantly drive forward nature recovery across England, or encourage developers to include nature-based solutions in their projects.

In his report, 'Biodiversity Net Gain – understanding the opportunities and challenges ahead', published in Town and Country Planning, Cummins comments that skills shortages and low levels of innovation within relevant areas of the public and private sectors, as well as loopholes within the policy itself, could undermine both the governance and the delivery of BNG.

"We need a more strategic approach to addressing complex and interlocking issues such as nature recovery, urban greening and the housing crisis," he said, noting that Surrey Nature Partnership's work to encourage planning authorities in the county to set BNG requirements at 20% instead of the national minimum of 10% is paying off. "This is more likely to ensure that outcomes for biodiversity will be genuinely positive."

▶ PLANTING ENERGY CROPS TO IMPROVE BIODIVERSITY

Developing safe and efficient alternatives to fossil fuels is an important area of research in the move towards net zero. Such alternatives include 'energy crops', and an analysis by Surrey researchers has shown how where these crops are planted makes a big difference to biodiversity outcomes.

Our researchers discovered that planting energy crops on existing agricultural land in places such as China and Central Europe could minimise the harm to biodiversity compared to elsewhere. Agricultural land in other places could then be restored to natural habitats, thus maximising the benefits to biodiversity.

The team studied which habitats contained the richest mix of species, then compared that information with maps of land use and information about where energy crops could produce the biggest yields.

Postgraduate research student, Sophie Tudge, said: "Our study suggests that, as far as biodiversity is concerned, it is always best to restore farmland to nature rather than re-plant it with energy crops. Yet, we are realists. In the future, more fuel will come from crops and it is far better to plant them on existing farms than destroy remaining natural habitats. We have shown that where you plant those crops makes a huge difference to how many species continue to thrive."

▶ GREEN FLAG AWARDED TO STAG HILL

The University's Stag Hill campus was awarded a Green Flag by environmental charity Keep Britain Tidy. This was the first year the University achieved this prestigious award, recognising the campus as a green space of international significance.

Stag Hill campus has a range of natural sites and is home to a variety of wildlife: from bee orchids to hedgehogs. These green spaces are not only a haven for staff and students, but the local community too.

The award celebrated the University's efforts to improve biodiversity on-site and integrate sustainable practices into the Grounds Team day-to-day operations – including a closed-loop recycling scheme, taking garden waste and processing it into mulch to be used across the University.





PEACE, JUSTICE AND STRONG INSTITUTIONS

▶ ACCESS TO JUSTICE FOR ALL

A report, launched at the University of Surrey School of Law's Access to Justice Clinic, by his Honour Sir Robin Knowles CBE, Chair of the Commercial Bar Association of England and Wales, has highlighted the need for accessible legal aid and representation and raises awareness of the challenges faced by vulnerable people in Surrey.

The Access to Justice Report, by South West London Law Centres (SWLLC), catalogues the gaps in legal aid within Surrey and highlights cases where people have had to rely on non-legal advice services instead of specialist legal services. This is particularly acute in employment, education and immigration cases.

The report shows that most social welfare advice is provided by voluntary or not-for-profit agencies, with Citizens Advice taking the leading role.

The report proposes new initiatives to improve legal support, including a Family Law Court Help Desk, an Education Rights Advice Project, and Immigration and Asylum Caseworkers in Surrey.

Liz Williams, Associate Professor and Director of Clinical Legal Education at the University of Surrey, said: "The Access to Justice Clinic at the Surrey Law School understands that social transformation and legal impact is only possible through a collaborative approach. The Clinic plans to expand in partnership with South West London Law Centres, local charities and legal professionals on a broad range of collaborations to help solve the access to justice crisis in Surrey."

▶ FACT OR FICTION? SURREY REPORT CAMPAIGNS TO SAFEGUARD DEMOCRACY

As AI-generated content is becoming more commonplace, it is increasingly important that people can spot what is real and what is not in order to safeguard democracy.

A new report by Surrey's Institute for People-Centred AI calls for campaigns teaching the public about the issue and for greater funding for research into detecting deepfakes.

This is particularly important to safeguard democracy, with AI making misinformation easier to spread across the globe. Dr Bahareh Heravi, Reader in AI and Media, said: "That's why we must give voters the tools to tell fact from fiction. Greater media literacy can only strengthen our democracy."

Along with a call for greater leadership from all politicians, the report's other key recommendations include:

- Wider use of content verification – including clear labelling for AI-generated material.
- A 'fact-checkers code' to encourage media companies to investigate and report misinformation.
- Laws should be made to make social media companies responsible for content on their platforms.
- Funding for UK-based research into AI tools which could help detect misinformation and disinformation.



PARTNERSHIPS FOR THE GOALS



▶ FOSTERING STRONG PARTNERSHIPS TO TACKLE SUSTAINABILITY IN EDUCATION AND RESEARCH

Academics, professional staff and PhD students from the University were proud to participate in the 2022 University Global Partnership Network (UGPN) online conference, bringing together delegates from member institutions in Brazil, Australia, USA and UK to promote and facilitate innovative collaborations in research and education. The spotlight was on sustainability in education and research and how UGPN partnerships can make a difference.

A number of Surrey staff members led workshops and panel discussions. These included Professor Osama Khan, Pro-Vice-Chancellor Academic, and academic colleagues from the Centre for Environment and Sustainability, who explored the challenges of embedding sustainability into the curriculum. Staff from the Faculty of Health and Medical Sciences led a series of workshops exploring sustainable and inclusive approaches to tackle health inequalities; and Professor Christine Rollier gave a keynote speech introducing Surrey's new vaccinology team, which is supporting the development of novel vaccines and tools to tackle diseases that affect the health of the most vulnerable populations.

Through the workshops, collaborations were identified and forged, while new projects were proposed for the 2022 annual Research Collaboration Fund, which funded new projects which will aim to address UN SDGs.

▶ ADDRESSING CANCER INEQUALITIES

Surrey is collaborating with NC State University, USA and the University of Wollongong, Australia to look into the inequalities in people's cancer experiences and outcomes.

The University Global Partnership Network: Cancer Inequalities Collaboration (UGPN CINC) brings together several disciplines, including behavioural science, health services research, social work, nursing and epidemiology, as well as research on a wide range of inequalities, including learning disability, socio-economic status and ethnicity.

By bringing together faculty and researchers in cancer inequalities, the collaboration aims to co-write and publish research papers identifying existing data sources and opportunities. It is hoped that the work can be used internationally to reduce cancer inequalities.

▶ EARTH MAKES NO SOUND...

A pop-up performance – Earth Makes No Sound – was held in collaboration with Filament Theatre and the Guildford School of Acting, inspired by the elements and the environmental changes happening to our planet. Performed as part of the University of Surrey Showcase, it combined choral singing and movement theatre, redefining the relationship between voice, movement, harmony, body percussion and improvisation.



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