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Current

ISSN 2753-2771

Surrey’s Satellite bio-diversity project promoted at COP30 Brazil

13 November 2025

Surrey’s Space4Nature project, which uses satellite data and community science to protect biodiversity across the county, is currently being showcased by the UK Government at the COP30 UK Pavilion in Belém, Brazil (10–21 November 2025). The display forms part of the UK’s official presentation of research and innovation tackling global climate and nature challenges.

Co-led by the University of Surrey’s Centre for Environment and Sustainability (CES) in collaboration with Surrey Wildlife Trust, Buglife, and the Painshill Park Trust, Space4Nature brings together scientists, local communities and conservation groups to map and monitor key habitats across Surrey – from chalk grasslands to heathlands and acid grasslands that support some of the nation’s rarest species.

Using advanced satellite imagery and artificial intelligence trained with data from local volunteers, the project can classify habitats to Level 4 of the UKHab system – producing one of the most detailed environmental maps of its kind. This allows conservation partners to pinpoint where biodiversity is under threat and focus restoration efforts, such as reconnecting fragmented chalk grasslands – often called the “rainforests of Europe” for their carbon storage and rich biodiversity.

Surrey Wildlife Trust plays a central role in Space4Nature, leading the project’s citizen science programme, training volunteers and coordinating the collection of field data that makes its satellite and AI mapping possible. The Trust’s on-the-ground expertise connects technology and conservation, turning local knowledge into invaluable data for protecting Surrey’s landscapes.

Dr Ana Andries, Lecturer in Remote Sensing and GIS at the University of Surrey, and project lead, said:

“We’re using satellite data and artificial intelligence in a way that directly supports conservation on the ground. Citizen scientists help train our machine learning models, thus turning local field data into high-resolution habitat maps that reveal where biodiversity is under threat. To see our work featured on a global stage at COP30 highlights how our region’s innovation and collaboration can help shape the future of biodiversity monitoring.”

Andrew Jamieson, Space4Nature Project Manager at Surrey Wildlife Trust, says:

“It’s time for conservation organisations like ours to step outside traditional boundaries and focus not just on land management and individual species recovery, but also on delivering the tools and partnerships that will drive change on a landscape level. This project exemplifies that approach.”

Space4Nature was among the first projects in the United Kingdom to receive Space for Climate Observatory (SCO) accreditation from the UK’s Space4Climate network, recognising its excellence in using Earth observation data to tackle environmental challenges. This year, it has been selected as one of just 19 organisations featured in the UK Government’s Pavilion at COP30, with a video and QR-linked display presented by government representatives throughout the conference.

Dr Zoe M Harris, Director of Surrey’s Centre for Environment and Sustainability and Co-Director of the Institute for Sustainability, said:

“The Centre for Environment and Sustainability was founded on the idea that solving environmental challenges means bringing disciplines and people together. Space4Nature embodies that vision – combining engineering, data science and community insight to create practical tools for nature recovery. Seeing this work recognised at COP30 highlights Surrey’s role as a global leader in sustainability research and innovation.”

Surrey University

Image: Centre for Environment and Sustainability, University of Surrey

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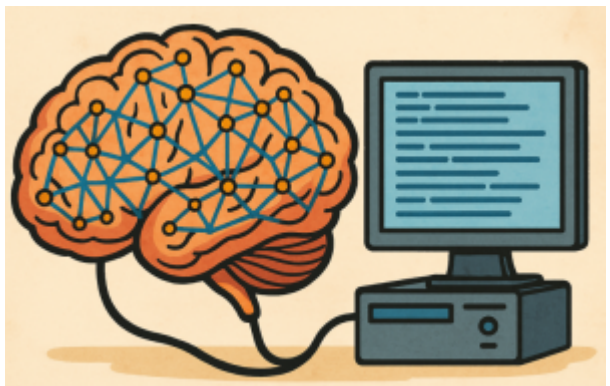
Epsom and Ewell Times adds – the Surrey project is one of only twenty presented by the UK at the COP30 summit. See

ISSN 2753-2771

the full list HERE.

Surrey Uni show AI systems based on the human brain's save energy

13 November 2025



Artificial intelligence (AI) could soon become more energy-efficient and faster, thanks to a new approach developed at the University of Surrey that takes direct inspiration from biological neural networks of the human brain.

In a study published in Neurocomputing, researchers from Surrey's Nature-Inspired Computation and Engineering (NICE) group have shown that mimicking the brain's sparse and structured neural wiring can significantly improve the performance of artificial neural networks (ANNs) – used in generative AI and other modern AI models such as ChatGPT – without sacrificing accuracy.

The method, called Topographical Sparse Mapping (TSM), rethinks how AI systems are wired at their most fundamental level. Unlike conventional deep-learning models – such as those used for image recognition and language processing – which connect every neuron in one layer to all neurons in the next, wasting energy, TSM connects each neuron only to nearby or related ones, much like how the brain's visual system organises information efficiently. Through this natural design, the model eliminates the need for vast numbers of unnecessary connections and computations.

An enhanced version, called Enhanced Topographical Sparse Mapping (ETSM), goes a step further by introducing a biologically inspired "pruning" process during training – similar to how the brain gradually refines its neural connections as it learns. Together, these approaches allow AI systems to achieve equal or even greater accuracy while using only a fraction of the parameters and energy required by conventional models.

Dr Roman Bauer, Senior Lecturer at the University of Surrey's School of Computer Science and Electronic Engineering, and project supervisor, said:

"Training many of today's popular large AI models can consume over a million kilowatt-hours of electricity, which is equivalent to the annual use of more than a hundred US homes, and cost tens of millions of dollars. That simply isn't sustainable at the rate AI continues to grow. Our work shows that intelligent systems can be built far more efficiently, cutting energy demands without sacrificing performance."

Surrey's enhanced model achieved up to 99% sparsity – meaning it could remove almost all of the usual neural connections – but still matched or exceeded the accuracy of standard networks on benchmark datasets. Because it avoids the constant fine-tuning and rewiring used by other approaches, it trains faster, uses less memory and consumes less than one per cent of the energy of a conventional AI system.

Mohsen Kamelian Rad, a PhD student at the University of Surrey and lead author of the study, said:

"The brain achieves remarkable efficiency through its structure, with each neuron forming connections that are spatially well-organised. When we mirror this topographical design, we can train AI systems that learn faster, use less energy and perform just as accurately. It's a new way of thinking about neural networks, built on the same biological principles that make natural intelligence so effective"

While the current framework applies the brain-inspired mapping to an AI model's input layer, extending it to deeper layers could make networks even leaner and more efficient. The research team is also exploring how the approach could be used in other applications, such as more realistic neuromorphic computers, where the efficiency gains could have an even greater impact.

Surrey University

Epsom and Ewell Times asked ChatGPT to explain the above press release from Surrey University and this is what it wrote:

ISSN 2753-2771

“Artificial intelligence models like ChatGPT rely on vast numbers of digital connections between “neurons”, mimicking how the human brain works – but they use enormous amounts of electricity to do it. Researchers at the University of Surrey have developed a new way to wire these networks that could make them dramatically more efficient.

Instead of connecting every artificial neuron to every other, the Surrey team copied the brain’s habit of linking only nearby or related neurons. Their method, called **Topographical Sparse Mapping**, cuts out unnecessary connections, saving energy while maintaining accuracy. A refined version, **Enhanced Topographical Sparse Mapping**, even “prunes” the network during learning – like the brain trimming unused connections as it develops. The result is AI that can train faster, use less memory and consume less than one per cent of the energy of current systems.

If this approach proves scalable, it could mean greener, cheaper and quicker AI – taking inspiration not from bigger computers, but from the extraordinary efficiency of the human brain.”

Defibrillators delivered by drone?

13 November 2025

A groundbreaking project testing how drones could be integrated into the UK’s 999 emergency response system to deliver defibrillators to out-of-hospital cardiac arrest patients has been launched by the **University of Surrey**, **Air Ambulance Charity Kent Surrey Sussex**, and the **South East Coast Ambulance Service NHS Foundation Trust (SECAmb)**.

Funded by the **National Institute for Health and Care Research (NIHR)**, the 16-month initiative will explore how drones can rapidly deliver Automated External Defibrillators (AEDs) to the scene of an emergency — potentially saving lives where every second counts.

The research will take place in two phases. The first will simulate 999 call handling, Air Traffic Control coordination, ambulance dispatch, and drone operations to develop and refine delivery procedures. The second will involve interviews with out-of-hospital cardiac arrest survivors, family members, emergency responders and members of the public to assess perceptions of drone technology, ease of use, and any concerns.

Dr Scott Munro, Lecturer in Paramedic Practice at the University of Surrey and project co-lead, said:

“This research is the first step towards integrating drone technology into our emergency response systems. Our ultimate goal is to develop and test the procedures needed to seamlessly introduce drone delivery of AEDs into the 999-emergency system.”

Professor Kevin Munro, Director of the NIHR Research for Patient Benefit Programme, added:

“Using drones to deliver defibrillators could help emergency teams reach patients faster, improve survival after cardiac arrest, and bring cutting-edge technology directly to the NHS frontline.”

Dr Craig Mortimer, Research Manager at SECAmb, said:

“Rapid intervention is vital in managing out-of-hospital cardiac arrests. Integrating this technology into future healthcare systems represents real progress in strengthening the chain of survival and giving patients the best chance of a positive outcome.”

With UK survival rates for out-of-hospital cardiac arrest currently below 10%, the research aims to tackle one of the biggest challenges in emergency care: getting a defibrillator to the patient in time.

About NIHR
The **National Institute for Health and Care Research (NIHR)** is the UK’s largest funder of health and social care research. It invests in high-quality studies that benefit the NHS, public health and social care, supports researchers and facilities, and partners with patients and communities to improve outcomes both in the UK and globally.

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ISSN 2753-2771

Surrey Uni to open in India after UK PM’s visit

13 November 2025

Surrey joins new UK Universities in India Alliance while on UK trade mission to India

The UK’s universities can be a “skills and research accelerator” for the potential of the strengthening UK–India trade partnership, which was the focus of Sir Keir Starmer’s trade mission this week. This is according to Professor Stephen Jarvis, newly appointed President and Vice-Chancellor of the University of Surrey – and a participant in the trade mission.

On his return from India, where the multi-sector delegation met with Prime Minister Narendra Modi, Professor Jarvis highlighted the strong fit of the University of Surrey’s ‘purpose-driven’ approach to education and research, and the importance of the new Universities in India Alliance, which Surrey was proud to become a founder member of during the trip.

During the visit, the University of Surrey was presented with approval in principle from IFSCA (International Financial Services Centres Authority) to proceed with opening a new International Branch Campus at GIFT City, in Ahmedabad, Gujarat State.

On the trip, the University also celebrated its network of research and education partnerships with Indian universities – including its partnership with the Indian Institute of Science, Bengaluru (IISc) – which will see both institutions partner to drive research and innovation in semiconductor chip design and medical research, with a particular focus on human health and veterinary medicine.

Professor Stephen Jarvis said:

“I was honoured to be invited to join the Prime Minister on his visit to India to celebrate the enormous potential for UK higher education to partner and collaborate in India to drive international skills development and research to solve global challenges. India is an economic and skills superpower – it has its own thriving higher education sector, but also recognises the value that Britain’s globally recognised higher education sector can bring to meeting the extraordinary growth in demand for quality education in India.

“As we move towards opening our new campus in GIFT City, we’re delighted to have been invited to become founding members of the nine-strong UK Universities in India Alliance. Education is an immensely important export industry for the UK, and Surrey is proud to be standing shoulder to shoulder with our fellow universities, bringing our own unique brand of purposeful education, as we seek to expand the potential for higher education to be a skills and research accelerator, benefitting both the UK and Indian economies.”

Alison Barrett MBE, Country Director India, British Council, said:

“Congratulations to the University of Surrey on receiving approval in principle from IFSCA (International Financial Services Centres Authority) to establish its International Branch Campus in GIFT City, Ahmedabad, India. This reflects the UK’s commitment to accessible, innovative, and inclusive education, but also demonstrates the positive impact of the National Education Policy 2020. Aligned with the shared ambition outlined in the India-UK Vision 2035, bringing Surrey’s expertise to India will create exciting new opportunities for students and equip them with the skills needed to thrive in the future.”

Surrey University

Image: 09/10/2025. Mumbai, India. Prime Minister Keir Starmer meets Indian Prime Minister Narendra Modi for a bilateral meeting at the Raj Bhavan. Picture by Simon Dawson / No 10 Downing Street

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ISSN 2753-2771

Get paid for falling over in Surrey study

13 November 2025

With 219,000 fall-related emergency hospital admissions among people aged 65 and over in England in 2023/24, a new trial at the University of Surrey is exploring how smart flooring could help prevent serious injuries by cushioning falls – potentially easing pressure on the NHS and reshaping the design of hospitals, care homes and even private homes.

In the ongoing study, participants wear reflective body markers that are tracked by infrared cameras, allowing researchers to measure how different floor materials – ranging from soft to hard – affect a person's balance, movement and stability. The findings will form the foundation for designing new protective flooring that looks and feels like a regular surface but can absorb the impact of a fall.

The team is currently seeking healthy adult volunteers of all ages, particularly those aged 65 and over, to participate in the trial.

Silas Purja, Postgraduate Researcher at the University of Surrey's School of Engineering and lead researcher in the trial, said:

"Every year in the UK, hundreds of thousands of older adults experience a fall – many of which lead to lengthy hospital stays and, tragically, some fatalities. Government figures show that unaddressed fall hazards in the home alone cost the NHS in England around £435 million annually, while fragility fractures – often caused by falls – cost the UK an estimated £4.4 billion each year, including £1.1 billion in social care. To help ease pressure on the health service and protect lives, we're investigating how different flooring types affect balance – with the goal of supporting the design of safer, smarter surfaces in various settings."

The current phase of the study involves testing different age groups on their ability to stand and walk on various floor conditions in a controlled indoor environment at the University. Researchers can then analyse how different levels of stiffness affect participants' natural balance.

The long-term vision is a flooring system that remains firm during normal use but softens when someone falls – reducing the risk of broken bones or head injuries. From the outside, it would resemble standard synthetic tiles or rubber flooring, but with smart materials and systems hidden beneath. As the technology matures, the flooring could eventually be rolled out in hospitals, care homes and private homes where older people are most at risk.

Dr Iman Mohagheghian, Associate Professor (Reader) in Mechanics of Materials at the University of Surrey and Principal Investigator on the project, said:

"Trials like this are crucial for determining age-related differences in balance and movement, and how those differences interact with the surfaces we walk on every day. Volunteers who take part will play an important role in helping us design safer, more supportive environments, and their contributions could ultimately help prevent life-altering injuries. If you would like to be part of our research, we'd love to hear from you."

The study is part of the wider Engineering and Physical Sciences Research Council (EPSRC)-funded project Multifunctional Flooring: Design for Independent Living, led by Dr Iman Mohagheghian. The project brings together an interdisciplinary team of researchers, including Dr Matthew Oldfield and Dr Radu Sporea from the University of Surrey, and Dr Amy Drahota from the University of Portsmouth.

The team is working closely with commercial partners and manufacturers of flooring for healthcare settings and advanced sensor and touch technologies. Together they aim to develop an integrated flooring solution that provides passive fall prevention, real-time fall detection and impact protection in one.

Participants will receive a £10 expenses payment for their time along with free parking at the University. To register your interest or find out more, contact Silas directly at s.purja@surrey.ac.uk.

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Current

ISSN 2753-2771

Surrey Uni finds gay vets face discrimination

13 November 2025

A new study from the University of Surrey and the Royal Veterinary College has highlighted the ongoing presence of discrimination and its impact on lesbian, gay, bisexual, transgender, and other (LGBT+) veterinary professionals and students in the UK.

The research, published in Vet Record, analysed 130 survey responses and found that over half (55.4%) of the participants had either experienced or witnessed some form of discrimination, ranging from microaggressions to outright threats of violence. This number highlights a concerning problem for LGBT+ veterinary professionals and students and a call to action for profession to collectively work to ensure everyone can work free from discriminatory behaviour.

The findings also reported that over half of the participants were not fully “out” to everyone at their workplace or place of study underlining that not all LGBT+ veterinary professionals and students feel safe or welcome to share who they are at work or study. However, in contrast, the positive findings from the study were that those who were “out” were more likely to report feeling supported at work and by the wider veterinary community.

Participants also cited a fear of negative repercussions on their career progression and educational attainment as a reason for not disclosing their identity. The study notes that such fear can lead to stress, anxiety and a sense of disconnection from colleagues.

Dr Charlotte S. McCarroll, Associate Head of School (Education) at the School of Veterinary Medicine at the University of Surrey, said:

“For our LGBT+ family, friends and colleagues, discrimination remains a pressing issue within the UK veterinary profession. More needs to be done by our institutions for these individuals to feel supported, including increasing and promoting support networks, improving education and training on anti-discrimination laws, and firmly promoting equality, diversity and inclusion initiatives.”

Dr Mat Hennessey, post-doctoral researcher in veterinary social science at the Royal Veterinary College, said:

“The findings of our study highlight the ongoing work which needs to occur, both in places of work and education, to foster inclusive environments which are supportive of all people. Creating such environments, where people can be their authentic selves without fear of discrimination, is a team effort requiring both institutional support for EDI initiatives and active engagement with the wider community.”

Peter Heather MRCVS, President of BVLGBT+ said:

“Within our profession there are many employers and colleagues who remain committed allies, but as this study shows, discrimination against LGBTQ+ people in the veterinary profession persists. To combat this, leaders in our profession need to educate others and themselves about discriminatory behaviour and learn more about the benefits of open and inclusive work and study environments that allow people to just be themselves.”

Surrey University

Prostate cancer vaccine research launched in Surrey

13 November 2025

ISSN 2753-2771

In September 2025, The Prostate Project, a Guildford-based volunteer-led charity, will launch a £250,000 campaign to raise funds for a prostate cancer research project widely anticipated to be ‘game-changing’.

Work has begun to develop a vaccine to prevent the return of prostate cancer in men who have undergone a radical prostatectomy, the surgical removal of the prostate. Cancer vaccines have become an exciting area of research in recent years, and this new treatment could potentially save the lives of more than 1,500 men each year in the UK alone.

The Prostate Project, based at the Stokes Centre for Urology at Royal Surrey County Hospital, has a proven track record of funding research and treatment of prostate cancer, raising more than £11 million since its formation in 1998.

During this time the charity has provided funds for research at the University of Surrey, leading directly to breakthroughs in the diagnosis and treatment of prostate and other urological cancers. The university team is one of the leading groups for immunotherapy research in the UK, and is recognised around the world for its work.

This latest initiative is part of the charity’s longstanding and ongoing support for the work of Dr. Nicola Annels and Dr. Guy Simpson and their team based at the University of Surrey.

A patent has been applied for the vaccine and Dr. Simpson has already proven that it works in the similar treatment of bladder cancer. This new research is required to see if the vaccine works as effectively for prostate cancer patients.

Dr. Guy Simpson, Research Fellow Oncology at the University of Surrey explains:

‘The research will focus on a ‘prime-boost’ vaccine strategy. The new cancer-killing virus, known as HSV5-15 developed by our team at the University of Surrey will be used as an immune ‘priming’ vaccine along with a prostate specific mRNA vaccine to ‘boost’ and maintain this immune response against the prostate.

mRNA vaccines have already proven to be revolutionary in preventing COVID, and this technology is promising similarly effective results in treating cancer tumours.

The vaccine trains the body’s immune system to recognise cancer cells so any that return after surgery can be hunted down and killed, reducing the risk of the disease coming back. Around 5,000 radical prostatectomies are performed each year in the UK, but between 20% and 50% of men who have their prostates removed will have their cancer return, resulting in them undergoing further radiotherapy and/or hormone therapy.

This treatment is costly, time-consuming and can have unpleasant side effects, and is not always completely successful.’

Prostate Project Chairman, Martin Davies, expands on the fundraising initiative:

‘For over 25 years the Prostate Project has been proud to support a team that is quite rightly recognised by their peers for their work in immunology research, and this latest initiative is perhaps the most important yet. We are looking to raise £250,000, a target that we recognise as ambitious but completely achievable, especially given our past record, and the significance of the potential outcome.’

A final word from Dr. Simpson on the timescales for delivery.

‘This funding will support the initial 18 month research period, but the more money that we raise will have a significant effect on timescales.

The Prostate Project website www.prostate-project.org.uk features a comprehensive FAQ page with answers to many of the questions about the vaccine and details of how to donate.

Almost any listening environment on Earth coming to Surrey

13 November 2025

ISSN 2753-2771

A new national audio hub featuring world-first acoustic facilities is being built at the University of Surrey, thanks to £2.2 million in funding from the Engineering and Physical Sciences Research Council (EPSRC). The facilities will allow researchers to simulate almost any listening environment on Earth, from a quiet living room or modern office to a vast concert hall, cathedral or bustling city street.

At the heart of AURORA³ (Anechoic and Universal Research Observation Rooms for Audio, Acoustics & AI) will be two world-class audio environments: a state-of-the-art anechoic chamber with a spherical loudspeaker array and a first-of-its-kind variable acoustics room capable of adjusting both reverberation time and physical volume at the push of a button. AURORA³ will be open to researchers from both academia and industry across the UK and globally, as well as to Surrey staff and students.

Professor Enzo De Sena, Director of the Institute of Sound Recording at the University of Surrey, and Fellow of the Surrey Institute for People-Centred AI, said:

“AURORA³ will create a national hub for excellence in sound and AI, allowing researchers to generate reproducible data, test innovations in controlled and lifelike environments, and shape technologies that benefit society.”

The initiative aims to unite the Audio, Acoustics and AI (A³) research community and fuel breakthroughs in sound technology by enabling more accurate modelling of the physical and perceptual phenomena involved in real-world hearing. AURORA³ will pave the way for voice assistants and remote communications that are more robust to noise and reverberation, more immersive Virtual and Augmented Reality experiences for entertainment and virtual prototyping, and smarter hearing aid devices that better understand and adapt to the acoustic scene.

AURORA³ will be hosted at Surrey’s Institute of Sound Recording – part of the School of Arts, Humanities and Creative Industries – and co-led with the University’s Centre for Vision, Speech and Signal Processing (CVSSP). The facilities will also work in collaboration with the Surrey Institute for People-Centred AI, the CoSTAR National Lab, and is backed by a consortium of 18 partners and 12 key users, including the BBC, Meta, KEF, Imperial College London, the University of Cambridge, and non-profits such as the Royal National Institute for Deaf People and the Institute of Acoustics.

Professor Enzo De Sena continued:

“Combined with the UK’s deep AI talent pool and rapidly expanding computing capacity, AURORA³ provides the missing facility for audio data capture, placing the UK at the centre of global audio and acoustics research.”

Image: Professor Enzo and the AURORA logo: credit Surrey University

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Surrey Uni expose the unwashed hospital toilet users

13 November 2025

Nearly 45% of hospital toilet users fail to wash their hands, study finds

Almost one in two people using a hospital toilet did not wash their hands afterwards, according to new research from the University of Surrey – raising serious concerns about hygiene compliance in high-risk environments.

In a 19-week study conducted in partnership with Bispebjerg hospital in Denmark, sensors were installed on toilet and sink pipes to unobtrusively monitor handwashing behaviour. The results showed that 43.7% of users did not wash their hands after using the toilet, with non-compliance peaking at 61.8% on certain weeks.

Despite the emphasis on hand hygiene during the pandemic, the findings suggest that regular handwashing is still not a

ISSN 2753-2771

consistent habit – even in places where cleanliness is vital for preventing infection spread.

Dr Pablo Pereira-Doel, lead author of the study and Human Insight Lab co-lead at the University of Surrey's Business School, said:

"People may assume handwashing is second nature by now – especially in hospitals and post-Covid-19 – but our data paints a different picture. In medical settings, not washing hands can directly affect patient safety. We need well-timed reminders and campaigns to get people back on track."

The study used advanced Aguardio pipe sensors to measure temperature changes in pipes, detecting water flow from both toilets and sinks. If taps weren't used within two minutes before or four minutes after a toilet flush, the event was recorded as a failure to wash hands.

Out of 2,636 flushes monitored from two public hospital toilets, 1,153 were not followed by handwashing. Non-compliance was especially high at the start and end of the day, as well as during typical mealtimes, indicating potential windows for targeted interventions such as signage, prompts, or behavioural nudges.

Professor Benjamin Gardner, co-author of the study and MSc Behaviour Change Programme Lead at the University of Surrey's School of Psychology, said:

"A key strength of this study is that it uses accurate data obtained using sink sensors, rather than relying on people being willing and able to report whether they wash their hands. Strategies that raise awareness at the crucial point in a bathroom visit and easily understood messaging about how to wash effectively – like singing Happy Birthday twice over – can help people form handwashing habits that last."

Professor Carrie Newlands, Lead for Clinical Skills at the University of Surrey's School of Medicine, added:

"These findings are worrying but not surprising. Even simple behaviours like handwashing can lapse without reinforcement. In hospitals, lapses like these can have serious consequences – for patients and for the wider healthcare system. It's time we moved beyond posters and hand gel stations to more effective behavioural strategies."

Are paper bottles the solution asks Surrey Uni

13 November 2025

There are few excuses left for polluting our environment with plastics – and the UK can lead the charge towards a more circular future, say researchers from the University of Surrey. The comments come as the Surrey team get ready to showcase three projects tackling plastic pollution at this week's Royal Society Summer Science Exhibition in London (1-6 July).

Surrey's interactive display will present various themes – from replacing petroleum-based packaging, to capturing microplastics before they enter our rivers and seas, to recycling mixed plastic waste that would otherwise end up in landfill.

One such project is SustaPack – a collaboration aiming to reduce the 1.9 billion plastic bottles produced globally every day by developing next generation paper-based alternatives. Backed by a £1 million EPSRC grant, the project is a partnership between Surrey and sustainable packaging company Pulpex Ltd. It combines AI, thermal imaging and advanced computer modelling to improve production processes, create a new biodegradable lining, reduce energy use, and extend product shelf life – bringing low-carbon, fully recyclable packaging closer to large-scale commercialisation.

Professor Joseph Keddie, Professor of Soft Matter Physics and Royal Society Industry Fellow, said:

"The high carbon footprint of plastic and glass packaging materials demands urgent change. This collaboration is about more than simply replacing plastic – it's about designing sustainable packaging that is truly recyclable, scalable, and with a low carbon footprint. It's a powerful example of how science and industry can join forces to address the urgent challenge of the environmental impacts of plastic."

Another project on display is addressing the recovery of plastic particles from our water systems. Some products such as sunscreens, cosmetics and disposable wipes can release microplastics, with the UK government considering restrictions or bans on certain items to reduce this form of pollution. On average, 50% of microplastics found in the world's wastewater treatment plants are fibres, mainly coming from laundry. If not captured, these tiny plastics can adsorb and carry pollutants circulating in the wastewater plant that are then ingested by marine life and ultimately enter the human food chain.

Surrey engineers are developing advanced membrane filtration technology designed to recover microplastics before

ISSN 2753-2771

treated wastewater is released into rivers and seas. By optimising membrane coatings and filtration conditions, the team is working to reduce clogging and improve long-term efficiency, paving the way for cleaner water and healthier ecosystems.

Professor Judy Lee, Professor in Chemical and Process Engineering, said:

“Microplastics are a serious and growing threat to water quality and human health. These tiny particles are difficult to remove once they’re in the environment and can carry harmful pollutants. Our research focuses on practical solutions that can be deployed in wastewater treatment plants to stop these pollutants at the source.”

To address the challenge of recycling plastics mixed with other materials, such as carbon fibre composites, engineers at Surrey are working to make the process more viable and commercially attractive. These composites are essential across various industries, including aerospace, transport and construction due to their lightweight, strong and versatile properties, but they are notoriously difficult to recycle.

Surrey’s research focuses on developing new manufacturing routes and enhancing the thermal, electrical and mechanical properties of recycled carbon fibre, making second-life applications practical and commercially appealing. Reducing waste and using reclaimed materials also help to lower the demand for raw resources.

Dr Iman Mohagheghian, Associate Professor (Reader) in Mechanics of Materials at the University of Surrey, and EPSRC researcher in residence fellow of the National Composites Centre, said:

“Our goal is to make recycled composites a reliable, high-value option for industry. Enhancing their performance and reducing manufacturing waste is an important step towards building a truly circular economy for advanced plastics, supporting the wider journey towards net zero.”

At the Royal Society Summer Science Exhibition, visitors can discover Plastic Alchemy – an outreach theme led by the University of Surrey’s Circular Economy Group and Fellows from the Institute for Sustainability.

The Surrey school run or walk?

13 November 2025

Parents want their children to walk to school, but what holds them back?

Children are the power brokers that can shift parents’ habits on the school run – and could be key to making healthier, greener travel choices the norm, according to a new report from the University of Surrey. Commissioned by Surrey County Council and delivered through the University’s Institute for Sustainability Innovation Hub, the report looked at how schools across the UK and internationally are encouraging families to walk, cycle or wheel to school instead of driving.

The report’s authors found that while families are generally supportive of safer, more active travel, they’re often held back by concerns over road safety, time pressures and infrastructure. The most effective initiatives, the report argues, are those that bring together schools, local authorities, planners and families to tackle these issues head-on.

Professor Benjamin Gardner, lead-author of the report from the University of Surrey, said: “The school run is rarely straightforward. Families support safer, active travel, but if we want more children walking or cycling, we need to stop seeing this as just an issue for school staff and parents to deal with. Schemes and reward programmes can spark interest, but they won’t bring about changes to the school run unless the wider system supports change. Parents worry about safety, time and whether their child can travel independently. We need a joined-up approach. Lasting change depends on schools, councils, planners and families working together to make walking or cycling feel like the easy and safe option.”

Matt Furniss, Cabinet Member for Highways, Transport and Economic Growth at Surrey County Council, said: “We’ve commissioned this report to better understand how we can support and encourage parents, carers and children to travel to school sustainably. We’re investing £5.5m over the next five years to improve road safety to encourage more walking, cycling and wheeling so children can take safer journeys, and to reduce pollution around schools. We’re also continuing to deliver Feet First walking training and Bikeability cycling training to provide lifelong road safety skills for Surrey’s school children. We’re looking forward to working with our schools and others, to design tailored initiatives and infrastructure that will benefit children now and in the future.”

The research team reviewed travel initiatives in the UK, Europe and beyond, including Canada, Australia and Brazil. They found that even young children can play a crucial role in influencing their parents’ school run choices, especially when schools engage children through activities, lessons or competitions.

ISSN 2753-2771

Surrey researchers conducted two focus groups with staff and caregivers at Surrey schools, analysed a range of international case studies, and reviewed both academic and grey literature. They used the COM-B model – which looks at capability, opportunity and motivation – to understand what stops or supports families from choosing active travel on the school run. The findings will help shape the Council's new School Travel Effectiveness of Planning (STEP) tool, designed to measure what's working – and what's not – in encouraging active school travel across Surrey.

About the Innovation Hub

The Innovation Hub is the delivery arm of the University of Surrey's Institute for Sustainability. It brings researchers together with local authorities, businesses and communities to co-create practical responses to real-world challenges. By supporting projects like the School Travel Plan report, the Hub helps translate research into action and strengthen partnerships that benefit both Surrey and the wider region.

To learn more about the project, read the full report at www.surrey.ac.uk/news/promoting-active-school-travel

Image: Benjamin Vautier Snow scene (Children leaving school) VA – PICRYL – Public Domain Media

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Smarter tickets would boost bus travel

13 November 2025

Public transport in Southern England is struggling, not just because of cost or convenience, but because it has failed to keep up with the digital age, according to a new study from the University of Surrey.

In a study published in Public Transport, researchers simulated improvements in areas like payment convenience and real-time service updates. The study found that these tech-driven changes could boost bus ridership by over 30%.

Researchers have found that simple innovations, such as easy payment systems, e-ticketing, and mobile applications, can transform public transport, boost ridership, and improve passenger satisfaction.

The study employed a novel analytical approach, Machine Learning Influence Flow Analysis (MIFA), to understand the attitudes and behaviours of bus passengers in Southern England. The team also analysed detailed survey data, which helped them identify the key factors that influence whether people choose the bus over their private cars. These factors where: addressing issues around payment convenience and real-time information can make buses far more appealing.

Dr Wolfgang Garn, one of the authors of the study and Associate Professor in Analytics at the University of Surrey, said:

"We discovered that passengers want a seamless, hassle-free experience. If paying for a bus journey feels complicated or outdated, people are more likely to opt for driving instead. By introducing smart ticketing and contactless payments, alongside mobile apps that provide real-time updates, we can not only make bus travel easier but also more attractive. This isn't just about technology, it's about fundamentally changing how people view public transport."

The study used advanced machine learning methods, including neural networks and random forests, to create predictive models from survey responses. These models enabled the researchers to identify the factors that most strongly influence bus usage decisions. By simulating improvements in passenger sentiment, such as increased satisfaction with payment methods, the MIFA framework can predict how these changes may alter people's willingness to use buses. The results suggest that these technological enhancements could increase bus ridership by over 30%.

The findings also highlight several critical issues that undermine bus usage, including inconvenient payment processes, a lack of clear information about bus routes and fares, and concerns about reliability and security. The research recommends practical solutions such as integrated smartcard payment systems, real-time travel apps, and expanded bus lanes to reduce journey times. Together, these measures can create a public transport system that competes with the convenience of private cars.

Dr Garn continued:

"Integrated ticketing is an option that needs to be further explored. It allows passengers to travel across different public transport modes using a single ticket or system, typically a smart card, for their entire journey. This means a traveller can switch between buses, trains, trams, and other modes of transport without needing to purchase multiple tickets or navigate different payment systems – an issue that arises when governmental policies do not sufficiently guide multiple private bus transport companies. A related study I worked on demonstrated that increased frequency, low fares, and an improved bus network significantly boost bus ridership.

ISSN 2753-2771

The future of bus travel in Southern England depends on embracing digital convenience and improving the passenger experience. With smart payments and better information at the heart of this transformation, buses can become the preferred mode of travel for many, not the last resort."

Image credit: Geoff Charles, National Library of Wales. Public domain