University of St Andrews | FOUNDED 1413

Sustainability Report

2023–2024

Contents

Introduction

I am delighted to present the 2023-2024 University of St Andrews Annual Sustainability Report.

With Sustainability as a key theme in the University's Strategy, our institution has elected to present our work in alignment with the United Nations Sustainable Development Goals (UNSDGs). These 17 goals serve as a universal roadmap to addressing the twin crises of biodiversity collapse and climate change, and give visibility to the depth and breadth of work being undertaken at the University of St Andrews within the framework of a common language.

We are at a critical juncture in those conversations. The growing intensity of weather events and their devastating impact combined with mounting geopolitical tensions challenge us urgently to address the sustainability question, and to take seriously our responsibilities to ensure a just and sustainable future for our planet.

While inspired by our placement in the 'Top 100' of the QS World University Rankings: Sustainability 2024, we recognise that we have more work to do. To that end, the University has recently become a signatory of the new UK Concordat for the Environmental Sustainability of Research and Innovation Practice, and we are currently working towards greater sustainability practices in our wet labs through the Laboratory Efficiency Assessment Framework (LEAF) certification process.

We have also joined the Scotland Beyond Net Zero partnership, a growing consortium of Scottish universities to promote collaborative research endeavours. These efforts will serve to consolidate higher education's already strong commitment to a sustainable future. Indeed, in the annual Higher Education Statistics Agency (HESA) report on environmental information released in July, close to 100% of Scottish higher education institutions have elected to submit data on carbon emissions to HESA, indicating an increased desire to improve on emissions reporting in Scotland.

We continue to submit information on all three categories of carbon emissions to the Scottish Government's Public Bodies Climate Change Duties (PBCCD) reporting framework and remain committed to our ambitious goal of achieving net zero emissions by 2035.

In this year's report, we are proud to showcase our operational improvements which have included a reduction in our carbon emission since last year, and we were selected by the Wolfson Foundation to receive a £2million grant to advance the development of green hydrogen technology at the University to further reduce our reliance on fossil fuels.

The extensive research work being undertaken across all our Schools has achieved global impact, including the creative integration of science and technology to address Urinary Tract Infection (UTI) diagnostic challenges in Sub-Saharan Africa, and the integration of traditional litter-pickers in Uruguay to develop a book project that has provided an instructive resource in Scotland, among many other examples.

The University of St Andrews has a strong legacy of stewardship, and we are, as Scotland's first University, uniquely placed to apply our history of transition and endurance to our strategic Sustainability theme as we look to the future. It is our hope that the efforts highlighted in this report serve both to challenge and inspire us all.

Professor Dame Sally Mapstone DBE, FRSE
Principal and Vice-Chancellor

Carbon reporting

The University remains responsive to increased external carbon reporting requirements, fulfilling obligations to the Public Bodies Climate Change Duty Report and Higher Education Statistics Agency, amongst other statutory bodies. Our reporting has consistently covered **Scopes 1**, **2** and **3**, as detailed below, providing a more holistic evaluation of our environmental impact.

Scope 1 emissions include direct greenhouse gases (GHG) from sources owned or controlled by the University, such as on-site fossil fuel burning. Biomass has moved to Scope 1, following recommendations from SSN and other universities.

Scope 2 involves indirect GHG emissions from purchased electricity, heat, or steam.
Scope 3 encompasses all other indirect GHG emissions throughout the value chain, both upstream and downstream. Examples include employee commuting, transportation of goods, and product lifecycle activities.

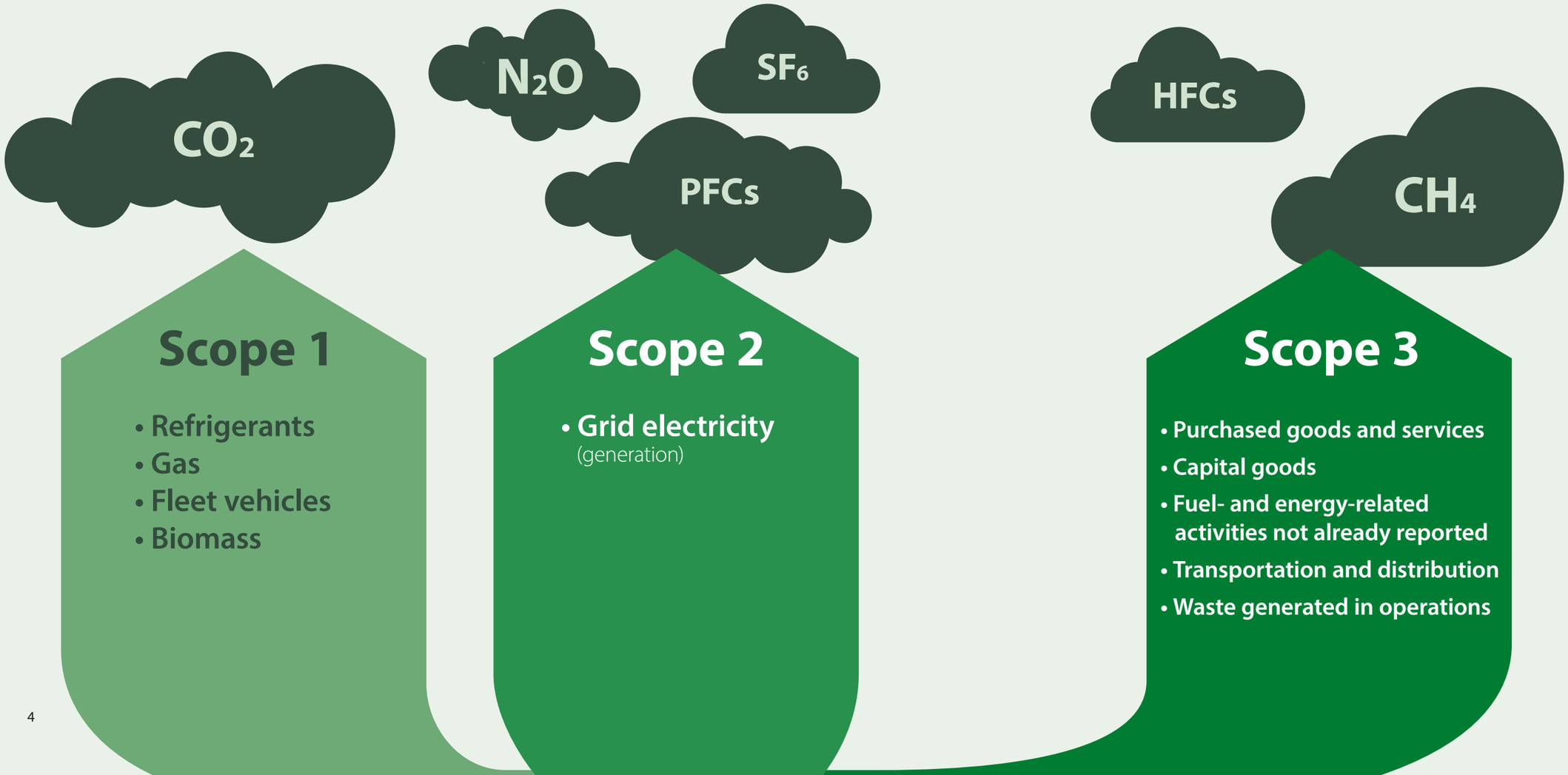
As reporting requirements have expanded, so too have the methodology and measurement tools, affording us the opportunity to scrutinise our emissions more thoroughly.

The **Scope 1** figure of 6,645 tonnes of carbon dioxide emissions again demonstrates a decline from the previous year. This figure indicates a slight increase in biomass use tempered by reductions in gas use. The **Scope 2** figure of 5,947 tCO2e indicates a slight decline in consumption from last year, but is reflective of the biomass figures now being reported under **Scope 1**.

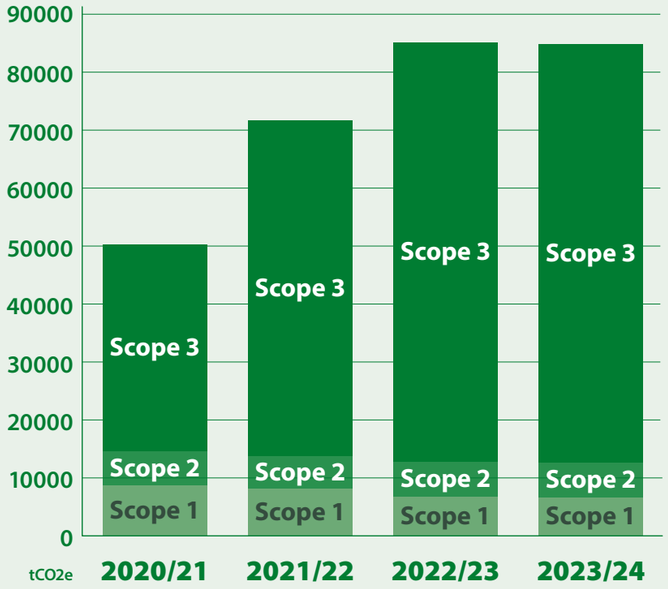
Our **Scope 3** emissions for 2023/24 are slightly down, at 72,378 tCO2e, but are indicative of student end-of-semester travel rising in line with a higher proportion of overseas students, and changes in the carbon conversion factors.

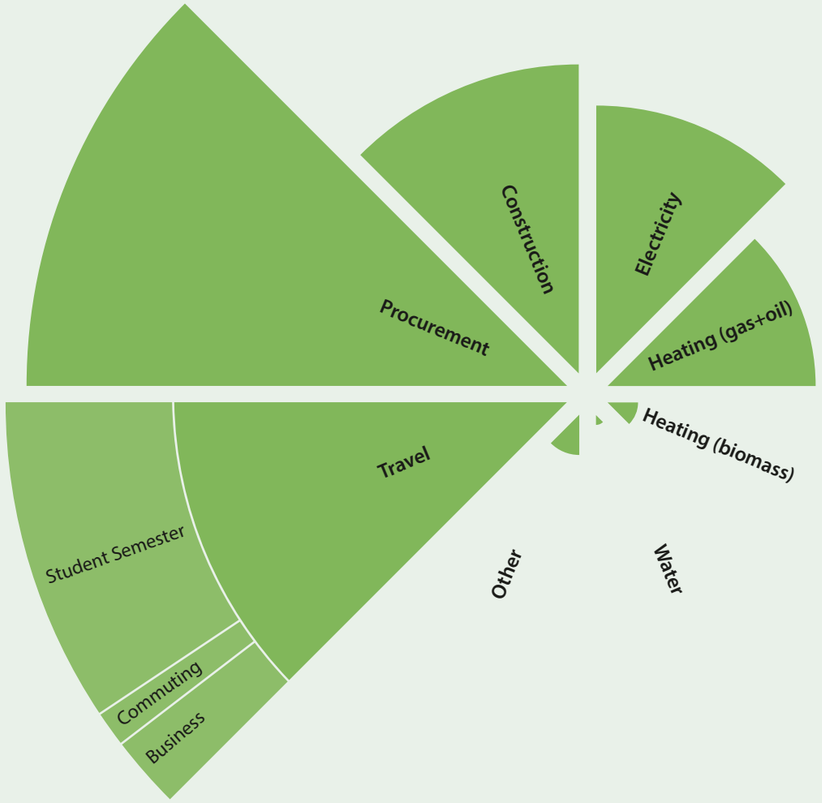
Business travel has also increased, while emissions from travel booked through DP&L have reduced. We are heartened by the slight declines in our overall emissions, from 85,240 tCO2e in 2022/2023, to a total of 84,969 tCO2e over 2023/2024, but acknowledge that to achieve our goal of Net Zero by 2035, significant reductions across all three scopes are necessary.

To that end, we have plans to introduce more renewable energy resources across the institution and have developed a travel policy to curb flight emissions.



Measured Carbon Performance at St Andrews





Reusing IT to combat digital poverty

IT Services

One in five children home-schooled during the pandemic lacked access to an appropriate device, such as a laptop. As technology continues to advance, more people are being left behind, worsening existing inequities related to race, gender, age, ability, and income. (Digital Poverty Alliance)

To combat digital poverty, the University of St Andrews has partnered with Reusing IT, a charity based in West Lothian. Reusing IT refurbishes and repairs PCs, laptops, and other IT equipment to supply low-income households and overseas organisations working in education, health, and agriculture.

Local Charities

Reusing IT currently collaborates with Families First, a local charity in St Andrews that supports children and young people facing significant life challenges, to provide refurbished laptops.

Project Zambia

The partnership also directly supports the University's Project Zambia by providing laptops and mobile phones to local schools in the country. The project aims to bring health, education, and sport to the children of Zambia and is a collaboration between the University's Department of Sport & Exercise and the non-government organisation Sport in Action.

Support for smallholder farmers in East Africa

Research – School of Biology

Scientists at St Andrews are collaborating with colleagues from the James Hutton Institute near Dundee and the International Institute for Tropical Agriculture in Kenya to develop tools to tackle an emerging threat to potato crops in Kenya.

Potato is one of the few crops grown for both food and income by millions of smallholder farmers across East Africa, and the emergence of a potato cyst nematode (PCN) pest threatens production in the region. If left unchecked, PCN could devastate potato crops and push millions into poverty.

Most potato breeding programmes focus on the needs of growers in Europe and North America, which means these cultivars may not be suited to the distinct growing conditions in East Africa. To address this, researchers, led by Professor John Jones in the School of Biology, have worked with local partners to identify the key factors driving variety choice among Kenyan smallholders.

This effort has notably included consultations with women in the region to better understand their needs in cultivar selection, which include rapid cook times to ease women's workloads, low dormancy rates for faster replanting, and resistance to PCN.

The new lines of PCN-resistant potatoes have undergone field trials and taste tests, which have provided valuable insights into potential barriers to uptake. The lines are now being assessed through National Performance Trials in Kenya, with support from the Syngenta Foundation. If successful, they will be distributed nationwide, allowing smallholders to continue harvesting potatoes successfully.

Transition St Andrews

Spare Spoon – the student-led initiative tackling poverty and food waste

Recognising the amount of food being wasted in the halls of residence at the University, students launched the Spare Spoon Initiative. With support from Transition, the team offered free, hot meals to the local community. During a trial week in early April, they served more than 250 meals that would otherwise have gone to waste.

The Gleaning Network

Gleaning – the practice of gathering leftover produce after harvest – continues to grow through the efforts of Transition St Andrews. This year, the network redistributed 634kg of vegetables, including carrots, potatoes, and organic turnips, to local schools, food banks, community cafes, fridges, and neighbourhoods across Fife.

The Tree Food Cooperative

The Tree is a student-led cooperative food hub connecting local consumers with local producers and wholefood suppliers. As part of a resilient local food network serving the entire St Andrews community, they support farmers and producers in maintaining organic practices that promote biodiversity while prioritising ethical and social values.

Edible Campus

Edible Campus is a network of community gardens spread throughout the community, with most located on the University estate, particularly around the halls of residence. Each garden has a leader who organises growing and harvesting and runs activities to engage the broader community. This year, approximately 300kg of free and organic produce was harvested and made available to those in need.

Sustainable Style Event

Transition supported a sustainable fashion event, held in spring, where colleagues from across the institution gathered to learn about making more sustainable fashion choices. The event was held in Walter Bower House, and featured speakers from SmartWorks, an organisation which supports women returning to work with high-quality interview wear, sustainable style student leaders who demonstrated their upcycling skills, and a discussion on the impact of "fast fashion". Funds from ticket sales raised over £300 for SmartWorks. The British Heart Foundation was also on hand to showcase the range of options in stylish, second-hand clothing.

Combining the sciences to tackle health challenges

Research: School of Medicine

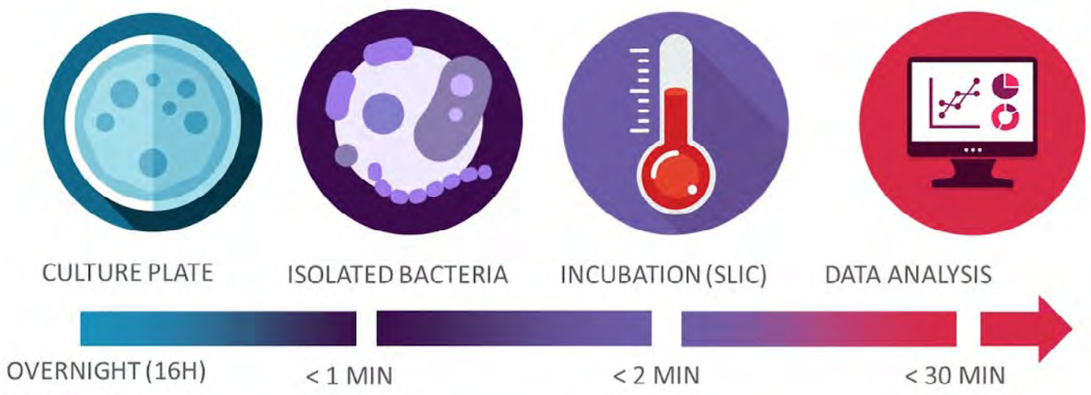
Hellen Onyango is a medical laboratory scientist at Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Kenya, specialising in medical microbiology. She is pursuing a PhD in the School of Medicine, supervised by Dr Robert Hammond, Dr Derek Sloan (School of Medicine), Dr Katherine Keenan, and Dr Mike Kesby (School of Sustainable Development and Geography).

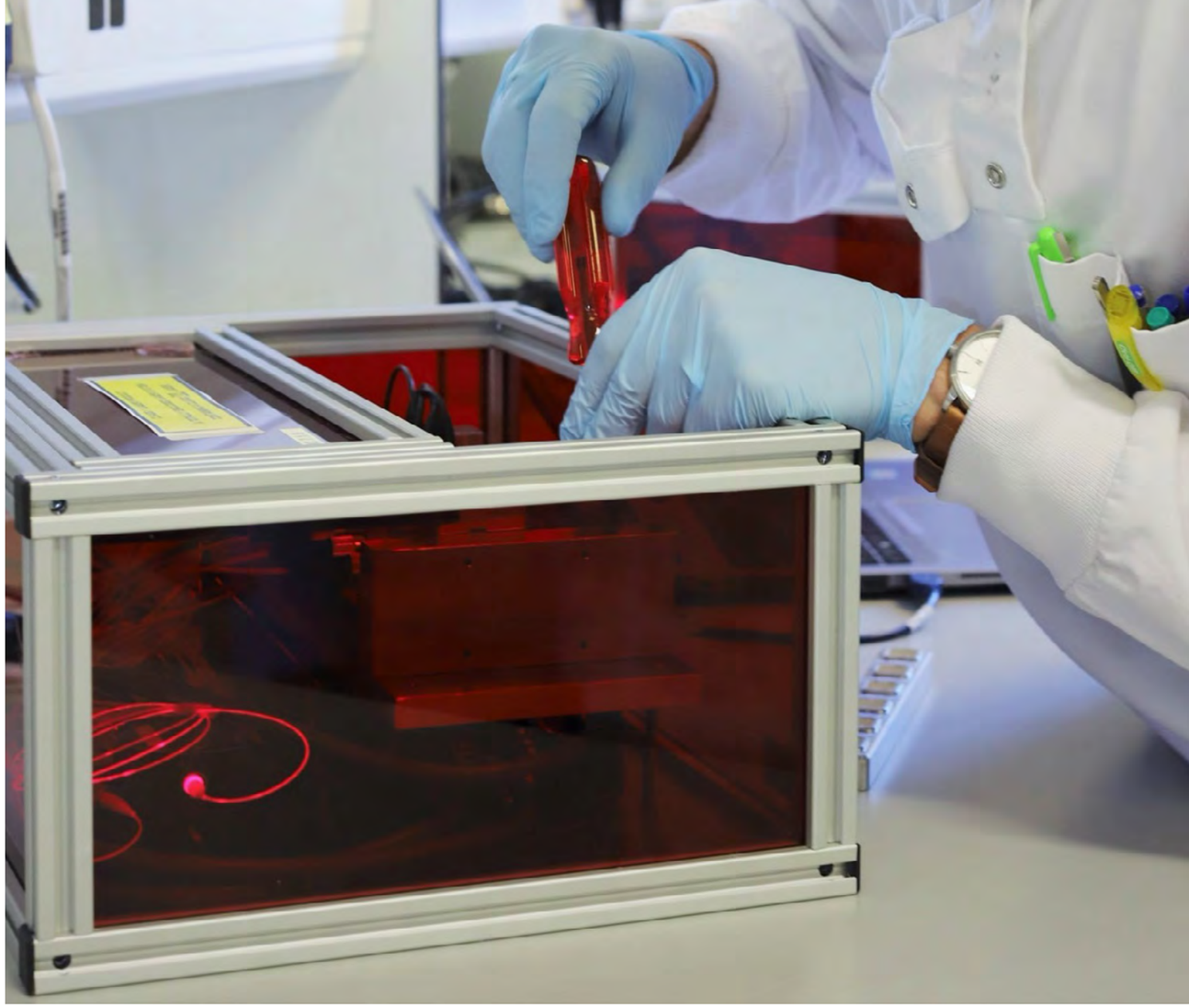
Urinary tract infections (UTIs) are among the most common infections, affecting over 404.6 million people globally in 2019. While antibiotics are typically used to treat these bacterial infections, the rise of antimicrobial resistance (AMR) has made UTI diagnosis and treatment more complex. Accurate diagnosis is essential to ensure the prescribed antibiotics target the right bacteria.

The gold standard for diagnosing UTIs is the culture method, which identifies the bacteria and helps determine the appropriate antibiotic. However, this method is time-consuming and expensive, making it difficult for patients in remote or low-income areas to access. As a result, hospitals in such settings rely on rapid diagnostic methods that are often less accurate, leading to misdiagnoses and inappropriate treatments.

Hellen's Global Challenges Research Fund (GCRF) project, funded by the Scottish Funding Council aims to address this issue by using the scattered light integrating collector (SLIC), a light-scattering device developed by Dr Robert Hammond.

SLIC offers a faster and cheaper way to detect bacterial infections and assess antibiotic resistance in just minutes to hours. Hellen's research, which involves analysing urine samples and working with clinicians and lab technologists in Kenya, is the first to introduce this technology to Sub-Saharan Africa, offering significant potential to improve healthcare in the region.





SLIC works by shining a laser on a urine sample. The scattered light indicates the presence of bacteria, and the growth patterns help determine if the bacteria are resistant to antibiotics. This technology can produce results with 95% accuracy, comparable to the gold standard culture method.

While SLIC is still a research tool, its accuracy and ease of use have been well received. However, implementing it widely requires behavioural changes from healthcare workers. To understand how to best integrate SLIC into clinical settings, Hellen conducted a feasibility study, engaging clinicians and lab technologists to assess their needs and perspectives. This approach fosters collaboration and communication among healthcare workers, improving diagnosis and treatment processes.

Hellen's work also supports the validation of SLIC as a medical diagnostic tool. The data generated will contribute to the SLIC database, helping to validate it for clinical use. If successful, SLIC could play a crucial role in the WHO's Antimicrobial Stewardship Programme, promoting responsible antibiotic use to combat AMR.

Hellen's research has the potential to transform healthcare practices by combining technology, science, and collaboration, benefiting both local and global healthcare systems.

Peatland Restoration: A Guide for Crofting Communities

Research: School of Geography and Sustainable Development

Peatlands cover about 20% of Scotland and store an estimated 1.7 billion tonnes of carbon, making them vital for sustainable climate action. In summer of 2024, Dr Lydia Cole, a lecturer in the School of Geography and Sustainable Development, secured funding from St Andrews Interdisciplinary Research Support (STAIRS) to create a guide to help crofting communities engage in sustainable peatland restoration.

Collaborating with colleagues at St Andrews and the Community Landownership Network at the University of the Highlands, the team developed a comprehensive guide aimed at supporting crofting communities in restoring their peatlands in an equitable and sustainable way.

Titled *Peatland Restoration: A Guide for Crofting Communities*, the resource is freely available and helps rural communities in Scotland make informed decisions about peatland management and restoration. The content was gathered through field-based research conducted with crofting communities in 2023 and includes a detailed section on financial pathways for restoration.

It also offers key insights on how to align peatland restoration with community priorities.

The guide serves as a benchmark resource for crofters, landowners, and public bodies, assisting them in community governance and decision-making regarding peatland restoration.

The team behind the project included Dr Cornelia Helmcke, a Postdoctoral Fellow in the Centre for Energy Ethics; research assistant Ewan Jenkins; Dr Shona Russell and Dr Milinda Banerjee from the University of St Andrews; and Dr Bobby Macaulay, Coordinator of the Community Landownership Academic Network (UHI CLAN) at the University of the Highlands and Islands.

BIRCH: Biodiversity Interdisciplinary Research Community Hub

The Biodiversity Interdisciplinary Research Community Hub (**BIRCH**) aims to foster interdisciplinary research on biodiversity by identifying opportunities for innovative collaboration.

Through student research internships that span multiple disciplines, BIRCH creates new biodiversity knowledge and explores collaborative approaches to addressing the biodiversity crisis. The programme supports the transition to a more sustainable and biodiverse world

BIRCH pairs undergraduate students with project leads from various University Schools, encouraging project-based approaches to deepen understanding of biodiversity loss and promoting actions that support ecosystem recovery. Since its launch in 2023, BIRCH has developed a dozen projects focused on engaging the public with resources that foster a deeper and more effective understanding of biodiversity. All materials are freely available on the BIRCH website.

Some notable projects include:

Engaging Schools with Biodiversity Monitoring
Led by undergraduate Rowan Kehrer (Biology, Earth Sciences), this project tackles how primary school students engage with the natural environment. The team developed activities that help students connect with and become more aware of the biodiversity around them. These activities, spanning the primary school curriculum, are freely available on the BIRCH website.

Ocean Ambassador Program
The Ocean Ambassador Program, led by Victoria Lee (Social Anthropology, Sustainable Development), empowers residents and visitors in St Andrews to take pro-environmental action. The initiative promotes alternative approaches to interacting with the natural environment, beyond resource extraction. The Ocean Ambassador booklet is available at the Scottish Oceans Institute and online.

Small-Scale Fisheries App
Undergraduate student Tianchen Wu (School of Computer Science) created an app to support small-scale fisheries with limited literacy. Small-scale fishing vessels, which make up about 80% of the global fishing fleet, operate with minimal regulation. In collaboration with the Scottish Oceans Institute, the app helps fishers track their catches. This innovative, cost-effective tool aims to contribute data to a global repository, improving understanding of global fishing patterns.

Further projects have involved University staff, exploring how their proximity to biodiversity affects attitudes toward conservation and sustainability at St Andrews.

Governance

School of Geography and Sustainable Development Environmental Sustainability Policy Working Group

Dr Lydia Cole chairs the Environmental Sustainability Policy Working Group in the School of Geography and Sustainable Development. The group works to reduce the environmental impact of the School's teaching, research, and daily operations, aiming to achieve net-zero emissions. By trialling interventions within the School, the group helps the broader University advance toward its net-zero goals.

The group develops strategies to encourage behavioural change based on climate justice and inclusivity principles. They collaborate with the School's Student Environment Team, who run events and partner with Transition on an outreach programme for local schools.

The School also includes their Director of Sustainability, Dr Louise Reid, and a Sustainability Research Group in its whole-school approach to sustainability.

Business School ranked among top global business schools

The University of St Andrews Business School has earned recognition in the Positive Impact Ranking (PIR), which assesses business schools' commitment to sustainability and ethical practices through student and faculty feedback.

Ranked among the Level 4 entries– Transforming Schools – the Business School is celebrated for fostering a culture of sustainability that is deeply integrated into its governance and systems. This recognition reflects the school's visible progress across multiple dimensions of impact.

The 2024 survey received 15,222 student responses, marking a 19% increase from the previous year, and signalling a growing demand for responsible business leaders. The PIR includes 102 schools from 34 countries, all rated at level 3 or above between 2021 and 2024.

Examining gender constructs in international relations fieldwork

Research: School of International Relations

Dr Keshab Giri was appointed lecturer in the School of International Relations this year. His research focuses on gender and war, intersectionality, intimacy and violent politics, and feminist research methods.

His paper, *A Decolonial Feminist Politics of Fieldwork: Centering Community, Reflexivity, and Loving Accountability*, was published in the journal International Studies Review in 2024. It explores the history of critical approaches to fieldwork in international relations.

International studies have benefited from ideas in anthropology, peace and conflict studies, geography, and other fields, offering researchers helpful reflections for fieldwork. In his essay, Dr Giri traces the development of critical approaches to fieldwork, starting with early research that highlighted the importance of reflecting on the researcher's position and the power dynamics involved.

Drawing on decolonial feminist scholarship, he explains how reflexive practices have developed, focusing on the researcher's role and the concept of "the field." This approach leads to a rethinking of key ideas, such as who the "researcher" and "research participant" are, what counts as "data," and what "knowledge" means.

Dr Giri's approach to fieldwork is grounded in feminist, decolonial, anti-racist, and anti-capitalist politics. This approach not only encourages critical reflection but also challenges the systems that create separations between the researcher and the researched, or between "here" and "there."

Dr Giri is also a Research Fellow at the Women and Public Policy Program at the Harvard Kennedy School, USA, and a member of the Gender, Justice and Security Hub, a multi-partner research network which includes over 40 partner organisations and 120 researchers around the world.

Using hydrogen to clean water and generate electricity

Research: School of Chemistry

Researchers at the School of Chemistry are developing fuel cell technology to capture and eliminate greenhouse gases at wastewater treatment sites while generating green electricity. Led by Dr Richard Baker, the project received a £449,640 award from OfWat's Water Discovery Challenge to accelerate innovation in the water sector.

Dr Baker's team is focusing on solid oxide fuel cells, which convert hydrogen into electricity without emissions, producing only water and heat, both of which can be reused.

In the UK, over 15 million litres of water are treated daily to meet strict standards, including the use of small amounts of chlorine, which requires significant energy and transport. The water industry is exploring low-emission hydrogen production through on-site electrolysis, leveraging methane from wastewater plants.

The Ofwat Water Discovery Challenge awarded £4.5 million to ten teams, including academic and industry innovators, to tackle major challenges in the sector.

St Andrews leads the way in battery technology with new Chair in Energy

In early 2024, the University strengthened its commitment to renewable energy innovation with the appointment of a new Chair in Energy. Professor Venkataraman Thangadurai, who joined St Andrews from the University of Calgary, Canada. Professor Thangadurai holds a Faraday Institution Adjunct Professorial Fellowship. This fellowship is designed to attract leading battery scientists to the UK and promote new talent in energy storage research.

Professor Thangadurai specialises in designing and preparing novel solid electrolytes that exhibit fast oxide ion, lithium ion, and sodium ion conduction, as well as mixed ionic-electronic conduction in inorganic crystal structures. His work focuses on improving battery performance, safety, and longevity by exploring new solid electrolytes, electrode materials, and interfaces. His research seeks to address key challenges in energy storage and accelerate the adoption of sustainable energy technologies, including electric vehicles.

As the new Chair in Energy at St Andrews, Professor Thangadurai brings his expertise to the University's School of Chemistry. His leadership will significantly enhance the University's research capabilities, advancing sustainable energy solutions and creating opportunities for technological spin-offs and Knowledge Transfer Partnerships (KTPs). This strategic appointment aligns with St Andrews goal to drive global energy sustainability through cutting-edge research and innovation.

Professor Thangadurai's work will focus on the future of battery technology, playing a pivotal role in tackling the climate emergency by improving energy storage solutions. These solutions are essential for integrating renewable energy sources like solar and wind into the power grid.

He will also collaborate with colleagues from the School of Chemistry, including Professor John Irvine CBE, as part of the Faraday Institution's NEXGENNA project. This initiative accelerates the development of sodium-ion batteries through a multidisciplinary approach, from fundamental chemistry to scale-up and cell manufacturing. The project aims to commercialize high-performance, low-cost sodium-ion batteries with long cycle lives and enhanced safety.

St Andrews secures £2m green hydrogen funding

In January 2024, the University of St Andrews received a £2 million grant from the **Wolfson Foundation** to advance the development of green hydrogen technologies, crucial for decarbonising the energy and chemical industries.

The Green Hydrogen Accelerator will provide dedicated space for cutting-edge research focused on the efficient production of hydrogen from water and its applications in energy storage and chemical production.

Plans for the facility, which have been submitted to Fife Council, include an innovation hall, laboratory space, and a fenced compound to house a large-scale electrolyser for green hydrogen production and carbon capture units. The 400-square-metre research facility will be located on the University's **Eden Campus**, on the former paper mill site at Guardbridge, just three miles from St Andrews.

The £13 million project marks a significant step in the development of the Campus, which aims to become the University's living lab for innovation, hosting a variety of facilities dedicated to the next generation of low-carbon technologies.

Professor John Irvine, who leads much of the University's work on energy storage and hydrogen production, commented: "The Green Hydrogen Accelerator will be instrumental in demonstrating how hydrogen can drive future energy systems. It will provide crucial research and development space to fast-track the development of these technologies."

Paul Ramsbottom, Chief Executive of the Wolfson Foundation, added: "Urgent action is needed to decarbonise energy, industry, and transport systems, and the long-term success of these efforts will depend on high-quality research and development. We are delighted to support this new infrastructure at St Andrews, which will accelerate the transition to cleaner energy for Scotland and beyond."

Recovering waste, recovering voices: recycling and empowerment in Latin America and Scotland

Research: Social Anthropology

Recycling, waste, and plastics have become central topics in the global conversation on sustainability. However, aligning plastic recycling and waste management with the needs of both people and the planet requires more than ecological and economic analysis – it also demands attention to their social dynamics.

Dr Patrick O'Hare, a UKRI Future Leaders Fellow in the Department of Social Anthropology, explores the intersection of recycling economies and waste pickers in Latin America. His research focuses on the role of individuals within the broader issues of labour, waste, and circular economies.

Global impact: The UN Plastic Pollution Treaty

Dr O'Hare's research is based primarily in Uruguay, where waste-picking – gathering recyclable materials from refuse and selling them to industry – forms the livelihood for a group of people known as *clasificadores*. Through his work with this community, Dr O'Hare investigates the connections between social and cooperative economics, the plastics industry, and various business types, including rural plastic recycling.

Living and working with waste-pickers, Dr O'Hare discovered that the community shares a deep-rooted connection to their work. Waste-picking often provides a higher income than other available jobs, and contrary to conventional views, the community considers their work dignified.

Empowering Waste-Pickers Through Collaboration

Dr O'Hare's close relationship with the *clasificadores* led him to become a civil society advisor for environmental NGOs during the development of Uruguay's national waste action plan. His role has expanded, and he now advises the **UN Plastic Pollution Treaty** – an international legally binding agreement currently being negotiated to address plastic pollution.

As a member of the Scientists Coalition for an Effective Plastics Treaty (SCEPT), Dr O'Hare helps link local plastic production and waste-picking contexts with broader treaty processes. He writes policy briefs and co-chairs working groups. His work also includes advising waste-pickers to ensure they are empowered rather than disadvantaged by the treaty process. This is particularly important as waste management services become more professionalised, which could restrict *clasificadores* access to waste.

By incorporating social science into his research, Dr O'Hare ensures that SCEPT's findings on extended producer responsibility, chemical recycling, and just transition fully consider the needs and perspectives of local communities.

Uplifting voices through bookbinding: *cartonera*

Dr O'Hare has conducted fieldwork with cartonera publishers in Mexico and translated his expertise into workshops for communities across Scotland. He has introduced the practice to schoolchildren in Fife through the **First Chances Fife programme** and to individuals recovering from addiction in Glasgow, who used the technique to publish scripts from their drama therapy performances.

On a more individual level, Dr O'Hare connects recycling to vulnerable groups through the **Cartonera Publishing Research Project**, which focuses on cardboard bookmaking inspired by the Argentinian cartonera movement. During Argentina's 2001 financial crisis, *cartonera* books – made from recycled cardboard – became a widespread craft as many people turned to selling recycled materials for their livelihood.

Much like his work with SCEPT, Dr O'Hare's cartonera project centres on recycling as a tool to uplift the voices of vulnerable groups. On both a local and global scale, his efforts are shedding light on the underrepresented social aspects of recycling and waste management, emphasising the importance of these often-overlooked perspectives in the pursuit of sustainability.

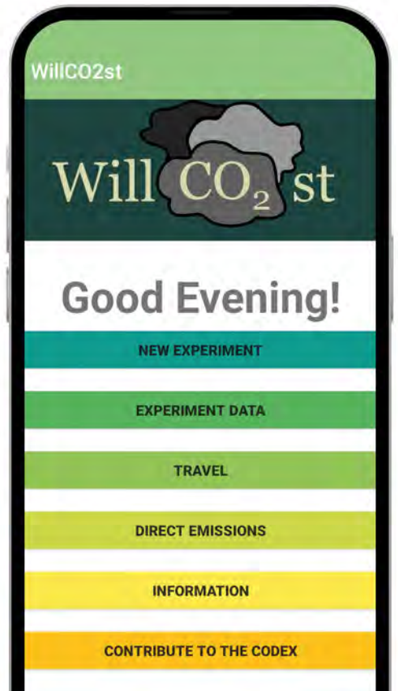
The cartonera movement prioritises affordable access to literature and encourages the dissemination of bookmaking skills to empower individuals to launch their own publishing ventures using accessible materials.

Empowering students to calculate the carbon footprint of research

Research: School of Psychology and Neuroscience

William Smith, Aimee Bebbington, and Ranjini Sircar are PhD students on a mission to track the environmental impacts of their PhD research. Collectively, their work spans neuroscience, biology, mathematics, and physics. Mentored by Dr Stefan Pulver in the School of Psychology and Neuroscience, they have developed '*WillCO_2st*', a phone app that makes it easier to track the carbon intensity of research.

The app allows users to account for carbon dioxide equivalent (CO_2e) emissions in three main categories: experiments, travel, and direct emissions, with further development planned to tackle procurement. The project is part of a larger, grass roots effort to empower postgraduates to publish *Carbon Appendices* which estimate the carbon footprint of PhD work, which can then collectively be collated into a codex of costings to guide university operations, interactions with funding bodies, industry partners, government agencies, and other stakeholders.



William, Aimee, and Ranjini are each part of larger communities expanding across Scotland, Europe and Asia and they are now using this network to plant seeds for carbon monitoring at other institutions. As a team, they have applied for funding to present at Europaeum Winter School, a student-led forum in catalysing action on the European Green New Deal.

The Team's mission to empower students to be carbon accountants is also now growing and extending to taught masters students through the innovative Masters of Research in Neuroscience programme, and to undergraduates through *Forging Sustainable Research* (PN4112) a new problem solving module which will launch in spring of 2025 as a recipient of a Golden Dandelion Seed Award.

This work shows how sustainability initiatives can link diverse funding sources together in common purpose. The work was funded by an EASTBIO Industrial CASE studentship (Smith), a St Leonards World Leading Studentship (Bebbington), and a Global PhD studentship (Sircar), a Global Office Collaborative Research Grants with Emory University, as well as a grant from the RS Macdonald Trust (Pulver). It is now being taken forward with support from the Scotland's Futures Series, an internal award to support projects to enhance discussion and debate on issues pertinent to Scotland's future.

Overall, this project aims to position St Andrews students as world leaders in efforts to promote sustainable research. Globally, this aligns with United Nations Development Goals through raising awareness and developing robust, accessible, inexpensive carbon mitigating strategies.

Exploring inequality and the historical neglect of creative industry roles

Research: Department of Film Studies

Dr Lucy Donaldson, from the Department of Film Studies, is working to bring greater visibility to marginalised workers in Scotland's film industry, particularly those in lesser-recognised roles such as costume designers, production designers, and sound designers. Her research focuses on issues of gender and inequality in the creative industries, advocating for the historical contributions of women and other minority groups in mainstream film.


on location for *Bhowani Junction*

Through her work, Dr Donaldson has published numerous articles, book chapters, and video essays that highlight design labour and queer creativity in television and film. In the spring of 2024, she co-hosted a public talk at the Sands International Film Festival in St Andrews with Debra Zane, discussing women's roles in the industry and the often-overlooked importance of casting, a role traditionally held by women.

In October 2023, Dr Donaldson's audiovisual work titled *"Isn't that going to be awfully dull and drab?": George Hoyningen-Huene's use of neutrals* was published in *[in]Transition: Journal of Videographic and Moving Image Studies*, a leading peer-reviewed journal for video essays.

The piece has garnered significant recognition, including being named a runner-up for Sight & Sound's 'Best Video Essays of 2023,' as well as winning the first prize at the Adelio Ferrero Award international video essay contest in Alessandria, Italy. It was also a finalist in the 'Best Videographic Criticism' category at the BAFTSS Practice Research Awards.

St Andrews Business School student scoops top social mobility award

Leonardo Dhinsa, a third-year Business School student at St Andrews, was honoured for his exceptional academic achievements at the sixth annual Student Social Mobility Awards in London. Raised by his mother and grandparents in Derby, Leonardo took on the responsibility of caring for his grandmother after his grandfather passed away when he was 14. He even took a year off after Sixth Form College to care for her during her illness.

After his grandmother's recovery, Leonardo moved 350 miles to study Economics at St Andrews. Despite the distance, he stays in close contact with his family and responds to health emergencies as needed. His dedication to both his family and studies has been evident, as he ranked first in his cohort in his first year and earned a place on the Dean's List for two consecutive years. He also won the William Blair Memorial Prize in his first year and the Nisbet Prize in his second year.

In addition to his academic success, Leonardo has built a career as a computer programmer, running his own software development company. He has worked on significant contracts for the NHS, football teams, and food producers, and has recently hired an intern to help a student he once tutored gain programming experience.

Leonardo credits his success to the support he has received from St Andrews staff and students. "The University has supported me in everything I do, assuring me that if I struggle, they will be there to help. As a student with a disability, the disability advisors at Student Services have been incredible," he said.

Winning the 2024 Student Social Mobility Award for Academic Achievement was a validating moment for Leonardo. "It reminded me that my dedication and persistence to overcome adversity are worth celebrating. This award motivates me to show others what is possible and will serve as a springboard for my future career."

The Student Social Mobility Awards, organised by the charity upReach, recognise the achievements of undergraduates from lower socio-economic backgrounds and highlight the work of individuals and organisations transforming social mobility in the UK.

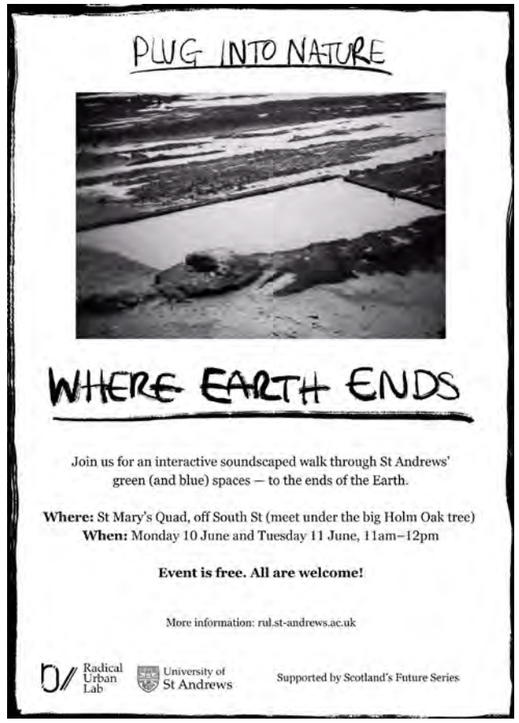
Nick Bent, CEO of upReach, remarked, "These awards are even more significant amidst the cost-of-living crisis. They celebrate the resilience and success of individuals who have triumphed over adversity, providing inspiration for future generations."

Where Earth Ends: Rediscovering and reimagining Scotland's urban green spaces

Research: School of Geography and Sustainable Development

Various sustainable landscape approaches, such as edible gardens and wildflower meadows, are gaining traction, yet biodiversity conflicts – stemming from differing expectations of landscapes – remain a significant barrier to their full realisation. This conflict is evident in debates ranging from pigeon spikes to the tension between manicured and messy gardens. Resolving these differences is crucial for transforming the human-nature relationship.

Benjamin Ong, a PhD student in the School of Geography and Sustainable Development and member of the Radical Urban Lab, was awarded a Scotland's Future Series grant for his project titled *Where Earth Ends: Rediscovering and Reimagining Scotland's Urban Green Spaces*.



The project seeks to spark new, ecologically regenerative visions of urban green spaces by exploring Scotland's deeper past and drawing on place-based approaches. It integrates perspectives from history, literature, culture, and heritage to reimagine future green spaces.

Ong's work raises important questions about how urban development can incorporate historical and cultural elements into contemporary landscapes and what "place-based" means in the context of Scotland's growing cosmopolitan urban areas.

The project fosters interdisciplinary dialogue across geography, literature, history, and theology. In Spring 2024, it featured an interactive soundscaped walk through St Andrews, in collaboration with local artists and community groups. Building on Ong's previous creative and participatory work, the project offers a vision of ecologically regenerative spaces in an age of climate anxiety and emergency.

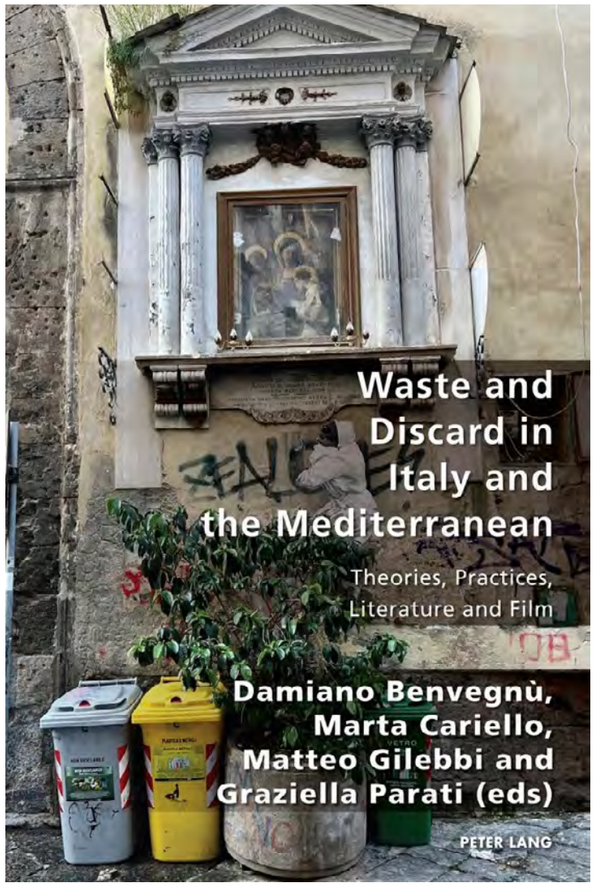
Research: The environmental impact of the Anthropocene

Research: School of Modern Languages

Dr Damiano Benvegnu, a Reader in Italian Studies and Comparative Literature, specialises in the interdisciplinary field of environmental humanities. His research examines how individuals, communities, and cultures interact with their surrounding environments, shedding light on the ways in which these relationships are shaped by broader ecological and social dynamics. In recent years, Dr Benvegnu has been leading two major research projects focused on ecocultural resilience in an age of environmental and social distress.

The first project delves into both historical and contemporary tree planting efforts, exploring these practices as cultural and political acts. It investigates how these actions offer valuable insights into the ways climate change and other environmental crises of the Anthropocene are transforming human-environment relations. By studying the origins and evolution of tree planting, Dr Benvegnu aims to better understand the ways in which societies confront and adapt to environmental challenges.

The second project, in collaboration with the St Andrews Botanic Garden, focuses on the epistemic and ethical foundations of natural history collections, particularly herbaria. This research critiques the often reductionist perspectives embedded within these collections, which tend to objectify nonhuman beings. Dr Benvegnu's goal is to reframe these collections, emphasising their role in revealing the complex history of human-nonhuman relationships and exploring alternative futures where ecological coexistence is central.



Additionally, Dr Benvegnu has co-edited a recent volume titled *Waste and Discard in Italy and the Mediterranean: Theories, Practices, Literature and Film*. This thought-provoking collection investigates the concept of waste from a semantic and cultural perspective, analysing its implications within the Mediterranean context. It takes a holistic approach to understanding waste, considering its environmental, social, and literary dimensions while reflecting on the destruction of landscapes and lives in the region. Through this work, Dr Benvegnu contributes to a deeper understanding of how waste is both a physical and symbolic marker of environmental degradation.

Rehoming Deaccessioned Items

As part of its archival work, the University regularly de-accessions materials that do not align with its collecting policy, removing unwanted items from the collections. In addition, the team frequently re-houses materials by moving them from boxes and files that could cause damage into acid-free storage, ensuring long-term protection. This process often generates surplus materials that would have previously been discarded as waste.

Through collaboration with Transition St Andrews, the University has successfully re-homed around 300 box files and 200 journals on family history and archaeology, preventing these materials from going to landfill.

Transition St Andrews

Transition St Andrews works across the community with individuals, groups, and charities to redistribute resources to those in need. They have set up several Reuse stations across halls of residence and within the wider community. Last academic year, they placed Reuse stations in St Salvator's and John Burnett Halls, as well as smaller stations at the community hospital and the Cosmos Centre.

They also organise circular economy events to provide more opportunities to keep materials out of landfill. These include repair cafes and skillshare events. Over the past year, 357 people attended skillshare workshops on sewing, upcycling, cooking, and gardening. Additionally, more than 140 people participated in repair cafes, repairing 280 items, and 196 tool loans were made at Toolshare events.

Through its partnership with the St Andrews Environmental Network, Transition's St AndReuse initiative successfully diverted 12,558 kg of items, including clothes, bedding, toys, stationery, and more, from landfill. This effort saved £162,818 for participants and prevented an estimated 117 tonnes of CO_2 from being released into the atmosphere.

St AndReuse recently won the Fife Voluntary Action 'Green/Environmental Award 2024' for its impactful work.

Key Scottish site for understanding rapid climate change gains Geological Heritage Site status

Honorary Professor Colin Ballantyne and Professor John Gordon, along with colleagues from multiple institutions, successfully petitioned for Glen Roy, a unique geological site in the Scottish Highlands, to be recognised as a Geological Heritage Site by the International Union of Geological Sciences (IUGS). The 2023 application, submitted in collaboration with members from Royal Holloway, University of London, nominated the Parallel Roads of Glen Roy, near Fort William, for its scientific significance in the 'History of Geology' category.

For the past 25 years, this area has been central to research, teaching, and outreach at both Royal Holloway and St Andrews, as well as other UK universities. The research has deepened understanding of the landscape's evolution at the end of the last ice age, focusing on the iconic glacial lake shorelines that contributed to the development of the Glacial Theory in the 19th century. Since the 1840s, studies of the landforms, sediments, and chronology in the area have shaped our understanding of rapid landscape evolution and environmental change at the close of the last glaciation.

Professor Gordon noted, "Glen Roy will join other internationally recognised sites such as Hutton's Unconformity at Siccar Point (Scotland), the Giant's Causeway (Northern Ireland), Uluru (Australia), the Grand Canyon (USA), and Yosemite Valley (USA), marking its place in geoscience history."

Dr Adrian Palmer, Senior Lecturer in Physical Geography at Royal Holloway, added, "The Parallel Roads of Glen Roy are distinctive features in the British landscape. These features sparked significant scientific interest in the 19th century, with Darwin, Agassiz, and Jamieson proposing theories about their origin. Darwin's marine shoreline theory was rejected in favour of Agassiz's ice age hypothesis, which identified the roads as former glacial lake shorelines.

"Recent research, including detailed landform analysis and sediment examination, has refined our understanding of how these lake systems evolved over time. By establishing annual chronologies of the glacial lakes, we can now pinpoint their formation, duration, and the pace of ice retreat. This data helps predict how modern ice caps may respond to future climate change."

The IUGS announced the inclusion of the Second 100 Geological Heritage Sites at its 37th International Geological Congress (IGC) in Busan, Republic of Korea, on August 27. More than 700 experts from 80 nations participated in this global initiative, which further solidifies the recognition of geological heritage.

Like the First 100, the Second 100 sites are recognised for their exceptional scientific value, showcasing some of the Earth's most significant geological features and discoveries. This recognition will increase visibility for these sites, enhancing their role as educational resources and, most importantly, supporting their preservation.

Addressing the carbon impact of digital technologies in museums

Dr Nicole Meehan, a lecturer in museum and heritage studies at the School of Art History, is leading a project funded by Impact and Innovation that explores the environmental cost of digital activity in museums.

The project, titled "Encode (Muse)", aims to understand the environmental consequences of using current and adopting new digital technologies within the museum sector. The initiative involves collaboration with Eilidh Lawrence, Head of Museum and Photographic Collections, Sean Rippington, Head of Archives and Rare Books, and two Laidlaw undergraduate students – one from Tufts University in Boston and one from St Andrews.

The team is assessing current strategies for reducing the carbon footprint of digital technologies, gathering insights on best practices from across the cultural sector. Their goal is to co-create resources that will influence policy-making through advocacy work.

Dr Meehan, together with a Research Assistant, organised a global online workshop that brought together museum professionals from countries including the UK, Rwanda, the US, Switzerland, Norway, and Barbados.

These discussions highlighted the barriers cultural institutions face in mitigating the environmental impact of their digital activities. Additionally, the team held a strategic meeting with national organisations, governing bodies, and funders in Scotland, Ireland, and Wales to discuss necessary actions and policy changes for widespread impact.

The project has already developed several key initiatives and tools, including a list of carbon calculators used by the sector and a selection of guidelines and toolkits from museums and collections around the world to inform their digitisation practices.

Encode(Muse)

Student engagement

The Environment Sub-committee organised a range of events throughout the year to promote sustainability across campus. One key initiative was the Sustainable Events Forum, where they invited societies that organise small-scale events to share their experiences and challenges in planning with an environmental focus. This forum provided valuable insights, leading to the creation of a Sustainable Events Guide, which offers practical guidance and resources to help societies make their event-planning more eco-friendly and sustainable.

In addition to the forum, several campus-wide events were held to engage the community and raise awareness about sustainability. These included Green Week, which featured a variety of activities promoting environmental awareness, the Green Careers Fayre, where students could explore sustainable career opportunities, and a thought-provoking panel discussion on Decolonising Climate Justice. The sub-committee also organized a series of social events to further encourage sustainable practices in a relaxed, engaging way.

There were several campus-wide events organized, including Green Week, a Green Careers Fayre, a panel talk on Decolonising Climate Justice, and several social events.

Scotland's longest running coastal habitat restoration project

Research: Scottish Oceans Institute

Green Shores at the University of St Andrews is Scotland's longest-running coastal habitat restoration project, with 25 years of saltmarsh restoration and research. Saltmarshes protect valuable land from coastal erosion and flooding, provide rare salt-adapted habitats, and serve as one of the best habitats in the UK for carbon storage in our rapidly changing climate.

The Green Shores team propagates plants, conducts research and monitoring, and installs storm fencing to protect newly planted marshes during their early stages. They have also formed a strong partnership with Dornoch Academy in the Highlands, where they established a second coastal plant hub. This hub offers local pupils opportunities to assist in growing transplants for the restoration effort.

The success of this initiative has garnered significant recognition, including an award for the renowned Royal Dornoch Golf Club, named Scotland's Best Course by the Scottish Tourism Awards. The club won the Golf Environment Organisation's Sustainable Project of the Year award for its work in tackling coastal erosion.

Green Shores' efforts were featured as a NatureScot case study, and the team spent an engaging day working with a professional film crew to collect sediment samples from local sites.

The project's success depends on the support of volunteers, who have dedicated over 280 hours in the past year to plant sites on the Eden and Tay Estuaries, the Dornoch Firth, collect sediment samples, and propagate hundreds of transplants at the hubs.

Policy engagement

Briefing to the United Nations on Maritime Security

In May 2023, Dr Ife Okafor-Yarwood of the School of Geography and Sustainable Development gave an expert briefing to the United Nations Peacebuilding Commission's meeting on Strengthening Peacebuilding and the Implementation of the Regional Maritime Security Framework in the Gulf of Guinea.

Her brief focused on the question, "What community-based initiatives, mechanisms, and strategies are in place to address the root causes of maritime insecurity in the Gulf of Guinea in support of building and sustaining peace, and how can these be reinforced and/or replicated to further address maritime insecurity?".

Fully aware that there is no one size fits all solution, Dr Okafor-Yarwood's brief ended with an emphasis to "ask the communities" what needs to be done differently to address the cause of their adversities. By prioritising their voices and insights, we can ensure a more tailored and effective approach to addressing the root causes of insecurity in the Gulf of Guinea.

Santa's reindeer and the quest for Scottish enlichenment

Research: School of Psychology and Neuroscience

Researchers at the University of St Andrews and Dartmouth College in the US revealed that, while Rudolph's red nose may help guide Santa's sleigh through a foggy night, it's a reindeer's excellent night vision that allows them to locate dinner after a long Christmas season.

A new study, Reindeer and the quest for Scottish enlichenment, led by Professor Nathaniel Dominy, Charles Hansen Professor of Anthropology at Dartmouth College, and Dr Catherine Hobaiter and Professor Julie Harris, both of St Andrews School of Psychology and Neuroscience, has shown that reindeer have special night vision enabling them to find food like lichen.

Commenting on the findings, Professor Dominy said: "Reindeer are so cool, but many people think about them only at Christmas. Now is a good time to alert people to their extraordinary visual system." The study, published in i-Perception, looked at why the surface of reindeer eyes (the tapetum) changes colour from golden-orange in the summer to rich-blue in the winter. Reindeer are the only daytime mammals to do this. While this shift to blue likely helps them to see in the permanent twilight of high-northern winters, it also allows their eyes to transmit ultraviolet light. That deepens the mystery – because when you live in snowy conditions, it is especially risky to have UV-sensitive eyes due to the fact sunlight reflects off snow resulting in a double dose of UV light.

A second piece of the puzzle lies in another unusual feature of reindeer biology – the fact that they feed primarily on a species of lichen – reindeer moss (Cladonia rangiferina). This is not actually moss at all; it grows in deep pale spongy beds right across the northern latitudes that reindeer live in and is crucial for their winter survival.

Dr Hobaiter explained that, a few years ago, it was suggested that reindeer's specialist vision might be an adaptation to help them detect lichen, but initial testing did not find much evidence. However, lichen species are incredibly diverse – there are more than 13,000 species worldwide and no one has yet tested the species that the reindeer feed on.

She said: "One of the amazing things about Scotland is that we have some of the richest lichen diversity in the world: the Highlands host over 1500 different species, and the Cairngorms are home to a local herd of reindeer, reintroduced to Scotland after being hunted to extinction. So, Scotland is the perfect place to try and finally solve the mystery."

Dr Hobaiter said the research team engaged in a little early March heather-bashing in search of Cairngorm lichen beds, with the aims of photographing them under UV light. They were able to show that different species of lichen absorb or reflect UV light differently – and crucially that the species reindeer feed on are strong absorbers.

She explained: "To our eyes, just like for most mammals, pale lichen in white snow is incredibly hard to spot! But to reindeer eyes, the species they need to feed on would stand out as dark patches in the much more reflective snowy landscape."

Professor Dominy added: "If you can put yourself in their hooves looking at this white landscape, you would want a direct route to your food. Reindeer don't want to waste energy wandering around searching for food in a cold, barren environment. If they can see lichens from a distance, that gives them a big advantage, letting them conserve precious calories at a time when food is scarce."

Global Research Centre: St Andrews Centre for Critical Sustainabilities (StACCS)

StACCS
St Andrews Centre for **Critical Sustainabilities**

StACCS is a University-wide Global Research Centre (GRC), funded for 2023-2024 that fosters collaborative, transdisciplinary research aimed at creating a more sustainable society. Drawing on insights from the humanities, arts, social sciences, and natural sciences, StACCS addresses key questions: What action is needed? Where is it needed? And who needs to act?

Co-directed by Dr Ian Lawson and Dr Louise Reid from the School of Geography and Sustainable Development. The Centre hosts, funds, and facilitates joint research, writing, exchange, outreach, and impact projects across three transdisciplinary topics: Carbon, Capital, and Community. StACCS also operates within four methodological themes that reflect current transformations in sustainability research: Creatively, Civically, Carefully, and Chronologically.

The ethos of StACCS aligns with the University of St Andrews' commitment to "model the solutions and behaviours humanity will need to tackle the climate crisis." The University has been a sustainability leader for nearly two decades, with milestones such as offering the first UK undergraduate degree in Sustainable Development in 2005, moving all endowment funds into sustainable investments in 2007, installing a £25M biomass boiler and district heating network, and becoming the first UK higher education institution to achieve carbon neutrality for energy in 2016.

Over the past year, StACCS has hosted numerous networking opportunities for academics across the University. In March, it welcomed a delegation from the University of Bonn to share ideas on institutional approaches to sustainability. The delegation included Pia von Falkenhausen, Advisor to the Vice-Rector for Sustainability; Leonie Kornel, Project Coordinator for Education for Sustainable Development; Juliane Dame, Researcher at the Institute of Geography; and Silke Tönsjost, Academic Coordinator at the Center for Development Research.

Pia von Falkenhausen commented on her visit: "The University of St Andrews sustainability strategy, in place since 2022, sets sustainability as the norm at the institution. We also bring this approach to our work on sustainability in Bonn. We share similar values and focus on recommendations rather than bans and mandatory requirements in how sustainability should be practiced at universities."

17 PARTNERSHIPS FOR THE GOALS

Scotland Beyond Net Zero – an ambitious climate and sustainability partnerships

In 2024, the University of St Andrews confirmed its participation as a signatory of the Scotland Beyond Net Zero (SBNZ) network, an ambitious climate and sustainability partnership designed to accelerate Scotland's transition to a post-net-zero future.

Founded by the universities of Edinburgh and Glasgow, SBNZ was launched earlier this year by Mairi McAllan MSP, Cabinet Secretary for Net Zero and Just Transition. The network brings together climate and sustainability experts from Scotland's universities, aiming to mobilise research, data, and innovation to drive progress, empower communities, and inform policymaking in support of Scotland's Net Zero targets.

SBNZ focuses on six key areas where further research is essential for achieving Net Zero and related sustainability goals: food, transport, finance, the built environment, natural systems, and energy.

In May, St Andrews supported the initiative by providing financial backing for the first round of seed funding within the coalition. The call for proposals, which opened in the summer of 2024, was open to all partner universities in the SBNZ network. Project proposals were required to involve collaboration and co-creation of research across at least two universities in the coalition, with clear plans for engagement or partnership with at least one other organisation.

Participating universities include the University of Aberdeen, University of Dundee, University of Edinburgh, University of Glasgow, Glasgow Caledonian University, Heriot-Watt University, University of St Andrews, and University of Strathclyde. Member universities were invited to apply for funding ranging from £5,000 to £15,000.

By joining the SBNZ partnership, the University of St Andrews reaffirms its commitment to sustainability, including the ambitious goal of achieving Net Zero carbon emissions by 2035.

SCOTLAND BEYOND NET ZERO

Making research connections to the Goals through policy advocacy

Research Understanding and Research Use (RURU) is based in the Business School with a history of policy engagement and studying how policymakers engage with research. RURU is part of the Local Policy Innovation Partnership (LPIP) hub funded by the ESRC, Innovate UK and the Arts and Humanities Research Council.

The hub brings together a network of people who have delivered engagement, impact, and translational research and is designed to support universities and their local partners through LPIP to produce evidence that will meet the needs of their communities.

The hub is led by the University of Birmingham's City Region Economic and Development Institute (City-REDI) and has been awarded £3.6m over 44-months, from June 2023.

RURU Director Vicky Ward and Associate Mark Monaghan published **a report on parliamentary mechanisms for engaging with academic research**.

The report expands the narrow, geographical boundaries of previous work to provide a more inclusive picture of research use by parliaments and challenge previous framings of research provision. It shows that many parliaments across the world have large-scale and advanced infrastructure for accessing and harnessing research evidence. This is not restricted to the advanced democracies of the global north where the knowledge economy is commonplace but is also a prominent feature of parliaments in the global south.

Robust, high-quality outputs and materials produced by highly skilled and qualified staff guided by a strong commitment to impartiality are a hallmark of most services, particularly those within Commonwealth parliaments. Whilst challenges remain, the landscape of parliamentary services appears to be strong and, in many cases, growing.

Net Zero by 2035

Scan to view:
Web version of the Sustainability Report

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