University of Strathclyde Glasgow

Innovation at Strathclyde

www.strath.ac.uk

Through the quality and impact of education and research, universities can transform lives. They create skilled and entrepreneurial graduates ready for the professions and business alike. Universities also foster innovation, drive the economy and generate jobs and companies. The outcomes of their research help to solve global challenges, open new windows on the world, and create technologies we come to rely on every day. Importantly, universities encourage a more equal society, ensuring that opportunities are available to all.

Harnessing this power to make a positive difference is at the heart of our ethos at the University of Strathclyde. In 1796, our founder called it 'useful learning'. Today, as a leading international technological University, it can be seen clearly in our world-class education, our pioneering research, and our innovative environment.

In the pages that follow, you'll see a brief snapshot of some of the extraordinary work happening on our campus – work that's changing lives for the better, and contributing to the UN's Sustainable Development Goals from ensuring clean water for all, to providing affordable and clean energy.

To accelerate the pace of change, we are forging ever-closer collaboration between academics and the public, private and third sectors in order to deliver real benefit for our students, our city, and the global communities we serve.

I'm delighted that, together with our partners, we're driving the development of the Glasgow City Innovation District – a beacon for innovative organisations both in the UK, and for inwardly investing global companies.

The University's Technology and Innovation Centre is the cornerstone of the District, with growing clusters of collaborative research in areas including space, low carbon energy, 5G, photonics, Pharma manufacturing, financial technology – or FinTech, health technology, industrial informatics and quantum technology.

At the same time, Strathclyde is the anchor University for the National Manufacturing Institute for Scotland. A second innovation district is developing around the Institute, including a Medicines Manufacturing Innovation Centre, which will see Strathclyde expertise helping to revolutionise the way medicines are made.

In the last 10 years, we've seen one of the greatest periods of change in the University's history. We're now building on this momentum, connecting our global partners and creating an environment where shared ideas can thrive.

That's why we're increasingly recognised as the partner of choice for other innovative organisations, and why our graduates and postgraduates are so sought-after by employers.

Best wishes,
Professor Sir Jim McDonald
Principal and Vice-Chancellor

Working with us

If you'd like to explore working with us, don't hesitate to contact our Research and Knowledge Exchange Services team at **rkes@strath.ac.uk**

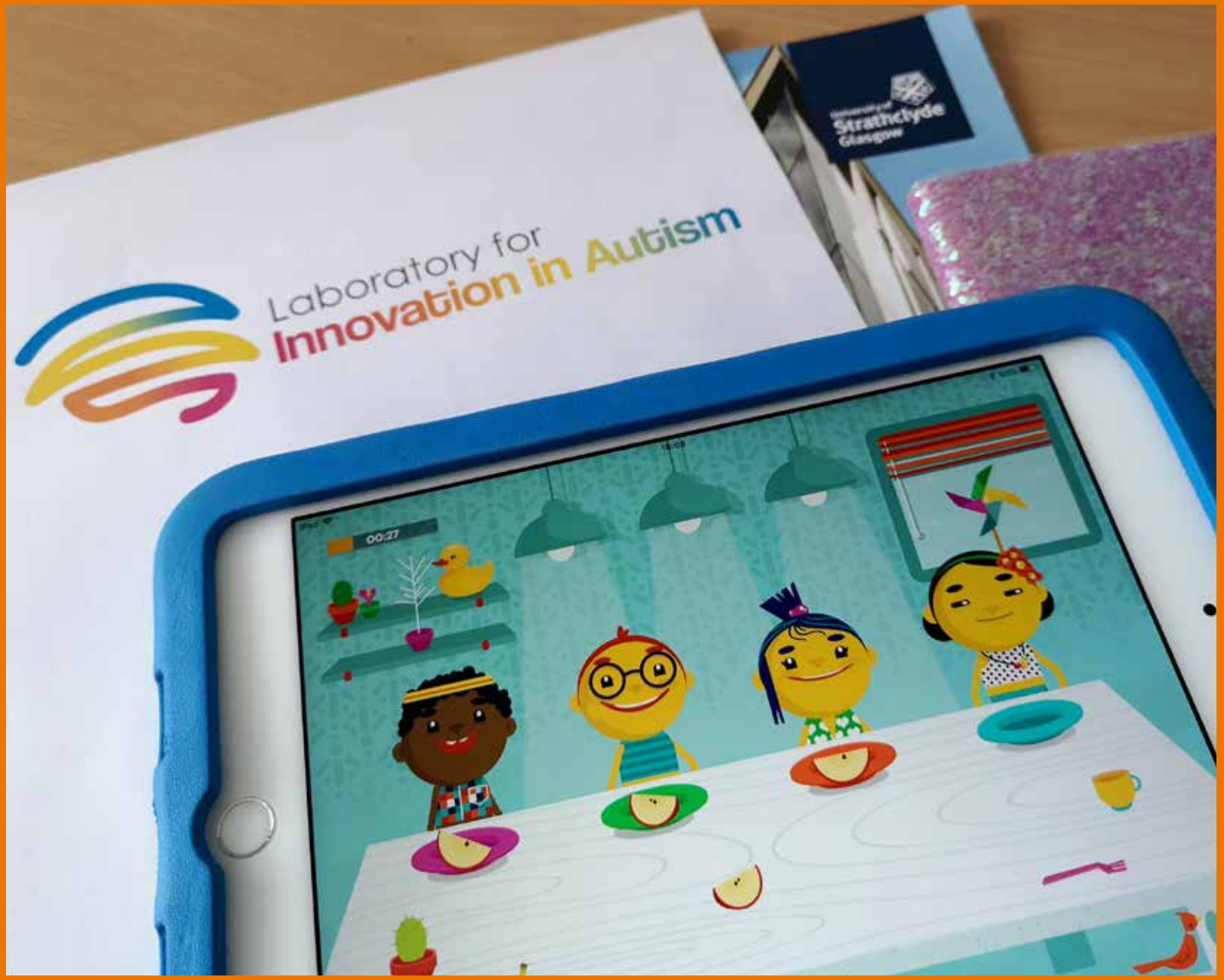
Contents

Sustainable Development Goal:

Good Health and Wellbeing

Too many people around the world continue to die prematurely from preventable diseases, struggle with mental health issues, and lack access to basic healthcare facilities.

At Strathclyde we're tackling dementia/ Alzheimer's, increasing access to quality prosthetics and orthotics, pioneering new approaches to mental health diagnosis and treatment, and battling superbugs.



Rogelio Arellano

How my work is Changing the World

MindMate is an app that helps to reduce the risk of developing Dementia/Alzheimer's through physical exercises, brain games and advice on proper nutrition. It also helps people already living with Dementia/ Alzheimer's through daily reminders, to-do lists, and reminiscence therapy – often through music.

Almost every person is touched by Dementia/Alzheimer's and 44 million people live with the disease for which there is no cure. Research shows that a regular physical activity, healthy diet and brain stimulation can reduce the risk of developing Dementia by up to 88%[1].

Research shows that a regular physical activity, healthy diet and brain stimulation can reduce the risk of developing Dementia by up to 88%[1].

[1] *Study published in Neurology, April 2018.*

About Me

A Strathclyde Masters in Global Innovation Management graduate and Chief Technology Officer & Co-founder of MindMate.

Dr Arjan Buis

About Me

Biomedical engineer, registered prosthetist/ orthoptist, and co-founder of Legbank, which aims to increase access to affordable prosthetics services for people in developing countries.

How my work is Changing the World

Around 30 million amputees worldwide have limited or no access to high-quality prosthetic care.

We've developed the Majicast casting device, which enables more efficient limb socket creation and increased comfort and functionality. The product is deployed through a social enterprise model to reach low-income amputees and increase access to high-quality prosthetics.

Currently we're conducting clinical trials and evaluating our delivery model in Colombia and envisage providing 15,000 lower-limb prosthetics in the coming five years. In addition we're expanding our work in Rwanda, India and Bangladesh.

Professor Jennifer Davidson

How my work is Changing the World

The Centre for Excellence for Looked After Children (CELCIS) is making a difference to lives of children experiencing adversity across the world by facilitating two-way learning about the development and reform of alternative care systems. We work in partnership with international organisations including UNICEF and the European Commission (EC), governments, and international NGOs. Aligning with the principles of the UN Convention on the Rights of the Child and the Sustainable Development Goals, our activities have prompted legislation and policy changes in several countries. We were commissioned by the UN to design and deliver the online learning programme to support implementation of the Guidelines for the Alternative Care of Children. Most recently, EC international development agenda and funding calls have been based directly on recommendations from CELCIS research into concerns about children living in residential institutions in different countries around the world.

In Kosovo, Tajikistan, Moldova and Albania for example, we have supported service changes to focus towards prevention and family-based care; improving assessment of children's family circumstances; and supporting better decision making and planning for practitioners.

About Me

Executive Director of CELCIS and Inspiring Children's Futures.

Dr Jonathan Delafield-Butt

How my work is Changing the World

Diagnosis of neuro-psychiatric disorders in childhood can be denied for years due to waiting times and uncertainty in clinical diagnostic fit. In the developing world, there may be no access to diagnosis at all. I build games and wearable tech, deployable to areas where medical services are not yet available, to record sub-second details of children's movements and use artificial intelligence and big data analytics to spot 'signatures' of neuropsychiatric disorders, even before conventional diagnosis is possible.

About Me

A neuroscientist and child developmental psychologist and Director of the multidisciplinary Laboratory for Innovation in Autism at Strathclyde.

Professor Terry Gourlay

About Me

Head of Strathclyde's Department of Biomedical Engineering.

How my work is Changing the World

I've developed the Hemosep Blood Salvage System, which addresses the issue of significant blood loss that can occur during major surgery. Currently, lost blood is either replaced using donor blood, or recovered, cleaned and returned to the patient using a complex system of pumps and centrifuges.

The technical complexity of such systems often means it's not available to stretched healthcare providers. Our system uses chemical adsorbent and filtration technologies to concentrate blood lost for return to the patient, reducing the need for expensive blood transfusions. This device is distributed around the world by the University licensee, Brightwake Ltd.

Our system uses chemical adsorbent and filtration technologies to concentrate blood lost for return to the patient.

Dr Michelle Maclean

About Me

Senior Lecturer and Chancellor's Fellow in Strathclyde's Department of Electronic and Electrical Engineering.

How my work is Changing the World

My research focuses on the antimicrobial effects of light – in particular, narrow spectrum, violet-blue light called HINS-light.

We developed a pioneering lighting system that can kill hospital superbugs – including MRSA and C.diff – by decontaminating the air and exposed surfaces by bathing them in HINS-light. Clinical trials have shown the system provides significantly greater reductions of bacterial pathogens than by cleaning and disinfection alone, providing a big step forward in our ability to prevent the spread of infection. This work won the 2011 Times Higher Education Research Project of the Year award.

The ground-breaking technology has resulted in licensing arrangements with major US manufacturers and is demonstrating great impact for safe, continuous cleaning of clinical environments.

Neil Quinn

How my work is Changing the World

Population mental health is a key societal issue for the 21st century and is now listed as a Sustainable Development Goal for the first time. Our international CRISP (Citizen, Recovery and Inclusive Society Partnership) programme has developed research on mental health and social exclusion in key areas of recovery, citizenship, stigma and rights.

The CRISP partnership has developed major evidence-based policy and practice initiatives between Europe and U.S to promote the social inclusion of people with mental health problems, involving people with lived experience of mental health problems.

About Me

Co-Director, Centre for Health Policy, University of Strathclyde.

Sustainable Development Goal:

Clean Water and Sanitation

It's essential to life but too many people around the world still lack access to clean drinking water while poor sanitation causes ill health.

At Strathclyde we're working on new ways to source sustainable water supplies, manage trans-national water sources and protect people's health through innovative water treatment processes and disease control.

Dr Alexandra Costa

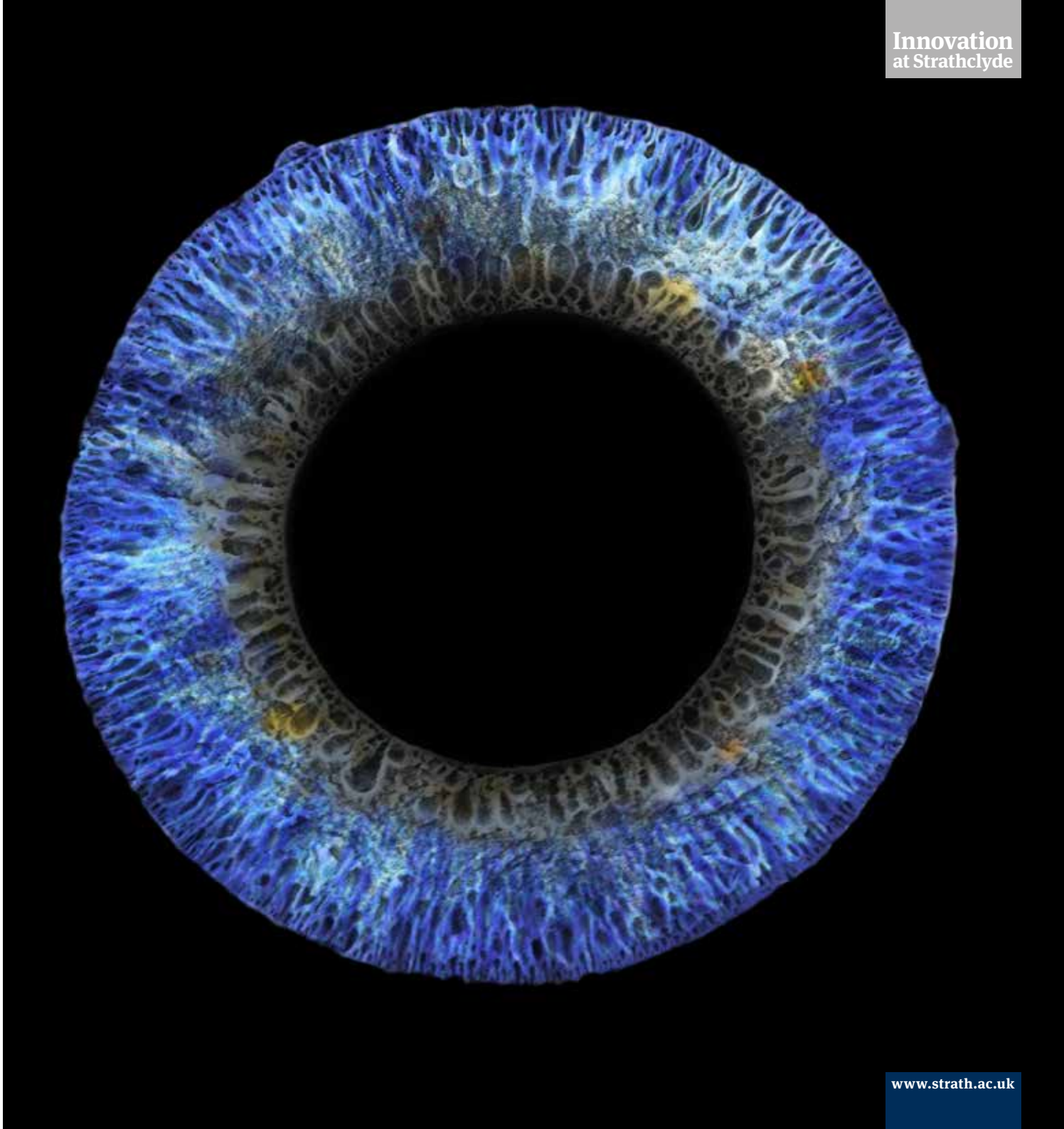
How my work is Changing the World

Some 842,000 people are estimated to die each year from diarrhoea as a result of unsafe drinking-water, sanitation and hand hygiene, according to the World Health Organisation. My research worked on a new approach which ultimately aims to reduce the cost of water treatment, thereby making clean drinking water more accessible to poorer communities.

It relates to the production of a membrane (pictured) to enhance ozone production in water treatment, reducing costs. Resembling an eye, the membrane also represents my research vision: to make a difference.

About Me

PhD alumna in Chemical and Process Engineering at the University of Strathclyde.



Professor Robert (Bob) M Kalin

How my work is Changing the World

The sole aim of the Climate Justice Fund Water Futures Programme is to assist the Government of Malawi to achieve Sustainable Development Goal Six – ensuring availability and sustainable management of water and sanitation for all.

The research is evaluating the asset status, risk management and investment planning for every water point in Malawi for a population of 18 million people. We have a team of more than 20 researchers at Strathclyde and nearly 300 from the Government of Malawi, working with all 28 District Government offices and six implementation NGO partners.

About Me

PhD alumna in Chemical and Process Engineering at the University of Strathclyde.

Dr Tracy Morse

About Me

Research Fellow with the Centre for Water, Environment, Sustainability and Public Health, Department of Civil and Environmental Engineering, and Malawi Liaison for the University of Strathclyde.

How my work is Changing the World

Our research is focused on development and delivery of health solutions for low-income countries in Sub Saharan Africa. Recognised by UKCDS in the top 10 development research programmes, it has delivered innovative community health programmes in partnership with the Malawian Government, which have directly influenced community health policy and been adopted for national use.

We have also focused on evidence gaps for diarrhoeal disease control, particularly in hygiene, sanitation, behavioural science, transmission of antimicrobial resistance and low cost solar-based household water treatment systems.

Our programmes have directly influenced community health policy and been adopted for national use.

Dr Francesco Sindico

How my work is Changing the World

I am an expert in climate change, water and sustainable development law and have worked in partnership with international organisations. I am advising a government before the International Court of Justice. Over the past ten years, I have explored the international law applicable to transboundary aquifers. In particular, my research discusses how this law informs the management of specific transboundary aquifers in Latin America, Central America and Southern Africa.

There are 592 transboundary aquifers (TBAs) in the world. Of these, only six have a legal arrangement in place. My research will enable more countries to consider legal frameworks to manage their TBAs, positively influencing global water security, climate change adaptation and sustainable development.

About Me

Co-Director of the Strathclyde Centre for Environmental Law and Governance.

Professor Robert M Kalin

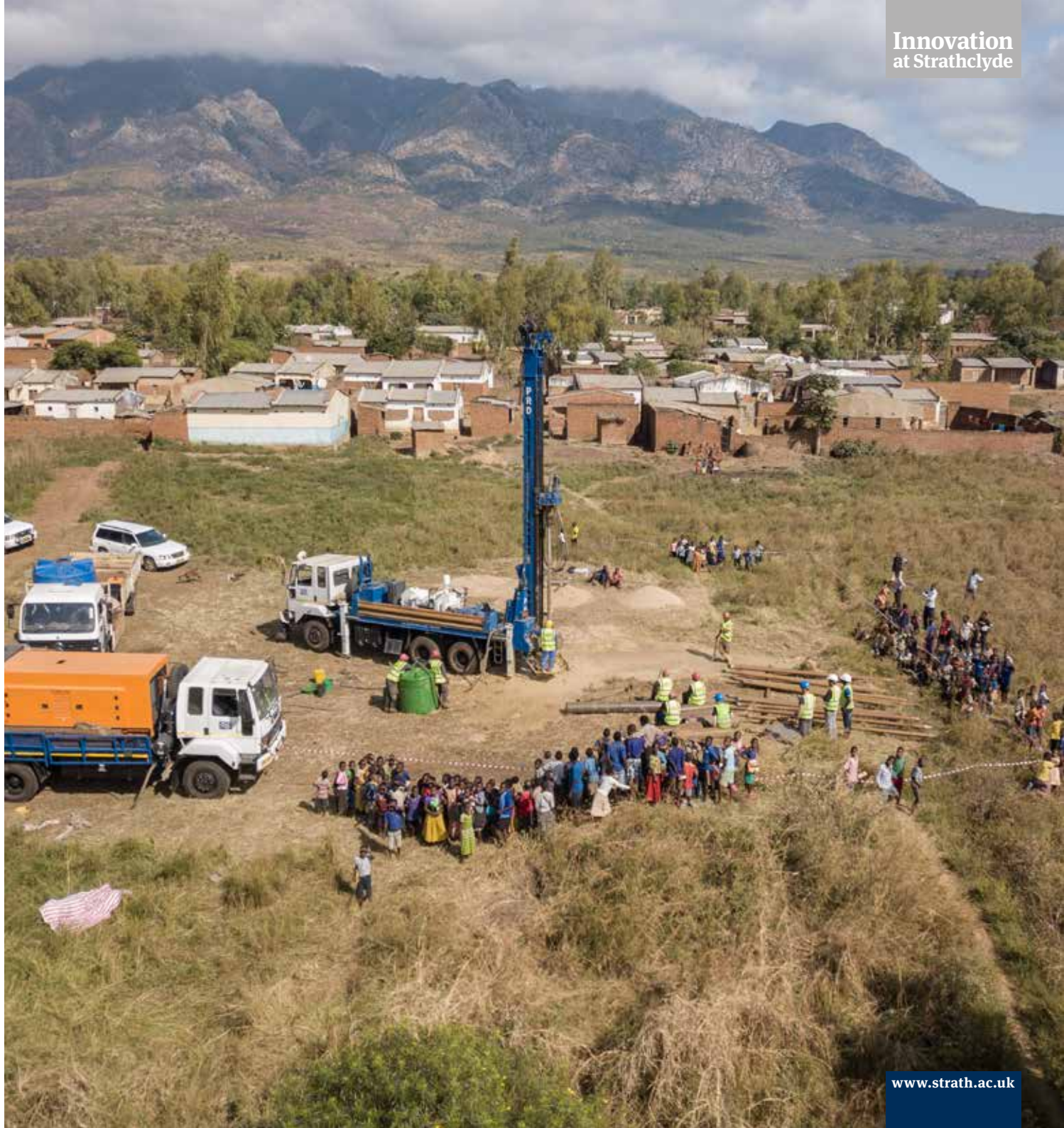
How my work is Changing the World

I've been privileged to lead a Vertically Integrated Project called WASH for the past six years. The WASH project links students from Strathclyde's four faculties with the Climate Justice Fund Water Futures programme in Malawi, where they develop new technology, enhance Malawi's drive towards sustainable management of water for all, and for some, spend time handson developing new innovative ways towards water security, such as the Afridev Hilift Pump.

My approach follows that of William Butler Yeats who said: "Education is the lighting of a fire, not the filling of a pail."

About Me

Lead for a Vertically Integrated Project called WASH and Director of the Climate Justice Fund Water Futures Programme.



Sustainable Development Goal:

Affordable and Clean Energy

Energy fuels the progress of humanity but too many people lack access to affordable, reliable and clean power.

At Strathclyde we're helping rural communities generate their own green energy through solar, wind and hydro technologies, and building sustainable models to manage these assets and create economic growth and opportunities.

My research will help communities move from basic energy access to modern services.

Jonathan Bowes

About Me

Member of the Future Power Networks and Smart Grids Centre for Doctoral Training and final year PhD researcher at Strathclyde.

How my work is Changing the World

I am investigating the technical and economic feasibility of bottom-up electricity provision in areas without infrastructure. This involves installing small, renewable energy systems in villages and houses and interconnecting them with low cost networks to provide reliable, sustainable electricity. Access to sustainable energy is a Sustainable Development Goal and enables technology fundamental to other goals.

My research will help communities move from basic energy access to modern services, facilitating everything from income generating activities to internet access and clean cooking.

Aran Eales

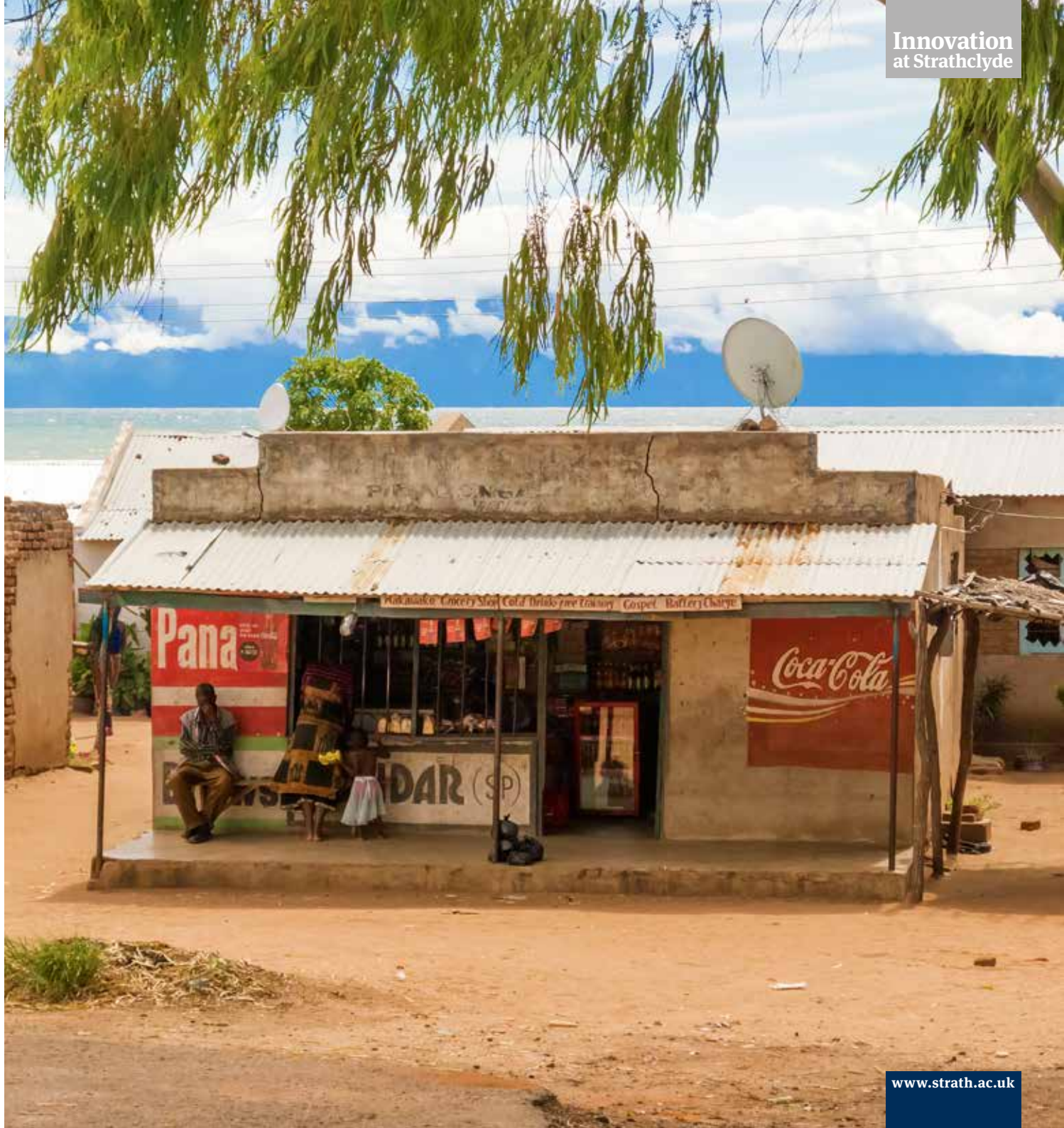
How my work is Changing the World

Globally, more than a billion people have no access to modern energy sources. Renewable energy technologies are making a positive impact on communities living in energy poverty, while contributing to climate change mitigation strategies.

I'm working with Community Energy Malawi, a social enterprise network, coordinating research projects to increase energy access in rural areas. Through technical design, business modelling and capacity-building, we're enhancing the impact of solar power to increase energy access, develop local economies and reduce poverty.

About Me

Research Associate and part of the University's Energy for Development team.



Cameron Johnstone

How my work is Changing the World

My research is improving the efficiency of wind and marine energy technologies to reduce the cost of energy, and help meet renewable energy targets.

Our patented CoRMaT tidal technology created a new generation of marine turbine, reducing the complexity of operation and maintenance, and led to our successful spin-out company, Nautricity.

Today, we're pushing sustainable energy design even further to maximise energy capture while minimising the weight, volume and complexity of production.

About Me

Senior Lecturer in Engineering and Director of the University's Energy Systems Research Unit.

Dr Scott Strachan

About Me

Teaching Fellow in Strathclyde's Department of Electronic and Electrical Engineering.

How my work is Changing the World

Around 1.1 billion people live without electricity and another 2.5 billion have poor quality, unreliable electricity. For the past decade, the Energy for Development research team has been engaging in research and outreach activity aimed at achieving Sustainable Development Goal Seven: to ensure access to affordable, reliable, sustainable and modern energy for all by 2030.

My research and outreach activity focuses on developing off-grid energy solutions involving solar PV systems, and the installation of these in rural communities in Malawi, The Gambia and India. Our flagship 'Vertically Integrated Projects for Sustainable Development', simultaneously engages Strathclyde students of all disciplines in collaborative, research-based learning centred around the Sustainable Development Goals.

Around 1.1 billion people live without electricity and another 2.5 billion have poor quality, unreliable electricity.

Damien Frame

How my work is Changing the World

Rural schools in Malawi face many challenges, including a lack of electricity that limits time for studying and teachers' ability to prepare lessons.

The University of Strathclyde has been working with partners in Malawi since 2008 to develop sustainable models for community renewable energy deployments. Where solar energy systems now supply electricity, educational outcomes are improving and school energy committees are generating revenue to support the sustainability of their systems.

About Me

Research Fellow
in the Department
of Electronic and
Electrical Engineering.

Hyndland School

How our work is Changing the World

Over 60% of greenhouse gas emissions comes from the production of energy, according to the UN. Switching from fossil fuel to renewable sources could dramatically reduce CO2 emission levels, but land-based renewables often compete with food and development for land. This challenge is more exacerbated in the context of island nations such as St Vincent and the Grenadines where 70% of energy is met from imported fossil fuels, and a mountainous volcanic landscape limits land availability.

Working with Strathclyde, we partnered with Fitzhughes Government School on St Vincent to investigate this challenge. Examining the climate and land-use availability of St Vincent, the team designed a new renewable energy technology, combining wind and solar energy. Based on the traditional wind turbine, the blades are covered by microfilm solar panels to double up energy production and be effective in changing conditions. The team hopes that this technology of the future can help St Vincent, and other islands like it, to meet their own clean energy needs.

About Us

Primary 5
Hyndland Primary
School, Glasgow.

Sustainable Development Goal:

Industry, Innovation and Infrastructure

Investments in infrastructure – including transport, energy and communication technologies – are crucial to empowering communities, and can lead to improvements in productivity, incomes, health and education.

At Strathclyde, we're proud of our innovative environment, where shared ideas can thrive – and make a positive impact on communities around the globe.

Daniel Broby

How my work is Changing the World

We're researching Financial Technology – Fintech – which has the potential to support a sustainable, inclusive financial system through faster, cheaper and more secure transactions. Innovative technologies can remove barriers to expansion and growth for micro, small and medium enterprises and revolutionise access to finance for entrepreneurs. We've launched a Fintech accelerator for start-up companies and the UK's first Fintech course.

We're producing a Massive Open Online Course with Datalabs and are working with the Glasgow International Financial Services District and Fintech Scotland to upskill Scotland's financial sector. Our activities recently won us the Education Award in the People Make Glasgow Inspiring City Awards.

About Me

Senior Lecturer in Accounting and Finance, and Director of the University's Centre for Financial Regulation and Innovation.

We are investigating the potential of 5G mobile internet connectivity in rural communities.

Dr David Crawford

About Me

Strathclyde's Centre for White Space Communications at the University of Strathclyde.

How my work is Changing the World

The Centre for White Space Communications is working closely with industry partners to provide affordable Internet connectivity in hard-to-reach areas. We aim to achieve this through dynamic spectrum management, to provide greater, more affordable, access to the radio spectrum.

We're helping to inform spectrum policy in the UK, and assisting regulators in Africa to evaluate options for dynamic spectrum management, initially in the TV band but with applicability to other bands too. Similarly, our 5G RuralFirst project is investigating the potential of 5G mobile internet connectivity in rural communities.

Dr Mark Post

How my work is Changing the World

I run the ROVER Vertically Integrated Project at Strathclyde. The programme's goal is to design, build and develop completely autonomous robotic vehicles to enable environmental sensing and interaction in harsh environments such as offshore wind farms. The project will educate and train students in any aspect of robotic systems relevant to their interests and discipline.

My research focuses on technologies for making robots and vehicles fully autonomous for long periods and capable of mobility, comprehensive sensing, and decision-making, while handling the harsh and rugged environments of planets, moons and asteroids.

About Me

Lecturer in Strathclyde's Department of Design, Manufacture and Engineering Management.

Professor Keith Ridgway CBE

How my work is Changing the World

The Advanced Forming Research Centre is recognised globally for developing innovative manufacturing technologies, and is at the heart of manufacturing research in Scotland. We're also a UK High Value Manufacturing Catapult centre, helping companies to boost their competitiveness by turning ideas into reality.

Working with the Scottish Government and partners, we're delivering the Manufacturing Future for Scotland plan to increase innovation, investment and productivity. We're proud to be the anchor university for the National Manufacturing Institute for Scotland, based in the country's first Advanced Manufacturing Innovation District.

About Me

Executive Chair of the University of Strathclyde's Advanced Forming Research Centre.

Sustainable Development Goal:

Responsible Production and Consumption

Consumption of natural resources is increasing. By promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs, countries gain a better quality of life for all.

Strathclyders are investigating environmental sustainability – and equity – through new technologies, policy and the law.

Craig Johnston

How my work is Changing the World

3F BIO's purpose is to tackle the issues of feeding a growing global population and the unsustainable impacts of traditional farming. By harnessing the protein producing power and feed efficiency of small organisms, 3F BIO produces an economically and environmentally sustainable, high-quality protein, with a wide range of food applications.

A successful spin out from the University of Strathclyde, the diverse team has a strong industrial track record in commercial management in food, technology development, scale-up and project management.

About Me

Co-founder,
3F BIO Ltd.

Scott Kennedy

About Me

Co-founder of Revive Eco, and an alumnus of Strathclyde's Business Enterprise degree programme.

How my work is Changing the World

Revive is a waste rejuvenation start-up which collects and recycles used coffee grounds to create a range of environmentally-friendly products.

Our mission is to drastically reduce the volume of materials needlessly sent to landfill, and extract maximum value from this material. We're developing a process which extracts natural chemicals from used coffee grounds and producing a 100% natural soil conditioner, which is being sold nationwide.

We're presently recycling over one tonne of used coffee grounds monthly, from a range of clients, and aim to increase this.

Dr Rafet Emek Kurt

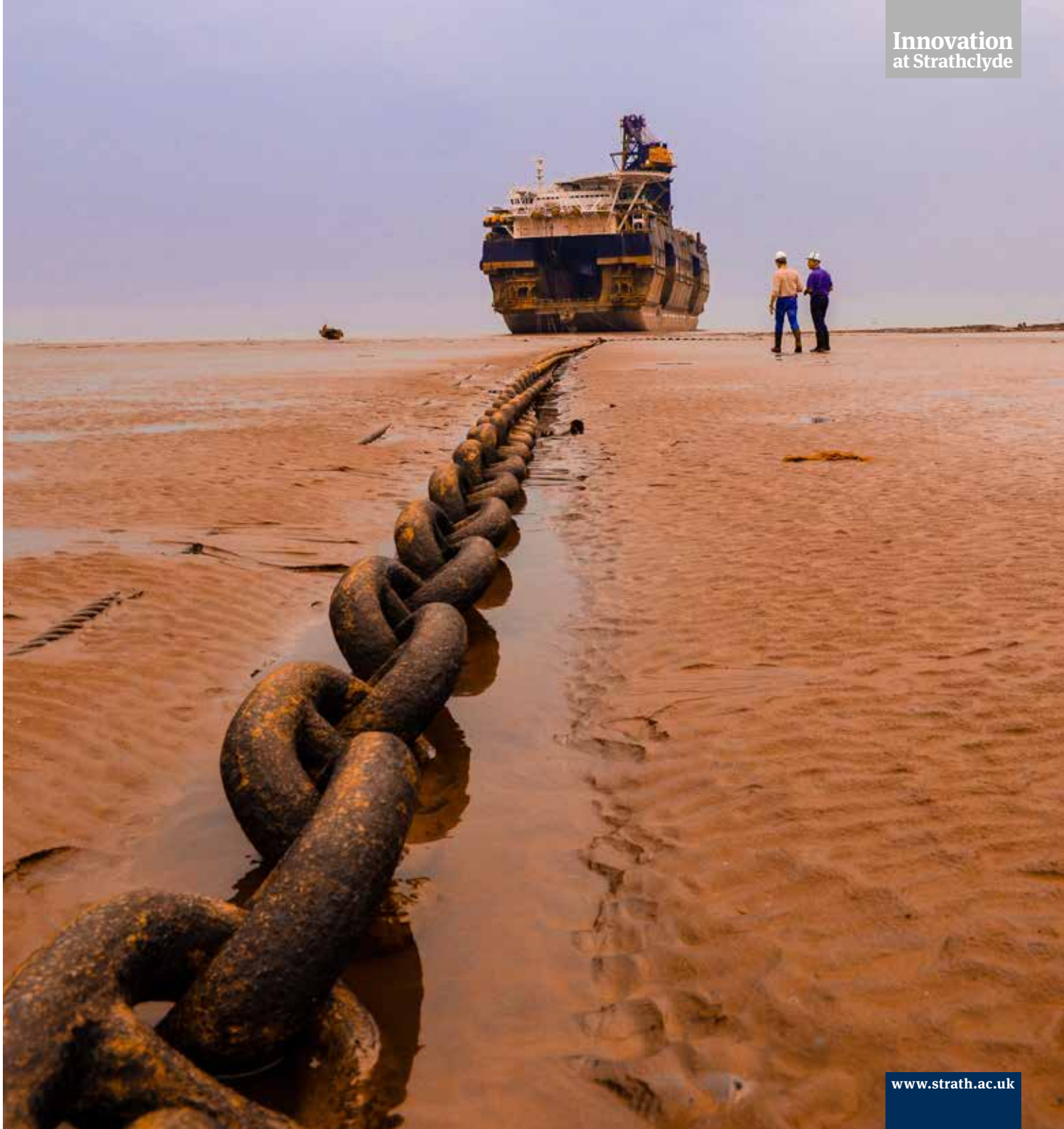
How my work is Changing the World

Our research aims to identify and quantify the potential health, safety and environmental impact of ship recycling, as well as assisting the achievement of safe, environmentally-sound management of end of life ships.

We provided evidence and data on potential risks to air emission, water pollution and human health and safety. In the ship recycling sector, we have helped to achieve a reduction in accidents, increased numbers of regulation-compliant ship recycling yards, increased numbers of workers trained for ship recycling, increased use of personal protective equipment, and reduced sea and soil pollution.

About Me

Lecturer in Strathclyde's Department of Naval Architecture, Ocean & Marine Engineering.



Professor Elisa Morgera

About Me

Professor of Global Environmental Law and Director of the Strathclyde Centre for Environmental Law and Governance.

How my work is Changing the World

I am a researcher of opportunities and limitations of law to ensure environmental sustainability and equity among governments, local communities, and the business sector, focusing on nature protection and human rights law.

The Benefit-sharing for an Equitable Transition to the Green Economy project explores opportunities and limitation for international law to support partnerships for sustainable use of natural resources. It researches efforts to conserve nature, tackle climate change, manage watercourses and protect oceans.

Cait Murray-Green

How my work is Changing the World

CuanTec is a blue biotechnology company formed in 2017 from the ideas of Strathclyde alumnus Ryan Taylor, and tackles food waste and plastic pollution through the innovative use of chitin.

Chitin is an edible biopolymer, found in the parts of shellfish that are usually discarded, which is converted into a durable, antimicrobial and compostable food packaging for seafood.

By processing the chitin into chitosan and mixing it with other biopolymers, CuanTec creates a flexible film wrapping resembling cling-film. CuanTec's plastic film is fully compostable, decomposing within weeks; antimicrobial, and can increase food shelf life by 40%; and will contribute to reducing plastic pollution and food-waste.

About Me

Chief Executive of CuanTec.

Dr Graham Skinner

How my work is Changing the World

I obtained my PhD in Physical Chemistry from Strathclyde, focusing on the development of technology for the food packaging industry.

This research led to the formation of Insignia Technologies Ltd. Using patented CO_2 indicating technology, Insignia develops colour changing labels which are time and temperature sensitive. When used in the food industry, these innovative labels can reduce food waste, enhance food freshness and improve food safety. They can be used in the supply chain, with retailers or with the consumer.

About Me

Product Development Manager,
Insignia Technologies.

University of Strathclyde Glasgow

YouTube

Discover more at **www.strath.ac.uk**

the place of useful learning

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