

PROGRESS REPORT JULY 2020

THE FIRST SIX MONTHS



CAMBRIDGE
ZERO₂



UNIVERSITY OF
CAMBRIDGE



Photo credit: Nick Saffell

WELCOME FROM THE DIRECTOR

Cambridge Zero is an ambitious new University of Cambridge climate change initiative aimed at transitioning to a zero carbon world.

Responding to climate change will require huge changes in the structures of our society. Every sector will need to be reimagined: we will need to change the way we travel, how we live, and even how we measure our prosperity.

Creating a sustainable society poses a great challenge but also a great opportunity. We have a unique chance to create a future which is not only sustainable, but is also resilient, equitable and fair.

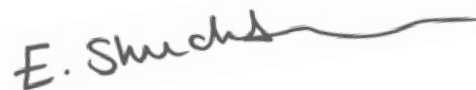
It's important that we view the issue of climate change through the lens of hope rather than despair. We need to approach this problem with optimism, energy, enthusiasm and excitement. If we work together, we can shape a world that we can all be proud to leave as a legacy to future generations.

Cambridge Zero aims to bring together the collective expertise of the University - from science and engineering to law and philosophy - to offer integrated, holistic and practical solutions to climate change and to bring these developments to bear at international, national and local levels.

Since our launch in November 2019, we have been rapidly establishing our place in the wider University environment, making connections wherever we are able to facilitate and enhance research and education opportunities, and co-ordinating responses to national and international initiatives.

Much of this has been achieved from our homes, against the background of the acute global challenge of Covid-19. We should glean what we can from responses to the pandemic and ask how this can be applied to tackling the climate crisis.

This, of course, is just the beginning. We hope you will enjoy finding out what the project has achieved during its first six months of operation and what we plan for the immediate future.



EMILY SHUCKBURGH

July 2020

Cambridge Zero: The First Six Months

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This report is the collective effort of the Cambridge Zero Team. Design by Antoinette Nestor

SUMMARY

STRUCTURAL PROGRESS

- **Established** with a grant from the University of Cambridge and a Strategic Grant from the Isaac Newton Trust
- **Launched** by the Vice-Chancellor at King's Place, London on 26 November 2019
- Grown a **core team**, including direct-funded staff
- Set up management and operations structures including a website
- Developed collaborations with key partners around the University
- Developed a role as national and international leader
- Established '**four pillars**' of activity: research; engagement; education; decarbonisation

RESEARCH PILLAR

- Identified **six core research themes** through internal consultation and engagement with a wide constituency of academic researchers
- Supported major **Energy Transitions** projects in collaboration with Energy Transitions@ Cambridge IRC
- Responded to major **external funding calls** and developed new research proposals, in collaboration with academic researchers

EDUCATION PILLAR

- Brought the **Living Laboratory** into Cambridge Zero
- Launched an **internship programme**
- Engaged with **University of Cambridge Primary School, Cambridge Assessment** and **Cambridge University Press**

ENGAGEMENT PILLAR

- Founded the **Cambridge Zero Policy Forum** with the Centre for Science and Policy (CSaP)
- Initiated a number of **business engagement** events
- Built a strong public engagement programme including **Cambridge Zero Climate Talks** radio show and a **strong social media** presence

DECARBONISATION PILLAR

- Supported the University and Colleges in their decarbonisation plan

OUR VISION

A resilient and sustainable zero-carbon world is attainable.

Universities are central to generating and disseminating the knowledge and ideas that will shape a rapid transition to such a world. They provide interdisciplinary research and innovation, deep and holistic analysis, objective and dispassionate guidance, and equip new generations with the skills to lead change.

Focusing on those areas where we can make a significant contribution, and by convening and collaborating with a broad coalition of relevant stakeholders, Cambridge Zero will catalyse a revolution to deliver a positive future.

OUR MISSION

Cambridge Zero exists to maximise the University of Cambridge's contribution towards achieving this vision, by harnessing the full breadth of the Collegiate University's capabilities to support the transition to a zero-carbon future, both in the UK and globally, developing solutions that work for our lives, our society and our economy.

It achieves this by acting as both a hub and an umbrella, integrating and substantially enhancing the University's activities, in particular through research and innovation to drive technological and social change, education and training to provide the skills needed to deliver a different future, engaging with a broad coalition of stakeholders to collectively develop solutions, and leading by example through supporting ambitious decarbonisation.



Otto in Lockdown by artist Beth Waters

STRUCTURAL PROGRESS

Cambridge Zero was formally launched on 26th November at an event at King's Place, London which was attended by 295 people. Sir David Attenborough provided the opening statement, followed by the Vice Chancellor and the Director of Cambridge Zero, Dr Emily Shuckburgh. A video introduced the breadth of relevant activities already being undertaken in Cambridge and interventions from Prof Bhaskar Vira (Head, Department of Geography), Dame Polly Courtice (Director, Cambridge Institute for Sustainability Leadership) and Esther Moore (PhD student, Department of Chemistry) set out the future ambition.

The **University's Development and Alumni Relations office (CUDAR)** organised the launch event and are now developing a major fundraising strategy for Cambridge Zero under the leadership of Aaron Westfall. Cambridge Zero is working with support from CUDAR and other University offices to secure funding for its activities from government funding bodies, philanthropists, trusts and foundations, and industry.

The Cambridge Zero website has been developed as a flagship site by the University Information Services, providing an exemplar for the University's new digital strategy. As the website continues to expand it aims to provide a platform showcasing the full range of the Collegiate University's climate-related activities in one place, providing a co-ordinated point of reference for relevant external and internal enquiries, facilitating communication with and between associated research teams and projects, and aiming to educate, encourage, engage, empower and inform.

Since its launch, the website has welcomed over 20,000 visitors from 160 countries. As new content is added, our engagement with visitors continues to strengthen – with increased average time on site and pages viewed per visit since the introduction of our blog. The University's Office of External Affairs and Communications have provided ongoing support.

The **Cambridge Zero core team** has been growing steadily. At the launch in November 2019, the only permanent staff member was the Director, Dr Emily Shuckburgh. As of July 2020, the permanent staff team additionally consists of the Deputy Director (Strategic Development), three engagement managers and a PA to the Director. This is complemented by a dozen additional staff who are funded or part-funded on a temporary basis or providing voluntary support. It is hoped to recruit for further permanent staff members soon. Our office is in the Maxwell Centre, but Cambridge Zero has representation in departments across the University.

Progress has been made on each of the **four “pillars” of activity**: research, education, engagement and decarbonisation, as described in detail below.

On a national level, we co-founded the **UK Universities COP26 Network** (now 36 member universities), which has become the principal way UK academia is interacting with the UK government with respect to planning for the UN’s COP26 climate conference in 2021. Through the COP26 Network and our own direct interactions, we regularly engage with and advise the Cabinet Office COP26 team.

On an international level, we have led the University’s involvement with the Global Alliance of Universities on Climate (GAUC). This is an international partnership of 13 leading universities (Tsinghua, Cambridge, Imperial, LSE, Oxford, Science Po, MIT, Berkeley, Rio de Janeiro, Stellenbosch, Indian Institute of Science, Tokyo, ANU). Its mission is to advance climate change solutions through research, education, and public outreach, and to partner with industry, non-profit and government organizations to promote rapid implementation from local to global scales. We are virtually hosting GAUC’s first high-level international workshop on “Pathways to Net Zero Emissions” in September 2020.



Photo credit: Science in HD on Unsplash

CAMBRIDGE ZERO PILLARS

RESEARCH PILLAR: PIONEERING RESEARCH

Research and innovation to drive technological and social change

EDUCATION PILLAR: INSPIRING LEADERSHIP

Education and training to provide the skills needed to deliver a different future

ENGAGEMENT PILLAR: ACCELERATING SOLUTIONS

Engaging with a broad coalition of stakeholders to collectively develop solutions

DECARBONISATION PILLAR: LEADING BY EXAMPLE

Supporting ambitious decarbonisation

We have identified these four priority areas as pillars on which our activities can be built during this early stage of our project's development and on these, the Cambridge Zero team has been building up a broad portfolio of supporting activities, striving to:

- offer a service of facilitation and encouragement that nurtures talent
- provide a vehicle for co-ordinating activities and funding bids
- build links with external partners
- organise events and workshops
- create platforms for public engagement and educational content
- coordinate policy discussions and briefings
- foster industrial and business collaborations and entrepreneurial activities

In the following sections, we provide an overview of our first six months of activity, describing the projects we have begun and facilitated, reporting on progress, and setting out some thoughts on where we might go from here.

Some of our key projects and partnerships are showcased in the following Focus Boxes:

1:	Energy Transitions @Cambridge	13
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RESEARCH PILLAR

AMBITION

Cambridge Zero aims to draw on and leverage the broadest possible range of research activities and expertise to tackle the intellectual and technical challenges in transitioning to a zero-carbon future.

DEVELOPMENT

We have been engaging with researchers across the University to inform our understanding of the internal research landscape and help us to identify potential opportunities and new research ideas for facilitation and support. A key element has been a series of **consultation exercises**:

- During summer and autumn 2019 we held four meetings, each with between 50 and 100 members of the University's research community, from all six Schools (Arts and Humanities, Biological Sciences, Clinical Medicine, Humanities and Social Sciences, Physical Sciences and Technology).
- In addition, we conducted surveys of current and future research interests with detailed responses from around 100 researchers.
- **Key research themes** emerged representing the breadth of relevant research undertaken in the University, and the question of how best to support research these activities was discussed.
- The **six emergent research themes** have been adopted by Cambridge Zero.
- We have instigated an internal research mailing list.
- We have conducted a range of consultation exercises within these six research themes (e.g. brainstorming sessions on "Grand Challenge" research ideas) and will continue to develop this.

CAMBRIDGE ZERO RESEARCH THEMES

Zero-carbon energy transformation:

developing next-generation power and heating systems, batteries, photovoltaics and turbine design, incorporating bioenergy and hydrogen economy and policies supporting an energy transition.

Health and society:

informing evidence-based policy to support individual and societal change through behavioural science, health and wellbeing research, and social studies, and incorporating climate risk into decision-making in health and social care.

Resources and production:

creating a zero-carbon circular economy incorporating sustainable industry and agriculture, resource efficiency, re-use of products, and recycling of embedded materials into durable new products.

Resilient futures:

building sustainability, climate risk assessment and adaptation measures into all financial processes and policy decisions, by applying artificial intelligence tools and thinking beyond GDP to redefine prosperity in terms of social and natural capital.

Transport, cities and infrastructure:

re-visioning mobility and urban planning by developing innovative solutions with autonomous vehicles, electric aircraft, district power systems, architectural design, and natural construction materials.

Carbon drawdown and climate repair:

advancing carbon capture, geological storage, industrial utilisation and carbon nanotube production, natural climate solutions, and exploration of the legal and technological dimensions of climate repair.

These themes are strongly supported by a number of the University's Strategic Research Initiatives and Interdisciplinary Research Centres, in particular Energy Transitions IRC (see Focus Box 1), Conservation, Global Food Security, Public Health and Global Challenges.

Cambridge Zero connects research groups and institutes across the University, joining up their research and policy expertise. Our network includes researchers and projects within:

- AI for the study of Environmental Risk
- Advanced Nanotube Application and Manufacturing Initiative
- Bennett Institute
- Cambridge Centre for Climate Science
- Cambridge Institute for Public Health
- Cambridge Institute for Sustainability Leadership
- Cambridge Judge Business School
- CamBridgeSens
- Carbon Capture, Storage and Use
- Centre for Alternative Finance
- Centre for Carbon Reduction in Chemical Technology
- Centre for Crop Science
- Centre for Diet and Activity Research
- Centre for Digital Built Britain
- Centre for Environment, Energy and Natural Resource Governance
- Centre for Gender Studies
- Centre for Industrial Sustainability
- Centre for Natural Material Innovation
- Centre for Risk Studies
- Centre for Smart Infrastructure and Construction
- Centre for Social Innovation
- Centre for Sustainable Development
- Centre for Sustainable Road Freight
- Centre for the Study of Existential Risk
- Centre for the Study of Global Human Movement
- Centre of Advanced Materials for Integrated Energy Systems
- Circular Economy Centre
- Climate Change and Earth-Ocean-Atmosphere Systems
- Combustion Research Group
- Conservation Research Institute
- Creative Circular Plastics Centre
- Energy Efficient Cities Initiative
- Energy Transitions@Cambridge
- Energy Policy Research Group
- Mechanics, Materials and Design
- Nuclear Energy Centre
- Public Health@Cambridge
- Real Estate Research Centre
- Resilient Materials for Life
- Resource Efficiency Collective
- Social Decision-Making Lab
- Whittle Laboratory
- Winton Programme for the Physics of Sustainability

* not all of the research conducted by these groups is relevant to Cambridge Zero.

The response to the climate and broader environmental crises needs to be designed in a holistic manner. We are working closely with the **Cambridge Conservation Initiative** to scope new programmes of activity, for example on nature-based solutions and on land degradation.

Some recent key developments with collaborators are highlighted in Focus Boxes 1 and 2.

FOCUS BOX 1 ENERGY TRANSITIONS@CAMBRIDGE

Energy Transitions@Cambridge is a University of Cambridge Interdisciplinary Research Centre (IRC), that brings together the activities of over 250 academics working in energy-related research. Its aims are to:

- *Leverage the University's expertise to tackle grand technical and intellectual challenges in energy transitions, integrating science, technology and policy research.*
- *Develop strategic academic and industrial partnerships around the world.*
- *Secure institutional support for multidisciplinary, cross-university projects*
- *Help research institutions, businesses, government departments and other organisations to establish research partnerships or collaborations with the University.*
- *Work with industry, funding agencies, UK and foreign governments and others to secure funding.*

Among the activities supported by Energy Transitions@Cambridge are:

The Cambridge Creative Circular Plastics Centre (CirPlas), which acts as a nucleus for a global network of partners and coordinates a range of research projects, workshops and forums to tackle contemporary challenges from the manufacturing of more sustainable materials to driving innovations in plastic recycling.

Cambridge University Energy Network (CUEN, a student-led special interest group) Energy Conference. The 2020 conference was a 3-day virtual event covering the themes of innovations in energy technology, adapting energy policies to mitigate climate change and energy business landscape.

Materials Research Exchange 2020, a two-day event aimed at demonstrating ground-breaking new materials and processes to industry to accelerate their commercialization at which Energy Transitions@Cambridge, Cambridge Zero, the Royce Institute, Cambridge Enterprise and the Maxwell Centre had a joint stand.

Cambridge Zero and Energy Transitions@Cambridge have consulted with the academic community to explore the most effective methods of supporting the research community and to identify research gaps and opportunities.

FOCUS BOX 2 CENTRE FOR CLIMATE REPAIR AT CAMBRIDGE

Centre for
Climate Repair
at Cambridge



The [Centre for Climate Repair at Cambridge](#) has recently been founded as a cross-disciplinary research institution affiliated to Cambridge Zero focused on:

- *Deep and rapid emissions reductions*
- *Greenhouse Gas Removal (GGR)*
- *Repairing broken climate systems*

The Honorary Executive Chair is Prof Sir David King with Dr Hugh Hunt (Acting Director), Dr Shaun Fitzgerald (Acting co-Director) and Dr Eleanor Standen (Senior Research Associate). The Centre is currently based in Downing College.

A key focus of activity has been developing a proposal for the **Natural Environment Research Council (NERC) call for a Directorate Hub for a national programme of five GGR demonstrators** (proposal deadline August 2020). The Directorate Hub (DiGGR) would be based on the Department of Engineering. The team is comprised of leading academics from the University of Cambridge, the University of East Anglia, University College London, and the University of Manchester and covers a broad range of academic disciplines (including, but not limited to: land management, sustainability science, biodiversity conservation, atmospheric chemistry, engineering, sustainability, social psychology, public engagement, governance and law).

The Hub would work with the demonstrator projects to:

- (i) devise new frameworks for effective comparison of technology options;
- (ii) work with society at large to build understanding of the important factors to consider in evaluating options for GGR;
- (iii) advance the state of knowledge on the broad implications of GGR technologies (including impacts such as environmental, economic, public health, impacts on local communities) as well as the required governance structures and implications for democratic decision making; and
- (iv) work with all interested parties to build understanding of the potential options for rolling out GGR technologies across the UK.

CAMBRIDGE ZERO RESEARCH ACTIVITIES

The Cambridge Zero team have directly contributed to research activities including scoping studies, proposals and projects related to climate change. We have prioritised activities that require building new collaborations across the University, the development of new research capability and the pursuit of strategically important research that requires a centrally coordinated response. Specifically:

- Our activities related to quantifying financial risk from climate change (see Focus Box 3) brought together climate scientists and computer scientists with researchers from the Judge Business School and the Cambridge Institute for Sustainability Leadership in a new collaboration.
- We have contributed to a confidential scoping study commissioned by GCHQ on **Climate Change and National Security** with the Alan Turing Institute which describes opportunities for the UK to develop an innovative research programme to develop novel forecasting and strategic insight tools to identify and measure climate security risks.
- We initiated a programme of research to quantify climate-related risks in developing countries.

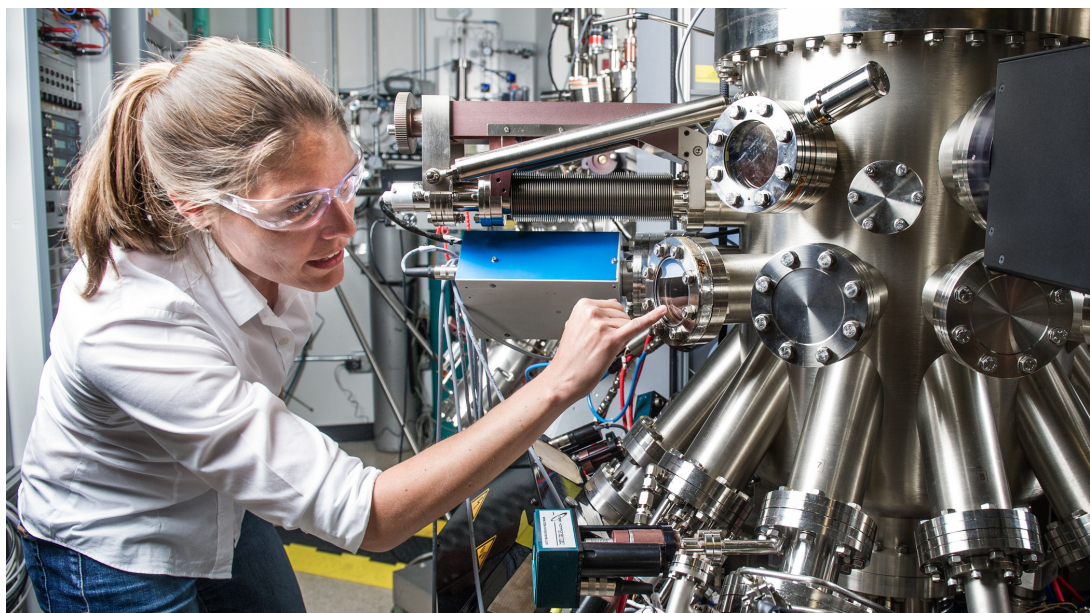


Photo credit: Science in HD on Unsplash

FOCUS BOX 3 FINANCIAL RISK FROM CLIMATE CHANGE

Working with Cambridge Centre for Risk Studies at Judge Business School and British Antarctic Survey we have created a first-of-its-kind prototype **Cambridge Climate Change Business Risk Index** for businesses to better quantify their exposures (assets and supply chains) to increased (current and future) risks from climate change and extreme weather events. An industry consultation event with 110 attendees was held in February 2020, to launch the Index with speakers from the University, the Met Office, HSBC, Citi and the Global Association of Risk Professionals.

Cambridge Zero is a co-investigator on an Innovate UK project, SERI (Standard for Environment Risk and Insurance), which aims to design, test and develop “climate-ready” financial products ahead of COP26. SERI is led by the global non-profit Icebreaker One.

We are also leading a £5m proposal to the **Natural Environment Research Council's Climate and Environmental Risk Analytics for Resilient Finance** call which aims to drive research and innovation to support the establishment of a climate and environmental risk analytics capability and capacity in the UK aligned to the specific requirements of the financial services sector such as banks, insurers, asset managers, pension funds and ratings agencies. Our proposal (Principal Investigator, Dr Emily Shuckburgh) brings together experts from across the University, British Antarctic Survey, the University of Exeter, and the Open University, and partner institutes UNEP-WCMC, Icebreaker One, and Cambridge Econometrics.

FUTURE PLANS

Over the next six months we will focus on developing each of the six themes in particular by:

- identifying flagship examples of recent or current research related to the Cambridge Zero mission
- further consultation to identify what support each thematic area requires to ensure the efficient and effective coordination of the research programme
- identifying “Grand Challenge” ideas or large, high-impact, innovative research proposals that could form part of a major fundraising effort
- coordinating and contributing to strategic research proposals/projects.

EDUCATION PILLAR

AMBITION

Cambridge Zero aims to enhance the lifelong journey of education in a holistic way to ensure it is fit to address the challenges of the coming decades in particular by realigning education and training and providing individuals with the skills to lead the necessary transformation of society.

DEVELOPMENT

We have been exploring the challenges and opportunities with partners across the learning space:

- University of Cambridge students, colleges and departments
- University of Cambridge Primary School
- Cambridge Assessment
- Cambridge University Press
- Cambridge Institute for Sustainability Leadership (executive education)
- Institute for Continuing Education
- Development and Alumni Relations office

We have conducted a preliminary series of open consultations with student groups to start to explore how we can support the undergraduate and graduate student population in Cambridge in matters related to sustainability. To date we have held three open discussion meeting in collaboration with the Centre for Climate Science, the Cambridge chapter of the Society for Industrial and Applied Mathematics and students from the Department of Engineering. To expand our consultation with students we have approached all colleges to provide an **undergraduate and a graduate liaison rep for Cambridge Zero**. We also arrange termly Green Officer Discussion Meetings across Colleges, providing a forum for Green Officers to meet and discuss environmental action in their Colleges.

COURSES AND INITIATIVES FOR STUDENTS AND EARLY-CAREER RESEARCHERS

Cambridge Zero is supporting a wide range of courses and initiatives for, by and in collaboration with students and early-career researchers, including:

- A student-led Carbon Literacy programme. Cambridge Zero is funding the training of students who can go on to train other students and is providing bespoke support to the students running the programme. The programme aims to provide an awareness of the carbon dioxide costs and impacts of everyday activities, and the ability and motivation to reduce emissions, on an individual, community and organisational basis.
- The Engage for Change Programme, a six-week skills-building, changing-making programme for students and postdocs of the University of Cambridge that has been developed by the **Cambridge Hub**, in conjunction with the University's **Environment and Energy team**, to promote social and environmental leadership. Participants learn to make change happen, through effective, transformative engagement with others. Previous initiatives of course participants have included a broad range of topics such as food waste, green transport, energy consumption, and education. The course ran for the seventh time in Easter 2020 and we are looking to expand the programme over the next year.
- The **Cambridge Climate and Sustainability Forum**, an annual student-run conference organised with the Cambridge Hub in order to create discourse with the local community and student body in Cambridge and encourage positive action towards sustainability. Cambridge Zero provided funding and support/advice for this event as it transitioned to a virtual format.
- ClimaTalks is a student-led initiative that aims to both educate students on climate policy and provide a way of synthesising student voices on climate change policy in the run up to COP26. We are providing funding for their virtual platform as well as offering support and advice to ensure that the initiative is impactful.
- Supporting revisions of undergraduate courses (Engineering and Chemical Engineering) to include an emphasis on sustainability.
- Contributing to discussions regarding a potential new undergraduate tripos on **Technology, Policy and Economics** to include, among other topics, climate change as a cross-cutting theme.

CAMBRIDGE ZERO INTERNSHIPS PROGRAMME

- Four paid **internships** have been made available for undergraduates and recent graduates in Summer 2020. Competition for these internships was intense with a total of 297 applications for the available positions.

(i) *Carbon footprinting* - to develop a CO₂ tracker that demonstrates the difference in carbon emissions between virtual activities and equivalent physical activities undertaken as part of Cambridge Zero operations:

Rachel Stoner has just completed the fourth and final year of her Engineering degree at Murray Edwards College.

(ii) *Research strategy* - to help develop Cambridge Zero's programme of support for research at the University of Cambridge:

Ella Palmer has just graduated in English from Fitzwilliam College. She interned previously at UNEP-WCMC in Cambridge and will begin a masters degree in climate change this autumn.

(iii) *Virtual environmental events* - to support the development of large-scale, virtually delivered Cambridge Zero events:

Rebecca Ige recently graduated from King's College with a degree in Geography.

(iv) *Environmental inductions* - to improve the University's provision of environmental induction materials for new students:

Lois Wright is about to go into her final year of studying Psychological and Behavioural Sciences at Fitzwilliam College.

- Four paid **internships** will imminently be advertised for postgraduate students:

(i) *Environmental impact of changes to working practices during Covid-19* – to compare the environmental impacts of working from home and on site.

(ii) *Attitudes to flying for research purposes* – to assess if and how attitudes to flying for research related purposes have changed across the Covid-19 period.

(iii) *Cambridge Zero Policy Intern (based in the Centre for Science and Policy)* - to support links between University academics and Cambridge City Council in reviewing the City Council's climate change policy.

(iv) *Cambridge Zero Media Intern (based in the Office of External Affairs and Communications)* - to support the development of climate and environment themed events as part of the Cambridge Festival.

FOCUS BOX 4 LIVING LABORATORY FOR SUSTAINABILITY

The Living Lab brings together students, academics and staff to test new ideas, apply research to practice and develop new solutions for enhancing sustainability across the University. The Living Lab has historically worked through a combination of academic and voluntary projects, internships and competitions focussed on improving the environmental sustainability of the University

Since the *Living Laboratory* has been brought into the *Cambridge Zero* project, this portfolio of activities has grown in scope but the focus on empowering students to bring about sustainable change remains. The scope has grown both in terms of the cross-section of students we engage with and the targets of projects themselves, for example:

In a new collaboration with **Homerton Changemakers** and the **Cambridge Institute for Sustainability Leadership** we are developing a short online course on changemaking which will be available to all students.

We are building on an extant project with **Cambridge Hub, Engage for Change**, to boost and extend the existing programme to increase availability for students.

This year's **internship programme** includes a number of postgraduate internships in partnership with the Centre for Science and Policy, the Office for External Affairs and Communications and the City Council.

This year's **Carbon Challenge** involved partnering with Cambridge Enterprise, Anglia Ruskin University and Games Eden to mentor a record number of teams in producing workable gamified decarbonisation solutions.

RESOURCES FOR SCHOOLS

Cambridge Zero is collaborating with the [University of Cambridge Primary School \(UCPS\)](#) on a number of initiatives aimed at developing resources for primary schools. In November 2019 we piloted a **Creative Engagement Workshop** which brought together three small groups of academics (PhD students and research leaders) from Public Policy, Engineering and Climate Science to learn about pedagogical research, to develop educational resources related to their disciplinary interests and to trial them on small groups of children and then on full year groups of 90 children. The programme was designed and delivered in collaboration with Dr James Biddulph, headteacher at UCPS and Mr Ash Smith, deputy headteacher. The intention is to learn from these trials to produce lesson plans that can be used in all schools. We also collaborated with UCPS on their [Agents for Change](#) project. The schoolchildren created an interactive and positive art project, highlighting the importance of addressing climate change.

We have created two **#LockdownScience** video resources for schoolchildren during the coronavirus lockdown. [Experiments with ice](#) presents three fun science experiments for primary school children (4-11 years old) where they learn about the properties of ice and the impacts of climate change. It has been viewed more than 1000 times. [Air Pollution](#) presents educational activities for school children (7-14 years old) about what causes air pollution, its impacts and how it is measured.

We have also engaged with sustainability initiatives in other schools, e.g. participating in a [podcast](#) for the **Stephen Perse Foundation** and in outreach activities for schoolchildren, e.g., the [Cambridge Physics Centre Sixth Form Lecture Series](#).

GRADUATE AND EXECUTIVE EDUCATION

The **Cambridge Institute for Sustainability Leadership** programmes offers a broad range of graduate and executive education courses related to sustainability, including [Masters in Sustainable Leadership](#), [Postgraduate Diploma in Sustainable Business](#) and [Postgraduate Certificate in Sustainable Business](#). We are working closely with CISL to contribute to these courses and explore where we can add value. **Chapter Zero** have produced a [toolkit for Boards](#) to help non-executive directors understand the key issues relating to climate change and ensure that their businesses have the right strategic plans in place to identify and successfully address climate change challenges.

CONTINUING EDUCATION

We have worked with the **Institute of Continuing Education**, which organises a wide range of accessible part-time and short courses. We have contributed to courses covering aspects of sustainability and climate change.

ALUMNI ENGAGEMENT

We have undertaken a small number of alumni engagement activities, including a presentation at the Varsity Rugby match and a contribution to CAM magazine, and are developing a programme of webinars for alumni.

FUTURE PLANS

Over the next six months we will focus on:

- developing and delivering an expanded **Engage for Change** programme
- reaching out to more departments across the University to support the greater integration of sustainability into undergraduate courses
- creating an educational and engagement **webinar programme for alumni**
- co-designing a blueprint for a coherent life-long learning journey in collaboration with **UCPS, Cambridge Assessment and Cambridge University Press**



Agents for Change @UCPS

ENGAGEMENT PILLAR

AMBITION

Cambridge Zero aims to generate the ideas and solutions that will help achieve our vision by working collaboratively with stakeholders outside of the University – in government, industry, the third sector, locally, nationally and internationally – enabling University insight to meet real-world needs.

DEVELOPMENT

We have been working with partners within the Collegiate University to build relationships and engage with a broad range of people and organisations, most notably:

- [Cambridge Institute for Sustainability Leadership](#) works directly with senior leaders, CEOs and boards of leading companies to align their strategy and commercial decisions with the Paris Agreement and drive the transition to net zero across their operations.
- [Centre for Science and Policy \(CSaP\)](#) aims to improve public policy through the more effective use of evidence and expertise, by creating opportunities for public policy professionals and academics to learn from each other.
- [Hughes Hall Centre for Climate Change Engagement](#) aims to increase awareness on company boards of the need for urgent action on climate change
- [Chapter Zero](#) helps non-executive directors understand and respond to the impacts of climate change on their business.
- [Maxwell Centre](#) links leading University research across Physical Sciences, Technology and beyond with industry and policy by providing collaborative working space and an engagement programme for its stakeholders. It also hosts the Cambridge components of the [Henry Royce Institute](#) for advanced materials research and the [Faraday Institution](#), the UK's independent institute for battery science and technology, and the Cambridge Zero office.
- [Cambridge University Press](#) is working with researchers and educators to develop a new open platform, Cambridge Open Engage.
- [Cambridge Conservation Initiative](#) is a collaboration between nine leading conservation organisations and the University, catalysing strategic partnerships across research, education, policy and practice to transform global understanding and conservation of biodiversity and secure a sustainable future.
- [University of Cambridge Museums and Botanic Garden](#) highlight environmental challenges through Operation Survival, an exhibition on co-operation in the face of a changing climate, and a new 'Climate Change' interpretative trail for visitors to the Botanic Garden.

POLICY ENGAGEMENT

In collaboration with the **Centre for Science and Policy (CSaP)**, we are bringing together evidence and expertise from across the University with relevant policy stakeholders to inform the policies needed to transition to a zero-carbon future. The **CSaP Policy Leaders Fellowship Programme** addresses the needs of the most senior policy makers. In November, our Director spoke at the CSaP Policy Leader Fellows' roundtable discussion *Energy: new forms of energy storage, transmission and use*; attendees included senior policy makers, such as the Government Chief Scientific Adviser; the Chief Operating Officer for the Civil Service and Permanent Secretary for the Cabinet Office; and the Director General, Energy Transformation and Clean Growth at BEIS.

The Director of Cambridge Zero also spoke at the **CSaP Christ's College Climate Seminars** in January.



Photo credit: Ms Jess Smith, Learning Coach at UCSP

FOCUS BOX 5 CAMBRIDGE ZERO POLICY FORUM

Cambridge Zero, together with CSaP, have set up the **Cambridge Zero Policy Forum** as a flagship initiative. The Forum brings together over 80 senior academics from across the University to address climate change through a multidisciplinary lens. We ran initial consultative meetings with University stakeholders, as well as a policy stakeholders, in January and February 2020 to help shape the forum.

Events to date include:

Policy Forum Discussion on COP26 Universities Network Briefing, 8/04/2020

This discussion brought together 23 experts from across the Cambridge Zero Policy Forum to feed into the COP26 Universities Network's briefing note to BEIS on a net zero emissions economic recovery from COVID-19.

Policy Workshop on Soils, 20/04/2020

The first Cambridge Zero Policy Workshop delivered by CSaP explored the policy question *What would an agricultural soil plan for the UK look like and which measures would we use to monitor its effectiveness?* It was attended by DEFRA as well as by academics and representatives from the private and third sectors. A report of the Policy Workshop has been published on the CSaP website. The workshop was attended by 28 participants.

Policy Forum Discussion on a Green Recovery from the Pandemic, 26/05/2020

Lord Martin Rees and Tony Juniper, Chair of Natural England, spoke at this event focussing on technological and nature-based solutions as contributors to a green economic recovery. 33 participants joined the discussion.

Alan Turing Institute Climate Security Workshop, in partnership with the Defence Science and Technology Laboratory (DSTL) on climate change and defence (5/06/2020)

The Cambridge Zero policy team helped organise this event, which forms part of a series exploring the impacts of climate change on defence and security. The series seeks to inform the Turing's Defence and Security Programme and influence future policy. Our Director presented at this workshop, which attracted over 35 attendees from organisations such as the Ministry of Defence, the Met Office, DSTL, United Nations Environment Programme, Department for International Development, Defence Equipment & Support, The National Cyber Security Centre and the Office of the Chief Scientific Adviser.

Policy Forum Discussion on Systems Thinking and Net Zero, 18/06/2020

This meeting brought together Lord Browne of Ladyton and Professor John Clarkson, Director of the Cambridge Engineering Design Centre, to discuss how to apply systems thinking to help transition to a clean economy and net zero society. 27 stakeholders participated in the discussion.

Policy Forum Discussion on a Green Recovery from the Pandemic, 30/06/2020

Catherine Arnold, Master of St Edmund's College, and Eliot Whittington, Director of Policy at Cambridge Institute for Sustainability Leadership, spoke at this meeting, leading 26 participants in a discussion of the international aspect of a green economic recovery and jobs.

NATIONAL POLICY

Cambridge Zero is proactively engaging in discussions related to national policy.

The Policy Forum ran a meeting on a post-pandemic stimulus package in March 2020 to feed into the [COP26 Universities Network's Briefing Paper](#) for the Department of Business, Energy and Industrial Strategy (BEIS), which we also co-led. We subsequently led a letter to the Chancellor of the Exchequer based on the briefing note.

One session of the 2020 CSaP Annual Conference focused on [net zero](#); this event attracted 118 attendees, including representatives from BEIS, the Cabinet Office, DEFRA, the Environment Agency and the Ministry of Justice.

The Cambridge Zero Policy Forum has hosted a series of discussion meetings related to a **Green Recovery** and is writing an in-depth report on the topic. We also participated in an invite-only high-level [roundtable discussion with the Secretary of State for Business, Energy and Industrial Strategy on the economic recovery from COVID-19](#) focused on how to capture growth opportunities from the shift to net zero.



Photo credit: Antoinette Nestor



FOCUS BOX 6 GREEN RECOVERY BRIEFINGS

The COP26 Universities Network Briefing Note: [A net-zero emissions economic recovery from COVID-19](#), was co-authored by the Director of Cambridge Zero and published on 5 May 2020. It has received very positive feedback from UK policymakers, and its evidence has also been cited in Parliament. It has been covered in many news outlets, from local to international, including:

The Guardian; The Independent; The New York Times; Bloomberg; The Sydney Morning Herald; ITV; BBC Radio 5 Live Breakfast; University of Cambridge News.

We have published a **series of blogs** by academics related to a green recovery from Covid-19:

[Build Back Better by Investing in Social and Human Capital](#), Dimitri Zenghelis, Bennett Institute

[Working towards a climate-neutral Europe - jobs and skills](#), Eliot Whittington, Cambridge Institute for Sustainability Leadership

[A green stimulus package for a post-Covid UK](#), David Newbery, Energy Policy Research Group

[An important and cheap component of a sustainable and strategic COVID-19 Green Recovery Package](#), Laura Diaz Anadon, Land Economy

The Director of Cambridge Zero has also contributed to a wide range of policy-related discussions, reports and other initiatives relating to national policy, including:

- Advisor to the [All Parties Parliamentary Group on Climate Change](#)
- Commissioner on [IPPR's Environmental Justice Commission](#)
- Member of [NHS Net Zero](#) expert panel
- Presentation to Civil Service [Fast Stream Environment Network](#)

INTERNATIONAL POLICY

We are also contributing to policy discussions internationally, for example, through participation in CISL's programme for the **Guangdong Provisional Government** in July 2019, and by preparing for the **26th UN Climate Change Conference (COP26)**.

FOCUS BOX 7 COP26



The UK is hosting the 26th UN Climate Change Conference of the Parties (COP26) in partnership with Italy in Glasgow in November 2021.

Cambridge Zero has been providing direct input to the UK Government team in the form of evidence, advice and access to academic expertise. We have contributed to roundtable discussions with the COP President and engaged in monthly meetings with the Cabinet Office team. We have been raising awareness of the COP priorities and engagement opportunities amongst the Cambridge community and engaging our international network to build dialogue around the core COP themes.

We co-founded the UK Universities COP26 Network to provide co-ordinated support from UK academia. Through this network we are contributing to briefing papers and supporting the COP26 team on their five campaign themes (energy transition, nature-based solutions, zero-emissions transport, green finance and resilience) through the application of scientific expertise and by providing communications and public engagement support. We co-authored the briefing, *A net-zero emissions economic recovery from COVID-19*, which received considerable coverage in the UK press, and are leading on the international and nature-based solution working groups.

As part of our engagement through the COP26 university network we are also hosting and co-ordinating a virtual climate conference titled Climate Exp0, bringing together experts from across the world to explore the core academic and policy issues relating to the COP team's priority themes.

The Cambridge Institute for Sustainability Leadership (CISL) has been an important internal partner and facilitator in our engagement with COP. In particular CISL has been working closely to support Nigel Topping, the COP High Level Champion of United Kingdom, and his team.

BUSINESS, INDUSTRY AND THIRD-SECTOR ENGAGEMENT

We are developing a coherent business and industry engagement strategy that leverages and enhances existing capabilities within the University. This will include: facilitation of strategic partnerships; development of opportunities to co-invest in research and new knowledge generation; incubation and acceleration services; support for commercialisation of ideas and consultancy; entrepreneurship training and mentorship; and coordinated access to knowledge and expertise.

Cambridge Zero's anticipated initial delivery partners for this engagement portfolio include:

- the Maxwell Centre
- Cambridge Institute for Sustainability Leadership (CISL)
- Hughes Hall Centre for Climate Change Engagement and Chapter Zero
- Cambridge Enterprise.

Cambridge Zero, Maxwell Centre and [Cambridge Cleantech](#) inaugurated an events series **Zero Carbon: From Research to Commercialisation** with the first workshop on the 4th of March 2020. It explored four themes:

- Energy Transition, Material and Systems;
- Plastics, Waste Management and Circular Economy;
- Future Transport from Renewable Fuels to Electrification and Hydrogen; and
- The Built Environment.

The event brought together over 70 participants, in equal parts representing University research, large companies, SMEs, start-ups, and government/3rd sector/other groups, highlighting and discussing research and commercialised solutions contributing to delivering a Zero Carbon future.

The Director of Cambridge Zero has contributed to a number of **CISL programmes**, with, among others, National Rail, BNP Paribas, McDonalds, Heathrow and Dow Chemicals. She has also contributed to a wide-range of activities with business, finance and third-sector organisations, including:

- Interview for the [Actuary Magazine](#)
- Presentation at the [CBI annual conference](#)
- [Better Boards](#) podcast
- Talk to [Ely Cathedral Business Group](#)
- Video for [Deloitte's climate change website](#)
- Opening presentation for [Clyde & Co Climate Change Liability Risk conference](#)
- Video for [1.5C Science Based Targets](#)
- Presentation to [G's Grower's annual conference](#) on Making Farming Carbon Neutral
- [Stantec lecture on resilience](#)
- Opening presentation to [UK Finance's Climate Risk, Green Finance and Sustainability Conference](#)
- Opening keynote to [Public Sector Green Finance Summit](#)
- Presentation to Bank of England
- Presentation to Banque de France at invitation of the Gouverneur
- Chatham House retreat on Mainstreaming Climate in Finance and Economic Decision-making
- Presentation to annual meeting of Wildlife Trust directors



Photo credit: Antoinette Nestor "International Women's Day 2020"

ENCOURAGING ENTREPRENEURSHIP

Cambridge Zero has supported entrepreneurship and idea generation by , for example:

- Developing and bolstering the annual Carbon Challenge Competition in collaboration with the University's Environment and Energy section. The competition facilitated the formation of novel teams of students and staff from across traditional disciplinary boundaries who then went on to work with mentors to develop ideas to address a brief of "Gamifying Decarbonisation". Participants gained experience of project management, team-work and product development throughout the challenge. This year saw a record number of entries and feedback on the competition was entirely good/excellent. The winning team won a £1000 prize with the idea for an app that looks at making behaviour change around food enjoyable. The second prize was for a city building game that incorporated environmental feedback systems. The winning teams were connected to further entrepreneurial support at Cambridge Enterprise.
- Providing advice to Climate-science, co-founded by two Cambridge students, which is primarily a climate education organisation that uses a large distributed network of volunteers to develop high-quality climate education content and engaging graphics.

PUBLIC ENGAGEMENT

Cambridge Zero seeks to engage and empower the public by highlighting environmental challenges and providing opportunities and platforms for open discussion and learning.

We have contributed to flagship events at the **Festival of Ideas** (Emily Shuckburgh in conversation with Ed Miliband MP, full audience and 1,700 views on Facebook) and the Science Festival (Martin Rees, Bryony Worthington, Partha Dasgupta, Emily Shuckburgh, Oliver Morton (a full audience and 500 views on YouTube).

The Director of Cambridge Zero has given a number of high-profile public lectures, including:

- WWF Annual Science Lecture 2019
- Turing Lecture, for Earth Day 2020 (1000 views on YouTube)
- Guardian Live event "The climate emergency"

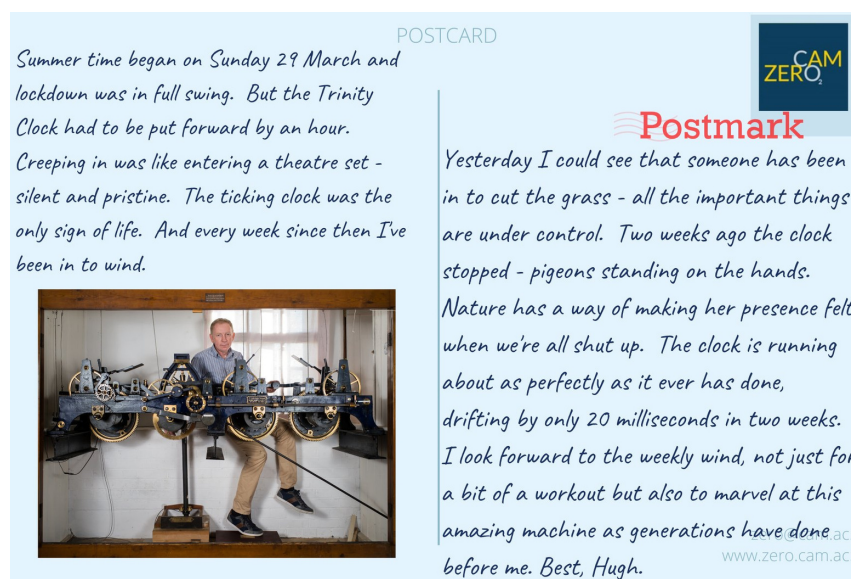
Cambridge Zero has developed a dynamic **social media engagement programme**. This promotes Cambridge Zero activity and creates a ‘conversation’ through key international celebration dates such as International Women’s Day (see p.30), International Earth Day and World Environment Day. We provide a real-time summary on social media of the major workshops/seminars we participate in or organise. At the start of the coronavirus lockdown period we ran a popular “Postcards from Home” series (see below). To date we have had almost 1 million social media impressions (the number of times a person has seen our posts), and our followers are growing steadily across all platforms.

We share news with the public via a monthly email newsletter and have launched a local radio show, Cambridge Zero Climate Talks on Cam FM and we have recently launched a Cambridge Zero YouTube channel.

FUTURE PLANS

Over the next 6 months, we will focus on:

- Growing and developing the **Cambridge Zero Policy Forum** to support COP26 and inform policy decision making in the UK and across the world.
- Supporting preparations for **COP26** by bringing university research and expertise to bear through briefing papers, workshops, conferences and one-to-one meetings.
- Developing a mechanism to facilitate engagement with business and industry and to support entrepreneurship and commercialisation of research that leverages and enhances existing capabilities within the University.
- Exploring the development of a **fellowship scheme** aimed at supporting early career academics engage with stakeholders on climate-related issues.
- Promoting public engagement at **local, national and international** level through communication activities and events.



Postcard credit: Dr. Hugh Hunt #PostcardsFromHome

DECARBONISATION PILLAR

AMBITION

Cambridge Zero aims to work with the collegiate University to help to develop, co-ordinate and facilitate a rapid transition to a zero-carbon future.

DEVELOPMENT

We have been working with the University's Environment and Energy Team within the Estates Division, a growing number of Colleges, the local councils and local interest groups.

SUPPORTING THE UNIVERSITY'S ENVIRONMENTAL SUSTAINABILITY STRATEGY

In July 2019, the University of Cambridge became the first university in the world to announce a 1.5°C **Science Based Target for carbon reduction**. This commits the University to reducing energy-related carbon emissions to absolute zero by 2048, with a steep 75% decrease on 2015 emissions by 2030. The ambition is to always be ten years ahead of this and hence to reach absolute zero by 2038.

Immediate actions to reach this target include exploring opportunities to reduce gas used for heating and a programme of energy efficiency improvements. Progress is also being made in quantifying non-energy related carbon emissions, in particular in obtaining data on flights and in estimating supply chain emissions.

The energy and carbon commitments are part of a wider range of environmental sustainability commitments. Work to deliver against these are led and coordinated by the **Environment and Energy** section within the University's Estates Division with strategic oversight provided by the **Environmental Sustainability Strategy Committee (ESSC)** on which the Director of Cambridge Zero sits.

We have facilitated connections to academics across the University who have expertise in improving the University's sustainability and continued to foster projects through the **Living Laboratory for Sustainability**, ranging from hydroponics for thermal regulation in the Engineering department, through to supporting biodiversity engagement for staff across the University. We have contributed to discussions with the Environment and Energy section to identify opportunities to promote a green recovery within the University from the COVID-19 pandemic.

Other activities such as the **Cambridge Carbon Challenge**, our internship programme and our policy workshops have further supported the University's environmental sustainability strategy.

SUPPORTING COLLEGES

We are engaging with various colleges with regard to their decarbonisation plans. The Director of Cambridge Zero sits on the relevant committee for Darwin College and Trinity College, and the Deputy Director sits on the committee for Churchill College.

SUPPORTING THE CITY AND REGION

We have engaged in meetings with the local city and county councils to explore how we can provide an evidence base for local decision-making and how we can collaborate on projects related to decarbonisation. We have also engaged with a wide range of local organisations such as [Natural Cambridgeshire](#), [Cambridge Carbon Footprint](#) and [Carbon Neutral Cambridge](#).

Cambridge students undertook an influential study of how [the region could achieve net zero](#) through a project of the [Cambridge University Science and Policy Exchange \(CUSPE\)](#) and we are looking at how we could support such activities in the future.

We have also supported the [Cambridge Carbon Map](#).

FUTURE PLANS

Over the next 6 months, we will:

- identify large decarbonisation projects requiring external funding within the Collegiate University
- support decarbonisation planning through projects as part of our internship programme
- promote a wider awareness of climate change and decarbonisation in the local community through a week-long climate change festival

THE CAMBRIDGE ZERO TEAM

Dr Emily Shuckburgh OBE Director. Emily is Reader in Environmental Data Science in the Department of Computer Science and Technology. In her previous role at the British Antarctic Survey she led a national research programme on polar climate change. She is recognised as a world-leading climate scientist and science communicator.

Steve Davison Deputy Director, with responsibility for strategy and planning, international engagement, strategic communications and relationship management, project and partnership development, and governance and system management. He was Head of Public International Partnership following the formation of the University's Strategic Partnership Office from 2017, and was Political Adviser and Head of Public Affairs before that. Steve previously worked in Westminster as Head of Environment for Policy Connect.

Dr Erik Mackie Engagement Manager, responsible for all research-related projects, including developing new research collaborations and engaging with internal and external research communities and partners. He has a PhD in oceanography and climate science, and previously worked at the British Antarctic Survey and in science policy and communication at the Parliamentary Office of Science and Technology.

Mary Howe HR/Finance, is a Senior Professional Services Manager in the University's HR Team with University-wide experience. She assists Cambridge Zero, with finance, HR, internal policy and process development.

Dr Antoinette Nestor Communications and Engagement Manager, with responsibility for the public engagement strategy. She further supports the research agenda where there is a public engagement component. She also develops our online presence and social media, including videos, podcasts, radio shows and updates for schools. She has a PhD in law with a focus on community economic development lawyering and has previously worked on issues pertaining the circular economy, plastic waste and community engagement on a local and international level.

Katherine Habib PA to the Director, manages communication and events.

Lauren Milden Policy Advisor at the University's Centre for Science and Policy (CSaP), supports our policy engagement, including establishing the Cambridge Zero Policy Forum and running Policy Workshops.

Amy Trevethan Public Affairs Manager (UK) in the University's Communications Team, where she leads on advocacy and engagement with the UK Government across a range of policy areas. She supports our communication of climate-related policy to key decision-makers and interested parties in the UK Government and Westminster, as well as at a more local level in Cambridgeshire.

Dr Aga Iwasiewicz-Wabnig FRSA, **Director of Partnership Development at the Maxwell Centre**, assists us in developing a strategy for industrial engagement. She holds a PhD in physics, and is a knowledge broker with a broad network, facilitating our engagement and visibility with industry as well as across the University.

Jen Hayes **Digital & Content Strategy**, responsible for website development, virtual events, digital optimisation, publishing and communications. Jen has a commercial background, specialising in digital marketing, content strategy, branding and engagement.

Dr Amy Munro-Faure **Living Lab Co-ordinator for the University's Environment and Energy Team**, is responsible for our student education, engagement and empowerment activities and the connection between research and operational sustainability. She has a PhD in evolutionary biology and has worked as an intern on climate policy at the Royal Society. She's previously conducted research on conservation and evolutionary biology at the Zoological Society of London, The Natural History Museum and University College London.

Sarah Collins **Research Communications Manager in the University's Office of External Affairs and Communications**, and **Paul Casciato** **News Communications Officer in the Office of External Affairs** proactively support our national and international media relations, advising on reputational issues as required.

Charlotte Courtney **Administrator**, provides financial and HR administration and team planning.

Dr Shafiq Ahmed **Co-ordinator of Energy Transitions@Cambridge IRC**, provides the essential link for our Energy Transitions theme with the energy research activities of around 300 University academics. He has a PhD in Materials Science and has previously managed international collaborative research programmes and partnerships for the Royal Academy of Engineering and the International Unit at Universities UK.

Alisdair Neilson is the lead for the ESRC Sustainability, Welfare and Prosperity thematic cluster. He is a PhD student in the Department of Geography and the lead for the ESRC Sustainability, Welfare and Prosperity thematic cluster. His research focuses on unpacking afforestation targets, primarily for carbon sequestration, in East Africa.

Dr Laurie Friday, is a volunteer Associate. She is **Director of the Isaac Newton Trust** and an ecologist with a broad knowledge of the collegiate University.

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