



Cabot Institute

for the Environment

Many minds, one mission

Welcome

The Cabot Institute for the Environment is a diverse community of 600 experts, united by a common cause: protecting our environment and identifying ways of living better with our changing planet.

Together, we deliver the evidence base and solutions to tackle the challenges of food security, water, low carbon energy, city futures, environmental change, and natural hazards and disaster risk.

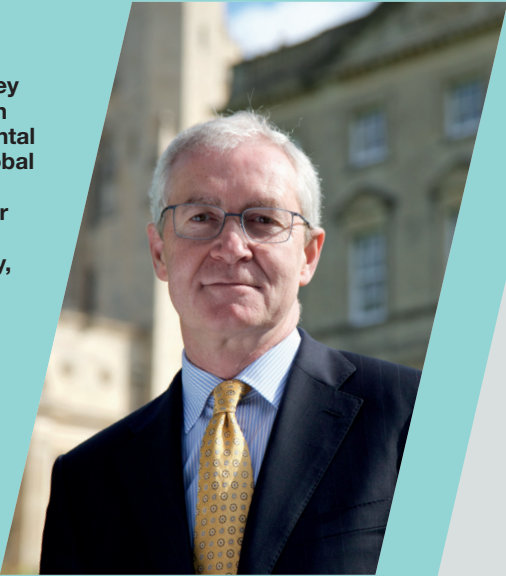
This report celebrates our achievements over the past five years and sets the stage for the next five.

A civic University

Our University's reputation is enviable and the Cabot Institute is a key part of that. It has supported our academic community to connect in new ways, co-developed novel ideas that address major environmental challenges, and proactively engaged with our local, national and global partners. We have ambitious plans for our University, not least the development of a new enterprise campus in Bristol's Temple Quarter that will develop the talent pipeline, research, digital technologies and applications that connect with the City. We are a civic University, embedded in Bristol through the research and volunteering work of staff and students, and open to the public in many ways.

The Cabot Institute plays a vital role here, not least through the legacy of its city-focused activity during Bristol's year as European Green Capital in 2015, but also due to the knowledge bank it harnesses; where expertise in urban planning, city futures, environmental risk and modelling will all impact on our capital projects, enhancing our city for generations of students and the public in the years to come.

Professor Hugh Brady
Vice-Chancellor and President of the University of Bristol



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About the Cabot Institute for the Environment

Our research is bold, creative and innovative

We share a vision: to live better with our world, safeguarding and enhancing the natural environment; equipped with strategies that help us respond to a constantly changing planet. We do this by harnessing and focusing the expertise of our 600-strong academic community at the University of Bristol to develop practical, interdisciplinary solutions to improve how we live and interact with the environment.

The Cabot Institute for the Environment is the University’s first flagship interdisciplinary research institute. Established in 2010, we bring together academics from across six faculties to conduct world-leading research on how we depend on and affect our world.

We have many minds; we share one mission.

Our core aims are to:

- Build multidisciplinary research communities that extend beyond the University.
- Catalyse fundamentally new and transformative research ideas.
- Secure funding to build our community and support new research.
- Maximise the value of Institute members’ research through engagement, events and promotion.
- Build a local, national and international profile for the Institute, its members and the University of Bristol.
- Contribute to a unique and visionary undergraduate and postgraduate student experience.



A message from our Director



I am excited and honoured to be in the position of Director of the Cabot Institute for the Environment after an exciting eight years of growth for the Institute. For me, the most rewarding moments of my research career have been discoveries that arise when working across disciplines and across borders. This is the essence of Cabot. The Institute is now a thriving, diverse community of 600 experts, united by a common cause - **protecting our environment and identifying ways of living better with our changing planet.** We draw our membership from the social sciences, sciences, engineering and the arts and humanities and aim to deliver the evidence base and therefore, the solutions to global challenges of food security, water, low carbon energy, city futures, environmental change and natural hazards and disaster risk.

As a well-established interdisciplinary research community with strong links with the City of Bristol and an expanding external partner network, we have the perfect platform to grow the Institute and its impact over the next five years. Our desire as an Institute is to lead the way in interdisciplinary research focused on the environment, bringing people together across disciplines not just at a local scale but also at a global scale, to solve some of the grand environmental challenges that the world faces.

Professor Jemma Wadham, Director

In 2017, we were delighted to welcome Dame Julia Slingo as the Chair of our Advisory Board. Dame Julia has served as Chief Scientist of the Met Office, high level scientific advisor to the European Commission’s Scientific Advice Mechanism and was the first female president of the Royal Meteorological Society.



We’ve reached



30,000

people over the last 5 years
through over 400 events



4000+
publications

Research
income supported



£45m+



700+
academic
researchers

Brokering Research

Our community of experts, many world-leading specialists, contribute the latest developments in their fields as part of interdisciplinary, integrated teams. We harness this expertise and direct it towards areas of environmental risk to develop sustainable, appropriate and inventive solutions to the challenges faced in our world.

The University of Bristol's overall research intensity is ranked among the top five higher education institutions in the UK, according to the Research Excellence Framework (REF) 2014. A number of research areas integral to the Cabot Institute achieved particular distinction:

- Geography / Ranked 1st
- Sociology / Ranked 2nd
- Earth systems and environmental sciences / Ranked 2nd
- Mathematical sciences / Ranked 4th
- Computer science and informatics / Ranked 4th
- Population health / Ranked 4th
- Chemistry / Ranked 5th
- 93% of engineering research (including aerospace, civil, electrical and electronic, engineering maths and mechanical engineering) was judged to be 'world leading' or 'internationally excellent'.

Our research communities

Food, water, low carbon energy, environmental change, natural hazards and disaster risk and city futures are the central themes that shape our research community, with cross-cutting themes of risk, resilience, law and policy, and global development.

Each of these communities comprises dozens of academics, from disciplines across the University, together with partners, working in bold and interdisciplinary ways. Across the communities we bring together world leading strength in risk and uncertainty assessment, modelling and data analysis, and expertise in co-production, security and governance.

Environmental Change



Natural Hazards and Disaster Risk



Food Security



Water



Low Carbon Energy



City Futures



Risk • Resilience • Regulation • Development

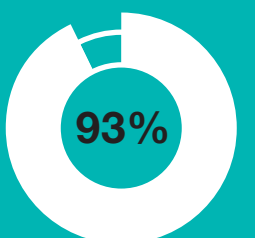
Ranked



for Geography in the UK



Research by Cabot Institute ranges from the local to the global



of engineering research was judged to be 'world leading' or 'internationally excellent'



Environmental Change



Overview

Our global environment is changing due to both natural long-term processes and human activity, with the latter forcing change at unprecedented rates. Our research focuses on a wide range of the associated challenges, including those related to climate, ocean acidification, ecosystems, biodiversity and pollution.

We are studying these issues using cutting edge observational, analytical and modelling tools, not just to describe them, but also to understand how to limit, manage and adapt to them.

Our research priorities

We research all aspects of our changing planet, from the local to the global and from the future to the ancient past. We probe backwards millions of years to reconstruct the climate, biology and chemical composition of the environment long before humans existed. We use cutting edge models, theory, experiments and observations to understand earth system dynamics across all time scales.

We dissect the effects that humans are now having on the planet, from sea level rise to revealing the rapidly changing character of our ocean, ice, water, air and soils. We pinpoint the sources and fate of atmospheric and freshwater pollution and probe the interplay of chemical cycles and ecosystems. Crucially, we explore all of these interconnected issues in the context of environmental regulation, policy, ethics, risk perception and public communication.

Our successes

- We have made fundamental contributions to the IPCC Assessment reports and the international Conference of Parties (COP) conferences that shape how governments understand and respond to climate change.
- Through our central role in the Advanced Global Atmospheric Gases Experiment, we are charting the rise and fall of ozone depleting substances, and are exploring why greenhouse gas concentrations are changing.
- Our work is used by the Department of Energy and Climate Change (DECC) to verify the UK's greenhouse gas emissions as part of its commitments under the United Nations Framework Convention on Climate Change (UNFCCC), enabling the UK to be one of only three countries to do this.
- We are changing how cities support thriving pollinator populations through the award-winning Urban Pollinators initiative.
- The handbook we developed on climate science communication links social and climate sciences and is now published in three languages.
- During Bristol's 2015 European Green Capital year, our research helped set Bristol apart from its peers by informing the city's policies on energy and climate change. We accompanied our Mayor and City Council to COP21 and advised local (and international leaders) on resilience strategies.

Our future

This work is more vital than ever. Our capacity to study environmental change is growing, but so is the need to provide even more robust evidence to guide the regulatory, policy and societal structures needed to live on a dynamic and finite planet. In the coming years, we will leverage ongoing investment in staff, computing and instrumentation to better examine our climate system. We will probe biological and chemical processes at greater scale and resolution so that we can provide crucial evidence to an increasingly diverse group of stakeholders.

Our new radiocarbon accelerator allows us to explore the fate of our land and soils and of the carbon dioxide in our atmosphere. With new monitoring capacity we can lead the way in understanding how agriculture and industry are affecting our atmosphere - and work with these groups to minimise it. Our research will continue to span all environments, from glaciers to forests, from soils to seas, and we will provide global and UK leadership in understanding our complex and changing planet.



We use cutting edge models, theory, experiments and observations to understand earth system dynamics



Our work is used by the DECC to verify the UK's greenhouse gas emissions



Our new radiocarbon accelerator allows us to explore the fate of our land and soils



Help decision-makers to understand and mitigate the effects of hazardous events



Our MoSSiaC methodology has reduced landslide occurrence across the Caribbean



We will continue to improve our understanding of natural hazards and disasters, to help people act in the face of such uncertainty



Natural Hazards and Disaster Risk

Overview

The risk from natural hazards and disasters is increasing. Population growth and urbanisation is increasing exposure to disastrous events, such as earthquakes, tsunamis and volcanoes. Climate change and intensified land use is intensifying chronic hazards, such as landslides and floods.

We study the physical and human drivers of these hazardous events, as well as risk perception, risk management and resilience.

Our research priorities

Cabot Institute researchers exhibit a unique breadth of natural hazard interests. We examine the fundamental science of hazards as well as how risk and exposure to events can be mitigated. Our researchers study the physics of volcanic eruptions, ash clouds, mudflows, and floods; how communities understand dangers and can be empowered to take action; and the complexities of multiple and cascading hazards.

We apply rigorous statistical and numerical models in our work and we fuse our findings with a deep understanding of societies work. We provide policy makers and industry partners with tools to assess the likelihood of a hazard occurring, to predict its behaviour if it does, and to calculate the risk and impacts for the people and places affected. By helping decision-makers to understand and mitigate the effects of hazardous events, we are improving community and infrastructure resilience and recovery.

Our successes

- We have provided expert advice and analysis to decision-makers interested in disaster risk reduction, including the National Audit Office (for flood risk), the Scientific Advisory Group for Emergencies (for risk of volcanic ash), and the Global Assessment of Risk (for volcanic eruptions).
- We have been recognised for our work in volcanic hazards, including the Queen's Anniversary Prize, the Lloyd's Science of Risk Prize, and the Vetlesen Prize.
- We developed a new framework to simulate cascading earthquake-tsunami hazards and then applied it to create new hazard and risk maps that explicitly account for key uncertainties.
- Our MoSSiaC methodology for reducing urban landslides has been widely adopted and has substantially reduced landslide occurrence across the Caribbean.
- We are increasing the robustness of hazard and risk assessment by building global hazard databases that can also be tailored to local needs.
- People from around the globe are being trained in risk and uncertainty in natural hazards and disasters through our annual Cabot Institute Summer School.

Our future

We will continue to improve our fundamental understanding of natural hazards and disaster risk and expand the evidence base available to decision-makers. This will equip them to take proactive, defensible action to reduce disaster risk. Building on our strengths, we will continue to develop strategies to extrapolate what we learn from well-studied systems to the many that are not, such as volcanic risks in unmonitored areas.

We are also connecting to the City Futures research community to transform how individuals and societies think about resilience to hazards. Natural hazards and disasters are, by their nature, uncertain and unpredictable, but with new methods for monitoring and a better understanding of fundamental processes and decision-maker contexts, we can help people act in the face of such uncertainty.



Food Security

Overview

Feeding the growing human population sustainably and without devastating our environment represents one of society's greatest challenges. Agriculture is essential, but it also exerts a huge toll on our soils, freshwater, seas and climate. Billions of people are undernourished, a challenge not only to global development but to social justice in our cities and nations. We are striving to address all of these issues, from intensifying production of food to changing how we consume it.

Our research priorities

Across all scales, we are investigating the confluence between climate change, flood and drought events and plant and animal health; navigating this critical nexus while sustaining or even increasing food production will be crucial. To do this, researchers in the food community span all of the University's Faculties, from human, animal and plant health experts to social scientists. The new Life Sciences Building, and Vet School, complete with working farm, contain state of the art facilities in bioimaging, genomics, plant and animal pathology and animal welfare and health. They are strongly connected to practitioners, from Somerset farmers to UK poverty experts to global development agents. Our community also comprises urban and global poverty experts, psychologists and nutritionists, who are exploring the impact of government policies on food deprivation and how consumers decide what to buy.

Our successes

- We work with leading experts across the Southwest UK as part of the Food Security and Land Research Alliance (FSLRA).
- We have assembled an international network, the Global Farm Platform, which shares best practice in the sustainable intensification of food production across more than 20 countries.
- Among our flagship successes is the ongoing characterisation of the wheat genome; we have identified and shared an open database of genetic markers of direct practical use to breeders across the world.
- We have made fundamental advances in understanding plant-soil interactions, plant pathogens and the effect of climate change on plant physiology.

Our future

In the future, our planet's food producers must become more adroit and resilient, learning best farming practice from one another and adapting to new climatic or cultural contexts. We will become a hub of expertise on crops, and wheat in particular, allowing us to better understand their future viability and how best to maximise energy and nutritional yields. Perhaps most importantly, via new initiatives, we are bridging the gap between the producer and the consumer, creating a dialogue that acknowledges the challenges of climate change, poverty, public perceptions of food and diminishing global resources.



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We have assembled an international network, the Global Farm Platform, across more than 20 countries



We will become a hub of expertise on crops and wheat, allowing us to better understand their future viability



We have put together the world's longest water quality time series to gain new insight into how humans are impacting our rivers



Our researchers have won awards in hydrology, geoscience, engineering, and computer science



Our future ambition is to transform the evidence base on which water-related decisions are made



Water

Overview

Water is crucial for the sustainable and safe existence of both people and nature, and ensuring water security entails protection from both floods and water scarcity. It also requires the sufficient supply and management of potable water to safeguard environmental and human health. Our research addresses all of these issues, but also the interconnections with food production, people and society.

Our research priorities

Our water research community is using novel measurements and new ways of analysing big data to advance our understanding of hydrological and water quality processes. We use cosmic ray sensors to measure soil moisture at unprecedented spatial scales and we have put together the world's longest water quality time series to gain new insight into how humans are impacting our rivers. New mass spectrometry capacity is allowing us to holistically characterise organic pollutants. We are using these observations to build and apply cutting-edge hydrologic and hydraulic models to predict responses in the cities and countryside, and from catchment to global scale. We are making these models more computationally efficient and hydrologically realistic through our investigations. To maximise the value of such models for decision-making, we have developed state-of-the-art sensitivity and uncertainty analysis tools that provide robust decision support when considering current and potential future conditions.

Our successes

- We have built a world-leading flood inundation model and our hydrologic models form the foundation for new national scale prediction efforts.
- Our flood modelling system is used by the Environment Agency and provides global flood analytics to the insurance industry, the aid sector and other users.
- Our sensitivity analysis tools are used by hundreds of users world-wide for modelling and decision-making.
- Building on our work on the global nitrogen cycle, we have briefed UN agencies on the mounting issues resulting from nutrient pollution of inland and coastal waters.
- Our researchers have won international awards in hydrology, geoscience, engineering, and computer science, as well as for their impact on practice.

Our future

Our future ambition is to transform the evidence base on which water-related decisions are made. We want to achieve this through new and more realistic models, through improved estimation of uncertainty using better methods, and through novel datasets that provide deeper insight at decision-relevant scales. We want to better reflect the complexity of and uncertainty in our water environment, especially due to climate change, and where it interacts with society. We envisage a new generation of integrated mechanistic models that link currently disconnected areas, such as water and health, and that will allow us to predict how contaminants move through the water environment. This requires a deeper understanding and communication of risk perception, new forms of decision making that incorporate uncertainty, and more training, expertise and computational platforms to enable risk assessment to become global and universal.





Low Carbon Energy

Overview

Governments that are legally obligated to keep global temperature rises below 2°C must do so despite growing populations who are dependent on energy intensive technologies. This has placed low carbon energy at the forefront of the global political agenda.

The global energy system must undergo unprecedented change to make this transition, whilst maintaining secure, safe and affordable energy for all.

Our research priorities

Our research supports cities, communities, energy providers and governments in their transition to a low carbon energy system. The Cabot Institute is distinctive in that it has leading expertise in almost every major form of low carbon energy production (geothermal, nuclear, solar, tidal, wave, and wind), in addition to technologies for using energy more efficiently and reducing demand.

We host the South West Nuclear Hub and we are a member of the Partnership for Research in Marine Renewable Energy (PRiMaRE), a network of excellence in offshore renewables centred in the south of the UK. We have strong partnerships with a range of leading energy companies, such as EDF and DNV GL, as well as consultancies such as Arup and Atkins. We innovate throughout the energy lifecycle - from harnessing resources and generation to regulation and behaviour change. Our interdisciplinary research strengths are underpinned by expertise in systems integration, which allows us to manage the requirements and constraints in designing effective, low-cost, safe and resilient energy systems.

Our successes

- Our world leading expertise in composite materials led to major partnerships to design and manufacture longer, more efficient blades for the next generation of offshore wind turbines.
- We pioneered cheaper and more efficient solar energy devices using thermionic convertors and novel materials.
- Our research supported major energy companies to increase confidence in critical equipment resilience by 46 operational years, generating ~£17 billion of savings.
- We were awarded the status of 'National College for Nuclear' by the UK government to combat future skills shortages in the nuclear industry; and we have developed new tools for understanding radiation risk, including high-resolution drones deployed following the Fukushima nuclear disaster.
- We collaborated with community groups to understand how they can sustain local energy initiatives following seed grants, informing the UK Government's national community energy strategy.
- We assessed the impact of wind turbines and shale gas on house prices and developed clear recommendations for policy makers.

Our future

We have built a strong platform from which we will launch new initiatives that expand our work across the low carbon energy sector. With the South West Nuclear Hub and our strategic partners, we will develop safe and cost-competitive nuclear technologies, and address key skills shortages in the sector. We aim to develop our work on renewables, particularly in relation to solar, offshore wind, wave and tidal energy technologies.

The Cabot Institute will play a key role in ensuring that we integrate our interdisciplinary research strengths to develop not just the technologies, but also the accompanying policy and behaviours to help enable an effective transition to a low carbon energy system.



We innovate throughout the energy lifecycle - from harnessing resources and generation to regulation and behaviour change



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Our researchers are helping cities around the globe become more sustainable



We have dramatically improved city-based flood risk and vulnerability assessments in developing countries



We will work with our partners to co-produce visions of urban futures that are inclusive, sustainable and resilient



City Futures

Overview

Cities are collectively responsible for over 70% of global greenhouse gas emissions and, due to their population density, are particularly exposed to natural hazards and disasters. And yet, thanks to their inhabitants, cities have great potential to innovate and resolve these challenges.

We aspire to help cities better understand the complex challenges they face, and support their transition to becoming sustainable, resilient and inclusive places with a high quality of life for all.

Our research priorities

Our researchers are applying their knowledge and expertise to help cities around the globe become more sustainable - particularly in terms of their energy use, emissions, biodiversity and food production. And we helping them become more resilient through supporting whole system responses to natural hazards and disasters, environmental change and pollution. In all of these endeavours, we understand that an inclusive agenda yields both a plethora of new solutions but also a collective will to action.

We see cities as places where challenges and opportunities collide, where citizens can drive solutions, and where vibrant leadership flourishes in unexpected places. This is why we work with citizen, politicians and businesses. We have developed globally recognised smart city technologies and facilities that help us to understand the complex relationships between society and the built and natural environments. Such technology empowers citizens and fosters collaboration and collective change. And creating the space to produce and test solutions to city challenges will lead to new opportunities.

Our successes

- In partnership with Bristol City Council, our University launched the smart city initiative Bristol Is Open (BIO). With 1,500 network points, an ultra-fast 5G wireless mile, and capacity for thousands of sensors streaming large volumes of real-time data, BIO will transform Bristol into a 'living laboratory'.
- We have dramatically improved city-based flood risk and vulnerability assessments in developing countries by combining our world-leading hydraulic models with social data.
- We have advised cities around the world on policy interventions to minimise pollution and enhance health and well-being.
- We directly informed Bristol City Council's low carbon plan by producing a 'mini-Stern' report, showing how an urban retrofit could save £200-300 million on city energy bills and create thousands of jobs.
- We are building or contributing to a host of new networks across our city, such as the Redistributed Manufacturing Network, the city's Resilience Sounding Board, blueprints for a child-friendly city, and the Bristol Green Capital Partnership.
- As a founding partner in the new £138 million UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC), we aim to build resilience, efficiency and sustainability into UK infrastructure.

Our future

We plan to transform the way that cities are designed, managed and experienced. We will help secure better investment for improved infrastructure by providing the evidence of how these urban infrastructures interact with the environment, society and the economy.

We will work with our partners to co-produce visions of urban futures that are truly and radically inclusive, sustainable and resilient. And we will support cities' transitions towards those visions, applying expertise ranging from energy management technologies and driverless cars to the economic impacts of a city mayor and the mechanisms by which citizens can effect collective change. In particular, we will support Bristol to diagnose and address the barriers to achieving its own vision of a carbon-neutral, inclusive, healthy and resilient city through the formation of an 'Urban Living Partnership', which builds on our exceptional relationships with city stakeholders.





Achieving Impact

We are catalysts for change.
The Cabot Institute facilitates and accelerates the translation of research outputs into societal impact.

We are catalysts for change. The Cabot Institute facilitates and accelerates the translation of research outputs into societal impact. We do this through our strong and evolving foundation of strategic partnerships as well as the incubation of new partnerships. We help embed collaborations into the early stage of project development, connect partners to student research projects, and host academic-stakeholder workshops.

We are a point of contact for decision-makers. We support policy-makers by ensuring our academic experts and research inform global, national and local debates. We respond rapidly to urgent requests and ongoing crises; provide advice to key partners; sit on national and international advisory boards; and co-create horizon scanning and foresight documents.

We are a voice for our community. We engage with the public through workshops, lectures, art and debates, but also with our website and social media presence, our blog and our annual magazine. We regularly provide expert commentary in the local, national and international press.



Vice-Chancellor Professor Hugh Brady collects the Queen's Anniversary Prize for Higher Education from HRH Prince of Wales at Buckingham Palace. Credit: Theodore Wood.

1 Influencing International Climate Change Policy
The IPCC is the leading international body for the assessment of climate change. Many Cabot Institute members were lead authors of the IPCC (2018) Special Report on Global Warming of 1.5°C and the Fifth IPCC (2014) report, which provided the foundation for the 2015 Paris negotiations. We contributed to Chapters related to the cryosphere, sea level rise, past climate, ocean systems, and land use-based mitigation.

Building from this, Cabot Institute academics contributed to COP21. We presented new results on sea level rise and the role of land use change and sustainable livestock in mitigating climate change. We also partnered with Bristol City Council and the Mayor's Office, supporting a strong effort to showcase the role of cities in decarbonising our society.

2 Volcanic ash research aids reopening of air space

In recognition of its world-leading research in volcanology, The University of Bristol was awarded the 2016 Queen's Anniversary Prize for Higher Education - the highest accolade for any UK academic institution.

The work of Bristol's Volcanology Research Group, including collaborators in the social sciences, engineering, physics and maths, has reduce volcanic risks across the world. They are improving local and national hazard management and emergency response planning; supporting the global catastrophic insurance industry; using fundamental knowledge of volcanic processes to create the world's first Global Volcano Model; and developing technologies that could monitor 1,500 volcanoes from space every 12 days.

Our volcanologists were immensely valuable to Europe and the UK when the 2010 eruption of Iceland's Eyjafjallajökull volcano left millions of travellers stranded and cost airlines an estimated €900 million. Professor Steve Sparks FRS, Professor Willy Aspinall and Dr Matt Watson joined the Government's Scientific Advisory Group for Emergencies (SAGE), offering advice that minimised risk and disruption.

3 Responding to Fukushima
Nuclear events can cause widespread damage, but assessing that damage during an event or in its immediate aftermath is challenging.

Following the Fukushima power plant incident in 2011, helicopter pilots were exposed to significant amounts of radiation. To address this challenge, our academics developed drones that allow a radiological hazard to be remotely assessed, providing accurate and real-time information on the chemical character, intensity and location of plume dispersal and fallout.

These drones were employed successfully in the Fukushima region following the nuclear disaster in 2011. The Bristol team, in a joint expedition with Kyoto University, used its drone in the inner exclusion zone of the Fukushima fallout area, as well as in the restricted zone where clean-up activity has been focused.

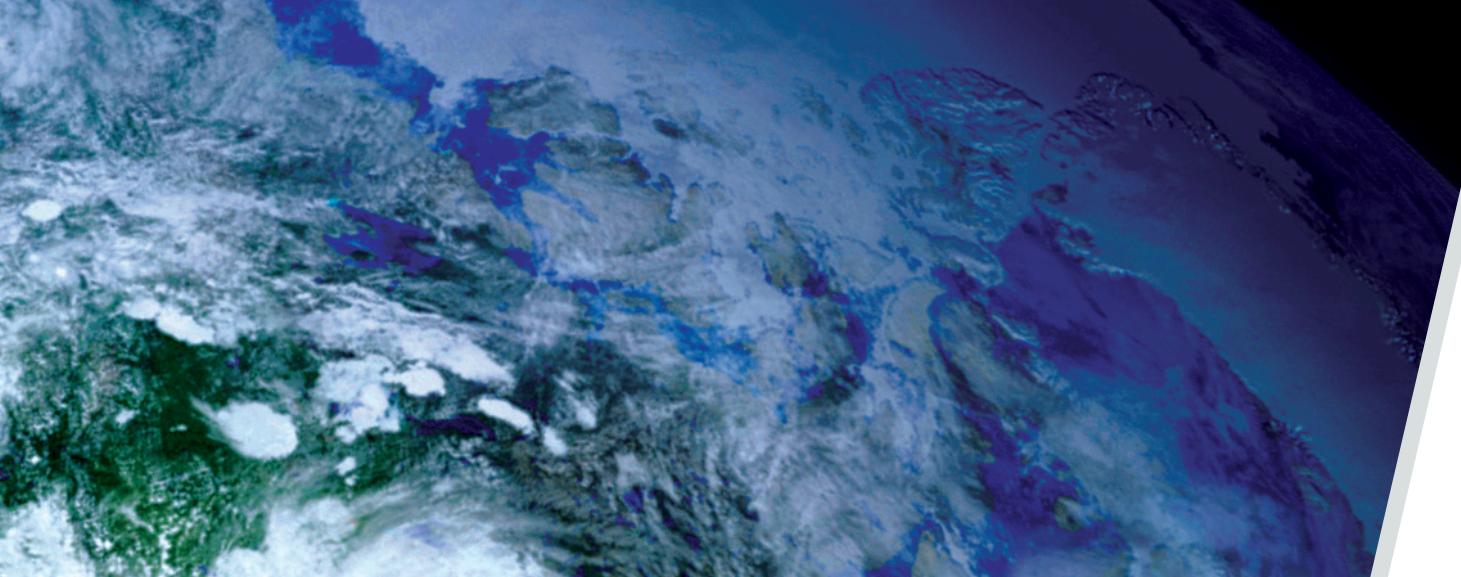
We are now exploring the many other applications for these drones, including rapid response disaster monitoring; routine monitoring of nuclear sites, mining operations and facilities; site decommissioning; and monitoring of war zones for spent depleted uranium munitions.



Following the Fukushima power plant incident in 2011, our academics developed drones that allow a radiological hazard to be remotely assessed



When Iceland's Eyjafjallajökull volcano erupted our volcanologists were immensely valuable to Europe and the UK



Working on a Global Scale

We aspire to bring fresh thinking and integrated approaches to global challenges.

At the Cabot Institute we excel at building diverse thriving networks that are capable of addressing complex global challenges. Our networks include world-leading academics as well as non-academic partners – from citizens to global NGOs – who can use the research to achieve change. Working at this global scale not only enables international research collaborations, it moves ideas into new contexts and people into new cultures.



1 The sharp end of environmental uncertainty – small island developing states

Natural disasters happen all over the world, but their impact on Small Island Developing States (SIDS) can be particularly catastrophic. Many of these small states experience ongoing risk from cyclones, flooding, landslides, tsunamis, or earthquakes, creating a constant cycle of redevelopment and regrowth. However, their citizens display incredible resilience and have developed innovative coping mechanisms, from developing their own insurance industries to building resilience through education.

Supported by Cabot Institute Innovation Funds, Bristol's SIDS group brought together over 100 NGOs, academics, small state representatives and development workers to share their learning; this led to the establishment of a global 'Learning from the Sharp End' network that was formally accredited by the UN at their Third Global Conference on SIDS in 2014. The network connects SIDS worldwide, providing a platform and mechanism to stimulate research partnerships, the sharing of experience, policy dialogue from local to governmental levels and practical interventions.



2 Geothermal energy in Ethiopia

Geothermal energy can help provide clean, inexpensive energy to some of the most impoverished people on the planet, including Ethiopians living on the great East African Rift. However, this potential is associated with risk and Bristol volcanologists are working with Ethiopian colleagues to understand and manage that risk.

By deploying real-time monitoring equipment, the team can assess how the rift is moving and whether drilling for geothermal is likely to induce micro-earthquakes or changes in the pattern of groundwater circulation. The work has provided critical information to Ethiopian industry and government as they develop this vital resource.



3 Mitigating flood risk on a global scale

Cabot Institute researchers are leading the development of fast and efficient modelling of global flood risk, which underpins hazard warning systems and provides rigorous analytics for decision-makers.

The group have developed global flood risk maps using satellite data and flood inundation modelling in regions where there is little or no information on flooding. This helps the insurance and re-insurance industry assess flood risk in these data-poor regions for the very first time. With the help of the World Bank, international governments are already benefiting from these risk assessment tools, informing infrastructure planning and development. Bristol is also working with Google to make these global flood risk data more openly accessible through the Google Earth engine.



4 Somali First (SF) – Locally-owned sustainable development

Professor of World Politics, Eric Herring, developed the Somali First (SF) project jointly with his colleague Latif Ismail and company Transparency Solutions. SF promotes Somali capabilities and creates the strong relationships needed to support the design, funding and delivery of locally-led projects.

Projects cover all sectors and include peacebuilding, economic development, training, resiliency, research and education. Crucially, SF works to integrate civil society networks, government and the public and private sectors to deliver sustainable and locally-owned solutions.



5 A global farming response to our changing climate

Livestock production faces significant pressures to both maximise yield and minimise pollution on a global scale – a process known as sustainable intensification. However, there is no single sustainable intensification model, and the way in which we achieve this outcome depends on local culture, resources and climate. To address this, Cabot Institute academics and their partners launched a global network of 'farm platforms' to share learning and optimise livestock production across the world.

The network now includes nine farm platforms, including the UK North Wyke site of Rothamsted Research, and 15 additional partners in 10 countries. Their high-profile publication - 'Steps to Sustainable Livestock' – is reframing the agenda for global farming practice.



Cabot Institute academics and their partners launched a global network of 'farm platforms' to share learning and optimise livestock production across the world



By deploying real-time monitoring equipment, the team can assess whether drilling for geothermal is likely to induce micro-earthquakes



Engaged and Connected Students

We actively connect our students to local and national partners, providing benefits for both.

Supporting students to make a difference

The Cabot Institute is strongly engaged with our outstanding postgraduate researchers and increasingly offers a unique experience for undergraduates studying or interested in Cabot-related subjects across the University.

Working with the Bristol Doctoral College, we offer a variety of support services to help nurture and develop these enthusiastic young researchers. We provide skills training, particularly related to engaging with the press, public and policy makers. Moreover, we strive to create an intellectually rich environment for our students. We use our diverse and expansive networks, and our view of the research landscape, to connect students to one another and to expertise outside the University.

Learning via partnership

We actively connect our students to local and national partners, providing benefits for both. Students work on real-world problems defined by local communities, businesses, and national or international organisations.

These partners not only join ongoing research projects but also propose and guide new projects, creating exciting educational experiences for our students while generating much needed research for themselves. Dissertation partnerships are available via the MSc Environmental Policy and Management, MSc Climate Change Science and Policy and the MSc International Development. We are currently using this model to embed engaged learning throughout the educational experience.

Training and professional development

The annual Cabot Institute Summer School provides advanced training in risk and uncertainty in natural hazards and disasters from some of the UK's leading academics in the field. As well as practical sessions and hands-on exercises to develop expertise, postgraduates have the opportunity to network with early career researchers and scientists from industry and government agencies working in their field.

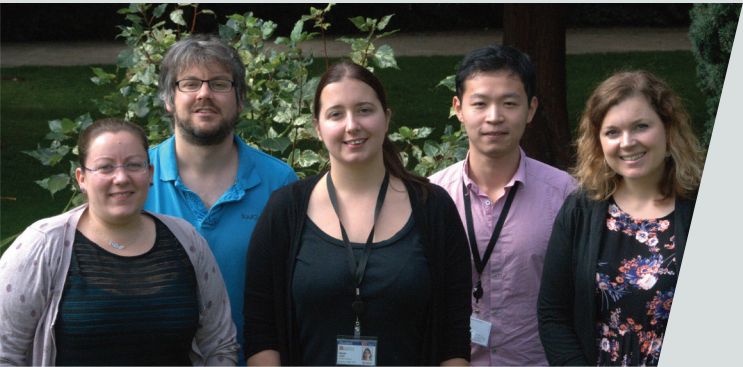
By inviting postgraduates to our seminars and workshops we help to enrich and diversify their exposure to new concepts, disciplines and collaborators. This embeds them into research communities at the earliest stages of their careers and teaches them the value of interdisciplinary working.



Science communication

The Cabot Institute Press Gang is a training, mentoring and partnering programme that engages students and early career researchers to communicate Cabot Institute research and comment on current affairs.

We deliver training in blog and press release writing, introduce students to senior figures who work in policy and the media and help them to develop their writing and communication skills. In turn, the Press Gang promotes our research across a variety of media including the press, social media and the Cabot Institute blog, supporting the Institute, their department and the University Press Office. The Press Gang spans all University faculties and has helped increase readership of the Cabot Institute blog to over 6,000 visitors a month.



We provide skills training, particularly related to engaging with the press, public and policy makers



Postgraduates have the opportunity to network with early career researchers and scientists

The Press Gang has helped increase readership of our blog to

6000+ visitors a month



Partnering with our City

The Cabot Institute is highly engaged and active in the Bristol region.

We work on approaches to more sustainable living, encouraging our students to develop meaningful partnerships with community-based groups, and leading discussions about living well in cities, among others. As a city, Bristol is diverse and beautiful, with a history of inspiring creativity, such as the greatest works of Brunel and innovations such as Concorde. With a strong research culture, Bristol is home to several national and international research centres, including the National Composites Centre. It is also a hotbed of diverse cultures and protest movements; a city where technology and creativity merge. It is a city which works in exciting new partnerships with different groups. It is the perfect partner for the Cabot Institute.

The Cabot Institute has built strong partnerships with city leaders, including Bristol City Council, and these are resulting in numerous activities – from one-off projects to ad hoc consultation to long-term strategic relationships. The Bristol is Open (BIO) partnership, for example, is a joint venture between the University and Council to create an open programmable city region, allowing new solutions to congestion, flooding, waste management and energy supply.

We recognise, however, that leadership in our city and region is diverse and that ideas flourish in a multitude of places. Bristol is home to over 91 languages and over 45 religions; its diversity is its strength and we strive to engage groups from across the city, from all classes and sectors, from businesses, community groups and our active citizenry. Among other initiatives, the Bristol Connected Communities Programme is a flagship effort to learn with the diverse groups in our city.

Bristol 2015: European Green Capital - our legacy

In 2015, the city of Bristol became the first UK city to be awarded the status of 'European Green Capital'. Cabot Institute members were instrumental in securing the award, which recognised both the city's green achievements to date, as well as its bold plans for the future.

The year served as a catalyst for thousands of events and activities across the city, and saw the University of Bristol become a 'Founding Strategic Partner' of the Bristol Green Capital Partnership – a powerful collection of over 850 organisations committed to achieving 'a low carbon city with a high quality of life for all'. Although our research informed the Green Capital year, our city also challenged us; we answered the call with our students (and those at the University of the West of England) delivering 100,000 hours of voluntary service and the University making bold pledges to become a net carbon neutral campus by 2030, reduce our transport footprint and improve our procurement processes.



Bristol 2015:
European Green Capital
has created a lasting legacy,
on which we continue to build

Knowledge



Resources

Profile



Networks



Working in Partnership

Partnerships are essential to our ambition to solve real world challenges via novel research directions and innovative solutions.

The Cabot Institute enables partners to learn from, challenge and inform our research. We dedicate significant resources to supporting these relationships, but we also work with our partners to procure external funding, ensuring that these relationships grow and thrive.

Partners benefit from and we benefit from our partners in numerous ways:

- Knowledge: access to world renowned researcher and facilitated interpretation of research outputs.
- Resources: attracting funding for co-developed research; honorary membership in the Institute including access to University space; and building connections with talented and ambitious students.
- Profile: a presence and partnership at high profile Cabot Institute events; secure exposure within the University of Bristol; and co-exhibiting or co-presenting at conferences.
- Networks: accessing our national and international academic networks and building relationships with other Cabot Institute partners.



We are continually exploring and improving our offer to partners, whether they are small community action groups or multinational corporations. Working with colleagues in Research Enterprise and Development, we act as a connector to an intellectually rich and diverse community, leading to externally-funded collaborations, commissioned research, consultancy, community-based learning, mutual training and jointly-supervised student projects.



Support the Cabot Institute

Philanthropy is helping drive discovery faster than would otherwise be possible.

To catalyse genuinely innovative solutions, the Cabot Institute depends upon a large and diverse network of people and organisations that support our core mission and the resulting projects and people. Philanthropy is helping drive discovery faster than would otherwise be possible. To date, the Cabot Institute has received more than £3.5 million to support its work. Here are just a few of the ways philanthropy has helped to secure a more certain future for our planet.

Student support case study - Building resilience (£90k)

Conversations about climate change often focus on developed countries and low-carbon solutions. But for small island states, like St Lucia or Fiji, rising sea levels and extreme weather are already a reality. PhD student, Terra Sprague (MEd 2008, PhD 2014-), is exploring how communities are coping with these changes by talking to climate change experts, community leaders and schoolchildren in these three regions.

‘We have much to learn from their collective experience,’ explains Terra. ‘Their insight (largely absent from international literature) will provide researchers and policymakers with powerful real-life examples. One of my objectives is to consider ways these can be introduced to the wider international development community.’

Terra’s PhD is collectively funded by alumni donations to the Centenary Campaign. ‘Being an alumna myself, receiving this funding is particularly meaningful – it makes me especially proud to be part of the Bristol community. The support I’ve received has allowed me to address my research at pace, and work with people across the globe. Thank you.’



Major gift case study - Saving our oceans (£300k+)

The world’s oceans are a natural sponge, absorbing much of what we put into the atmosphere. That includes nearly a third of our CO2 emissions, causing seawater to become more acidic than at any other point in human history. Ocean acidification is not just jeopardising the world’s coral reefs; one in three of us depend on marine life as our primary source of protein.

Donations have brought PhD students and post-doctoral fellows to Bristol – people with the talent and ambition

to better understand how marine organisms and ecosystems are adapting to falling pH. They are making new discoveries on the dispersal of coral larvae, the stability of reef structures and the impact of past ocean acidification events. The donations have also empowered academic leaders like Professor Daniela Schmidt to support decision-makers, through the IPCC as well as direct engagement with political leaders.

‘Without funding for post-doctoral posts to support my research, it would have been impossible for me to dedicate so much time to my role as a lead author of the IPCC’s Working Group report,’ says Professor Schmidt. ‘Through that work, I’ve been able to ensure that the message about the speed of ocean acidification, and its effects on marine organisms, is clearly heard on an international platform. I’m especially proud that our message has made it into the Summary for Policy Makers – the key document that will influence policy making at both a national and an international level.’

Cabot Innovation Fund (up to £5k)

The Cabot Institute Innovation Fund allows us to support bold, ambitious, and impactful ideas that transcend disciplinary boundaries. This call invites new ideas from our research community – those that might not receive funding from traditional sources, but which show real intellectual or practical promise. Applicants benefit not only from the funding to deliver their project, but also the support from Cabot staff to communicate and develop their ideas. Crucially, these projects are focussed on creating something new, from new connections across disciplines to new solutions for society.

We do a lot with a little. With £20,000, this year’s Innovation fund has supported young researchers to develop their careers, facilitated new projects amongst award-winning scientists, pump-primed future research proposals, established global networks, and supported real-world impacts.

For a full list of recently funded projects, visit: www.bris.ac.uk/cabot/research/funding/

We are extremely grateful to our donors, without whom, we could not support such a wealth of novel and impactful ideas. If you would be interested in supporting the Institute, please call **+44 (0)117 394 1046** and we would be delighted to discuss your interests.

Policy



I’m especially proud that our message has made it into the Summary for Policy Makers – the key document that will influence policymaking at both a national and an international level

With

£20,000



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BRISTOL
2015 EUROPEAN
GREEN CAPITAL

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