



Focus on climate change

**How has the climate debate evolved over time
and what can this tell us about the future?**

UK space policy

**What comes after the abolition
of the UK Space Agency?**

Science diplomacy

**The pursuit of global influence
through scientific excellence**

AI roundtable

**How AI impacts productivity,
creativity and research integrity**

PLUS:

Guest editorial: Unlocking thermal energy

Viewpoint: Seeking markets for space technology

The Foundation for Science and Technology is a registered charity established in 1977. Its role is to facilitate debate between Parliament, Government, the devolved administrations and the business and research communities on policy issues that have a science, engineering or medical element.

The Foundation holds regular discussion events and policy roundtables, debating issues such as AI, Net Zero, STEM skills, fusion, quantum technologies, and equity and diversity in the STEM workforce, among many others. It explores both how science, innovation and technology feed into all policy areas (such as transport, environment and energy), and the policy for funding and delivering science and innovation in the UK. All discussion events are free and open to all, with recordings available on our website.

The Foundation runs the Foundation Future Leaders programme, which each year brings together a cohort of around 35 mid-career professionals drawn equally from the research community, industry, and the civil service and wider public sector. Over a 12-month period, the group meet and discuss with senior figures from government, parliament, universities, large industry, SMEs, research charities and others. Just as importantly, Future Leaders present their own expertise, develop skills and make future contacts. The programme includes external visits and the development of an annual conference.

The Foundation for Science and Technology runs a regular podcast, publishes blogs, and produces this Journal. In addition, it provides advice on governance and operational matters to learned and professional societies.

The Foundation is strictly neutral and does not express an opinion on any policy question.

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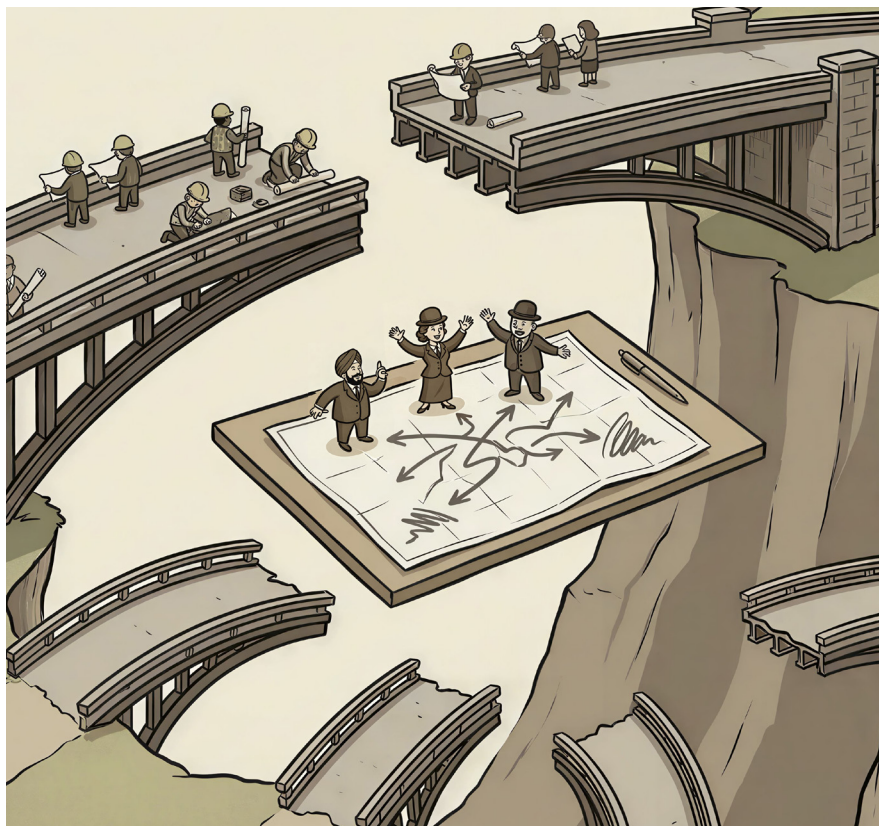
When the biggest barrier to success is a system that can't keep its resolve

Two events since our last issue have stayed with me, and I want to use this column to think through why.

The first was a [discussion with Professor Sir Ian Chapman](#), Chief Executive of UKRI, about the way the organisation supports British research. The second was in Glasgow, which focused on [innovation across Scotland's cities and regions](#). At first glance, they seemed quite unlike each other: one was a fireside chat at the Royal Society about the apparatus of national funding, while the other brought together people from Glasgow, Aberdeen and elsewhere to talk about what is really happening on the ground. Yet together they neatly show what FST is for: bringing together people who occupy different positions within the same system, and allowing the audience to make connections and hear differing views. One connecting theme stood out to me and I share it here as a personal reflection.

Ian Chapman described UKRI's wider purpose, the tension between supporting curiosity-led research, turning that work into benefits in the near term, and driving economic growth, as well as the demands of overseeing a funding system on that scale, from handling tens of thousands of grant applications each year to testing how AI might reduce the load. Beneath those details, one question kept returning: how do you back something for long enough to give it a genuine chance of succeeding, rather than altering it each time priorities or governments shift? Naturally, these are current and deeply debated issues, and the Q&A afterwards made that clear.

The Glasgow event, kindly hosted by the University of Strathclyde, kept returning to a connected idea through a different topic. Speakers from Government, universities and industry in Scotland broadly agreed that the country's underly-



Projects can suffer by changing direction too soon or losing focus

ing research capacity is not really in doubt. The disagreement lay elsewhere: what is needed to turn that strength into companies that expand, invest and provide jobs over many years? Among the recurring points were the importance of patience measured in years rather than spending rounds, tighter alignment between the UK and Scottish Governments, and a readiness to support fewer true strengths instead of dispersing backing thinly across everything at once.

After hearing both, I found myself thinking more generally from my own perspective, shaped by a career spent moving between science, health and charity leadership. Across all those, the biggest barrier to good results I have observed was not a lack of capable people or strong evidence. Instead, it was a system that could not quite keep its resolve, whether that be changing direction too soon through

to losing focus before an opportunity had developed enough to make an assessment. That is a natural human trait. Announcing something new is sometimes easier than remaining committed to something already in progress.

I do not believe there is a simple solution and would distrust anyone who said otherwise. However, I believe it is exactly the sort of question the FST exists to accommodate. Working to bring together people from different parts of the system in one place, teasing out links between conversations that might otherwise remain in separate silos, and allowing fresh thinking to develop from that. □



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is Chief Executive
Officer at The
Foundation for Science
and Technology*

Can we devolve more science and innovation spending?

The debate about how the UK's science and innovation funding is distributed is ongoing. Questions range from whether giving cities and regions greater control over investment could help drive economic growth across the country, to what greater devolution means in practice. On Wednesday 7th October, we will host a discussion at The Royal Society to explore these themes and how the UK can support growth across the country, while maintaining the research excellence that underpins its international competitiveness.



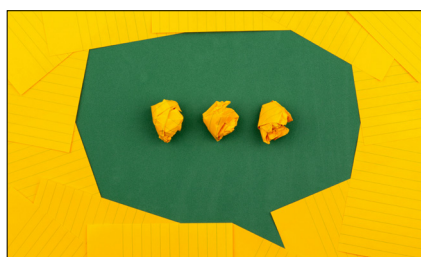
Speakers include:

- The Lord O'Neill of Gatley – Economist and former government adviser
- Professor Dame Jessica Corner DBE – Executive Chair, Research England
- Richard Jones FLSW FRS – Emeritus Professor/Chair of Materials Physics and Innovation Policy, The University of Manchester
- Rt Hon the Lord (David) Willets FRS.

Book your place in-person or online, at www.foundation.org.uk/Events/2026/Can-we-devolve-more-science-and-innovation-spendin.

Lunchtime learning: fresh minds discuss cutting edge S&T issues

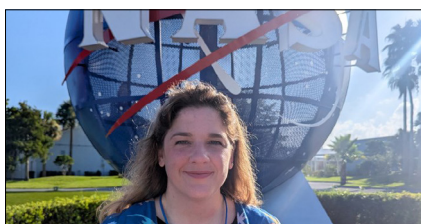
Spend your lunch break listening to some of the freshest thinking at the cutting edge of science and policy. We are delighted to announce a series of fully remote online discussions led by our Foundation Future Leaders, beginning in October 2026. From civil servants to engineers to researchers, our Future Leaders are at the forefront of the UK's scientific endeavours, engineering feats and parliamentary policy. Ranging from why young people are losing interest in science, to whether it is better to be



a specialist or generalist, to visibility and being yourself in science, they will unpick some of the most talked about issues. More details and how to book will be available on our website soon.

Running for the Foundation

We are delighted to announce that [Cally Walker](#), Programme Lead – International Bilateral Fund at the [UK Space Agency](#) (and a current Foundation Future Leader), will be running the 2027 London Marathon in aid of the Foundation for Science and Technology and our mission to foster open, evidence-based conversation to shape better decision-making. We cannot wait to cheer



her on! You can support Cally in achieving her 26-mile goal at <https://www.justgiving.com/page/cally-walker-1>.

Exploring a new vision for UKRI

On 16th June, the Foundation hosted a fully booked 'in-conversation' evening with Professor Sir Ian Chapman, Chief Executive of UKRI (UK Research and Innovation). He took to the stage with FST Chair the Rt Hon The Lord David Willets to explore his vision for UKRI, its prior-

ities and the future. Sir Ian took a varied selection of questions from the audience, including some highly topical and contentious ones on physics funding cuts. The in-conversation format has proved very popular, and you can watch the whole discussion again on bit.ly/UKRI-26.

News in brief

Upcoming events

Autumn is here and so is our autumn and winter 2026 events calendar. As ever, it will be a busy few months where we will be platforming discussions on some of the most topical and most talked about issues in science, technology and innovation. Here is a list of upcoming FST discussion events:

- **Can we devolve more science and innovation spending?**

Wednesday 7th October 2026, The Royal Society and online. [Book here](#).

- **In Conversation with Sir Patrick Vallance**

Wednesday 11th November 2026, Harwell Science and Innovation Centre.

- **Joint FST/Council for Science and Technology event [TBC]**

Wednesday 9th December 2026, The Royal Society and online.

- **Horizon Europe and beyond: should the UK continue to associate?**

Wednesday 27th January 2027, The Royal Society and online.

A swell of new podcasts

Recent topics covered by our podcast include: public attitudes to science; championing disability in STEM; how maths can be better taught in schools; and the impact of climate change on birds. Catch the latest episodes at www.foundation.org.uk/Podcasts.

Unlocking thermal energy

More than half of the energy consumed by UK industry is wasted rather than put to productive use. **Andy Woods** and **Leo Marioni** examine the alternatives

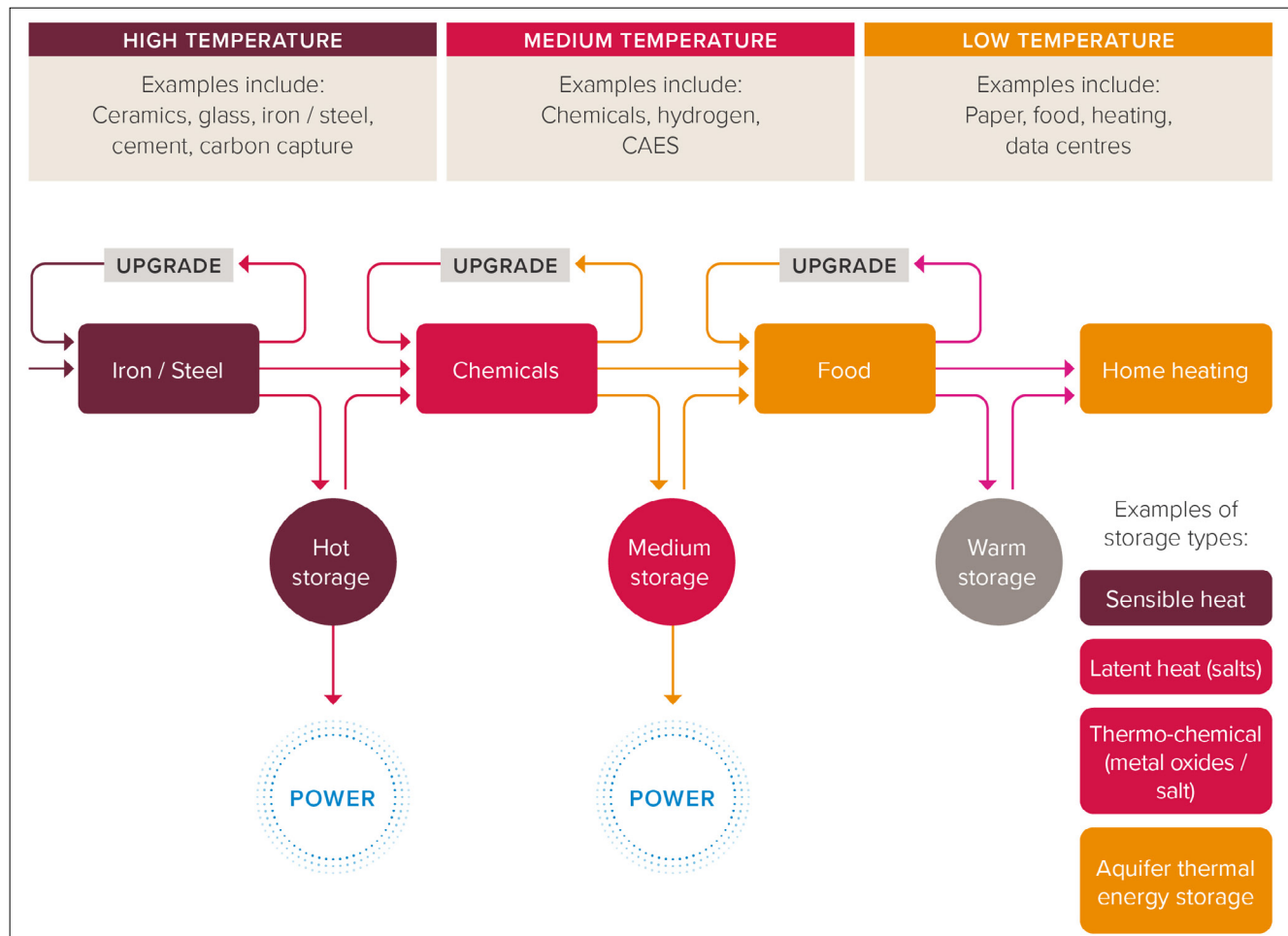


Figure 1: Surplus heat can be cascaded to lower temperature industrial uses and low-temperature home heating

UK industry accounts for approximately 15% of total UK energy consumption and 14% of UK greenhouse gas emissions. However, it is estimated that more than half of the energy consumed by UK industry is wasted rather than put to productive use. Much of this energy is lost as heat due to system inefficiencies. Reducing these losses and developing systems to re-use surplus heat could cut energy costs for industry, lower the UK's green-

house gas emissions, and unlock new sources of heat for consumers.

As the UK transitions to net zero, there is an opportunity to reimagine the role of heat in the UK energy system, thinking of it as a valuable resource, rather than an unavoidable loss.

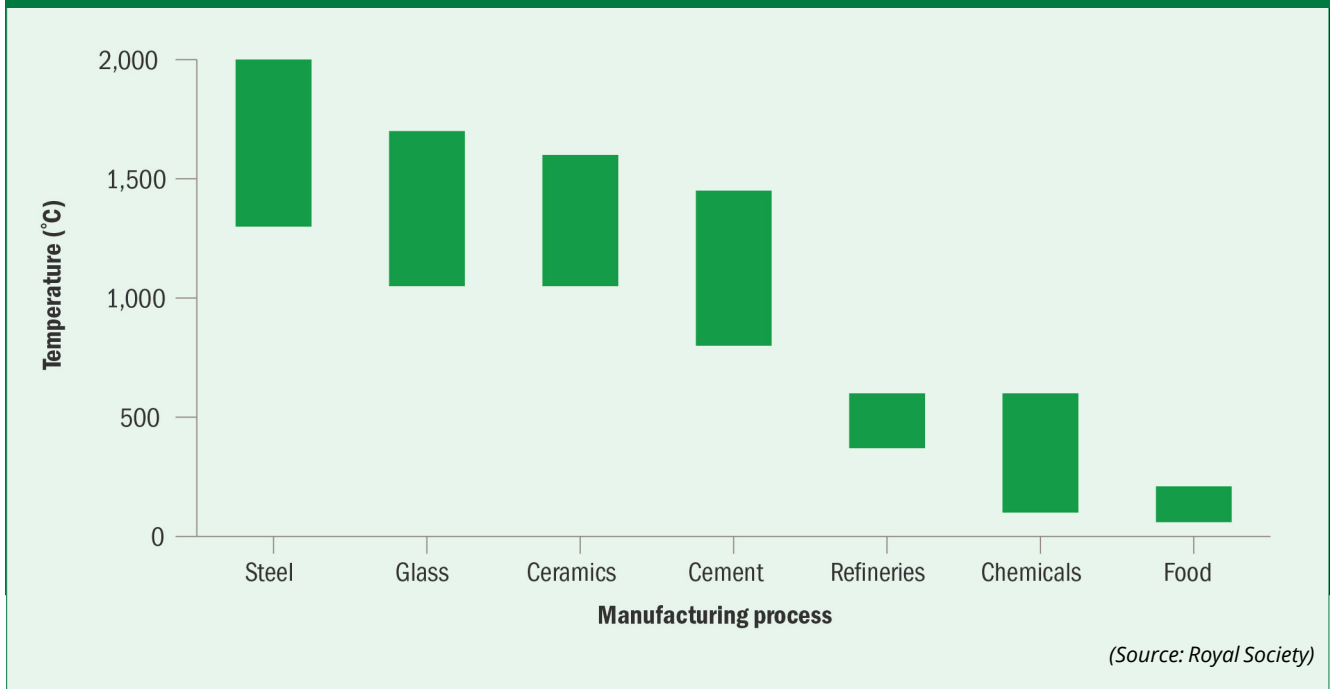
Reducing heat losses and putting surplus heat to use will depend on the development and deployment of technologies to capture, transport, store and re-use heat. Failing to

reduce heat losses and improve efficiency risks locking in energy inefficiencies for decades to come.

Reimagining heat use

The Royal Society has published its report [Unlocking thermal energy](https://www.foundation.org.uk/publications/unlocking-thermal-energy), which presents a vision of a UK thermal energy system based on heat cascades, where waste heat is captured and reused across a variety of processes. In this vision, heat is captured at high-temperature point sources, such as factories or data centres, and then 'cascaded' through other uses (figure 1). The further the heat travels, the cooler it gets, which determines how it can be used. In this model, the surplus heat could first be

As the UK transitions to net zero, there is an opportunity to reimagine the role of heat in the UK energy system

Figure 2: Typical temperature ranges for core manufacturing processes by industry

reused on site, then used in adjacent industries, and finally sent further afield to warm homes, hospitals or offices.

Foundation industries such as the steel, glass, cement and chemical industries, which form the backbone of UK manufacturing, rely heavily on high-temperature heat in their production processes. Waste heat in these industries is often at a high temperature, potentially offering a valuable source of thermal energy suitable for capture, storage and reuse.

There will also be novel opportunities to harness heat from emerging sources in the UK. Deployment of data centres, for instance, will provide new sources of surplus heat. Where data centres are situated in urban environments, the surplus heat they produce could be integrated into heat networks and used by nearby homes and buildings, providing a new, low-carbon heat source for consumers while simultaneously helping to cool data centres.

Similarly, technologies associated with the transition to net zero, for instance carbon capture and storage or electrolytic hydrogen production, will provide new sources of heat. Integrating efficient systems that minimise thermal energy losses and capture residual heat during the development and deployment of these technologies will help avoid locking in inefficient processes and potentially later retrofit costs.

Transporting thermal energy

Reusing heat from existing and emerging sources in heat cascades will require the development of effective heat networks. Today, only 2% of UK buildings are heated via heat networks. This compares to approximately 61% in Denmark and 57% in Sweden (with 45% of the latter's heat network supply being recovered waste heat). The CCC estimated 20% of UK buildings could be heated through heat networks by 2050. As the UK looks towards net zero, reuse of surplus heat from data centres, industry or other hot point sources could provide an available low-cost, low-carbon heat source.

The technologies required to enable transport of heat through heat cascades exist today. District heating networks are mature and deployed widely in Europe. These typically use separate flow and return loops which circulate hot water to buildings, which is then transferred for use in the building via a heat exchanger. These usually require heat energy to be at a high temperature. Newer-generation district heating networks can transport heat with increasing efficiency and can do so at lower temperatures suitable for indoor use.

Thermal energy storage

Not all heat supply and demand aligns temporally. For instance, while some

manufacturing processes might produce a steady stream of heat, demand for heat in the built environment is variable over daily and seasonal cycles. Thermal energy storage systems will be required to balance supply and demand.

Heat can broadly be stored as i) sensible heat (heat that can be felt, e.g. by increasing the temperature of a medium like water), ii) latent heat (heat energy that is released during phase change of a material, e.g. from a solid to a liquid), and thermochemical heat (in which heat can be stored or released by reversible chemical reactions). For example, for inter-seasonal storage, heat can be stored in the subsurface using boreholes or aquifers. The aquifer is heated during times of surplus heat supply and low demand during the summertime and released for use during the winter (figure 3).

Wider system requirements

Developing systems to reuse heat at scale depends on a variety of enabling factors alongside technological innovation. Principal among these is the need for systems to measure, value and trade heat. This will require suitable information on available heat resources. Certainty will also be central to heat re-use systems; heat users will require supply reliability, and producers will require demand certainty. Finally, underpinning this system are the needs

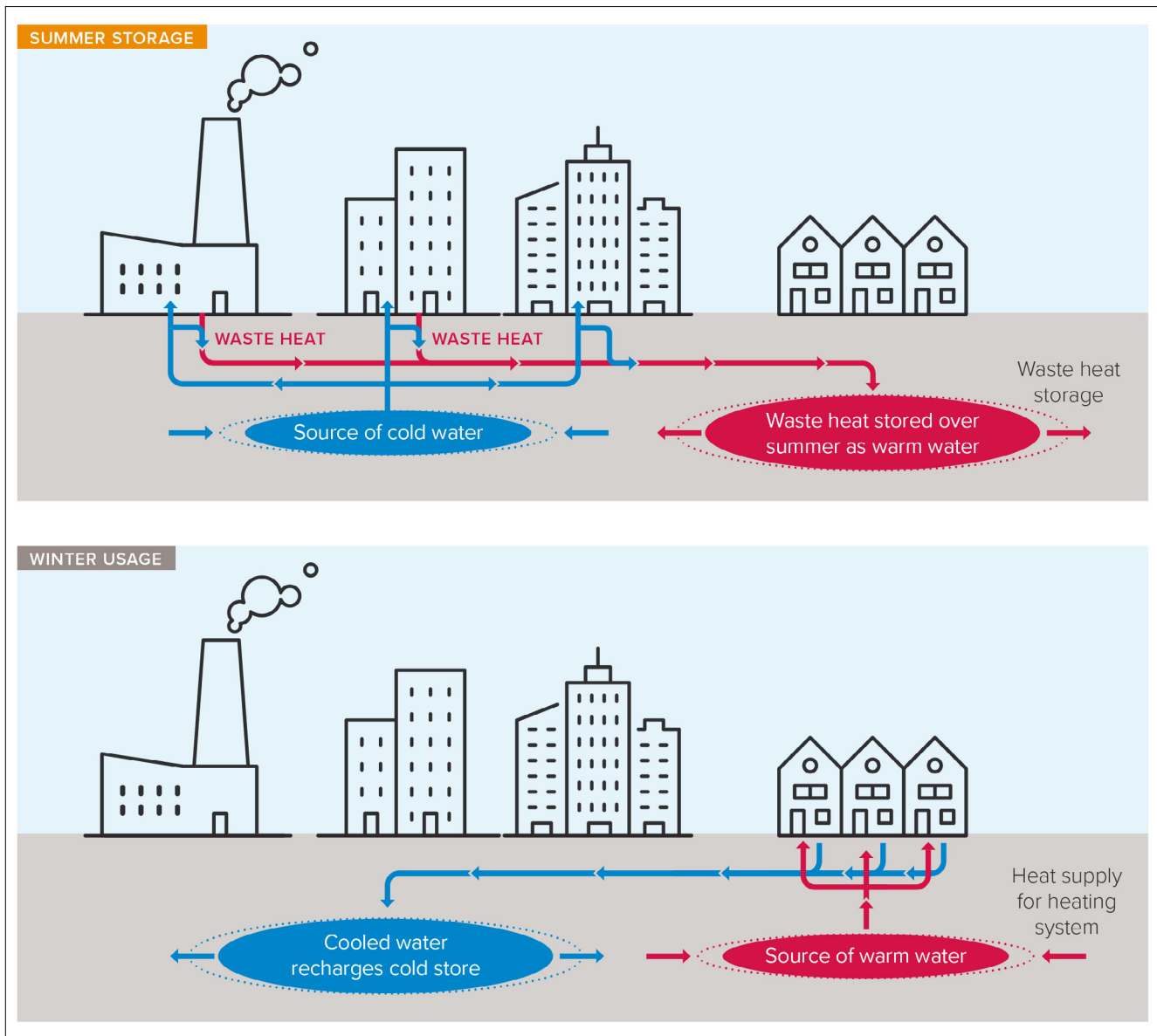


Figure 3: Diagram of aquifer thermal storage for summer and winter applications

for a suitable regulatory environment, a skilled workforce, collaboration between system actors, and technology development and demonstrations.

Heat loss is not a challenge unique to the UK. The technologies and processes used in energy systems across the world have inherent inefficiencies. Therein lies an opportunity for UK technology development. Should the UK take a leading role in the development of efficient technologies and systems to capture and reuse heat, there may be an opportunity to become an exporter of these technologies.

To enable the development of a system to effectively harness surplus thermal energy, the Royal Society's report proposes that industrial thermal energy efficiency and reuse should be integrated into

national decarbonisation and industrial strategies. The transition to net zero is a period of opportunity to integrate thermal efficiency and reuse measures into new infrastructure and systems.

Enabling heat cascades will also, in part, rely on good data. Further assessment of potential waste heat supply and heat demand, including how these vary over space and time, would further aid the understanding of the quality and quantity of waste heat and its potential for reuse.

Alongside assessment of the UK's waste heat resource, appropriate governance and financial mechanisms will be necessary to enable the valuation and trade of heat. Finally, supporting technology development and deployment could enable the UK to become an innovation

leader on thermal energy efficiency and reuse technologies.

Reimagining waste heat as a valuable resource, and deploying the solutions to enable its capture, transport, storage and reuse, could support the UK's journey to net zero, reduce energy demand and associated costs, and provide new local sources of heat for communities. □

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Climate déjà vu: a conversation through the decades

In February this year, the Foundation held a discussion on [‘Enhancing the UK’s preparedness and resilience to climate change’](#).

Jim Hall, Professor of Climate and Environmental Risks at the University of Oxford, started his talk by highlighting that adaptation is an essential part of government policy, as weather events become increasingly severe despite action on mitigating the worst effects of climate change. He suggested that more policy commitments have been made than concrete changes, and that adaptation routinely slips down the agenda.

In response, 2026 has been designated Year of Adaptation by Dame Angela MacLean, Chief Scientific Adviser to the UK Government. As part of this programme, the Council for Science and Technology has listed four recommendations in a recent letter to the Government to improve its mitigation efforts: ensuring each department has measurable adaptation targets; commissioning a Government-wide spatial dashboard to monitor climate risks and impacts; communicating the inevitable remaining risks and trade-offs, and leading communication to the public on the importance of adaptation. Professor Hall noted that, although the public are generally aware of the direct impacts of climate change through weather forecasts and news media, little is being done to communicate climate risks and adaptation measures.

Systems mindset

Professor Anjali Goswami, Chief Scientific Adviser to DEFRA, spoke about the Government’s Fourth National Adaptation Programme, due in 2028, and how DEFRA is supporting government departments to build clear adaptation plans. She highlighted the importance of a systems mindset, where natural systems are not artificially divided into silos. Research and development are vitally important, she said, but too often it can be used to delay future action: decisions must be made now in the absence of perfect evidence.

In contrast to the previous speakers, **Professor Mike Tipton, President of the Physiological Society**, reminded us that some of the direct consequences of climate change are closer to home. He contrasted the previous discussions on infrastructure, politics and policy with the particular human challenges of a more extreme world.

He initially described how humans evolved to be comfortable in quite a narrow temperature range. We

The Foundation recently hosted two events discussing the climate crisis. Here, Douglas Brown explores how the climate debate has evolved over the last 30 years, and what that might tell us about the future

have already adapted to survive outside this by using clothes and buildings, but extremes in temperature can have a serious impact on health. This is especially true for the wide range of groups at higher risk, including the very young, the elderly and those who need to work with PPE. The knock-on effects on productivity and health-care make this a society-wide consideration.

He emphasised that some adaptation targets should be physiological, and that planning for future scenarios should take account of the effects on human health. We should communicate to the public at the level of individuals, he suggested, including the risks of dehydration; how to exercise in a heatwave, and how to best adapt your house. He suggested that these human-centred perspectives can be more engaging than big-picture discussions about national policy and planning.

Rachel Kyte, the UK Special Representative for Climate, highlighted the UK’s international role in adaptation. Emphasising the soft power of ‘UK Inc’, she described how countries around the world look to the UK for institutional know-how, including policy on carbon budgets and adaptation. She described the importance of community engagement, taking inspiration from resilient communities worldwide, especially when making difficult and realistic decisions – such as which assets should be protected, and who should be involved in the discussions?

The panel discussion covered a range of topics, including both the practical and the moral. A noteworthy exchange was on whether embracing adaptation is simply ‘giving up’ – an issue also raised during the activism event a month later. Panellists highlighted that adaptation is now essential no matter how hard we mitigate, and that higher emission trajectories mean even worse extremes, which must be dealt with. Adaptation solutions can in turn help with mitigation efforts, such as sustainable buildings.

Another issue raised was whether adaptation – and



SHUTTERSTOCK/ATAURRAHMANSTUDIO

Firefighters respond to a wildfire in July 2026, near Perpignan in the Pyrenees-Orientales region of southern France

climate action as a whole – is treated urgently enough by Government and by wider society. Panellists, and the chair, raised the apparent lack of urgency in the Government's reply (short and, at the time of the event, unpublished) to the CST's letter spelled out by Professor Hall.

Responsible activism

March saw a second climate-themed discussion, [‘From publication to public action: the case for responsible science activism’](#). This raised the question of whether there is a case for scientists to go beyond research and instead take part directly in activism, and how institutions and employers should support this.

Dr Charlie Gardener from the University of Kent discussed his journey as a scientist joining the Extinction Rebellion mass protest in 2019. He suggested this was more effective than decades of scientific work, with Parliament declaring a climate emergency within weeks, and setting legally binding targets later that year. He reflected on how science policy is not simply a case of “information deficit” – vested interests and lobbying can successfully affect Government policy. He commented that, by publishing warnings while continuing with day-to-day work, scientists do not demonstrate the urgency that their work suggests is needed.

Dr Abi Perrin, biologist and science communicator, talked about her story of trying to find evidence around climate change to reassure her own worries, and concluded that things were in fact worse than she thought. She found a group of scientists in the environmental movement and valued the exchange of ideas on both science and communication. She described feeling an active resistance to activism from the institutions she was part of, and how colleagues and students did not feel

supported to take direct action themselves. Her talk finished by emotionally describing the feeling of futility in studying a dying world in extreme detail and reflecting on how activism can allow scientists to be genuinely effective and impactful.

Professor Jeff Waage from the London School of Hygiene and Tropical Medicine, and an agricultural scientist, described how the pace of his scientific advisory roles was brought into perspective by the 2016 US election. He described that, as an established researcher, he felt an obligation to give back to the community without having his career at risk. In particular, he listed three requests: that institutions support activism, rather than simply tolerating it; that more scientists become active, by running workshops, writing to media and to MPs; and that science activism is more widely accepted by the community as a tool for influencing policy and engaging the public.

The final speaker, **Professor Sir Mark Walport, former Government Chief Scientific Adviser**, provided a challenge to the first three speakers. He suggested that, although the evidence for action on climate is overwhelming, there is nothing that makes scientists superior to others when it comes to difficult policy decisions such as balancing the interests of current and future generations. He described the logistics involved in maintaining large populations, and how fossil fuel usage cannot be stopped overnight in urbanised society. He suggested that policies fundamentally need to be feasible and electorally acceptable, and that a priority should be increasing the representation of scientists in elected office, who would be better placed to carry out scientifically rigorous policy than through activism.



Some scientists believe that the issues at stake are so urgent that direct action is a more effective way to cause action

The panel discussion – at times passionate and lively – repeatedly circled around whether activism and disruptive action increase the support for particular issues. Discussion also focussed on how scientists communicate solutions as well as problems, and how trade-offs can be honestly and openly debated in the political sphere.

A perspective from the past

The environment has been a recurring theme of FST events over the past 50 years, but the way the issues have been discussed has evolved considerably.

Two Foundation events from the 1990s mirror the two above. One, from September 1990 had the title ‘Can we cope with Climate Change?’. The second, from April 1991, titled ‘Global Environmental Change – The UK Research Framework’, discussed a recent strategic paper on the UK’s national climate priorities ([Global Environmental Change – The UK Research Framework](#)).

A repeated thread of discussion in both these events was around the relationship between science and policy – no less relevant today. One speaker – sociologist Professor Howard Newby – highlighted the desire of policy-makers for objective facts to make ‘soft’, value-based policies, where instead climate science provided uncertainty for officials making very hard decisions.

Professor Newby foresaw the importance of social science and public support – especially prominent in the Activism event – and how best to communicate to the public the sacrifices they may need to make. He mirrored Professor Walport’s warning on electoral support, describing the difficulty inherent in persuading the public to “give up their own private motorcar” as an extreme

measure, and how it is crucial that climate measures have public support.

A striking contrast in the earlier debates are the optimism around collaborative, international approaches: the UN; expert panels; even likening climate talks to the Strategic Arms Limitations Talks between the US and USSR (while noting the difficulty in getting even two nations to agree to action on a single issue). Speakers involved in the March 2026 science activism event refer to their feeling that the issues at stake were “too urgent for committees”, and that direct action is a more effective way to cause action. Similarly, in February 2026’s event, Rachael Kite advocated for the need to “break open centralised politics”, with communities deciding for themselves which assets to protect, and the need to learn from more resilient communities around the world. The 1991 UK Research Framework event makes similar reference to the need to “understand those who inhabit environmentally sensitive sites”, but the implication appears to be to inform international decision making rather than enabling communities to drive their own change.

Several speakers from the 1991 event praised the US National Academy of Sciences’ expert committee, and note the favourable response of the Bush White House to their report ([Policy Implications of Greenhouse Warming](#), written by the Committee on Science, Engineering and Public Policy, chaired by former senator Daniel J. Evans). Nonetheless, the appeals for the US to play a

It is crucial that climate measures have public support



SHUTTERSTOCK/WORAKIT SIRIJINDA

Early speculation that reduced crop potential in Europe might be balanced out by improved rice production in Southeast Asia has proven false

“positive leadership role” and return to funding a key UN agency (the United Nations Population Fund, in this instance) may seem familiar 35 years later. While the 20 month-long committee consultation may well have felt effective at the time, speakers from the more recent events may feel that these recommendations were too easy to ignore.

Predictable findings

The US committee report is predictable in many aspects. It outlines the science around greenhouse gases, discusses the economics of various mitigation and adaptation strategies, and suggests further research and international cooperation. It plainly states in its introduction that “human activity has contributed to increased atmospheric concentrations of CO₂”, but is reluctant to directly link this to global warming. Many of its recommendations are straightforward: eliminating CFCs, introduce a “full social cost pricing” for energy, and reduce global deforestation. Population control is also frequently touted as a major pathway to reducing global emissions, although the report admits there are “political, social, and ideological” considerations. The report recommends further research in a range of areas, although under the lightly euphemistic banner of “Improving knowledge for future decisions” – perhaps an attempt to persuade policymakers to fund climate science without stating as much.

A further thread running through both events was the uncertainty of the possible effects of climate change. For speakers in the 1990 “Coping with Climate Change” event, it seemed a genuine unknown whether climate change would be of net harm or benefit to the global food system. Speakers postulated that “reduced bread-

basket potential” in Europe may be balanced out by improved rice production in Southeast Asia. While increased concentration of CO₂ does improve the yield of some crops, the scientific consensus is that the harmful impact of an increasingly extreme climate outweighs any benefit on yield. Speakers repeatedly highlighted the need for further research in almost all areas imaginable, from local soil run-off to geoengineering. There was certainly a lack of urgency in parts of the discussion, with one speaker in this event commenting that whether it would be cheaper to take action before impacts occur or to simply adapt later was “a matter for the working group”.

Despite huge emphasis on the uncertainty of the scientific knowledge at the time, many panellists nonetheless advocated for the adoption of ‘no regrets’ policies, noting that decisions must be made in the absence of perfect knowledge. No doubt these views would be welcomed by many speakers in the more recent events, but panellists and audience members alike may feel that these academic appeals for forethought lacked the urgency to be heard in the corridors of power.

Many threads of discussion have been unchanged over the decades: science and politics; public support for policy; the need for innovation and international cooperation; the role of the US in global leadership. Nonetheless, modern readers may feel that precisely because the issues discussed 35 years ago are so familiar, the intervening years have heralded little progress. □

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Douglas Brown is a DPhil student of biophysics at the University of Oxford

End of an era as the UK Space Agency winds up

Lord Willetts (FST Chair) opened the evening by recalling how he inherited the newly created “arms-length” body, the [UK Space Agency](#), in 2010 from the then Minister of Science Paul Drayson and chose to implement and strengthen it over a four-year ministerial tenure. He noted that, by the time the arms-length model ended, excessive bureaucracy had developed, with roughly 70 policy officials in the [Department for Science, Innovation and Technology \(DSIT\)](#) constantly negotiating with the operational agency. He argued that a single integrated entity within DSIT is superior to a forced distinction between “policy” and “operations”.

After thanking Lord Willetts for his words, **Lord Drayson** began discussions with a strong criticism of the Government’s decision to close the UK Space Agency and fold it into DSIT, labelling it a “plain wrong” strategic error. He recalled that the agency was originally founded in response to a 2007 Royal Society call for a “one-stop shop” to replace the [British National Space Centre \(BNSC\)](#). He said that the historical success of the agency relied on its arm’s-length status, which protected its budget from short-term political cycles, gave it peer status to negotiate effectively with the ESA, and allowed it to chase clear, industry-backed targets.

Lord Drayson warned that merging the agency back into a Whitehall department of civil service generalists would dilute technical expertise and leave the space budget vulnerable to raiding by shift-

Given that space is now recognised as a critical operational domain by NATO and holds immense economic value, how wise is the decision to fold the UK Space Agency into the Department for Science, Innovation and Technology?

ing political priorities like AI compute. Given that space is now recognised as a critical operational domain by NATO and holds immense economic value, Lord Drayson believes that this is the wrong moment to demote the agency. He quoted that 18% of current UK GDP (around £454bn) depends on satellite services. He also said that “in an age when we cannot rely on US space assets, sovereignty means more, not less”. He urged the space community to build a unified evidence base, monitor metrics like staff retention and procurement velocity, push for a joint civil-defence minister for space, and make the case that space is critical national infrastructure, not a digressionary budget line.

The next panellist, **Alice Bunn** politely disagreed with Lord Drayson and made the case for a cohesive “national space enterprise” tightly coordinating academia, industry, and government.

Reflecting on the past, she noted that programmes like the [Mosaic small satellite initiative](#) succeeded

EVENT BACKGROUND

On Wednesday 29th April, The Foundation for Science and Technology hosted a meeting to review the 16-year history, current state, and future of UK space policy following the decision to abolish the UK Space Agency as an arms-length body and absorb it into the Department for Science, Innovation and Technology (DSIT). Chaired by the Rt Hon the Lord David Willetts, the event brought together key figures from the agency’s history to debate the strategic implications of this structural shift, the balance between civil and defence space coordination, international partnerships (such as [ESA](#) and [NASA](#)), and how to effectively commercialise the UK’s strong academic and industrial talent.

Speakers included:

Lord David Willetts (Chair), Chair of the Foundation for Science and Technology and former Chair of the UK Space Agency

Lord Paul Drayson, Former Minister for Science who led the creation of the UK Space Agency

Alice Bunn, Chair of UK Space (representing British business interests) and former senior adviser to the World Economic Forum

Dr Paul Bate, Final outgoing Chief Executive of the arm’s-length UK Space Agency

Dr Professor David Parker, Former Chief Executive of the UK Space Agency and former Director of Human and Robotic Exploration at the European Space Agency (ESA).



Interior control room of the NATO Space Operations Centre (NSpOC)

because the community chose priorities and backed winners across civil and defence lines. She said that it was ‘truly a joined-up partnership’.

Ms Bunn highlighted procurement and ‘financed scaling’ as a historical failure in pooling requirements for space data and services. She said that the UK has never effectively joined up the downstream use of space data and services at pace or scale. She emphasised that the industry does not need the Government to buy everything, but rather act as a credible “anchor tenant” to help companies leverage private finance.

Geopolitical uncertainty

There remains a remarkable amount of geopolitical uncertainty. For this reason, Bunn said that we “need to bring our own ball... one that can withstand the geopolitical storms”. She emphasised that international competitors like Germany are heavily outspending the UK, meaning the British sector must be smarter and bolder rather than relying on empty “global leadership” rhetoric. The UK should make decadal commitments to areas of true capability, like space weather for example. Addressing the reality of dual-use technology, Ms Bunn noted that capabilities used for civil monitoring (like wildfire detection) are identical to those used in warfare. She said that we need R&D programmes at scale. In terms of procurement, she argued that the UK must pool its requirements and show up as a credible tenant for industry so that it can leverage the finance from the right places. Ultimately, Ms Bunn advocated for a cultural shift toward making difficult prioritisation choices and maintaining decadal funding commitments to withstand geopolitical shifts.

The Outgoing Chief Executive of the UK Space Agency (UKSA) and former Director of Human and Robotic Exploration at the European Space Agency (ESA), **Dr Paul Bate**, spoke next and used a NASA cosmic web simulation as a metaphor to argue that space policy is an interconnected web binding discovery science, commercialisation, civil space, and military applications. He cautioned that if governments take a simplistic shortcut and only fund things closest to short-term economic growth or national security, they risk breaking vital components of the sector.

Dr Bate called for protecting the “anchor points” of the web: the research base that drives long-term innovation and the diverse pool of small and medium-sized enterprises (SMEs). He noted that to drive actual scaling, the government cannot support all 1,900-plus space organisations equally. Instead, it must pick a targeted portfolio of companies with built-in scalable business models and support them holistically through research and development grants, government contracts and balance sheet investments.

Dr Bate advocated for the UK to carve out global niches, such as leading international policy and technical standards on space sustainability and orbital debris mitigation. While emphasising the UK’s leadership in space sustainability, he cited the [Inter-Agency Debris Coordination Committee \(IADC\)](#) and shared a stark data point regarding atmospheric ablation: a single de-orbited satellite can deposit metal oxides into the atmosphere equivalent to 250,000 cars’ worth of annual emissions.

He said that we need to move further forward on valuing our bilateral missions (the global missions



SHUTTERSTOCK/FRAME STOCK FOOTAGE

we are part of) and see these as strengths. Dr Bate highlighted the importance of global relationships – particularly with ESA and NASA. It is “deeply important” he said to be “decadal” if we want to foster those international relationships. The space web is global, so as well as setting out our niches, we need to play well internationally.

Professor David Parker took to the stage last. He provided a historical perspective, reflecting on the structural success of the old British National Space Centre, which featured a mandatory Ministry of Defence second-in-command to ensure tight civil-military dual-use coordination – a connection that was later severely weakened. Professor Parker emphasised that steadiness of purpose and direction are critical for long-term space policy. He tracked the evolution of UK capabilities from early satellite successes down to industry consolidation that diluted sovereign industrial powers.

Deep tech funding

Professor Parker highlighted that the UK’s 25% funding increase to ESA in 2012 triggered a wave of inward investment. Disagreeing slightly with Lord Drayson, he noted that international treaties – rather than an arms-length structure – are what truly guarantee long-term funding for deep tech by making the costs of Treasury-driven political withdrawal too high.

Professor Parker also classified the UK’s current status as just below Italy in the “first division” of global space powers (behind the US and China). He stressed the importance of moving US-style policy forward via discrete, single announcements rather

than trying to slow-cook everything into massive, delayed strategy documents.

Looking to the future, Professor Parker warned that the global landscape had shifted away from international cooperation toward fierce national competition and de facto commercial monopolies. He outlined a 10-point to-do list, which includes appointing a national space policy adviser within the Cabinet Office to ensure cooperation across warring departments.

Closing the panel discussion with the Chair’s remarks, Lord Willetts weaved in some historical context and personal reflections. He noted the political irony of his own career: having spent over four years as Science Minister loyally implementing a previous Labour Government’s plan to create and strengthen the UK Space Agency, only to end his time as its Chair executing a new Labour Government’s plan to abolish it as an arm’s-length body.

Lord Willetts admitted that the agency had developed a recipe for excess bureaucracy, pointing out that by the time it was integrated into DSIT, there were roughly 70 policy officials inside the department in a permanent state of negotiation with the operational agency. Because the distinction between “policy” and “operation” breaks down in a high-tech environment like space, Lord Willetts expressed optimism for a single entity inside DSIT. He also emphasised that international treaties and partnerships are an excellent way to secure long-term deep-tech funding.

To listen to the Q&A and debate that followed the presentations, view the [full event recording here](#). □

The problem of space debris – a single de-orbited satellite can deposit metal oxides into the atmosphere equivalent to 250,000 cars’ worth of annual emissions

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Can we help the world align through science?

How can the UK leverage its scientific excellence to drive innovation, maintain global influence and address urgent challenges at home and internationally? Science diplomacy could be the answer

Dame Chi Onwurah opened proceedings by highlighting the pressing need for a unified and coherent UK science diplomacy strategy in the face of intensifying global competition.

Dame Onwurah discussed [the committee's new report](#) – launched that week – on science sovereignty, diplomacy, and the UK's strategic position in the global race for technological and research leadership. She highlighted the importance of cross-government alignment to ensure that science and innovation remain central to national policy, not just within the [Department for Science, Innovation and Technology \(DSIT\)](#), but across all governmental departments. Dame Onwurah also emphasised the crucial role of public trust in science, pointing out that clear communication of the value of scientific research is essential for maintaining this trust and for ensuring that scientific advancements contribute meaningfully to society.

She advocated for the creation of measurable goals and robust metrics to evaluate the impact of science diplomacy efforts. Dame Onwurah argued that the UK must leverage its scientific excellence to drive both innovation and influence on the global

stage. She also addressed the need for science to be at the heart of UK responses to domestic and international challenges, stressing that only a coordinated, strategic approach would secure the UK's leadership in science and technology.

George Freeman's remarks focused on the growing global race for technological sovereignty, framing the UK's position as both promising and precarious. Using the USA's approach to Greenland, the Arctic and NATO as examples, he said that the UK must be prepared to stand up and take a position globally. He argued that the UK must adopt a “start-up mentality”—agile, strategic and proactive in building international alliances that play to its unique strengths and harness science for the global good. Mr Freeman called for the creation of a “muscular framework” of bilateral and multilateral partnerships (an approach to international relations with regards to partnerships between two states and multiple states). He also pointed to regulatory leadership and investment in early-career talent as ways to maintain the UK's competitive edge.

Mr Freeman warned against complacency, noting that scientific excellence alone does not guarantee impact on society or the economy. He emphasised the importance of translating research strengths into tangible benefits for the UK, such as resilient supply chains and leadership in emerging industries. Mr Freeman finished by highlighting the need for a holistic strategy that aligns the UK's globally respected research and regulation with its industrial policy, to really maximise the nation's influence and prosperity.

EVENT BACKGROUND

In collaboration with Sense about Science and the Science, Innovation and Technology Committee, the Foundation brought together leading voices in UK science, policy, and academia to discuss a new report on science sovereignty, diplomacy, and the UK's strategic position in the global race for technological and research leadership. The discussion took place at Portcullis House, Westminster on Tuesday 7th July. Panellists focused on how the UK can leverage its scientific excellence to drive innovation, maintain global influence, and address urgent challenges at home and internationally.

Speakers included:

Dame Chi Onwurah, Chair, Science, Innovation and Technology Committee

George Freeman, Deputy Chair, Science, Innovation and Technology Committee and former Science Minister

Emily Darlington MP

Professor Sir Peter Knight, Chair, UK National Quantum Technology Programme Strategy Advisory Board

Professor Charlotte Watts, Executive Director, Wellcome Trust; former Chief Science Adviser, FCDO

Emily Darlington addressed the challenges posed by [recent research funding reductions](#) and the impact of [cuts to Official Development Assistance](#) on UK science and its international collaborations. She outlined the UK's distinctive role in fostering research partnerships that focus on capacity building in partner countries, particularly through standards and [BSI \(the British Standards Institution\)](#). Darlington argued that maintaining the UK's "soft power" requires ongoing commitment to these collaborative efforts, ensuring that the UK remains a trusted partner in global science diplomacy.

Ms Darlington also stressed the importance of scientists engaging with the public, especially via new media platforms, to foster continued public support for science.

Public engagement

Highlighting the British involvement in many scientific feats such as the near eradication of HIV in the UK, Ms Darlington commented that our problem was not talking about it enough and communicating the steps taken to get to the end goal. She asserted that science diplomacy should not only focus on global challenges but also contribute directly to UK prosperity and security. Her remarks called for a renewed emphasis on public engagement and the strategic use of science as a tool for both domestic and international benefit.

Professor Sir Peter Knight provided a perspective from the UK's quantum technology sector. He highlighted the country's world-leading research and successful venture. He explained that the UK has published 13% of the world's highly cited papers saying that, scientifically, the UK punches way above its weight, but that we need to turn that into an economic advantage. He discussed the importance of aligning strategy with funding and the need to build "sticky" ecosystems that retain talent and innovative companies within the UK. He said that we are second only to the USA when it comes to science-based start-ups and used an example of a new company called [Digistain](#) in Milton Keynes, which uses quantum imaging to transform the ability to diagnose breast cancer. He emphasised that what has been done in quantum technology and photonics are examples of science and technology that are a strength for the UK, and these are sectors producing outputs that can be rolled out internationally.

Professor Knight emphasised the key role of standards, research security, and international collaboration in maintaining the UK's leadership in advanced technologies. He also warned about the risks posed by fragmented or short-term funding, which can undermine long-term research stability and the development of robust technology ecosystems. His talk underscored the need for sustained, stable investment and strategic planning to ensure that the UK continues to lead in quantum and other emerging fields.



Professor Charlotte Watts spoke about the UK's historical strength in science, which she attributed to a culture of openness and international collaboration. She highlighted the significant and catalytic role of philanthropy and the need to pool resources from government, private sector, and charitable organisations to create impact. Professor Watts warned against complacency, referencing the increased global competition and the risk of the UK losing its leadership position if it fails to adapt.

Professor Watts also discussed the importance of preserving specialised expertise within government and maintaining robust diplomatic science networks. She emphasised the need for clear communication of scientific processes and uncertainties to the public to foster understanding and trust. Her remarks

Initiatives such as a pop-up sexual health clinic in Berkshire have seen an increase in the number of new people coming forward to get tested for HIV

Science diplomacy and international collaboration are central to the UK's future prosperity, security and global influence

reinforced the idea that maintaining the UK's scientific influence requires both internal investment and outward-facing engagement strategies.

The discussion underscored that science diplomacy and international collaboration are central to the UK's future prosperity, security and global influence. Realising this potential requires joined-up strategy, stable investment, support for talent, and active communication—both within government and to the wider public.

This event was kindly funded by the [Parliamentary Science and Technology Information Foundation \(PSTIF\)](#). To listen to the Q&A and debate that followed the presentations, visit bit.ly/FST_Diplomacy. □

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AI should not replace thinking, but create more space for it

How can researchers make best use of AI without compromising integrity and accuracy? A roundtable by Elsevier and the Foundation aimed to find out



Adoption is rising, but confidence lags

Elsevier's most recent findings from its ['Researcher of the Future'](#) initiative highlighted that around half (52%) of UK researchers now use AI tools in their work, mirroring global adoption levels. Uptake has grown sharply (by more than 20 percentage points in a year), but UK researchers are notably more cautious than their international peers. This caution reflects a culture that focuses on integrity and quality. UK researchers are notably more cautious when it comes to trust, ethics, and the role of AI in advancing discovery. According to the report's findings, 11% of UK researchers say AI is trustworthy, and only 5% believe AI tools are ethically developed.

Productivity versus creativity

Roundtable participants agreed that AI should be used as a productivity tool, not a creative partner in research. AI is widely valued for efficiency gains – for example, in data analysis and automating repetitive processes. However, participants noted that AI often produces the “obvious answer” quickly, which is useful but may limit deeper or more novel inquiry. The group stressed that AI can answer questions, but cannot reliably ask the right ones, which is central to scientific breakthroughs. Concerns were raised that AI-generated material can appear plausible but lacks originality or true insight, potentially contributing to a homogenisation of research outputs. Importantly, this dynamic risks reinforcing conservative thinking and reducing the diversity of research voices and ideas.

Although it was noted that caution around AI

could hinder innovation, several voices argued that the UK's careful, ethics-led approach could become a distinctive advantage internationally, positioning it as a hub for high-integrity, quality-focused research.

For example, rather than chasing scale and speed, the UK could emphasise “responsible excellence” – balancing innovation with rigorous oversight. However, achieving this would require sustained investment in skills development, data quality, and public trust in research.

Training emerged as a top priority, extending beyond students to faculty, supervisors, and research professionals. Only 13% of UK researchers report receiving sufficient training in AI tools – much lower than the global average which stands at 27%. A recurring theme was the absence of structured institutional support for researchers using AI. Participants noted that there is a growing “assessment gap”, where AI use is disclosed but evaluators lack the capability to judge it effectively. Governance arrangements and guidance also remain inconsistent across institutions.

There was concern that the overuse of AI (e.g.: for literature reviews) may undermine researcher development, especially for early-career researchers. Participants said that the goal is to enable researchers to use AI thoughtfully – to prompt deeper analysis and reflection, not replace it.

Some individuals around the table said that researchers are not just under-trained; they are concerned about retrospective accountability (being judged later for current AI use). Many researchers are also learning through experimentation, leaving them uncertain about ethical boundaries, data management, and disclosure expectations. Agreement was heard around the table for centralised, cross-institutional guidance rather than fragmented local policies. They saw libraries and research support offices as critical infrastructure for research literacy and expertise for critical thinking, ethical use, and data governance.

Trust and research integrity were central concerns. Participants noted risks from biased or incomplete datasets, opaque AI models, and unverified outputs. There were calls for transparency about how AI is used



in research design, data analysis and writing, and the discussion highlighted the need to differentiate between types of AI – ranging from assistive tools to autonomous systems – with distinct ethical and governance implications.

Several participants around the table said that real-world risks were already visible (e.g.: biased health outcomes from unrepresentative datasets). There was agreement that greater openness about negative or null results was important to counteract publication bias and strengthen research credibility.

It was noted that broader research system challenges – including funding constraints, shrinking time for research, and incentives that reward volume and polish – shape how AI is being used. Participants said that this creates a system-level challenge, not just an individual behaviour issue, requiring redesign of evaluation processes.

For example, funders are already seeing sharp increases in application volumes, likely driven by AI-assisted proposal writing. AI enables higher throughput of proposals and publications, potentially making it harder to identify high-quality, original research.

Participants warned that this could lead to an oversupply of “well-written” work with limited novelty, while genuine breakthroughs risk being crowded out.

Next steps: action and policy

The roundtable concluded with a shared sense of urgency to move from uncertainty to clear cross-sector principles. It was repeatedly stressed that AI is not a single category and includes very different tools and capabilities. Therefore, policy and governance should be use-case specific, rather than one-size-fits-all.

Recommended areas for action included:

- The need for flexible frameworks that evolve with technology, rather than static regulation
- Integrating training on AI ethics and data management at all career stages
- Creating mechanisms for sharing negative findings and improving data transparency
- Encouraging collaboration across academia, funders, and publishers to ensure consistent standards
- Supporting research on AI’s social, cultural, and ethical impacts alongside technical developments.

Artificial intelligence is embedded in researchers’ daily routines, according to Elsevier’s *Researcher of the Future* report

Conclusion

The discussion reflected both optimism and unease about AI’s growing role in research. UK researchers are adopting AI at pace but remain cautious – an attitude that could become a strength if it leads to robust, trustworthy, and creative science.

The path ahead will depend less on promoting AI adoption and more on building competence, confidence, and clarity: ensuring that tools accelerate high-quality research without eroding the values and rigour that underpin the UK’s scientific reputation. □

DOI: 10.53289/AJRE8298

“Skepticism has value if it helps us build better and more responsible systems”
Roundtable participant



SHUTTERSTOCK/MAX ACRONYM

Real-world risks in AI-driven healthcare are already visible, from the use of biased datasets

EVENT BACKGROUND

On Thursday 12th March 2026, a group of scientists, policy makers, and industry experts gathered to identify practical actions that could strengthen UK research in an era of rising AI technology and rapid technological change. The roundtable was organised by Elsevier in collaboration with the Foundation for Science and Technology. Meeting at the Royal Society, the group started the first in a series of international discussions exploring how artificial intelligence (AI) is reshaping research systems worldwide. Elsevier shared findings from its ongoing *Researcher of the Future* initiative, based on insights from more than 3,200 researchers across 113 countries. The session examined the UK-specific data set, discussed institutional and cultural responses, and explored how AI might influence productivity, creativity, research integrity, and policy frameworks.

Attendees included:

Tracey Brown, Director, Sense about Science

Gavin Costigan, (Former) Chief Executive, Foundation for Science and Technology

Helen Coulshed, Associate Vice Dean Education and Senior Lecturer in Chemistry Education, King's College London

Camilla D'Angelo, Policy Manager, CASE
Esra Erkal, Executive Vice President, Global Communications, Elsevier

Catriona Firth, Associate Director, Research Environment, Research England
Pallab Ghosh, Science Correspondent, BBC
Laura Hassink, Managing Director for STM Journals, Elsevier

Sudesh Kumar, President of AIRTO and Vice-President Health, University of Warwick and AIRTO

Sarah Main, Vice President Academic and Government Relations UK, Elsevier

Geoffrey Neale, Lecturer in Multifunctional Composite Structures, Cranfield University

Paul Nurse, President, Royal Society

Lawrie Phipps, Director of External Policy Development, Jisc

Hetan Shah, Chief Executive, British Academy

Vivienne Stern, Chief Executive, Universities UK

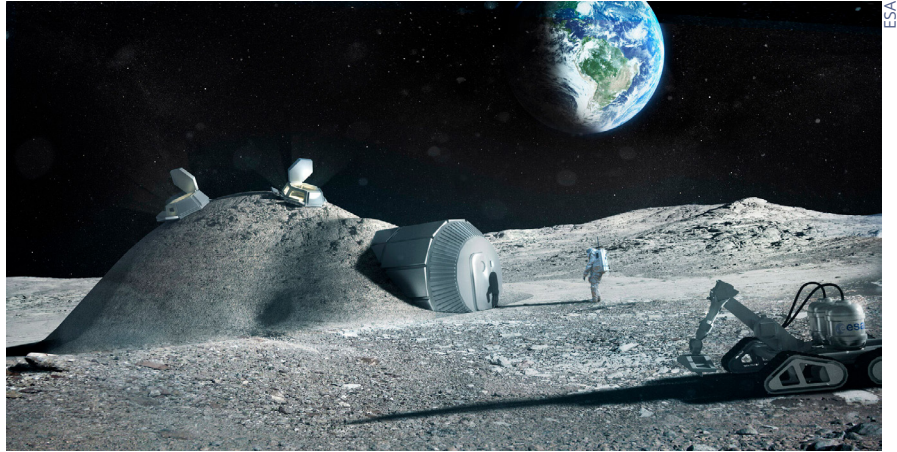
Dominic Tate, Deputy Director of Library and University Collections, University of Edinburgh

Lesley Thompson, Vice President, Funders, Global Business Development, Elsevier

David Willetts, Chair, Foundation for Science and Technology

Building markets for space

Britain has spent years building impressive space capability, but current Foundation Future Leader Joaquin Perez-Grande argues that the next task is harder and less glamorous: building the markets for it



3D-printed Moon base concept: a permanent lunar base like this could be a springboard for further exploration into the solar system

For four decades, the UK has invested in the technologies, infrastructure and companies that underpin its space economy. That effort has produced a sector with real depth: strong satellite capabilities, world-class research, emerging launch activity, a network of fourteen space clusters and a policy environment that increasingly treats space as both an economic opportunity and a source of strategic resilience. The latest UK Space Agency Size & Health report estimates sector income at £18.6 billion, while satellite services support around 18% of UK GDP, worth more than £454 billion.

Judging success

The next phase of UK space policy should build on that progress, but judge success differently. The test is what space capability changes in practice: better public services, stronger businesses, adoption by sectors beyond space, regional growth and fewer strategic dependencies. The policy question is no longer only whether the UK can develop space technology. It is whether the UK can create the conditions for that technology to be bought, trusted and used across the wider economy.

This calls for market formation to be treated as seriously as technology development. Funding still matters, but adoption also depends on credible customers, procurement routes, regulation, evidence of value and the hard translation work that turns promising capability into a usable product or service.

Too many promising technologies

arrive with the equivalent of “batteries not included”. The hardware may be impressive, the research rigorous and the engineering world class. The UK spent £1.1 billion on space research and development in 2022/23 alone. Yet the route to use can still be unclear.

Those missing batteries are usually practical rather than technical: a compelling use case, an adoptive customer, integration into existing systems, standards, regulation, procurement and evidence

Technology only creates value when someone uses it or pays for it

that the new approach is better than what users already do.

Commercial adoption cannot be left until the end of technology development. It has to shape choices from the beginning, because technology only creates value when someone uses it, pays for it or changes a decision because of it.

A recent discussion by the Foundation for Science and Technology on UK space policy has reflected this shift. Looking beyond the creation of the UK Space Agency and the maturing of national capability, the question for 2027 and

beyond is how that platform delivers economic, public and strategic outcomes.

The National Space Strategy set an ambition to build one of the world’s most innovative and attractive space economies. The Space Industrial Plan then moved the conversation towards delivery, with a stronger emphasis on procurement, adoption of space services, regulation, investment and resilient national capabilities.

That direction is welcome because it brings demand closer to the centre of policy. If space is to become a stronger driver of productivity, resilience and growth, policy must ask who will buy the resulting products and services, what evidence they need, how they will procure them and how space companies will reach customers outside the sector.

Necessary focus

It also requires focus. No country can lead in every part of the space economy. The UK is more likely to win internationally by concentrating effort around distinctive capabilities, strong industrial bases, high-potential firms and clear demand from government, industry or international partners.

The space sector is rightly proud of its engineering. Yet organisations rarely wake up wanting to buy “space”. They want resilient communications, lower emissions, better medicines, improved agricultural productivity, safer transport,



An illustration of the RFA ONE rocket launching from SaxaVord Spaceport in Scotland

stronger national security or better data for public services.

That difference matters. A space company may talk about resolution, latency, payload performance or orbital capability. A potential user is often thinking about cost, risk, regulation, integration, liability, procurement and whether change is worth the effort.

Market creation starts in the user's environment. The hardest competitor is often the status quo: the existing process, supply chain, dataset or procurement route that already works well enough.

This is why markets need institutions as well as policy statements. They need organisations that can connect industry, government, investors, regulators and end users in the space between research funding, private investment and regulation.

The Satellite Applications Catapult is part of that national infrastructure. Its role has evolved with the sector, from broad sector-building towards more targeted support for high-potential businesses: combining technical development with customer discovery, business support, investment readiness and routes to market.

Its wider value is in helping the system around a technology keep pace: unblocking common barriers, convening emerging markets, supporting regulators to understand novel activities and opening routes to international customers.

Microgravity shows why translation matters

Microgravity and in-space manufacturing illustrate the point. More than 3,000 experiments have been conducted on the International Space Station, and the technical potential is credible. Microgravity can alter processes such as crystal growth, fluid behaviour and cellular development, with possible applications in biopharma, advanced materials and manufacturing. The UK Space Industrial Plan points to opportunities such as manufacturing pharmaceuticals and printing organs in microgravity, while companies including BioOrbit, Frontier Space and Kayser Space are developing technologies for pharmaceutical research and manufacturing in orbit.

Scientific potential, though, is only the starting point. A commercial pathway needs a real industrial or scientific problem, evidence that microgravity offers an advantage, access to orbital platforms, reliable launch and return, validation on Earth, regulatory and customs clarity and an organisation willing to buy or adopt the output.

Life sciences and manufacturing organisations do not just need to hear that space is exciting. They need to test whether it solves a problem they recognise, produces evidence they can trust and fits within the practical rules of their sector.

Market formation depends on regulators clarifying the route, intermediaries bringing the right actors together and early projects generating proof that non-space users can rely on.

Work is already under way. The UK Space Agency has worked with the Medicines and Healthcare products Regulatory Agency, the Civil Aviation Authority and the Regulatory Innovation Office to support a more coordinated approach to medicines and biopharma activity in orbit. The Satellite Applications Catapult has complemented that by convening life sciences, academic and space-sector stakeholders through a Microgravity Life Sciences Working Group, developing use cases and supporting pilot projects with partners such as the Industrial Biotechnology Innovation Catalyst.

The future of in-space manufacturing will be shaped as much by adoption conditions on Earth as by what can be produced in orbit: whether customers can use, regulate, insure, classify, return and justify paying for it.

What market-building space policy would look like

A stronger market-building approach would still invest in ambitious technology, but it would ask earlier what must be true for that technology to be adopted.

- **First, create credible demand**



UK SPACE AGENCY

Microgravity research in space is opening up new possibilities for pharmaceutical discovery and manufacturing

signals. Businesses and investors need confidence that strategic priorities will endure long enough to justify investment.

- **Second, use public procurement more deliberately.** Government can be an early customer where space capabilities support public objectives, but procurement should test operational value rather than manufacture artificial demand or fund another demonstration.
- **Third, fund translation, not only invention.** Support is often strongest at the research stage and weakest during the transition towards validation, regulation and commercial readiness. Translation funding should help companies prove the customer, the advantage, the evidence required and the route into existing markets.
- **Fourth, remove pathway uncertainty.** Clear standards and regulatory routes can be as valuable as direct funding. In emerging areas such as in-space manufacturing, uncertainty around return, customs, product classification and evidence requirements can delay investment even when the science is promising.
- **Fifth, connect space with user**

sectors earlier. Health, energy, agriculture, transport and manufacturing organisations should help shape programmes before the technology has already been developed.

- **Sixth, focus on where the UK can win.** Market-building should concentrate resources on companies and capabilities with commercial potential, credible routes to growth and alignment with national strengths, while being willing to stop support where the evidence is weak.

There is also a place dimension. The UK's space clusters and regional partnerships show that space policy is about where innovation-led growth happens, not only which national capabilities are built. Future policy should treat space as a route to productivity and opportunity across the UK.

The UK should continue investing in ambitious technologies and infrastructure. Technical excellence remains essential, but the next phase of space policy should also be judged by what capability changes in the real economy: whether customers are secured, businesses scale, industries adopt new tools, public services improve, international markets

open, regional economies benefit, and strategic dependencies are reduced.

That means building markets with the same discipline used to build technology: creating demand, proving value, reducing uncertainty, connecting with user sectors and focusing effort where the UK has a credible route to win. Britain has spent years building impressive space capability. The next task is to make sure that capability finds the customers, evidence and routes to adoption that give it purpose.

It is a unique and successful model adopted by other bodies, notably the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES). The IPCC's tried and tested ways of working will allow it to deliver clear, authoritative, timely and actionable findings for policymakers and other decision-makers in the coming years. □

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Joaquin Perez-Grande is a Partnerships and Policy Manager (Place) at the Satellite Applications Catapult, supporting the Catapult's Beyond Earth Mission to grow the in-space economy. He works at the intersection of policy, place-based innovation and cross-sector partnership building, helping to create the enabling conditions for in-orbit servicing, assembly and manufacturing (ISAM) and microgravity-enabled applications.

2016

The wellbeing of our young people

In each issue, the Foundation will look back at an event from our archive. In this edition, we will be digging into an FST discussion that we hosted at The Royal Society of Edinburgh a decade ago on the wellbeing of young people.

2016 saw a Foundation event entitled 'Health, happiness and well-being: supporting the transition from adolescence to adulthood' held at the Royal Society of Edinburgh. With social media bans for young people recently announced in the UK and abroad, children's mental health is at the forefront of public debate.

The speakers at this event included:

- **Dr Joanna McLean**, Research and Development Manager, Scotland, Mental Health Foundation
- **Dr Helen Sweeting**, Reader, MRC/CSO Social and Public Health Sciences Unit, University of Glasgow
- **Prof Lord Layard FBA**, Director, Well-Being Programme, Centre for Economic Performance, London School of Economics and Political Science
- **Catherine Calderwood**, Chief Medical Officer, Scottish Government.

Dr McLean's systematic review of the more successful population-based interventions found several common features. These interventions often touched on personal development, were engaging and interactive, and consisted of multiple components such as policy and taxation, mass-media and family involvement. She noted that digital interventions – often low-cost – may prove promising, but that evidence is currently limited. Unlike many systematic reviews, Dr McLean asked young people themselves about their priorities when moving into adulthood. Among their highest priorities were a supportive network of both peers and adults. She also pointed out that research often focuses on reducing risk rather than promoting positive wellbeing.



SHUTTERSTOCK/SABPHOTO

A second review, presented by Dr Sweeting, looked at individual-level interventions on vulnerable young people. The key finding was the lack of evidence for firm conclusions across any of the interventions, including practical support, mentoring, and psychological interventions. A very limited amount of evidence was found for mentoring and cognitive behavioural therapy (CBT) in particular vulnerable groups. She suggested that interventions which have more practical aims (such as employment and education) should also measure mental health and wellbeing outcomes in future.

Minimising misery

An enquiry led by former Cabinet Secretary Gus O'Donnell, *Wellbeing and Policy*, was discussed by the third speaker, Professor Lord Layard. Mental illness is a great threat to someone's sense of wellbeing, more so than income or education, and 50% of mental illness manifests by the age of 16. The report suggests that policies should be measured by aggregate individual happiness, but with a particular weight on minimising misery. Both early treatment and general prevention are important: only 26% of 16- to 25-year-olds with mental health problems were treated, compared to 75% for physical health problems. Digital CBT was seen as particularly effective, with recovery rates

of 75% for social anxiety disorder, but taking only a quarter of the time. A wellbeing rating for schools in addition to academic achievement was suggested. Finally, he highlighted that cultural change is needed in society. Progress is under way, but is held back by Puritan beliefs.

The discussion was opened by Dr Calderwood. She discussed the funds allocated by the Scottish Government for mental health provision, but emphasised that tough choices must be made on where this should be directed. Participants were concerned that the reports only concentrated on vulnerable young people, and that the whole age group should be considered too, especially for preventative measures.

Panellists discussed the importance of considering the opinions, reactions and engagement of young people themselves when designing programmes. The stark lack of evidence for the effectiveness of particular interventions undermined the idea of a phased programme which will inform policy. Research typically considers mental health outside contexts such as housing and education. While funding is important to consider, cost-free initiatives are possible, such making use of the voluntary sector, and many interventions have economic benefits in the long term.

Read the full event summary and listen again at bit.ly/FST_wellbeing. □

Forthcoming and recent events

Presentations and audio recordings from all meetings of the Foundation for Science and Technology are available at: www.foundation.org.uk

FORTHCOMING EVENTS

Horizon Europe and beyond: should the UK continue to associate?

Wednesday 27th January 2027

The Royal Society and online

Joint FST/Council for Science and Technology event

Wednesday 9th December 2026

The Royal Society and online

In conversation with Lord Vallance

Wednesday 11th November 2026

Harwell Science and Innovation Centre

Can we devolve more science and innovation spending?

Wednesday 7th October 2026

The Royal Society and online

In the debate about how the UK's science and innovation funding is distributed, questions range from whether giving cities and regions greater control over investment could help drive economic growth across the country, to what greater devolution means in practice. On Wednesday 7th October, we will host a discussion at The Royal Society to explore these themes and how the UK can support growth across the country while maintaining the research excellence that underpin its international competitiveness.

RECENT EVENTS

From publication to public action: the case for responsible science activism

Wednesday 18th March 2026

The Royal Society

Adapting to climate change – how prepared is the UK?

Wednesday 25th February 2026

The Royal Society

Resilience of the UK's national infrastructure

Wednesday 28th January 2026

The Royal Society

Opportunities and challenges in science, technology & innovation

Wednesday 19 November 2025

Liverpool University

[The UK Life Sciences Strategy](#)

Wednesday 12 November 2025



Past events

AI and the future of work Wednesday 22 October 2025

Belfast

Patricia O'Hagan, Deputy Chair, Matrix
Professor Helen McCarthy, Chief Scientific and Technology Adviser, Northern Ireland Assembly
Professor Philip Hanna, Dean of Education, School of Electronics, Electrical Engineering and Computer Science, Queens University Belfast
Dr David Jordan, Lecturer in Economics, Queens University Belfast, and Ministerial Adviser on Productivity

In conversation with Professor Dame Ottoline Leyser

Wednesday 8th October 2025

The Royal Society

Exascale computing for research and the implications of quantum computing, AI and Net Zero May 29, 2025

Professor Mark Wilkinson, Professor of Theoretical Astrophysics and Director of the DiRAC High Performance Computing Facility, University of Leicester
Professor Mark Parsons, EPCC Director and Dean of Research Computing, College of Science & Engineering, University of Edinburgh
Professor Katherine Royse, Director, Hartree Centre, STFC

How can R&D collaboration with Africa support an agenda for sustainable growth in the UK and beyond?

Wednesday 11th June 2025

The Royal Society, London

Dr Rhona Mijumbi, Co-Director at The Center for Rapid Evidence Synthesis (ACRES), Makerere University and Head of the Policy Unit at the Malawi-Liverpool-Wellcome Programme at the Liverpool School of Tropical Medicine
Professor Ambreena Manji, Dean of International for Africa at Cardiff University, and former director of the British Academy's British Institute in East Africa
Professor Christopher Smith, Executive Chair of AHRC and UKRI International Champion

Decarbonising the built environment and delivering the Warm Homes Plan - the role of social science and engineering May 21, 2025

Professor Jennifer Schooling, Professor of Digital Innovation and Smart Places, Anglia Ruskin University
Helene Gosden, Associate Director, Retrofit

at Scale Taskforce Leader, Arup
Professor Chris Wise FREng, Senior Director, Expedition Engineering and the Useful Simple Trust
Professor Mari Martiskainen, Director, Energy Demand Research Centre, University of Sussex

How can space science missions advance science, drive innovation and create a vibrant UK space industry?

April 30, 2025

Professor Carole Mundell, Director of Science at the European Space Agency and Head of the European Space Astronomy Centre
Professor Adam Amara, Chief Scientist, UK Space Agency
Dr Tudor Williams, Chief Technology Officer, Filtronic

Critical Minerals – how can science and technology help deliver the UK Strategy? February 24, 2025

Professor Paul Monks, Chief Scientific Adviser, Department of Energy Security and Net Zero
Dr Gavin Mudd, Director, Critical Minerals Intelligence Centre, British Geological Survey
Dr Sarah Gordon, Chief Executive Officer, Satarla, and Co-Director of the Rio Tinto Centre for Future Materials, Imperial College
Professor Emma Kendrick, Chair of Energy Materials, School of Metallurgy and Materials, University of Birmingham

Governing AI for humanity – what is needed globally and in the UK?

January 29, 2025

Feryal Clark MP, Parliamentary Under-Secretary of State for AI and Digital Government, Department for Science, Innovation and Technology
Dr Douglas Gurr, Director of the Natural History Museum and Chair of The Alan Turing Institute
Professor Dame Wendy Hall DBE FRS FREng, Regius Professor of Computer Science, University of Southampton, and Member of the UN High Level Advisory Board on AI
Adrian Joseph OBE, Board Member and AI Advisor (DirectLine Group, National Lottery, GOSH and Natwest), former Chief Data and AI Officer BT Group

How can science and technology contribute to the UK's Industrial Strategy? December 2, 2024

Dr Julia Sutcliffe, Chief Scientific Adviser, Department for Business and Trade
Professor Mariana Mazzucato, Professor in

the Economics of Innovation and Public Value, University College London
Dr Peter Waggett, UK Director of Strategic Relationships, IBM Research Europe, IBM UK
Rt Hon Greg Clark, Executive Chair, Warwick Innovation District, and former Secretary of State for Business, Energy & Industrial Strategy

Building careers and skills in science and technology for national and global challenges

November 8, 2024

Professor Sarah Sharples, Chief Scientific Adviser, Department of Transport
Dr Stephen Hendry, Programme Manager Socioeconomic Inclusion, Royal Society of Chemistry
Dannielle Croucher, Policy Lead for Skills and Talent, National Centre for Universities and Business
Dr Billy Bryan, Evaluation and Research Leader, RAND Europe
Professor Christopher Smith, UKRI International Champion and Executive Chair of AHRC
Professor Marika Taylor, Pro Vice Chancellor and Head of College of Engineering and Physical Sciences, University of Birmingham
Alex Hale, Technology Programme Manager, National Composites Centre
Dr Geoffrey Neale, Royal Academy of Engineering Research Fellow and Lecturer, Cranfield University

Should R&D policies and budgets be devolved to English regions?

October 23, 2024

Professor Tim Jones, Vice-Chancellor, University of Liverpool
Thomas O'Brien, Vice-Chair, Liverpool City Region's Innovation Zones Program
Dr Lesley Thompson, Vice-President Funders Global; Business Development, Elsevier
Dean Cook, Executive Director – Place, Innovate UK, UKRI

In conversation with Professor Dame Angela McLean

October 9, 2024

Professor Dame Angela McLean DBE FRS, Government Chief Scientific Advisor
The Rt Hon the Lord Willetts FRS, Chair, The Foundation for Science and Technology

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Matrix - The Northern Ireland
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Medical Research Council, UKRI
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Natural Environment Research
Council, UKRI

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The Royal Academy of Engineering
The Royal Commission for the
Exhibition of 1851
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Can we devolve more science and innovation spending?



Wednesday 7th October 2026

The Royal Society

Details and registration via our website www.foundation.org.uk/events

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