Advanced Research + Invention Agency

ARIA

Activating the ecosystem

Contents

For more about our mission and the latest news, visit our website: **aria.org.uk**

Follow our progress

Subscribe to our newsletter
substack.com/@ariaresearch

Email updates
aria.org.uk/updates

LinkedIn
advanced-research-and-invention-agency

Twitter/X
@ARIA_research

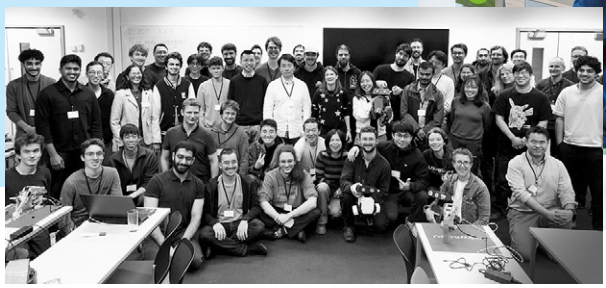
Bluesky
@aria-research.bsky.social

Our mission

ARIA's mission is to unlock scientific and technological breakthroughs that benefit everyone. Our success will be measured by the lives transformed by ARIA's work.

But we can only succeed by building communities around us, bringing together the people, capabilities, and institutions needed to turn bold ideas into real-world breakthroughs.

From the funded teams working across each opportunity space, to the new partnerships, networks, and unexpected collaborations forming around them, 2026 is the year those connections begin to compound and accelerate our progress.



“I admired ARIA’s ambition long before joining as CEO. Seeing that ambition in action, and the progress already made, has only strengthened my belief in its potential.”

Kathleen Fisher
CEO

The UK is closer than many realise to shaping the next wave of global scientific progress. The density of talent, the ability to bridge disciplines, and the willingness to try new ways of supporting ambitious science mean the opportunity is ours to seize.

ARIA by the numbers:

+£500m
of funding under agreement

11
international organisations attracted to the UK

14
live programmes

16
new companies catalysed

200
R&D Creator teams across the UK

30%
of funding going to SMEs

I admired ARIA's ambition long before joining as CEO. Seeing that ambition in action, and the progress the organisation has already made, has only strengthened my belief in its potential.

Today, that ambition is no longer theoretical. Thanks to the work of the people who have built ARIA over the past three years — an exceptional team of Programme Directors, technical experts, operational staff, and partners — we have committed over £500m across our live programmes. Those programmes now support more than 200 Creator teams: from ambitious startups in Glasgow to advanced engineering partners in Sheffield, and world-class university labs across the UK.

But ARIA's potential cannot be measured only in programmes launched or funds committed. It lies in how we pursue breakthroughs and the kind of progress that approach can catalyse across the ecosystem.

At its best, ARIA has the capacity to unlock three miracles.

The first is breakthrough science that resets what's possible: not incremental advances, but genuine step-changes that redefine what we mean by safe AI or unlock therapies that were previously unimaginable. Many attempts will not succeed, but at the frontier, a well-understood failure is often the most direct path to progress.

The second miracle is societal impact: turning discoveries into new industries, capabilities, and better lives for people across the UK and beyond. Groundbreaking science is essential, but so is clarity about why it matters and who might carry it forward. Our Programme Directors actively steer their programmes, pushing teams to aim for outcomes that redefine what success looks like, not just improve it at the margins. From the outset, each programme is designed with translation in mind, getting breakthroughs to the point where industry, government, or investors can carry them forward with confidence.

The impact of this model is already taking shape. In February, we doubled down on our Scaling Compute programme and announced £50m to build the Scaling Inference Lab, a national testbed where startups can showcase the next generation of AI hardware.

Partnerships are also helping teams move from the lab to capabilities faster. Amodo Design, one of our Activation Partners, applies world-class engineering to help ARIA programmes overcome hardware blockers that can stall frontier research. In one case, a team developing Arctic observation systems moved from concept to a field-ready modular battery prototype in just three months, a journey that under traditional funding routes could have taken up to four years. That tenfold compression of timelines changes what becomes possible.

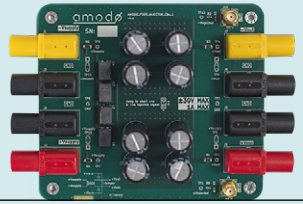
The third miracle is harder to measure but just as real: a shift in mindset. Breakthrough science changes what we believe is possible. In a period often described as pessimistic, ARIA is a deliberate commitment to hope, and to the belief that the best of what science can do for humanity is still ahead of us.

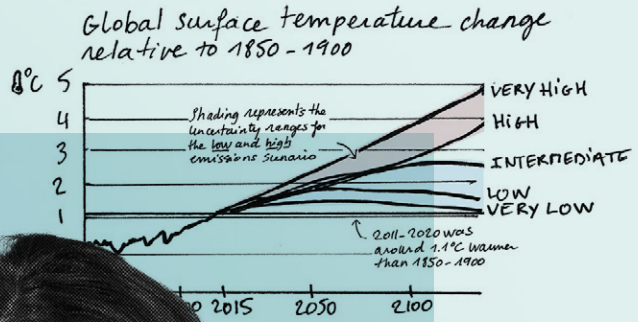
As ARIA enters its fourth year, and my first as CEO, our focus is clear: protect that culture of intelligent risk; be rigorous about translation; and ensure ARIA is deeply connected to others who are equally committed to shifting the boundaries of what is possible.

Kathleen Fisher
CEO

What we're building

Our work sits at the edge of possible. Three years in, we're catalysing new paths forward for those who think differently.





Scaling momentum: 2025 highlights

Breakthroughs require three things: capabilities, communities, and capital. Over the past year, we've seen momentum build across all three.

Capabilities

We're expanding our surface area for breakthroughs: opening up new scientific frontiers and building the foundations for future programmes.

- We launched seven new opportunity spaces, extending into areas ranging from programmable matter to shaping innate immunity.
- Our opportunity spaces are already beginning to translate into new capabilities. In our Precision Neurotechnologies programme, a novel ultrasound-based brain imaging system is now part of a clinical study being run by an NHS Trust. The technology is being used to scan the brains of people who have had part of their skull removed, helping researchers to better understand brain processes so they can develop highly precise, minimally invasive treatments for brain conditions.
- Oshen, funded by our Forecasting Tipping Points programme, has achieved a world-first by deploying autonomous sensing platforms into a Category 5 hurricane — gathering data in conditions previously considered intractable — whilst doubling the size of its UK-based team within six months (see page 21).

Communities

New communities are taking shape around ARIA's work, connecting the people, ideas, and disciplines necessary to achieve breakthroughs.

- We brought our community together in person for the first time at the ARIA Summit, convening more than 500 researchers, entrepreneurs, and partners. Creators shared early results, alongside voices from across science, industry, and government — building a shared sense of ambition, identity, and direction for ARIA's work.
- We're seeing broader ecosystem connectivity begin to take hold. Our Activation Partner Venture Café launched weekly gatherings in London, Manchester, and Edinburgh, bringing together more than 10,000 people across the UK's science and technology ecosystem. At a smaller scale, our Innovator Circles pilot has shown how high-trust technical communities can unlock new ideas.
- Our growing momentum is also reflected in the talent drawn to ARIA. We received more than 300 applications for our CEO role, including from Advanced Research Project Agencies (ARPAs), successful entrepreneurs, and metascience leaders from across the globe.

Capital

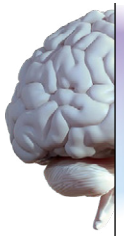
We're committing capital at scale and beginning to see it translate into new organisations, companies, and economic activity.

- We've committed more than £500m across our live programmes. We fund more than 200 teams at the frontier of R&D, tackling intractable problems and advancing ideas with real-world potential.
- ARIA funding has already catalysed the formation of 16 new UK-based companies and attracted 11 new UK subsidiaries of international companies. 5% of ARIA awards have triggered the formation of new companies.
- One example is Callosum, a startup building a new class of AI infrastructure: systems-level software that makes diverse chip architectures work together, co-optimising workflows, models, and silicon in real time to unlock orders-of-magnitude improvements in performance and cost. Founded by two ARIA Creators, the company has since raised $10m, secured investment from the UK Sovereign AI Fund, and become an inaugural partner in our Scaling Inference Lab. The team credits ARIA's Nature Computes Better seed funding as pivotal to their public launch.

Our opportunity spaces

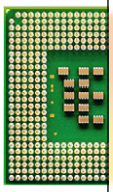
Opportunity spaces are critically important but underexplored areas of research that we believe are ripe for breakthroughs. They each serve as a bedrock for multi-year programmes, as well as additional flares of seed funding to support researchers pursuing bold ideas. Over the last year, our second cohort of Programme Directors defined a new set of opportunity spaces, and we deepened our overall portfolio by launching additional programmes in existing spaces.

First set of opportunity spaces

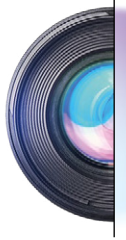


Scalable Neural Interfaces

Programmable Plants

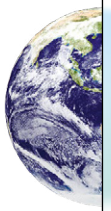


Nature Computes Better

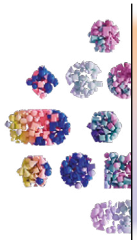


Scoping Our Planet

Smarter Robot Bodies



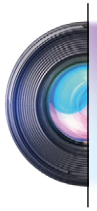
Future Proofing Our Climate and Weather



Mathematics for Safe AI

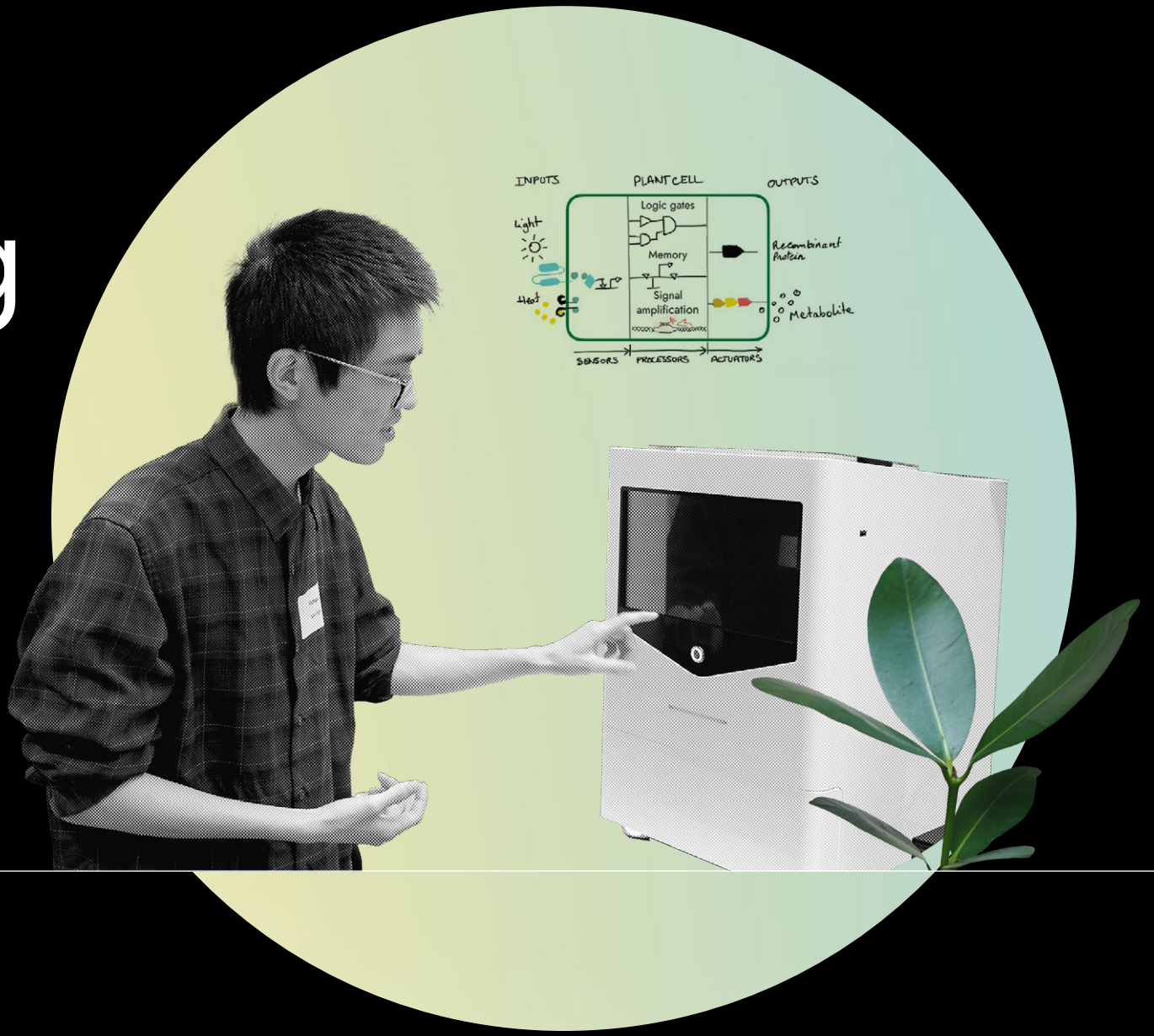
New opportunity spaces

Opportunity space	Description	Programme	Programme Director
 Sculpting Innate Immunity	As the body's first line of defence, the innate immune system has enormous therapeutic potential, sensing and initiating responses to infection, injury, metabolic stress, and chronic inflammation. Sculpting Innate Immunity explores if precision modulation of innate immunity could unlock transformative solutions for society's major health challenges, from rapidly mutating pathogens to chronic disease.	**Sustained Viral Resilience** This programme seeks to create a new class of medicines that provide durable, broad-spectrum protection against respiratory viruses by engineering the innate immune system.	 **Brian Wang**
 Bioenergetic Engineering	Genetic engineering now lets us control life's information, but the engineering of life's energy remains underdeveloped, limiting what biology can do for health, resilience, and productivity. Bioenergetic Engineering explores how we can build enabling tools to understand and reprogramme energy flows inside cells.	**Precision Mitochondria** This programme aims to create a foundational toolkit for engineering the mitochondrial genome in vivo, turning the mitochondrion into a programmable system, and empowering scientists to rigorously and robustly investigate the link between mitochondrial health and disease.	 **Ryan Olf**
 Manufacturing Abundance	Ages of human history are defined by materials that transformed societies and breakthroughs in our mastery over matter, yet we still cannot reliably assemble molecules into bespoke, scalable solutions without high costs to energy, waste, and planetary health. Manufacturing Abundance explores how assembling molecules into bespoke materials could enable us to programmably assemble matter, creating more resilient societies and unlocking sustainable abundance.	**Universal Fabricators** This programme aims to create scalable processes that use proteins to template the assembly of inorganic and composite materials, with structures that currently cannot be mass manufactured.	 **Ivan Jayapurna**
 Engineering Ecosystem Resilience	Living organisms underpin our food, climate stability, and materials, but ecological collapse threatens the foundations of civilisation. Engineering Ecosystem Resilience explores whether we can become more precise and purposeful in how we monitor and intervene in ecosystems, pairing high-resolution management with targeted, resilience-boosting interventions to reverse biodiversity decline and enable both humanity and nature to thrive.	**Accelerated Adaptation** This programme explores potential pathways to accelerate the adaptation of wild species in order to prevent biodiversity loss and secure the natural infrastructure that underpins our global economy and wellbeing. Concurrently, the programme will rigorously assess the ethical and governance implications around these pathways.	 **Yannick Wurm**

Opportunity space	Description	Programme	Programme Director
 Trust Everything, Everywhere	Trust 'building blocks', like encryption, enable digital industries to flourish securely, but they don't extend into the physical world, especially as technology blurs the lines between digital and physical. Trust Everything, Everywhere explores how we can build new trust infrastructure that can extend formal security reasoning into the physical world, enabling safe, verifiable interactions amongst people, devices, and agents.	**Scaling Trust** This programme explores how AI agents could securely coordinate, negotiate, and verify with one another on our behalf. By developing new protocols and mechanisms for AI-to-AI trust, the programme aims to enable AI systems to collaborate safely in complex digital and physical environments.	 **Alex Obadia**
 Extending Our Perception	The world is rich with information hidden from human senses and not captured by our algorithms, meaning we're often unable to 'see' the most informative variables in complex systems. The next era of AI will require Hypersensory Intelligence: AI and novel sensors co-engineered to perceive reality in new ways, catalysing breakthroughs across disciplines. Extending Our Perception explores how we can develop Hypersensory Intelligence so that perception itself becomes a new engineered capability.	**Hypersensory Intelligence: Olfactory Perception** Claire Donoghue is developing the first programme within this space; the direction is to advance digital olfaction as a new sensing modality, pairing emerging chemical sensing technologies with model architectures that can interpret high-dimensional real-world signals. This approach addresses the current lack of standardised devices, large-scale datasets, and integration into multimodal AI systems across domains where conventional sensors fall short.	 **Claire Donoghue**
 Scoping Our Planet (expanded)	Our understanding of the Earth system is limited by serious measurement and modelling gaps that lead to unacceptable uncertainties in weather and climate predictions. Scoping Our Planet seeks to unite frontier platforms, sensors, and AI models to revolutionise our understanding of our Earth system, maximise planetary resilience, and revolutionise global business.	**Enduring Atmospheric Platforms** This programme aims to unlock the stratosphere as a new infrastructure layer for advanced communications. We'll fund teams tackling the interdependent challenges of flight and energy to enable low-cost, persistent, autonomous atmospheric platforms operating between Earth and space.	 **Rico Chandra**
 Collective Flourishing	Societies have more data, connectivity, and technologies than ever before, but our tools for navigating the future haven't kept pace with its growing complexity. Collective Flourishing looks at how we can build new technical capabilities — a deliberative scaffolding — to augment our collective ability to envision, deliberate, and act on complex, large-scale challenges.	***Programme in development*** Nicole Wheeler is developing the first programme in this space, focusing on technical approaches that combine modelling and foresight with interfaces and processes that augment collective reasoning.	 **Nicole Wheeler**

Our funding in action

Our R&D Creators are how our ambitions become reality. Across our opportunity spaces, the first signs of what's possible are beginning to emerge.



Scalable Neural Interfaces

Precision Neurotechnologies

One in six people in the UK live with a neurological condition. These disorders affect the lives of millions of individuals, and cost the NHS an estimated £4.4bn each year. Many of these conditions are disorders of neural circuits, involving a diversity of cell types distributed across different brain regions that shape how we think, feel, and act. Yet today's treatments are often blunt or highly invasive, unable to target these circuits with the necessary rigour.

Our Precision Neurotechnologies programme aims to change this reality. Backed by £69m, the programme is developing targeted tools that combine engineered biology and advanced hardware to interface with the brain with unprecedented precision. If successful, the programme will unlock the full potential of neurotechnology, moving us closer to a world in which precise, effective, and personalised brain health care is available to everybody.

£4.4bn

Estimated cost of neurological conditions to the NHS each year

Massively Scalable Neurotechnologies – a second programme

What if treating severe depression were as simple as a flu jab?

ARIA has committed a further £50m to Massively Scalable Neurotechnologies, a second programme within the Scalable Neural Interfaces opportunity space. Led by Programme Director Jacques Carolan, the programme seeks radically new ways to deliver responsive neurotechnologies to the brain without transcranial surgery, including approaches that leverage the body's natural pathways to reach the central nervous system. The programme will award funding to Creators in summer 2026.

"Just as the transistor enabled the pacemaker revolution, the future of surgery-free neurotechnology will be shaped by the convergence of engineered biology and engineered hardware."

Jacques Carolan
Programme Director

Project spotlight

Non-invasive neural interfaces for high-precision treatment

Project lead: Òscar Calderón Agudo (Sonalis)

Sonalis is developing a new kind of brain interface that could allow doctors to both read and influence neural activity without surgery. Working with Imperial College London and UCL, the team is building a system that combines ultrasound and electric fields to communicate with the brain's natural signals at extremely precise locations. Today, most technologies that interact with the brain either require invasive surgery or lack the precision to target specific neural circuits. The team aims to unlock a non-invasive alternative capable of operating across the whole brain. If successful, Sonalis' technology could open the door to safer, more scalable ways to diagnose and treat conditions such as epilepsy, Parkinson's disease, and dementia.

Since the project began in January 2025, the team has validated its approach across multiple frequencies, strengthening confidence in the technology's underlying physics. The team has also built a specialised laboratory system for studying how ultrasound interacts with the brain's electrical signals, alongside new computational tools to precisely focus those signals inside the brain. ARIA has helped accelerate progress by connecting Sonalis with Activation Partner Amodo Design, whose team has supported the development of critical electronics and provided additional computing capability, enabling more complex modelling and experimentation.

The next major milestone is building and testing a wearable 'helmet' prototype, enabling delivery and recording of these signals across multiple regions of the brain. Upcoming experiments will expand from laboratory models to more complex biological systems, with the longer-term goal of demonstrating the technology in human volunteers and pre-operative epilepsy patients. If successful, this work could help transform how we study and treat brain disorders by making high-precision neural interfaces safer, more accessible, and easier to scale.

"ARIA has been uniquely valuable in giving us the freedom to pursue a high-risk project that wouldn't have been feasible through traditional funding or private investment, whilst helping us to connect with the right expertise and partners. This has allowed us to move at a significantly faster pace than would otherwise be possible."

Òscar Calderón Agudo
Sonalis

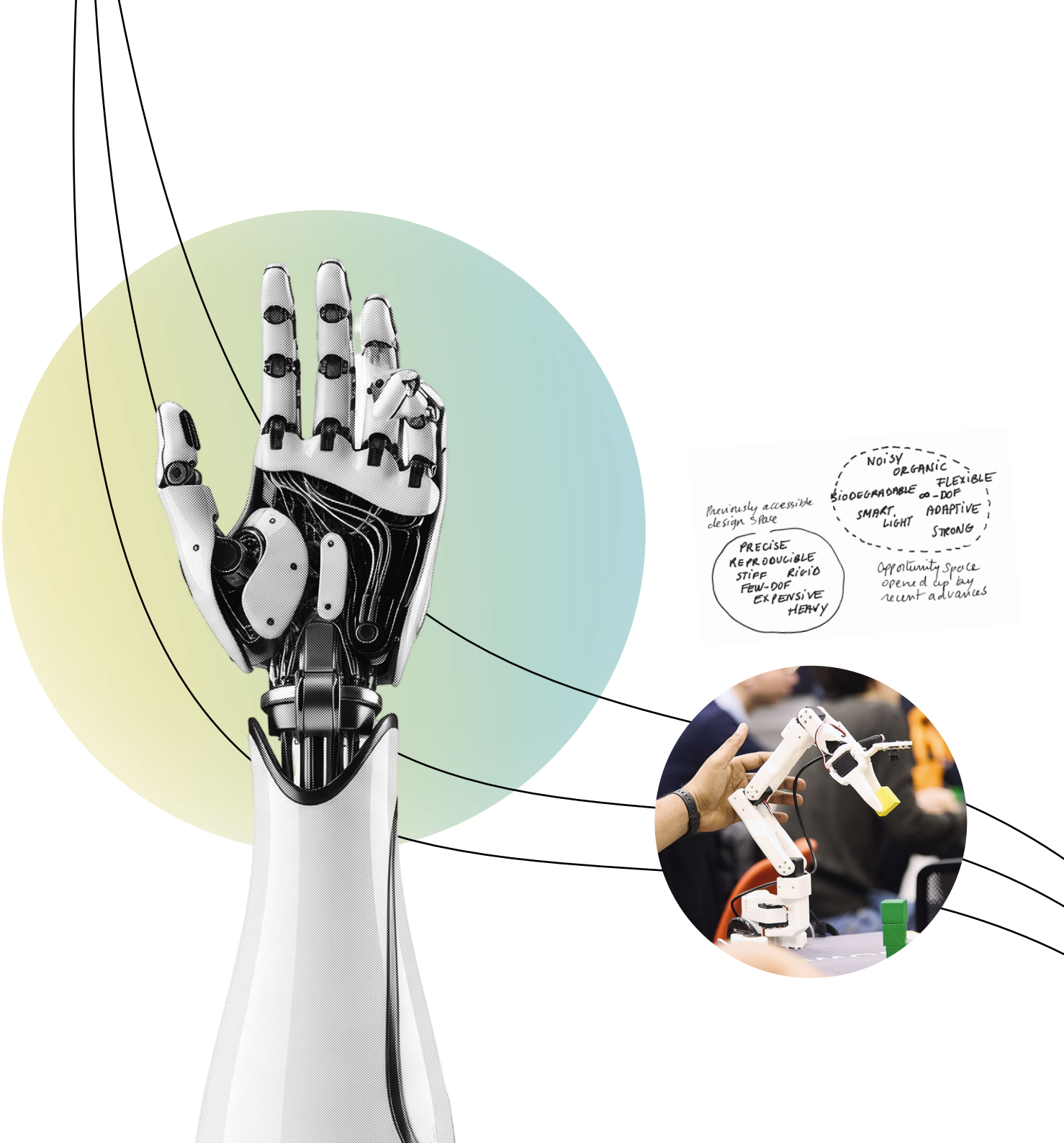
Smarter Robot Bodies

Robot Dexterity

For the first time in history, global population growth is forecast to slow to zero by the end of the century. As societies age and the number of working-age people shrinks, we face an increasing shortfall in the workforce needed to sustain complex economies and standards of living.

Robots could help close the gap, but today's machines still fall far short of human capabilities. Breakthroughs in AI have transformed robots' intelligence, while their hardware hasn't kept pace. Most robots are still built with rigid components and centuries-old motor technology — and AI is working overtime to compensate. The result is robots that cannot match the flexibility, speed, and precision of human manipulation, rendering them ineffective for many of the difficult or dangerous tasks where we need them most.

The Robot Dexterity programme is designed to close this gap. Backed by £57m, we're funding the next generation of hardware built for AI, focusing on a critical missing piece: a robot manipulator that's as capable as the human hand. If successful, the programme could transform robotic capabilities at a pivotal moment for human productivity and welfare.

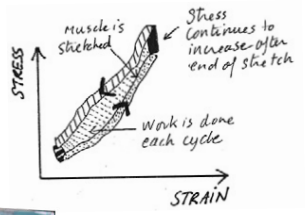


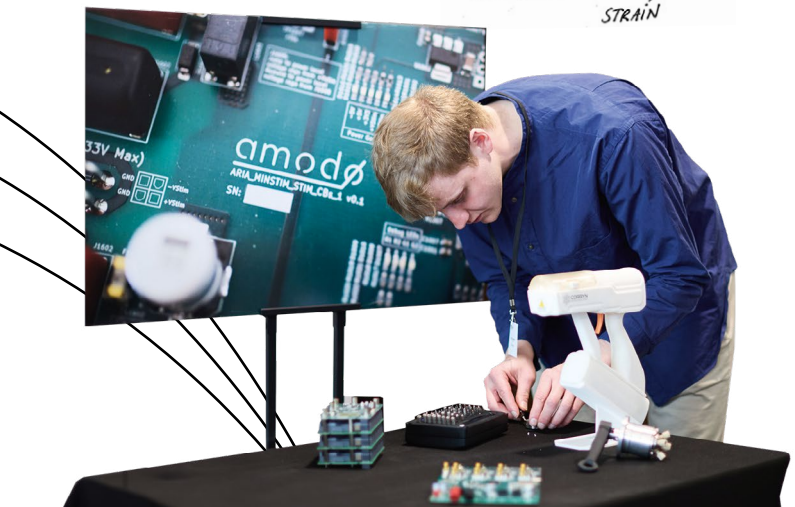
Project spotlight

Unlocking human-level dexterity in robotic hands

Project leads: Tairan Wang (Sangtera) + Jakub Kedzierski (MIT Lincoln Laboratory) + Chia-Chun Chung (Cadence Process Consulting)

Tairan Wang and team are developing a next-generation robotic actuator: the elements responsible for movement by acting as the robot's 'muscles', converting energy into physical motion. The human hand's 27 degrees of freedom allow it to perform precise, complex tasks, but existing robotic hands fall short due to these bulky, inefficient components. Sangtera's actuators are powered by surface tension and offer torque densities hundreds of times greater than traditional options, which unlocks the possibility of gearless and compact designs. These actuators are the size of human finger joints, and could therefore enable us to build robotic hands with bio-aligned dexterity, marking a paradigm shift in manufacturing and a reimagining of how robot components are built and sourced. By continuously improving actuator performance, compactness, and cost-effectiveness, this project could transform robotic manipulation across industries and address labour shortages by automating repetitive, physically demanding, and unsafe tasks.





In its first six months, the team progressed from concepts to functional, finger-joint-sized prototypes. This rapid acceleration was enabled by active cross-project collaboration between the programme and Amodo Design: an ARIA Activation Partner. Sangtera and Amodo worked together to translate their early designs into prototypes with novel design features, opening new pathways for electronics and control integration. Sangtera has filed a patent for their work, which includes a named Amodo Design engineer. The team also shared their prototypes with Shadow Robot — an industry leader and fellow Creator on the programme — for testing and for immediate feedback on performance requirements, helping to improve the industry readiness of their hardware.

The Sangtera team has also won venture capital investment as a result of ARIA's funding. Going forward, the team plans to finalise international supply chain partners in the US and Taiwan, expanding their impact beyond the UK.

"Sangtera's pace and progress have been impressive. They've already knocked down several technical hurdles and realised they can do more than just produce a prototype: they can go as far as manufacturing actuators on LCD panels with the help of international foundry partners. This will increase the level of automation and speed of production they can achieve – and we've given them a funding boost to deliver this."

Jenny Read
Programme Director

Mathematics for Safe AI

Safeguarded AI

Artificial intelligence is advancing at extraordinary speed, enabling and accelerating both offensive and defensive applications. To ensure that societal resilience keeps pace, we need to build infrastructure that directs as much AI capability as possible towards resilience-enhancing applications.

Backed by £59m, our Safeguarded AI programme is building a mathematical assurance toolkit that allows AI to produce verified outputs — from hardened software components to cyber-physical control systems and scientific models — at unprecedented speed and scale. Rather than directly relying on human reviewers, this approach enables scalable oversight through mathematical proof: overseers specify their requirements, and the mathematics is able to ensure a verified output.

Rapid advances in AI have outpaced initial assumptions about how and where high-risk systems would emerge. In response, the programme has pivoted to strengthen its core safety toolkit and focus on areas where robust guarantees are most urgently needed. Cybersecurity is the first and most urgent proving ground for this toolkit. The programme is targeting critical defensive building blocks where correctness produces outsized resilience gains. This includes protecting the boundaries of critical infrastructure, securing AI systems from interference and exploitation, and ensuring that the verification methods themselves are reliable. As the toolkit develops, the goal is for it to expand beyond any single application. If successful, the programme will help to establish the meticulous safety standards needed to unlock the full potential of AI, whilst ensuring it can be used with confidence in high-stakes environments.

Programme Director transition

Programme Director roles at ARIA are time-limited by design, ensuring a continual influx of new ideas, perspectives, and leadership. This creates urgency, keeps programmes focused, and allows fresh thinking to shape work as it evolves.

As a result, transitions are an expected part of how programmes evolve over time. By the time leadership changes, programmes are already underway, with teams, funding, and momentum in place. New Programme Directors build on that foundation, bringing new perspectives and directions where needed.

As part of this model, leadership of the Safeguarded AI programme has evolved from founding Programme Director David ‘davidad’ Dalrymple to Nora Ammann, who previously served as Technical Specialist.

Nora Ammann
Programme Director

Project spotlight

Mathematical guarantees for safe and reliable AI

Project lead: Mirco Giacobbe (University of Birmingham)

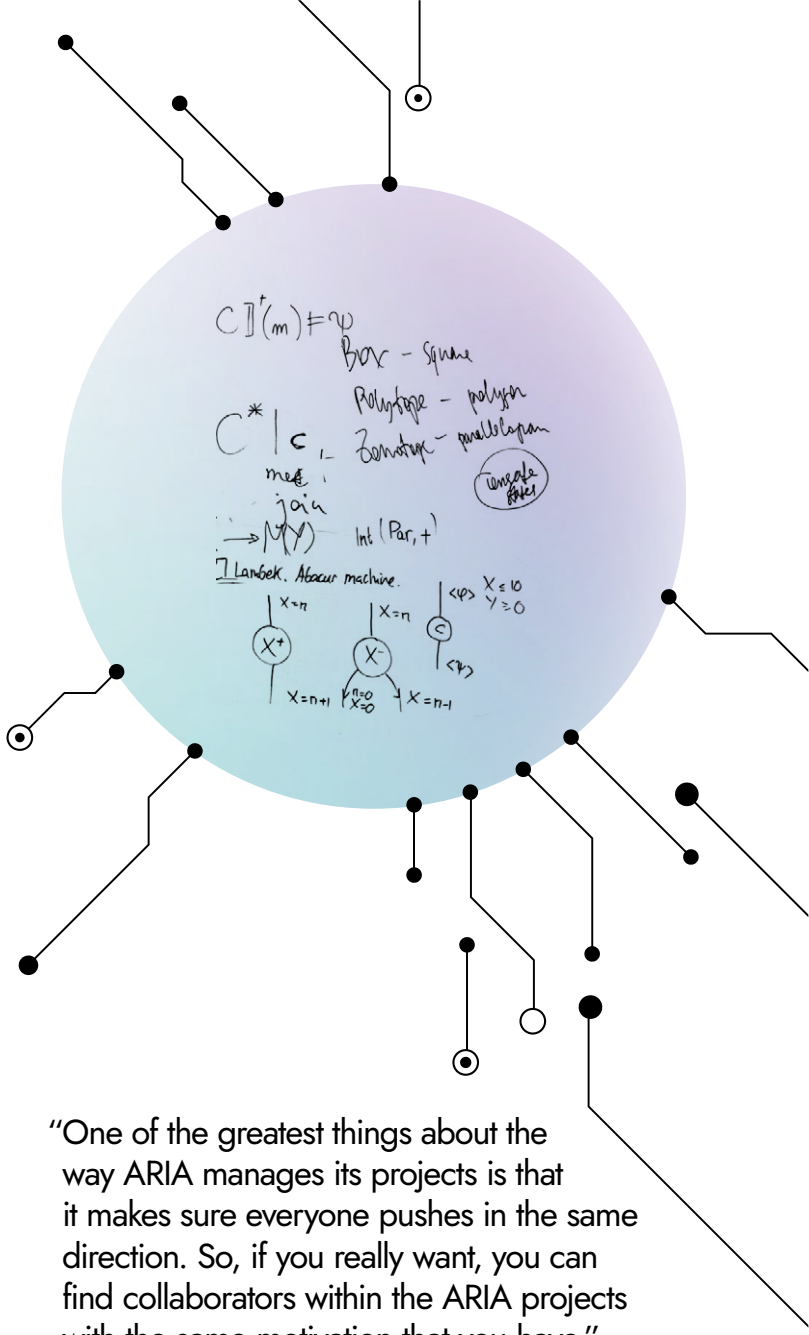
Mirco Giacobbe and team are driving a new foundation for trustworthy AI, exploring the use of proof certificates: mathematical guarantees that demonstrate whether a system will behave safely under uncertainty. They're applying these methods to complex real-world systems, including biopharmaceutical manufacturing. By building verified models of how sensitive medicines degrade and move through manufacturing processes, the project aims to show how AI can optimise production, whilst still meeting the strict safety and quality standards required in the pharmaceutical industry. If successful, the project could help to unlock AI adoption in safety-critical sectors, where reliability is essential.

Since the project began, the team has developed a physics-based model predicting how biopharmaceutical products degrade over time, validated using real-world data from AstraZeneca. This collaboration has helped to connect the research directly to industry needs, whilst demonstrating how formal verification techniques could support practical manufacturing decisions. Beyond this application, the work is also helping to establish a broader research community around neural proof certificates, with growing academic and industry interest from organisations including Amazon and Mitsubishi.

Going forward, the team will continue expanding the verification framework so that complex AI-driven systems can be formally proven safe before deployment. Alongside further collaboration with industry partners, the researchers are advancing new mathematical tools and software for automated reasoning about AI systems. If successful, the project could help lay the foundations for an emerging industry built around formal guarantees for AI, enabling safer deployment of powerful systems across multiple sectors, from manufacturing to infrastructure.

"As AI capabilities grow, it will be increasingly hard to make good judgement calls about the quality and trustworthiness of its outputs, such as code. To leverage the full potential of AI for engineering, we have to solve the problem of scalable oversight so that humans can have justified confidence in the outputs of AI systems."

Nora Ammann
Programme Director



"One of the greatest things about the way ARIA manages its projects is that it makes sure everyone pushes in the same direction. So, if you really want, you can find collaborators within the ARIA projects with the same motivation that you have."

Mirco Giacobbe
University of Birmingham

Nature Computes Better

Scaling Compute

Our use of AI has grown exponentially, but its ubiquity is exacerbating unsustainable demand for compute. With growing dependence on leading-edge chip manufacturing, AI research is increasingly governed by whether practitioners can access the vast compute resources required to train new models.

Backed by nearly £100m, the Scaling Compute programme aims to address this challenge by rapidly shifting our current compute paradigm. Aiming to bring down the cost of AI hardware by >1,000x, the programme is funding pathways that take inspiration from natural processing systems, which innately process information orders-of-magnitude more efficiently than today's largest AI systems. If successful, these new approaches will reduce the manufacturing and operational cost of current hardware, making AI-powered research increasingly widespread, and unlocking an increase in global access to the technology.

The Scaling Inference Lab

Building on learnings generated from the early stages of the Scaling Compute programme, we've committed a further £50m to establish the Scaling Inference Lab. This has been backed by an additional funding pledge of at least £20m from the Department for Science, Innovation and Technology, expanding the Lab as part of the new UK AI Hardware Plan.

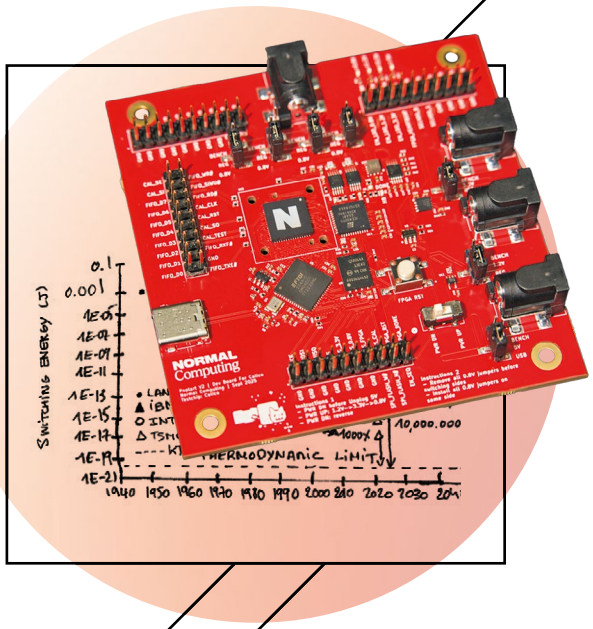
Delivered by CommonAI CIC, the Lab will create real and deployable rack-level AI systems, designed to increase the ability of startups to openly test new technologies with the goal of rapidly reducing the cost of large AI systems, prioritising accelerated iteration, open collaboration, and long-term sustainability.

"To lead in AI, the UK must lead in silicon and the systems that power it. ARIA's Scaling Inference Lab is exactly the catalyst we need to break open the hardware ecosystem, drive innovation, and ensure the UK is building the physical foundation of the AI revolution."

Nick McKeown
Professor Emeritus, Stanford University +
Visiting Professor of Engineering, University of Oxford
+ ARIA Non-Executive Director

"The majority of industry currently focuses on pushing the bounds of bleeding edge performance through tighter integration of proprietary (and largely homogeneous) systems. We believe costs can be driven down at a much faster rate by pursuing an alternate path: placing emphasis on low-power compute coupled with novel networking and software innovations, all facilitated with open-source interfaces and rapid iteration."

Suraj Bramhavar
Programme Director



Project spotlight

Lower-power computing chips for next-generation AI

Project lead: Patrick Coles (Normal Computing)

Normal Computing is building physics-based computing chips to solve computationally expensive, algebra-intensive problems with significantly higher speed and energy efficiency. Unlike traditional processors, the alternative silicon chip uses thermodynamic computing principles to achieve at least the same level of computation, if not more, from a considerably smaller chip. Conventional computation requires high levels of energy to suppress the inherent randomness that occurs in physical systems due to factors such as heat. Thermodynamic computing, however, harnesses this physical randomness to perform computations, offering an approach to improving AI efficiency and addressing challenges of energy scaling. The long-term goal is to transform the energy efficiency of hardware by orders of magnitude, reducing the costs associated with AI and tackling the AI energy crisis.

Within the first four months of the project, the team successfully built and tested 'Calico': their first custom chip. Early simulations show that the chip can solve complex linear algebra problems, a core component of many AI algorithms, whilst opening the door to new applications such as probabilistic machine learning and generative AI. The work has also helped to solidify thermodynamic computing as a legitimate emerging field, attracting growing interest from investors and researchers.

The team recently announced $50m in strategic funding from the Samsung Catalyst Fund, bringing their total funding to over $85m. In parallel, the project has expanded Normal Computing's presence in the UK, establishing a London-based chip design team and building collaborations with partners across the semiconductor ecosystem.

Next, the team will test and refine the Calico chip whilst designing the next generation of thermodynamic processors. These efforts will explore how specialised probabilistic hardware could integrate into future data centres, where different types of chips may work together to run increasingly complex AI workloads. If successful, Normal Computing's technology could form the foundation of a new computing paradigm, helping to make powerful AI systems far more energy-efficient and widely accessible.

> "The goal is to significantly reduce the power consumption of AI, driving a shift in our current computing paradigm by orders of magnitude. This will have a worldwide impact, and open a fundamentally new path forward."
>
> **Marc Bright**
> Normal Computing

Programmable Plants

Synthetic Plants

Plants are the foundation of our food system, representing 80% of the world's biomass. They're indispensable providers of fibres, fuels, and medicines, and a critical and underutilised lever for addressing the twin challenges of food insecurity and climate change. However, the pace of agricultural innovation remains incremental, struggling to keep up with a rapidly changing climate.

Synthetic biology offers extraordinary new solutions, but the diversity and utility of today's engineered plants are still highly limited. Most approaches in plants are either too slow or too small-scale, focused on editing individual genes. Synthetic plants, with genomes written from scratch, could deliver vastly more sustainable food, products, and services, and unlock new capabilities.

ARIA's Synthetic Plants programme is building the foundation, with an initial focus on Solanum tuberosum (the potato), a crop of major societal and economic importance in the UK and globally. Backed by £62.4m, the programme is funding efforts to design, build, deliver, and maintain synthetic chromosomes and chloroplasts that are viable in a living plant, alongside public engagement on the social and ethical considerations around new technologies. If successful, the programme will catalyse a new generation of major crops that are more productive, resilient, and sustainable, and able to meet the future needs of humankind.

Project spotlight

Reducing costs and iteration times for synthetic plants

Project lead: Karen Sarkisyan (Syntato)

Building entirely new synthetic chromosomes — the structures that carry genetic instructions in plant cells — could help crops withstand the impacts of climate change. However, current gene editing methods in plants remain slow, manual, and expensive. To unlock plants that can thrive in unpredictable and changing environments, we need to be able to build complex, adaptive traits by making chromosome engineering more affordable, precise, and sustainable.

Syntato's work focuses on overcoming this challenge. The team is identifying reproducible ways to design synthetic chromosomes that can be used across multiple crops, which could make it cheaper and faster to design, build, and test these genetic units, unlocking vastly more scalable capabilities.

Since its ARIA award, Syntato has successfully spun out of Imperial College London into an independent company with its own dedicated laboratory space, team, and network of collaborators. The team has already developed a high-throughput screening platform, which allows them to test how new genetic instructions perform in fully intact plant cells, with the highest level of speed and reproducibility observed in similar platforms. Syntato's platform is universal, and can therefore be adapted to any plant species, whether for large-scale herbicide screenings, testing of AI-designed protein binders, or directed evolution of proteins in plant cells.

Having established this screening platform and gathered a large body of high-quality data, the team will look to establish a framework for potato cell cultures. Their goal is to build and deliver a functioning synthetic chromosome into a potato, proving that their approach can produce a new, resilient crop variety and lay the foundation for a more cost-effective and efficient way of engineering plant genomes.

"ARIA's funding allowed us to buy equipment, build a small team, launch lab operations, and create a frontier screening platform for plant engineering work, all in under nine months. We now have the opportunity to offer these services to other R&D teams in the UK, which we hope could be useful for the whole UK engineering biology ecosystem."

Karen Sarkisyan
Syntato

"Syntato is building the fundamental infrastructure that will allow us to design and deploy complex traits across many different species. I'm excited to see the team build up a community around them to create a new toolkit for synthetic biology."

Angie Burnett
Programme Director

Scoping Our Planet

Forecasting Tipping Points

As the planet warms, we risk crossing climate tipping points — critical thresholds where small changes can trigger large-scale, irreversible shifts in the Earth's systems — within the next century. These shifts could have major consequences for food security, agriculture, economic systems, biodiversity, and humanity. Yet despite the potential impacts, we're poorly equipped to characterise the long-term trends of our climate systems, or predict the future risk of runaway, self-perpetuating change.

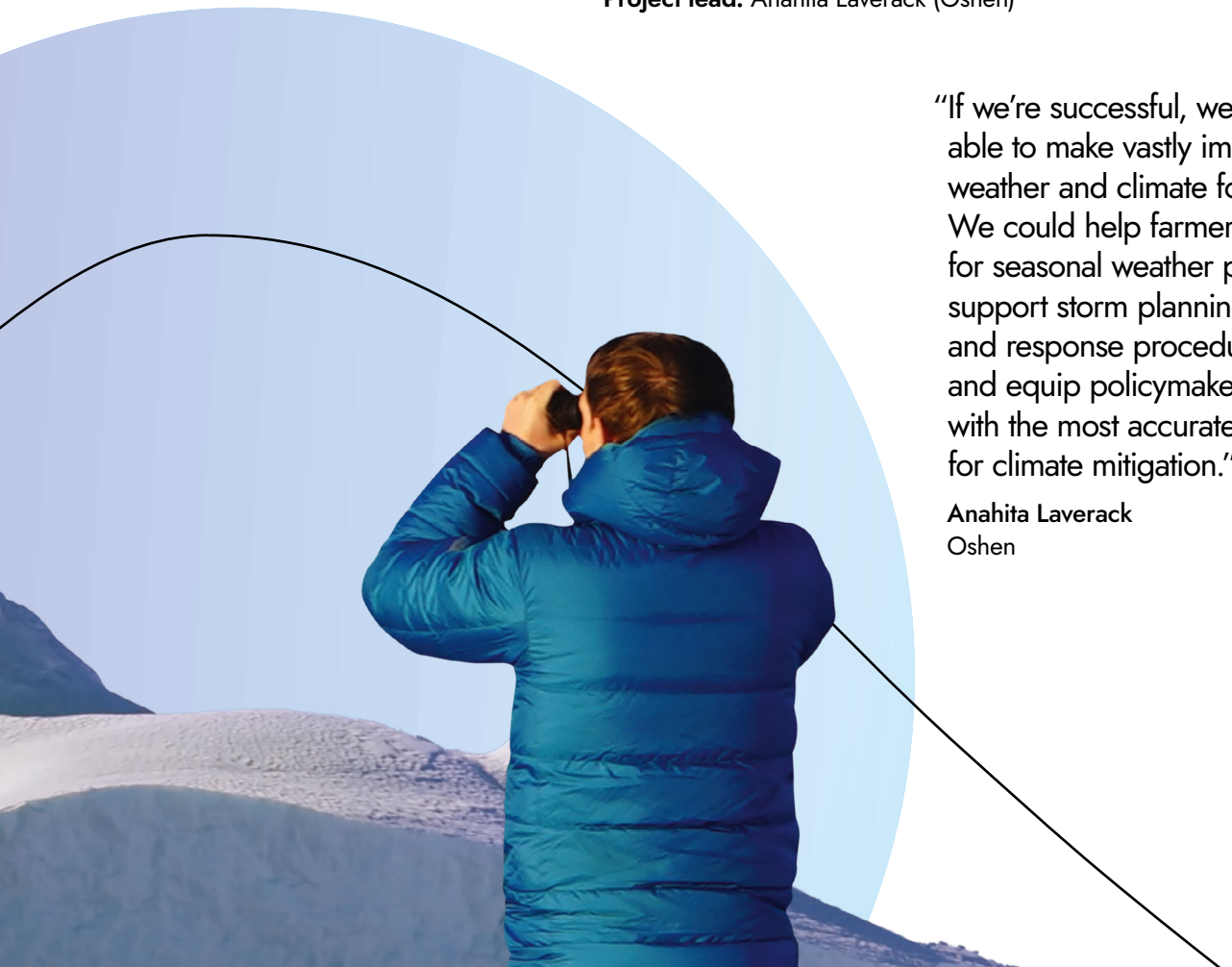
Our ability to forecast these events is limited by a data desert in the most critical and volatile areas of our planet. Current climate models are sophisticated but computationally expensive and fail to capture all the physical processes we need sight of. They're also starved of real-time, high-resolution data from remote ocean depths and the upper atmosphere, environments where traditional sensors cannot survive. Without these datasets, we're unable to provide the early warnings necessary to build resilience and accelerate proactive climate adaptation.

ARIA's Forecasting Tipping Points programme is designed to close this gap. Backed by £81m, it is funding the development of low-cost, autonomous sensing technologies that can operate continuously in the world's most challenging conditions — tested in a multi-year field campaign. By unifying these observations with predictions, and integrating new data with advances in physics- and AI-driven models, we aim to develop a proof-of-concept for an early warning system for climate tipping points. Our aim is to confidently predict whether a system will tip, what the consequences would be, and how quickly that change would unfold.

Project spotlight

Oshen-SWARM: Scalable Waterborne Autonomous Research Modules

Project lead: Anahita Laverack (Oshen)



"If we're successful, we'll be able to make vastly improved weather and climate forecasts. We could help farmers plan for seasonal weather patterns, support storm planning and response procedures, and equip policymakers with the most accurate data for climate mitigation."

Anahita Laverack
Oshen

Ocean environments are one of the most difficult settings for traditional climate monitoring techniques. To tackle this problem, Plymouth-based Oshen is deploying rugged, hand-deployable, wind-propelled autonomous robots known as C-Stars to the North Atlantic Subpolar Gyre, a key system that influences the European climate. Designed to withstand harsh ocean conditions and using a low-power system, C-Stars form adaptive 'constellations' and can collect year-round, continuous data on critical ocean-atmosphere processes, sea and air temperature, and wind speed. These datasets could pioneer data provision for a long-term early warning network for the tipping point of Subpolar Gyre collapse, providing decision-makers with the accurate, real-time insights needed to make interventions.

Since receiving ARIA funding in early 2025, Oshen has achieved a world-first: its C-Stars were successfully deployed into a Category 5 hurricane to gather data in conditions previously considered intractable. The team has also rapidly iterated on their hardware, extending the robots' operational time at sea from just five days to more than 70 days in only six months. This momentum has allowed Oshen to double the size of its UK-based team, and secure follow-on funding from international partners.

Having proven the durability of the platforms in extreme environments, the team is now looking to scale to a 50-strong constellation of C-Stars within the next year, using AI algorithms to optimise the adaptive network. Having already secured £2m in additional funding, Oshen is planning to scale its manufacturing and expand its data products.

Future Proofing Our Climate and Weather

Exploring Climate Cooling

Cutting emissions is the only sustainable solution to the climate crisis. However, continuously rising global temperatures are driving a surge of interest in approaches designed to cool the climate on timescales faster than decarbonisation. But our understanding of the impacts, risks, governability, and feasibility of these approaches is limited. We need deeper technical and societal understanding in order to govern this field responsibly, and reduce risk in ways that are ethical, legitimate, and inclusive.

Backed by £56.8m, the Exploring Climate Cooling programme seeks to fill that evidence gap. We are funding fundamental research, spanning everything from ethical frameworks, computer modelling, observations of natural analogues, and small-scale, carefully controlled outdoor experiments, with stringent requirements for safety, respectful engagement, and transparency. In doing so, the programme will generate the open knowledge base needed for society to make safe, informed decisions about the field of climate cooling.

Project spotlight

Space reflector baseline survey

Project lead: Morgan Goodwin (Planetary Sunshade Institute)

To make informed choices about potential climate cooling strategies, society needs a clear understanding of possible options. This includes less-studied approaches like space-based reflectors, which may reduce the amount of solar radiation that reaches Earth. Whilst these ideas have attracted growing attention, they remain far less understood than atmospheric approaches, with little consensus on their feasibility, scalability, or potential side effects.

The work of the Planetary Sunshade Institute aims to address this uncertainty. The team will create a shared evidence base to assess the viability of these concepts, which could eventually be used to inform global discussions about whether space-based approaches warrant further study. This project brings together leading space engineers and expert climate modellers to survey six distinct conceptual designs for space reflector approaches, then model their potential climate impacts to assess whether reducing warming from solar radiation is a viable medium-term solution whilst decarbonisation proceeds.

In only nine months, the team has identified materials capable of selectively reducing specific wavelengths of sunlight, and developed a novel spacecraft design that achieves shading goals whilst reducing system mass by up to 30%. In parallel, the climate science team has broken new ground in how to model spectral and spatial shading, allowing for an exponential increase in the accuracy of climate modelling results. These results are now moving towards publication, with the work expected to contribute to the next Intergovernmental Panel on Climate Change (IPCC) report.

In summer 2026, the Planetary Sunshade Institute will host the world's first sunshade research workshop, convening sector experts to explore common learnings and discuss future research. Following the workshop, the International Academy for Astronautics is planning to publish a special issue of its journal, Acta Astronautica, to cover the event's proceedings.

"Planetary Sunshade Institute is the first organisation with professional staff and funding dedicated to advancing the sunshade concept. This has been made possible by ARIA. This structure allows us to take advanced research, which we are driving forward, and connect that to policymakers in both the space and climate realms."

Morgan Goodwin
Planetary Sunshade Institute

"ARIA's Exploring Climate Cooling programme is providing the objective evidence base the world needs to make safe, informed decisions about these proposed interventions, so that if the world ever faces a choice on climate cooling approaches, it will be made with rigorous scientific evidence."

Mark Symes
Programme Director

Seeds, one year on

Outside of programmes, we award seed funding of up to £500k to individuals or teams pursuing research aligned to our opportunity spaces. With smaller budgets, shorter timeframes, and less structure than programmes, seeds support researchers to uncover new pathways that might otherwise fall through the cracks. With our first tranche of seeds reaching completion — and many receiving follow-on funding — here's a snapshot of what we've uncovered, and where we're going next.

FV-Spec: a large-scale benchmark for formal verification of software

Opportunity space: Mathematics for Safe AI

Project leads: Mike Dodds + Ledah Casburn (Galois)

ARIA's initial seed funding for this team tested whether AI-enabled formal methods — a potentially critical route to making complex software systems more reliable, auditable, and trustworthy — could be benchmarked on realistic engineering tasks rather than toy problems. The challenge is important because modern software increasingly underpins safety-critical systems, yet remains difficult to verify with confidence. That early work established an initial benchmark called FV-Spec, reducing uncertainty not only around the idea itself, but around the team's ability to deliver a more ambitious next phase. On that basis, we gave the team a follow-on funding boost to turn the original benchmark into broader shared infrastructure: a public leaderboard, automated evaluation of frontier models, and a wider set of formal-methods benchmarks. Rather than producing a one-off demonstration, the project has created the basis for measuring real progress in a field that could be critical to the future safety and dependability of software. By making it easier to track, compare, and incentivise advances in AI-enabled formal methods, the work helps steer AI progress towards software systems that are dependable by design.

Shape-changing Origami-inspired probe for autonomous, bi-directional navigation for multimodal inspection in the colon

Opportunity space: Smarter Robot Bodies

Project lead: Thrishantha Nanayakkara (Imperial College London)

Colonoscopies are a vital diagnostic methodology but can be challenging to perform and often result in patient discomfort. We've funded this team to develop a kirigami-inspired, tethered, soft colonoscopy capsule that can use natural peristaltic contraction waves for passive movement in the large intestine. Unlike traditional colonoscopes, this capsule will be soft, short — in order to easily manoeuvre bends — able to move forwards and backwards, and equipped with tactile sensing and a camera to locate early tissue anomalies.

Since its ARIA award, the team has made major progress. They've miniaturised the kirigami structure, reducing its diameter by more than half its original size; refined the structure's fabrication to feel as soft as a balloon to the touch; and developed a dedicated handheld user interface for the probe itself, which enables active locomotion even in the absence of peristalsis. The team has also built an upgraded model colon that pushes the state-of-the-art in hardware: it can simulate both propagating peristaltic waves and random, non-coordinated contractions, more closely mirroring human biology. If the team can prove that the probe functions optimally in this way, they can extend to testing in animal models, before eventually progressing to clinical studies. We've extended their project beyond the usual one-year timeline on the strength of this work.

"This is exactly the sort of seed project I'd dreamed of funding. The team has a highly differentiated approach that would be hard to fund elsewhere, is easier to bring to the clinic, and could ultimately deliver real benefits to patients."

Jenny Read
Programme Director

Rapid development of a mass-manufacturable SWIR hyperspectral camera

Opportunity space: Scoping Our Planet

Project lead: Sam Hornett (Living Optics)

Traditional hyperspectral imaging has typically come with a large price tag that limits the scale at which it can be reasonably deployed, meaning key climatic measurements can be hindered in resolution and frequency. We funded the Living Optics team to tackle this challenge by developing a platform that is suitable for deployment at low cost, in a form factor that is appropriate for drone mounting. The team tested if its dispersive HyperSpectral Imaging (HSI) technology could be successfully adapted from the visible spectrum to the Short-Wave InfraRed (SWIR) range (900–1700nm) to identify water, ice, and plastics. They also explored a hypothesis that a low-cost, uninsulated 3D-printed enclosure could maintain optical stability in Arctic conditions.

The team successfully built a 1530g SWIR-HSI camera with a Digital Single-Lens Reflex (DSLR) form factor, achieving a 90x reduction in size, weight, and power compared to commercial reference systems. They learned that whilst the system effectively distinguishes between water phases and ice characteristics, performance in the field was dependent on surrounding light conditions. The prototype proved its durability and optical stability during a field campaign on the Greenland Ice Sheet and Living Optics has successfully raised more than £20m in follow-on funding. The team's ARIA seed project yielded crucial evidence that they could deliver at speed in the real world.

The project demonstrated that portable SWIR-HSI can provide high-resolution climate data, such as snow albedo and cloud density, without the need for expensive, large-scale airborne campaigns. In addition, collaborations across the opportunity space enabled testing in Greenland and expansion of the technology's use cases, all of which yielded mutual benefits for multiple Creators, and key data outputs for the space and programme.

Rooting Out Danger

Opportunity space: Programmable Plants

Project lead: Richard Webster (Liverpool John Moores University)

Across post-conflict regions, landmines pose a persistent and deadly threat, but existing clearance methods remain slow, costly, and often ineffective against plastic mines. We funded this team to develop a radically different approach: a bioengineered microbial system that uses plants themselves to disarm mines. By combining specific Miscanthus genotypes with selected microbial inoculants, they're reprogramming plant roots to grow into and around landmines, physically penetrating and neutralising them. The work draws on advances in plant-microbe interactions and uses 3D-printed mine models to optimise safety and efficacy. The result could be a safer, more scalable solution that not only clears mines, but helps restore damaged land for future civil and agricultural use.

UK National Partnership for Neurotechnology

Opportunity space: Scalable Neural Interfaces

Project lead: Luke Bashford (Newcastle University)

"We're ensuring the regulatory pathway for translating neurotechnology innovation to widespread patient benefit is relevant, appropriate, and easily accessible to all stakeholders. It should be seen as a global invitation to advance neurotechnologies here in the UK."

Luke Bashford
Newcastle University

Novel neurotechnologies are opening new ways to understand the human brain and treat neurological conditions. However, too often, cutting-edge devices struggle to reach studies, trials, and patients because regulatory pathways are unclear or difficult to navigate. Realising the potential of neurotechnology to improve health, further scientific discovery, and deliver economic benefit requires the UK's regulatory system to support global scientific study and translation of new neurotechnologies.

This new partnership between Newcastle University and the Medicines and Healthcare products Regulatory Agency (MHRA) will develop clear and comprehensive guidance on the regulation of neurotechnologies, designed to be relevant, appropriate, and easily accessible, accelerating studies and trials of these cutting-edge devices. What makes it unique is that the regulator is at the table from the start, co-developing guidance alongside researchers, clinicians, people with lived experience, and industry.

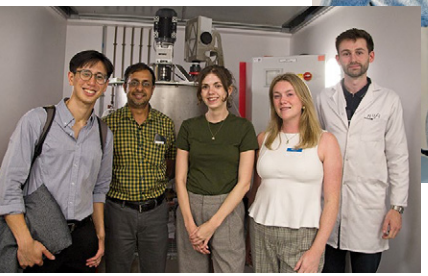
The team will conduct a comprehensive review of existing regulations and guidance for neurotechnologies and develop new guidance for emerging devices, covering the entire translation pipeline — from first-in-human research studies through to pivotal and post-market clinical trials. This end-to-end clarity is what developers and researchers need to confidently bring their technologies to the UK, and it will help cement the nation's position as a global destination for neurotechnology innovation.

"The UK is uniquely positioned to lead in neurotechnology — combining world-class neuroscience and med-tech with the NHS, which provides an unparalleled platform for research and real-world application. To unlock the UK's full potential, we must strengthen understanding of existing regulatory frameworks so that developers are clearer on how to get their products to market as quickly and safely as possible."

Mark Grumbridge
Head of Clinical Investigations, Science Research & Innovation group, MHRA

Accelerating progress with our Activation Partners

Breakthroughs depend not only on the research itself, but on the surrounding ecosystem of talent, organisations, and capabilities that allow bold ideas to move from the lab into real-world impact.



Activation Partners are a core pillar of ARIA's model, increasing both the pace and probability of transformational scientific outcomes.

Our partners were selected for their world-leading expertise across a range of roles — from deeptech company builders and engineering specialists to organisations developing new research models. By working directly with teams across our opportunity spaces, they help remove practical bottlenecks, support translation, and create new organisations and communities both within and beyond the projects we fund.

Our first cohort of Activation Partners launched in 2024. Since then, they've created new pathways for ideas and talent: Sheffield-based Amodo Design is currently supporting ARIA-funded teams with bespoke hardware and prototyping. By removing engineering bottlenecks, Amodo has demonstrated that engineering expertise can accelerate research timelines by 6–12 months, allowing for more complex experimentation.

Activation Partners are also helping translate research into new organisations and communities. Through the 5050 UK programme run by Fifty Years, 86 scientists and engineers have been supported to create deeptech ventures from R&D in ARIA's opportunity spaces. In just one year, the programme has resulted in 26 new startups that have raised more than £7.5m in pre-seed and seed funding. Venture Café has also launched its first UK sites in London, Manchester, and Edinburgh, creating regular gathering spaces that bring together researchers, entrepreneurs, investors, and policymakers. In its first year in the UK, Venture Café has brought together more than 10,000 people working across ARIA's opportunity spaces, sparking lasting collaboration across the innovation ecosystem.

Together, these partnerships are building the organisations, communities and capabilities needed to take breakthroughs forward.

Expanding into AI in Science

In April 2026, we launched a new £100m call for Activation Partners to bring additional capabilities to accelerate progress across our opportunity spaces. In addition to the translational work we've seen early success in, we expanded the call to include organisations who are applying advanced AI capabilities to science. By bringing together AI researchers, developers, and automated laboratories, we're ensuring UK scientists and engineers can work with these capabilities as they mature, significantly increasing the speed and scale at which new scientific hypotheses can be explored.

Embedding AI in frontier science

Encode is an AI for Science fellowship that embeds exceptional AI researchers within leading scientific laboratories working across ARIA's opportunity spaces. Fellows spend a year applying advanced machine learning techniques directly within experimental research environments, developing new computational tools and approaches that accelerate discovery. The fellowship accelerates Creators' work by bridging the gap between AI and frontier science, reducing the time and translation costs that slow the application of advanced machine learning to experimental research.

Demand for the programme has been strong. The founding cohort attracted more than 600 applications and selected 18 fellows who are now working across areas including climate science, robotics, neuromorphic computing, and bioengineering. The strength of the applicant pool led the Department for Science, Innovation and Technology (DSIT) to commit an additional £5m to expand the fellowship and double the number of fellows placed in UK laboratories. Early work from the first cohort has already produced open-source tools, initiated new industry collaborations, and seeded early-stage ventures emerging from their research. The second cohort built on this strength, receiving more than 1,400 applications, and recruitment is now underway to continue scaling this model for AI-enabled scientific discovery.

Bridging the engineering bottleneck

Amodo Design is addressing a recurring challenge in ambitious R&D: the limited availability of specialised hardware and engineering capability. The Sheffield-based team develops the prototypes and experimental systems needed to pursue frontier research. By embedding engineering expertise directly into our programmes, the partnership accelerates Creators' pursuit of cutting-edge science, and its translation into real-world capabilities.

Since the partnership began in 2024, Amodo has worked on more than 35 projects for over 25 different teams, unblocking research across all of ARIA's current programmes. In the Robot Dexterity programme, Amodo has developed an advanced tool to give robots a more responsive sense of touch, helping one research team to accelerate its work by an estimated 12 months and move closer to commercial deployment.

The partnership is continuing to scale rapidly. The team has expanded from ten to 45 people since late 2024, growing its engineering capability to meet increasing demand from ARIA-funded teams and the wider scientific ecosystem. The team has doubled its facility space in Sheffield to 20,000 square feet and is establishing a London presence, working to support the wider ecosystem both in the UK and internationally.

AI Scientists: a new frontier for discovery

As systems become better at generating hypotheses, designing experiments, and iterating on findings, our capacity for scientific discovery is undergoing a foundational shift. Autonomous systems designed to conduct the entire research process without human intervention could help to unlock the next frontier in science and technology, expanding the number of ideas we can explore and accelerating progress on problems where faster discovery could have outsized societal impact.

Backed by £6m over nine months, our initial AI Scientist initiative is supporting 12 projects to test whether autonomous systems can contribute to real-world scientific discovery. Each project is structured as a focused sprint, pairing a challenge the system is expected to solve with one where it is likely to struggle, so we can learn not only what works, but where current systems break down.

With 245 applications, the response to the call was our largest to date, reflecting the speed of progress and the breadth of ambition within this space. Funded projects are testing AI Scientists on challenges such as Alzheimer's therapeutics and battery longevity, exploring the current potential of these systems — and what it would take for them to become a new engine for scientific discovery.

Autonomous discovery for endometriosis

Project leads: Ashot Papoyan + Garik Petrosyan (Deep Origin)

Endometriosis affects an estimated 1.5 million people in the UK, but takes an average of nine years to diagnose, and research into novel treatments remains limited. Deep Origin's AI scientist team are identifying novel drug candidates and a validated molecule for endometriosis. Three months into the project, the system has already delivered a strong technical signal: screening millions of papers down to just 10,000, and identifying 178 disease targets against strict dimensions of novelty and structural druggability. The team is now moving these targets into lab validation with Arctoris, a UK-based autonomous research lab.

Rather than producing a one-off demonstration, the project is testing whether domain-specific AI agents can work together across a real-world scientific workflow with a high degree of autonomy. Success will be measured not only by whether the team identifies a novel endometriosis target and produces at least one drug-like molecule predicted to inhibit it, but by how much of the process can be performed autonomously. By logging AI and human actions across hypothesis generation, experiment design, data collection, analysis, interpretation, and reporting, the project will help ARIA understand where AI Scientists are already capable, where human oversight remains essential, and where future funding could close critical gaps. If successful, the work could help accelerate therapeutic development for a major unmet healthcare need, and provide a rigorous testbed for the future of AI-enabled science.

New materials for solar hydrogen

Project lead: Andrew I. Cooper (University of Liverpool)

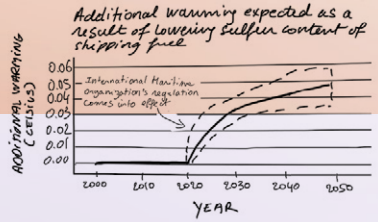
Hydrogen has the potential to play a major role in climate change mitigation, but today's production routes remain too expensive or infrastructure-intensive to scale as widely as needed. Single-step conversion of water into hydrogen using only sunlight could substantially reduce this cost, if the right materials can be found and incorporated into systems resembling solar cells. The team are testing whether AI Scientists can accelerate that search: generating hypotheses, designing experiments, running them in automated labs, interpreting results, and iterating on findings in a closed loop.

In a trial where human teams competed against an AI Scientist system to improve the performance of water-splitting catalysts, the AI system achieved a noticeable improvement in material performance over the starting conditions, reasoning much faster than a human team. The project is testing whether autonomous reasoning and robotic experimentation can be combined on a real-life materials challenge with noisy data, moving beyond benchmarks and toy problems. The team are now extending this approach to a second challenge in CO_2 capture, exploring how AI Scientists and human researchers can work together in hybrid workflows where different experiments, calculations, and measurements carry different costs and timescales. If successful, the work could help establish a new model for AI-enabled materials discovery across climate-critical technologies.

"AI Scientists have enormous potential. By understanding how these systems tackle complex problems, we can learn what's needed to evolve them from promising prototypes into genuine engines of discovery."

Ant Rowstron
Chief AI Scientist

What we're learning



We have a culture of continuous learning, improving standards for how we operate, and driving greater accountability across all our work.

Putting our learnings into practice

Ethics and social responsibility

Our Programme Directors think deeply about the ethics and social responsibility (ESR) considerations in their research to maximise social benefit for the communities they serve. In particular, the robust governance framework established in the Exploring Climate Cooling programme set a precedent for using different tools to bring in additional oversight and for building trust with the public, as demonstrated by the launch of its first outdoor experiment in the Arctic.

Other programmes have adapted the oversight committee model to set up similar mechanisms for external advice and critical challenge. For example, the Forecasting Tipping Points programme has also established an oversight committee, to provide local perspectives and meaningful engagement to inform the research taking place in Greenland. As this year progresses, we expect to see more activities that drive public engagement; social science projects to better inform the application of new technologies, such as research on patients' lived experience; and establishing ethical frameworks to guide our growing focus on AI in Science.

"As an investor of public money, ARIA needs to make sure it is alive to the ethical and social implications of the work it is supporting, both now and in the future. Innovating with new models for doing this will increase our chances of having a positive impact, whilst also creating blueprints for other organisations and researchers to adopt."

Sarah Hunter
Chair of the Board ESR Committee

Active programme management

Active programme management is a key differentiator of the ARIA model. Our Programme Directors are expected to proactively monitor and manage their Creators, spotting where projects are deviating from their goal or where new opportunities are emerging, and course-correcting or pivoting in a timely manner. This approach is critical to fostering a culture where failing fast and iterative learning are practised day to day. We've already seen this yield results, with Programme Directors either pivoting or doubling down based on learnings from individual projects or the wider field.

Many of our Creators have mentioned the benefits of active programme management, particularly how this moves the funding relationship from something transactional to more of a partnership. Creators have highlighted the following:

- genuine interest in project success beyond contract compliance;
- substantive technical understanding enabling meaningful dialogue;
- willingness to problem-solve rather than enforce rigid requirements.

Active management framework

Design for outcomes first	Plan for success	Keep the bar raised	Responsibility
We ask ourselves: What's the end goal? What needs to be demonstrated to globally shift the conversation and justify further investment in a world-changing capability? What are the critical risks that could prevent us from achieving that final milestone? What would unambiguously demonstrate progress towards mitigating it?	If success can't be defined, a project shouldn't be funded. Design for success first then plan activities, timelines, and budgets.	Ensure the number of milestones is appropriate for the project's complexity, with at least one major milestone per year and ideally one per critical risk area. Ensure each milestone is clear, measurable, and ambitious. We won't accept conservative milestones. ARIA funds ambitious projects, and while failure is possible, lack of ambition isn't acceptable.	Programme Directors are responsible for managing projects to achieve world-changing results, using these guidelines as a foundation.

Active programme management in action

Robot Dexterity

As our Robot Dexterity programme has progressed, close engagement with Creators has helped to clarify where the strongest opportunities for impact lie. In one case, both ARIA and the Creator recognised that, whilst the project's work was technically strong, it was unlikely to deliver transformative impact within dexterity itself. This assessment led to a mutual decision to end funding, and refocus efforts elsewhere.

The project has since demonstrated strong potential beyond its original scope, continuing to evolve post-ARIA funding. The team are now advancing the technology in new directions, including working with commercial partner Sarco Stopper to explore its use as a novel solution for pipe maintenance.

"ARIA gave us the freedom to explore ambitiously and the clarity to pivot when needed, allowing us to discover a promising new direction for our work."

David Newsam
Project Lead

Diversity

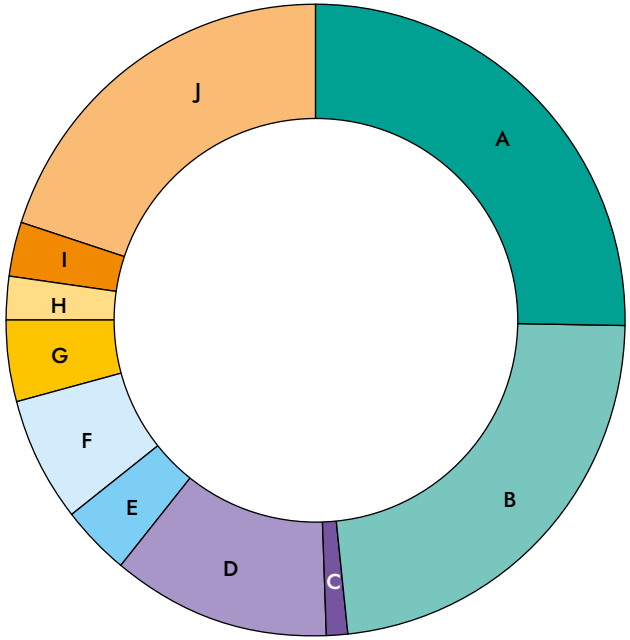
For our second year of live programmes, we continued efforts to broaden who we engage with during discovery — including UK-wide roadshows and targeted outreach to research communities beyond established networks. This follows our principle of building in public, where we publish all our programme theses and run workshops during discovery to actively solicit feedback from diverse research communities. We have learnt, however, that deepening the regional diversity of who we fund requires a more sustained effort and needs to align with the strengths of our funding model and mandate.

ARIA's funding model follows underserved but ripe scientific potential, wherever it exists. Over 80% of our funding goes to UK-based teams across universities, startups, companies and non-profits. Where we fund internationally, we do so to fill specific capability gaps — and on terms designed to ensure the benefits land here: international recipients must commit to establishing UK operations, spending the majority of project costs in the UK, or both, and every funding agreement includes a royalty fee payable to the UK on any ARIA-funded intellectual property (IP) commercialised abroad.

But we know that geographic concentration within certain parts of the UK remains a challenge. Going into our third year, we will launch a structured series of engagement across all regions of the UK — with the aim of increasing the pipeline of diverse applicants to our funding calls from across the UK.

From 2026/27, no new programme will be approved without first demonstrating meaningful engagement in discovery across all regions and nations of the UK, while ensuring funding decisions continue to be driven by scientific excellence and the needs of our programmes. This will be underpinned by more granular data on our funding activities and strengthened through partnerships with organisations already working to support underrepresented communities in the science and research ecosystem.

Where we funded, by value

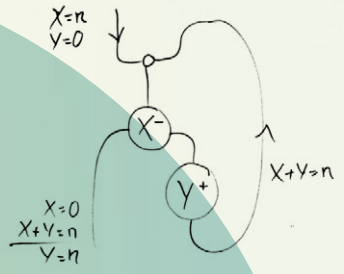


A	East of England	25.44%	F	South East	6.43%
B	London	23.17%	G	South West	4.32%
C	North East	0.90%	H	West Midlands	1.97%
D	North West	11.60%	I	Yorkshire and the Humber	2.95%
E	Scotland	3.41%	J	Non-UK	19.81%

This graph represents our total funding for programme and seed projects with an agreement start date from 1 May 2025 to 1 May 2026. Geographic breakdown is based on the registered location of the principal investigator's organisation.

Our next chapter

With strong foundations, we're now deepening our focus and harnessing AI to drive momentum.



The year ahead

Building on programme momentum

Our first programmes are delivering — with key milestones landing across AI, climate, robotics, and synthetic biology. Several will launch their next phase of funding, and a new set of programmes will begin funding their first projects.

Dan Cole

Enhancing our translation

Dan Cole, who previously served as ARIA's Chief of Staff, was appointed as our inaugural Chief Translation Officer, strengthening our ability to turn cutting-edge science into real-world impact.

"Three years in, ARIA is picking up momentum. When you hear what our teams and their partners are starting to accomplish — and the talent and dedication they bring to it — it is hard not to feel excited about what we as a country can achieve."

Matt Clifford

Chair

Harnessing AI to accelerate discovery

With our Chief AI Scientist, Ant Rowstron, in post, we're focused on establishing ARIA as a leader in AI-augmented scientific discovery, bringing new partners and talent into this space and positioning the UK at the forefront of the AI in science revolution.

Ant Rowstron

Welcoming our third cohort of Programme Directors

We will recruit our next cohort of entrepreneurial scientists and engineers: people with the boldness to imagine a different future, and the ability to take us there.

Expanding Activation Partners

Building on our founding cohort, we will welcome 8–10 new Activation partners, expanding our work into AI Scientists.

We are grateful to everyone who has contributed to ARIA's progress this year, and to our sponsor, the Department for Science, Innovation and Technology, for their ongoing support.


SCIENTISTS
FIRST

Advanced Research + Invention Agency

ARIA

For more about our mission and the latest from ARIA, visit our website: aria.org.uk

Follow our progress

Subscribe to our newsletter
substack.com/@ariaresearch

Email updates
aria.org.uk/updates

LinkedIn
advanced-research-and-invention-agency

Twitter/X
@ARIA_research

Bluesky
@aria-research.bsky.social