Australia's National
Science Agency

Highlights 2023–24

Contents

Cover top: Wajarri Yamaji man and SKA-Low field technician Lockie Ronan holds one of the 131,072 antennas that will make up the SKA-Low telescope in Western Australia, under Wajarri Yamaji sky and stars.

Being built by the international SKA Observatory (SKAO), SKA-Low will look back in time to the Universe in its infancy, when the first stars and galaxies were born.

The first antenna for the telescope was installed in March 2024 at Inyarrimanha Ilgari Bundara, our Murchison Radio-astronomy Observatory. Read more about our involvement in this mega-science project on page 23. Credit: SKAO.

Cover bottom: Susan Merry, *Our Home*, 2023 (detail).

***Our Home* by Wajarri Yamaji artist Susan Merry was created during the SKAO Council's first visit to Inyarrimanha Ilgari Bundara, our Murchison Radio-astronomy Observatory on Wajarri Country in Western Australia. Council members contributed to the artwork with handprints and detailing under Susan's guidance. In Susan's words, she shares the story of the painting:**

> **"Our home: years ago our old people used to walk everywhere hunting for food and water. Our home: we used to live on Boolardy and go and stay at the top shed. My uncle and brothers and other family members used to go mustering sheep for shearing. Today all you can see are the antennas large and small, with the wildflowers and hands representing that we all come as one on Land."**

We acknowledge the Wajarri Yamaji as Traditional Owners and Native Title Holders of the Inyarrimanha Ilgari Bundara, our Murchison Radio-astronomy Observatory site.

Message from the Chief Executive

Science and CSIRO have never been more important to Australia as the profound challenges we face become increasingly urgent and complex. As we confront these challenges, we must also look to seize the incredible opportunities they present. Over the last 12 months, it has been a privilege to lead this remarkable organisation and the talented and passionate people at the heart of it. We are delighted to present CSIRO's Highlights for the financial year.

This year, our Highlights tell the stories that bring to life a number of our more detailed reports. This reporting suite includes: our legislated role as articulated in our Corporate Plan and Annual Report; our role in advancing reconciliation in our Indigenous Collaboration and Partnerships Report; benchmarking our research in our Science Health and Excellence Report; assessing our economic impact in our Value of CSIRO Report; and walking the talk on sustainability in our Sustainability Report.

Relationships are at the heart of everything we do at CSIRO. Our partnerships with industry, government and academia are central to delivering impact, and our conversations with the community help us shape our future work.

In particular, our Highlights include partnerships with Aboriginal and Torres Strait Islander communities – Australia's First Scientists.

In addition to the environmental, social and economic benefits of our science and research, we aim to instil hope and wonder, working hard every day to preserve the trust Australia places in us. We hope this collection of highlights leaves you with as much optimism as we have about the role of science and CSIRO in our nation and region's future.

Ms Kirsten Rose
Acting Chief Executive, CSIRO
(July–September 2023)

Dr Doug Hilton
Chief Executive, CSIRO
(from September 2023)

CSIRO acknowledges the Traditional Owners of the lands, seas and waters of the area that we live and work on across Australia. We acknowledge all Aboriginal and Torres Strait Islander Peoples and their continuing connection to their culture and pay our respects to Elders past and present. CSIRO is committed to reconciliation and recognises that Aboriginal and Torres Strait Islander Peoples have made and will continue to make extraordinary contributions to all aspects of Australian life including culture, economy and science.

At a glance

Where our people are based*

*Excludes casual employees

We're from **130+ countries**

Age **17–80+ years**

~28% from non-English speaking backgrounds

Aboriginal and Torres Strait Islander Peoples representation

1.8% 2023

2.5% 2024

We engaged with over **3000** domestic and international, industry and government entities, including 1,440 SMEs

8.8:1 return on investment

$13.3 billion annual benefit to the nation

Read more in the Value of CSIRO report and our Annual Report: csiro.au/reportingsuite2024

Sydney Gay and Lesbian Mardi Gras **80 marchers**

RV *Investigator* made its **100th voyage**

Reporting suite

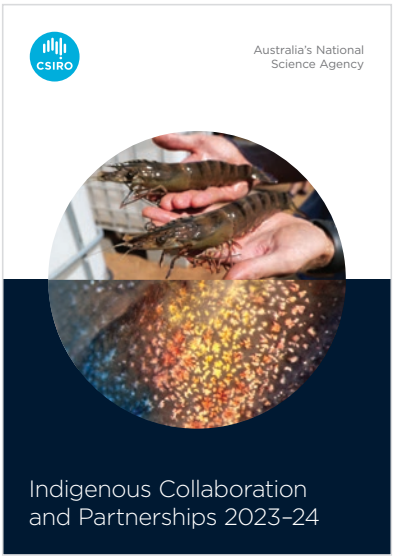
We are Australia's national science agency, solving the greatest challenges through innovative science and technology.

We are one of the largest and most multidisciplinary research organisations in the world, creating a better future for Australia.

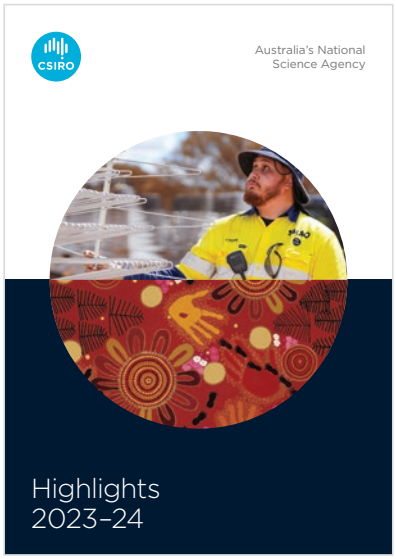
This Highlights document tells the stories of the people and the science behind our 2023–24 formal reporting suite, which includes our Annual Report, our Sustainability Report, our Indigenous Collaboration and Partnerships report, The Value of CSIRO report and our Science Health and Excellence Report. Its structure follows the four objectives of our 2023 Corporate Plan, which is our key strategic planning document.

The CSIRO 2023–24 reporting suite reflected in this Highlights document is outlined below.

CSIRO Annual Report 2023–24

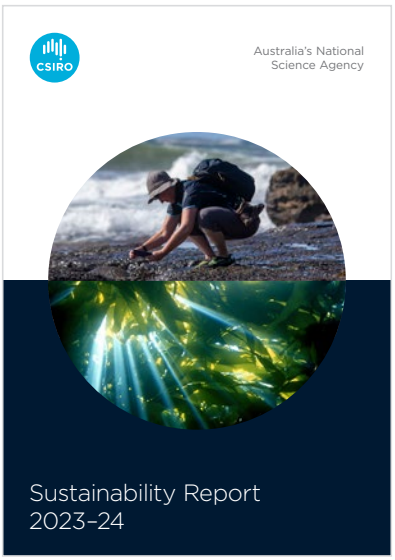


CSIRO Indigenous Collaboration and Partnerships 2023–24

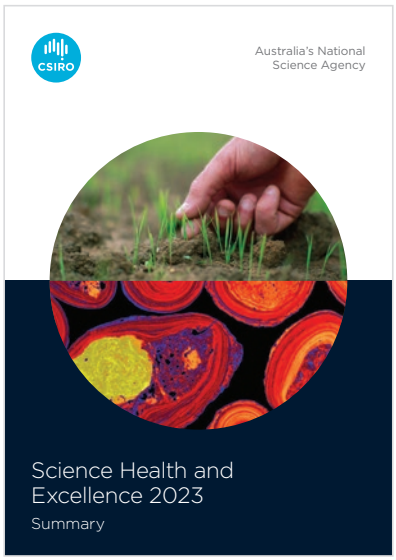


CSIRO Highlights 2023–24

The Value of CSIRO 2024



CSIRO Sustainability Report 2023–24



CSIRO Science Health and Excellence 2023

Access the reports at: csiro.au/reportingsuite2024

Impact translation

Corporate Plan Objective 1: We are advancing Australia's translation and commercialisation of science through collaborative networks.

Helping start-ups accelerate their path to impact

CSIRO provides start-ups and small- to medium-sized enterprises (SMEs) with research and development (R&D) resources, mentorship and industry connections to accelerate their growth trajectories and facilitates the development of impactful solutions that address global challenges.

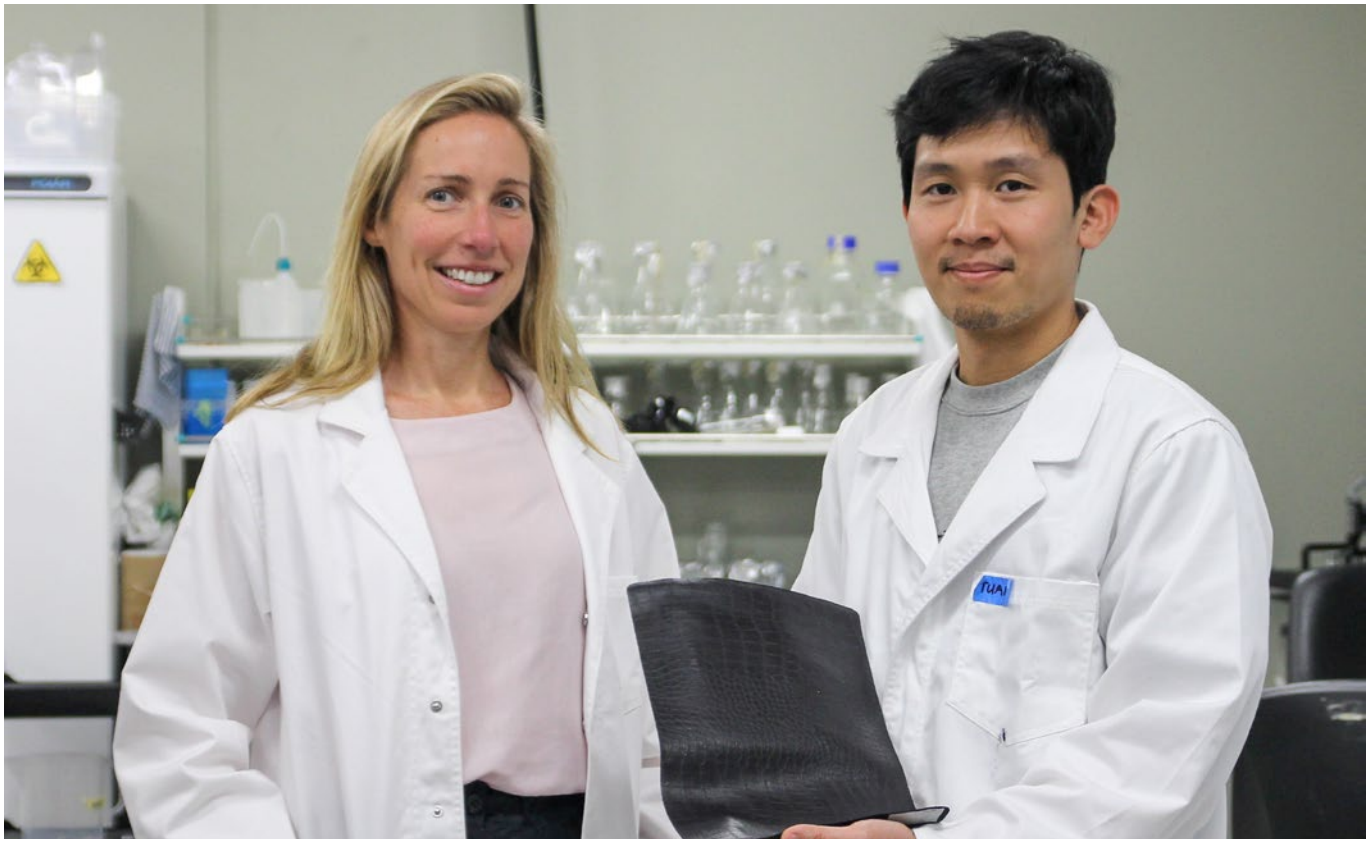
Rainstick: Harnessing Traditional Knowledge for environmental solutions

Rainstick, an Indigenous biotech start-up from James Cook University (JCU), utilises electricity to enhance plant and fungi growth, optimising crop yields, reducing pesticide use and strengthening food systems. By merging Traditional Knowledge of the Maiawali People of central west Queensland with western science, Rainstick have pioneered sustainable agriculture innovation that builds on a 10,000 year old practice to harness the influence of lightning on how plants grow.

The founders received guidance and support through CSIRO's ON Program, which helps researchers translate their research to impact, providing the skills and confidence needed to understand and achieve the full potential of their research. They also took part in our Kick-Start program, which matches funding up to $50,000 per project, specifically aiding start-ups and SMEs (less than 3 years old) with an annual turnover below $1.5 million. Rainstick have now secured investment and funding through Main Sequence, which was established to manage the CSIRO Innovation Fund.

Rainstick has scaled their seed treatment technology and are working with producers and researchers to improve global food security.

Team Rainstick pictured at the CSIRO ON Accelerate 7 Bootcamp event held in Sydney in late 2022. L–R: Chris McLoghlin, Darryl Lyons and Mic Black.



Tina Funder, Founder and Chief Executive Officer of Alt. Leather together with Alt. Leather's Chief Scientific Officer, Dr Tuan Nguyen.

Alt. Leather: Pioneering sustainable alternatives

Alt. Leather, an Australian company supported by CSIRO's India Australia RISE Accelerator and Kick-Start programs, aims to revolutionise the fashion industry with Australia's first 100% plant-based leather alternative.

The India Australia RISE Accelerator, a bilateral initiative between Australia and the Indian government's Atal Innovation Mission (AIM) and NITI Aayog, supports start-ups and SMEs in scaling technologies addressing global climate and environmental challenges between India and Australia.

Through the RISE Accelerator, Alt. Leather gained insights into the Indian market, establishing critical in-country connections to refine their plant-based leather for global adoption. They have now progressed and will start CSIRO's Kick-Start program which will provide matched funding and essential resources to enable Alt. Leather to refine their technology.

AloxiTec: A journey in sustainable packaging

AloxiTec, a participant in CSIRO's Gap Blitz Program and resident at the CSIRO Lindfield Collaboration Hub in NSW, is at the forefront of developing specialised packaging that significantly extends the shelf life of fresh food.

Founded in 2019 by Dr Jinghua Fang, a materials scientist, AloxiTec has leveraged various CSIRO innovation programs including ON Prime, ON Accelerate, Connect @ Lindfield, and the Gap Blitz Program. The Gap Blitz Program provides a 12-week gap analysis program for early-stage start-ups, with customised support for commercialisation and strategy development coupled with 1:1 coaching.

In 2024, AloxiTec is poised to undertake a Kick-Start project with CSIRO, marking another milestone in their journey from prototyping through proof of concept to pilot production.

Honouring knowledge through collaboration

This year we developed Indigenous Cultural and Intellectual Property (ICIP) Principles for CSIRO to demonstrate our deep commitment to honouring and respecting the cultural heritage of Aboriginal and Torres Strait Islander Peoples. Informed by our collaborations with Aboriginal and Torres Strait Islander communities and organisations, we developed our principles with support from external experts, including internationally recognised ICIP expert Dr Terri Janke and the CSIRO Indigenous Advisory Group.

Our collaborations with Indigenous Knowledge holders, including the Gulumoerrgin, Gooniyandi, and Ngan'gi peoples on the co-production of seasonal calendars, exemplifies how we put the ICIP Principles into action. The typical western four-season calendar often falls short in representing the weather patterns and associated ecological relationships of Australia. That's where the wisdom of Aboriginal and Torres Strait Islander Peoples, Australia's first scientists, comes to the fore.

We worked collaboratively to document and translate seasonal-specific Indigenous Knowledge into a format that respects the unique and highly localised ecological knowledge of these groups. The seasonal calendars are a tool for communicating their understanding of Country. They also support learning about Indigenous values, knowledge systems and connection to place – all essential parts of their cultural heritage and Traditional Knowledge. The co-produced Indigenous seasonal calendars have informed water resource planning and the development of school curricula, to name just two areas.

We continue to work on addressing challenges to the ongoing appropriate use of ICIP, including attention to benefit sharing and attribution. Aligning with our ICIP Principles, the Indigenous seasonal calendars show cultural integrity in how they were documented and compiled and how they are shared: respecting the interests of Aboriginal and Torres Strait Islander partners, their knowledge, and cultural heritage. The calendars have embedded ICIP and copyright notices and are available to download on our website, requiring users to agree to ICIP terms and conditions and share how they propose to use the calendars for educational outreach.

Gulumoerrgin/Larrakia Seasonal Calendar. © Gulumoerrgin/Larrakia language and ecological knowledge contributors: Lorraine Williams, Judith Williams, Maureen Ogden, Keith Risk, Anne Risk; and CSIRO. All rights reserved.

Main Sequence surpasses $1 billion

Main Sequence, the deep tech investment fund founded by CSIRO, surpassed $1 billion in total funds under management with the close of its third fund in July 2023. The $450 million raised for Fund 3 included new and returning investors such as Hostplus, LGT Crestone, Morgan Stanley Wealth Management, Temasek, NGS Super, Australian Ethical Investment, Daiwa Securities Group and The Grantham Foundation. The fund also includes the first half of $150 million committed by the Federal Government through CSIRO.

Main Sequence invests in companies that reflect Australia's national priorities and aim to diversify and transform Australia's industries and economy. Since its founding in 2017, Main Sequence has backed over 60 companies, including Regrow, Advanced Navigation and Q-CTRL. These Australian deep-tech companies have created over 2,200 new jobs and their combined market value has grown to over $6.7 billion.

Main Sequence team celebrating portfolio company Cauldron's first birthday on a site tour of their precision fermentation facility.

Innovation across borders

Australia's Southeast Asia Economic Strategy to 2040 encourages engagement with the region to ensure Australia's long-term economic stability and growth. Through our collaborations, we make connections and build partnerships to ensure prosperity for our nation and momentum to address areas of mutual opportunity, including food scarcity, disease, pollution, plastic waste and mismanaged pests.

Some priority multilateral partnerships include:

- **Indo-Pacific Plastics Innovation Network (IPPIN):** Supporting emerging innovators to develop commercial-ready innovations focused on ending plastic waste.
- **Regional health partnerships:** Supporting infectious disease resilience to tackle emerging and endemic infectious diseases in Australia and our region.
- **SEA Data Cube:** Unlocking Earth Observation data for Southeast Asia with the Open Data Cube, which supports climate smart innovation in Asia.
- **Innovations in food for sustainability:** Encouraging development and research opportunities in various areas of the food spectrum including novel ingredients, complementary protein and waste valorisation.
- **Australia-Singapore Low-Emissions Technologies (ASLET) initiative:** Aiming to accelerate demonstration and industry deployment of zero and near-zero emissions fuels and technologies in maritime and port operations.
- **Aus4Innovation:** Uniting Australia and Vietnam by providing development assistance to explore emerging areas of technology, digital transformation, scenario planning, commercialisation, innovation policy and strengthen Vietnamese capability in digital foresight.
- **ASEAN Fall Armyworm Action Plan:** Bringing together key stakeholders to build a strategy for managing and monitoring Fall Armyworm and plan for future biosecurity threats.
- **Partnerships 4 Infrastructure:** Providing technical assistance to partner agencies across 8 ASEAN countries to ramp up the regions transition to cleaner energy systems.

Purpose-driven science and technology

Corporate Plan Objective 2: We are delivering impact at-scale aligned to the challenges we are solving and portfolios of research directed to them. We are investing in the right future science and technology to solve tomorrow's challenges..

Food security and quality

Grow the triple bottom line value of Australia's agri-food and fibre industries

Boosting crop resistance to disease

We've developed a new rapid gene-screening platform that can identify genes that protect plants from pathogen infection, helping us get ahead of disease outbreaks and to breed durable, disease-resistant crops.

The technology identifies 'pathogen effector' genes, which can be recognised by a plant's immune system. Plants and diseases evolve together, so changes in pathogen effector genes pose a constant threat of outbreak from a new, virulent disease that escapes immunity.

Our advanced screening technology represents a technological leap forward in our ability to study the processes that give plants enduring resistance to disease, allowing new genetic strategies to safeguard crop production and manage disease in Australia and abroad. It enables high-throughput screening of complex genetic libraries in a plant's cellular environment at an unprecedented speed.

Already, the technology has enabled researchers to identify several new effector genes in wheat, reducing the time from years or even decades to mere months. This will be a vital defence against the increasing rate of crop disease caused by climate change.

New way to source region of agricultural products

Australia's top research agencies have teamed up to create a new isotopic data platform to help verify the claims and environmental credentials of Australian agricultural and food products in an increasingly competitive international market.

Isotopes are unique chemical signatures that can be used to determine the origin and production conditions of food. Accurate isotopic data can be used to verify a product's credentials, allowing for better market access. This includes meeting increasing demand for low-emission or deforestation-free commodities across Europe.

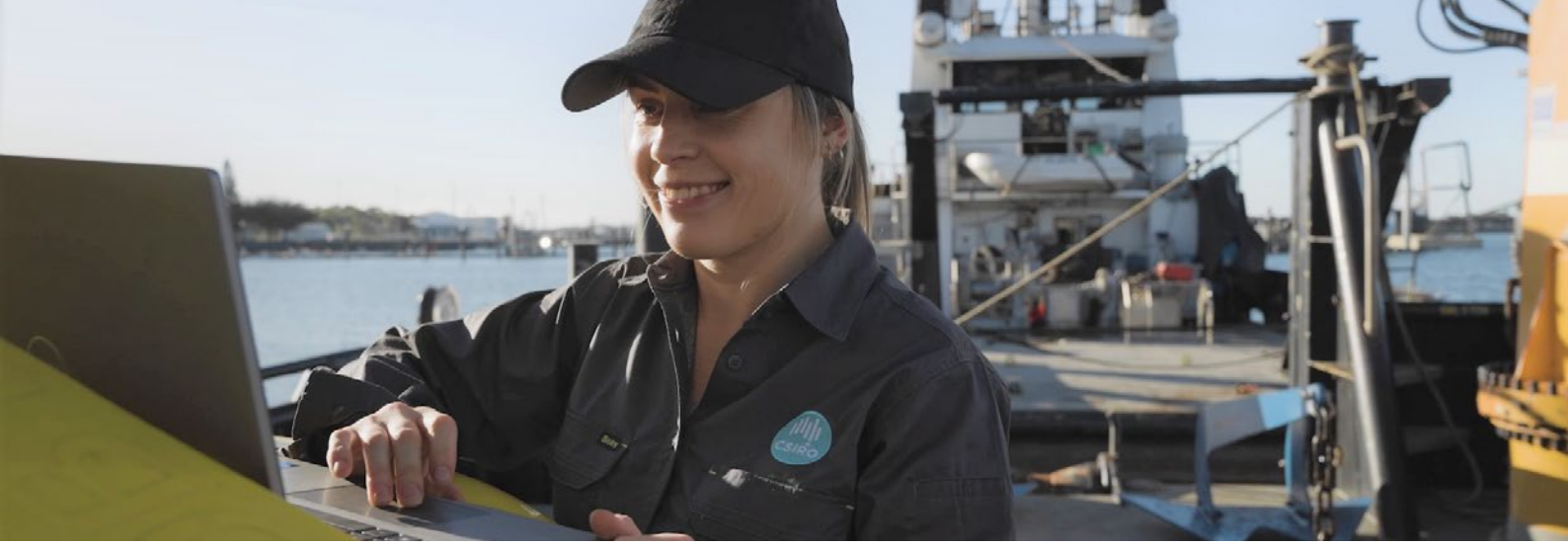
The collaboration, which includes CSIRO, Geoscience Australia, ANSTO and NMI, combines data from different sources into a single national collection by connecting datasets and insights across the supply chain to improve and grow Australia's access to overseas markets.

The isotope data platform will help tackle Australia's export challenges and support research for the public good, as well as commercial outcomes for Australia's agriculture, food, and water systems. As the market demand for sustainable agricultural practices is increasing, this data platform can support innovation and insights to differentiate Australian products. This data can assist in evaluating trade-offs and decisions, allowing Australian agricultural commodities to reach premium markets and diversify their offerings to meet changing demands.

Currently, agricultural and food export trade is critically important to the Australian economy, bringing in about $80 billion a year. A verification tool will help the nation maintain and grow new high-value market opportunities, supporting the agriculture industry's goal to increase export value to $100 billion by 2030.

The development of the national data platform will be informed by use cases from industry, peak bodies, universities and other research organisations, ensuring that it is relevant, accessible and serves the needs of different sectors.

This project received co-investment from the ARDC. The ARDC is funded by the National Collaborative Research Infrastructure Strategy (NCRIS).



Secure Australia and region

Safeguard Australia and our region from threats

Investing in technology to improve water quality and seafood futures

The Spencer Gulf in South Australia, known as 'Australia's seafood basket,' is a key contributor to the nation's seafood supply, generating roughly $238 million annually through local aquaculture. However, issues like algal blooms can arise in the Gulf, with potentially devastating impacts for seafood farms and marine environments.

The Spencer Gulf is one of a handful of locations around Australia where we've been testing AquaWatch Australia, our water quality monitoring and forecasting service. The same system is used at another AquaWatch test site on Darumbal Sea Country in QLD near the Southern Great Barrier Reef to help monitor and forecast sediment run-off, which impacts the UNESCO World Heritage site's marine ecosystem.

The water-based sensors monitor the flow of sediment and dissolved organic carbon – an indicator of the carbon exchange between land and ocean – while the satellites can give us a broader geographical view from space. The data from both sources is processed using Artificial Intelligence (AI) and computer models to give a forecast and provides early warning of potential issues to decision-makers. This can range from businesses like the aquaculture industry in the Gulf, through to governments that can make planning decisions to respond to high-risk areas.

Above, CSIRO scientist Gemma Kerrisk reviews AquaWatch data.

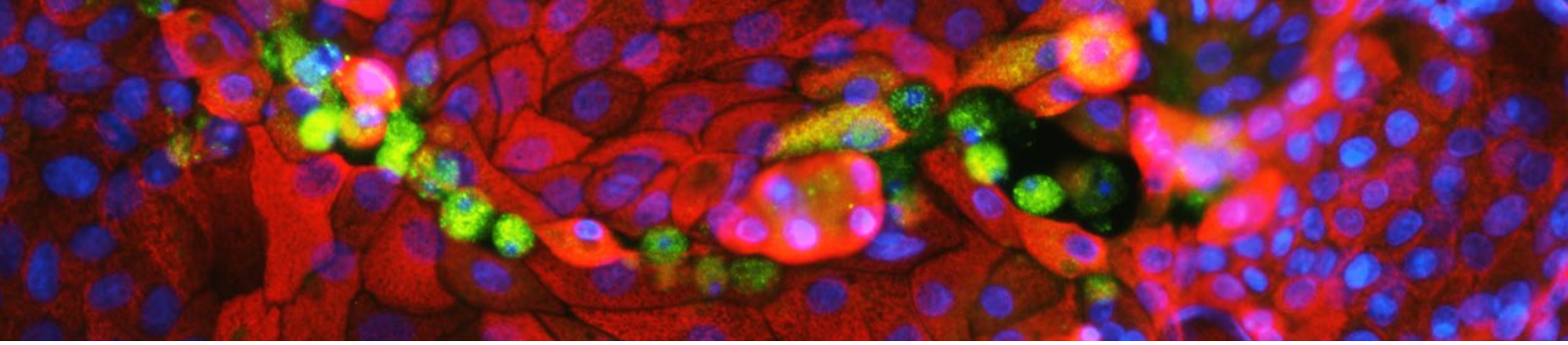
While this test data will only be available to research partners and Traditional Custodians initially, the long-term goal for AquaWatch across all project sites is to provide national water quality monitoring and forecasts to all Australians.

Partnering across multidisciplinary agencies and industry to boost biosecurity defences

Better coordination and alignment of biosecurity research and development is at the heart of the newly launched Catalysing Australia's Biosecurity (CAB) initiative, with an initial co-investment of over $55 million over 6 years from CSIRO, the Australian Department of Agriculture, Fisheries and Forestry, industry and other partners.

The initiative will invest in emergency animal disease preparedness, trialling new technology to detect Varroa mites in bee hives, delivering a real-time biosecurity alerts service, deploying advanced pest management systems, and developing an Australian Biosecurity Research Database.

It also focuses on empowering Aboriginal and Torres Strait Islander communities to contribute their expertise towards national biosecurity efforts and has the potential to enhance regional prosperity and security.



Health and wellbeing

Enhance the health and wellbeing of all Australians

AI unlocks Alzheimer's data

Tools we developed to harness AI have now identified two new genetic variants and 95 new gene interactions associated with Alzheimer's disease. Identification of variants helps to predict the occurrence, severity and potential treatments of the neurodegenerative disease.

By using our VariantSpark and BitEpi tools, we've been able to examine the interactions between variants, something not easily done using other research methods but known to be a key in understanding Alzheimer's. In this way, we captured 10.41 per cent more 'phenotypic variance' than past methods, which means an increase in our ability to record the drivers of disease so we can identify and intervene with patients sooner.

VariantSpark offers a solution to the challenge of genomic information being stored in disparate geographical locations and constrained by data privacy through 'federated learning', where a machine learning model can be generated from siloed data sources and the insights can be delivered without the entire dataset needing to be revealed. Our researchers plan to apply these AI-driven tools to many more health data challenges.

Alzheimer's disease affects the activity of neurones (brain cells, pictured) in certain regions of the brain. It is a neurodegenerative disease. © Chloe Rankin.

Benchtop bunnies

We've developed a new tissue culture system to grow and study rabbit caliciviruses, which are used for biological control (biocontrol) of rabbits, outside of live animals. It will make our research faster and easier and reduce animal testing.

Previous biocontrol releases have shown that the effectiveness of biocontrol agents tends to wane after 10 to 15 years as they co-evolve with rabbits, but studying the viruses has been difficult without a reliable cell culture system.

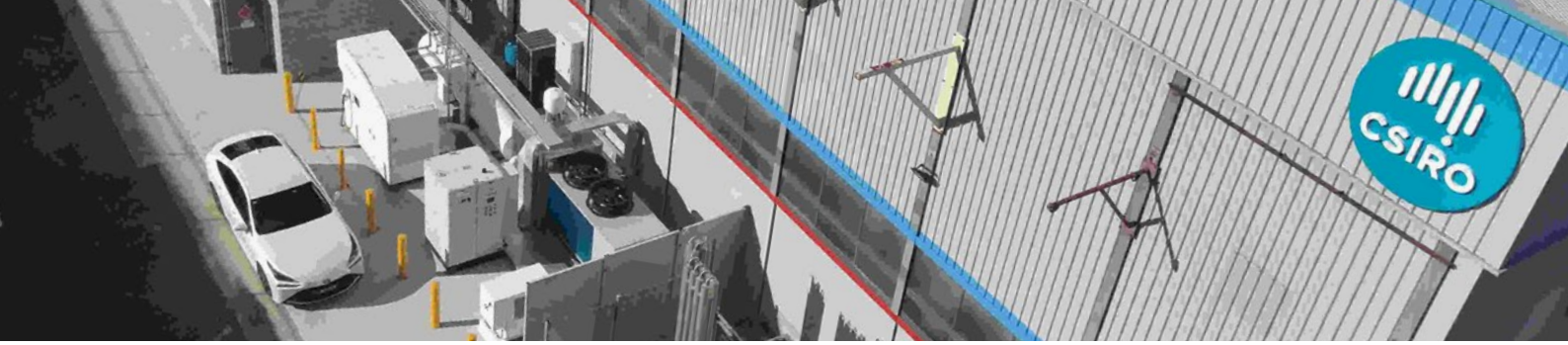
Our new rabbit 'organoids' are tiny 3D cellular structures that mimic the organ the cells come from—in this case liver cells cultured from already culled wild rabbits and hares. It's the first time scientists have been able to reliably grow these biocontrol viruses in a cell culture outside of the animal, despite attempting it for more than 40 years.

We found that Rabbit Haemorrhagic Disease Virus (RHDV) 1 replicated successfully in the rabbit organoids, and RHDV2 replicated in both rabbit and hare organoids, which exactly replicates their respective properties in the animal hosts. We also made organoids derived from cat, fox and mouse livers. RHDV did not replicate in these, which highlights the additional value of the organoid system for species specificity testing of viral biocontrols.

This research complements our citizen science-based rabbit disease monitoring program tracking rabbit viruses across Australia, which revealed that rabbit caliciviruses recombine frequently to generate new variants, much more frequently than we previously anticipated.

This foundational research is the result of our international collaboration with the University of Canberra and the Baylor College of Medicine in Texas, with the support of Meat & Livestock Australia (MLA). Funding for the citizen science disease monitoring program is currently being provided by the Australian Department of Agriculture, Fisheries and Forestry.

Above, close up of rabbit liver organoid cells, showing the virus proteins in green, cell nuclei in blue and liver cells in red. © Dr Egi Kardia.



Sustainable energy and resources

Lower emissions to net zero while sustaining Australia's prosperity.

Hydrogen refuelling station a boon for green technology

In November 2023 we opened a hydrogen refuelling station at our Clayton campus in Victoria, as part of the Victorian Hydrogen Hub led by Swinburne University. The station, which cost $2.5 million to construct, generates 'green' hydrogen using renewable electricity purchased from the grid.

Hydrogen can help to decarbonise the transport sector, as a fuel for cars, buses, trucks or even as a building block for clean aviation fuel. It also shows significant promise for decarbonising 'hard to abate' heavy industries such as iron, steel and aluminium; and could be a useful mechanism to firm electrical grids exposed to high levels of intermittent renewables (solar and wind).

The hydrogen refuelling station provides research infrastructure for hydrogen generation, storage and utilisation and is a tool to educate stakeholders about hydrogen's potential as a clean energy source for transportation. It is being used in conjunction with our Hydrogen Technology Demonstration Facility in Clayton to test new hydrogen technologies and to train the next generation of hydrogen professionals, helping to ensure that Australia remains at the forefront of the global hydrogen industry.

We have already started sharing our learnings from the planning, construction, operation and maintenance of the refuelling station, as we refuel our hydrogen vehicles and those of our partners. The refuelling station has also been used for training and demonstration to several national and international delegations.

Fire and emergency responders are particularly interested in preparing themselves for safe responses to hydrogen emergencies including hydrogen refuelling stations and vehicles, with many groups visiting our refueller to learn more about hydrogen infrastructure. Deakin University have used the hydrogen refuelling station to demonstrate safety features in a video for emergency response teams.

Above, the above $2.5 million refuelling station allows hydrogen cars to travel over 600 km emissions-free on a full tank.

The Victorian Hydrogen Hub will use the hydrogen refuelling station for the training and skills development of Swinburne University of Technology personnel and industry partners, as well as to demonstrate hydrogen technology to the community. Swinburne staff and students will have the opportunity to leverage existing research capabilities and the refuelling technology to engage in impactful research projects in the hydrogen space, including in fuel cell vehicles and hydrogen refuelling technology.

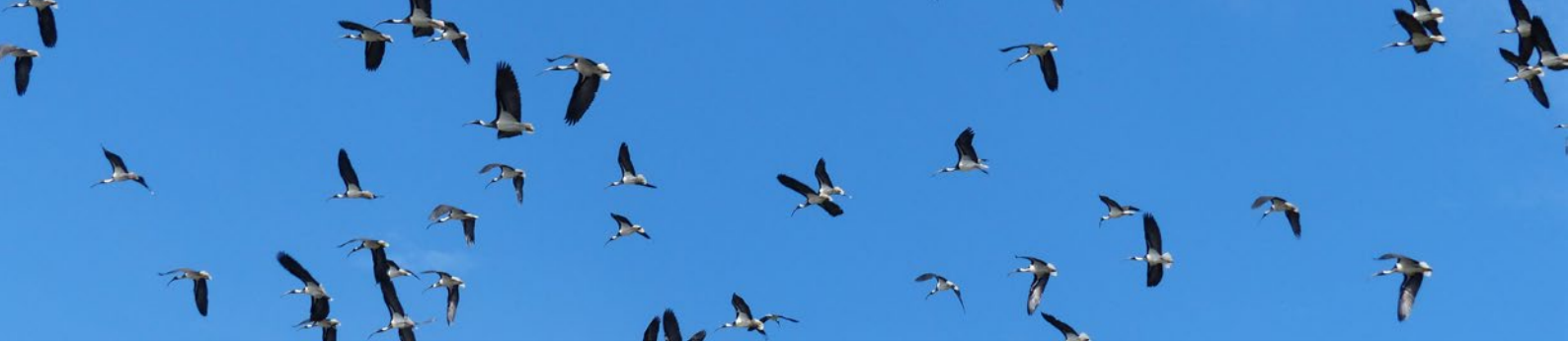
Partnering for a greener minerals future

We've partnered with Australian critical minerals company Tivan Ltd to further develop our novel vanadium processing technology, in a step towards advancing the energy transition through sovereign capabilities. Vanadium is a critical mineral and demand is forecast to grow significantly as it is increasingly being used for renewable energy storage systems, like redox flow batteries.

Our novel vanadium processing technology can deliver three products – vanadium, titanium and iron – from vanadiferous titanomagnetite (VTM) ore. The patented CSIRO process operates at atmospheric pressure and temperature and produces less ore-based waste, which no other existing commercial process can achieve. The use of conventional equipment enables a lower capital cost, whilst lower energy usage results in a lower carbon footprint. It also recovers high purity (>99.5%) vanadium as V_2O_5, which will help facilitate a downstream vanadium industry in Australia.

This long-term strategic partnership facilitated the collaborative development of CSIRO's VTM intellectual property, patents, know-how and further improvements for the recovery of vanadium, to deliver the TIVAN+ critical minerals processing technology.

The partnership will also facilitate the commercialisation of TIVAN+ which will present an opportunity to establish a domestic vanadium production industry for Australia, increasing our market share in greener energy materials, and creating a stream of opportunities in the economy, through job creation and community participation.



Resilient and valuable environments

Enhance the resilience and value of our natural and built environments

Protecting and understanding the Murray–Darling Basin ecosystem

We worked with the Murray–Darling Basin Authority to deliver the award-winning Ecosystem Functions project. The project addressed key knowledge gaps in the Basin essential for maintaining health, structure and integrity of an ecosystem. Traditionally, there has been a focus on selected species and key sites rather than a holistic approach to managing water-dependent ecosystems.

This project focused on the entire Murray–Darling Basin across four main themes of research. They included:

- Hydrological connectivity: this generated new datasets that support applications such as determining the volume of water present in the Basin and assessment of historical inundation of different vegetation communities.
- Biological habitat: a statistical modelling approach was applied to generate predictions of species occurrence and habitat quality across several decades (1995–2020) for the entire Basin.
- Productivity including flow: this demonstrated that flow and the connectivity between floodplains and rivers is an important determinant of riverine dissolved organic carbon supply.
- Biological connectivity for waterbirds and native fish: this quantified the drivers and likelihood of long-distance, basin-scale movements of waterbirds as well as native fish movements, which is useful knowledge for managers to enhance movement opportunities through the strategic use of environmental water. River regulation in the Basin has altered the hydrology and hydraulics of rivers, and created barriers that impede fish movement along rivers.

The project delivered new products such as floodplain inundation extent and depth estimation, long-term habitat mapping for vegetation, waterbirds and fish, and waterbird movement modelling and prediction. The research has found causal relationships between ecosystem functions and flow/connectivity, which is imperative to inform improved environmental water management focusing on ecosystem functions.

Modelling outputs generated from the hydrological connectivity theme are being used and extended by Australian Government-funded projects including the Flow Monitoring, Evaluation and Research program and the Murray–Darling Water and Environment Research Program. The research has been published in prestigious journals and won the R&D excellence award at the 2024 Australian Water Association's national awards.

Genome sequencing to reveal biology of rare Night Parrot

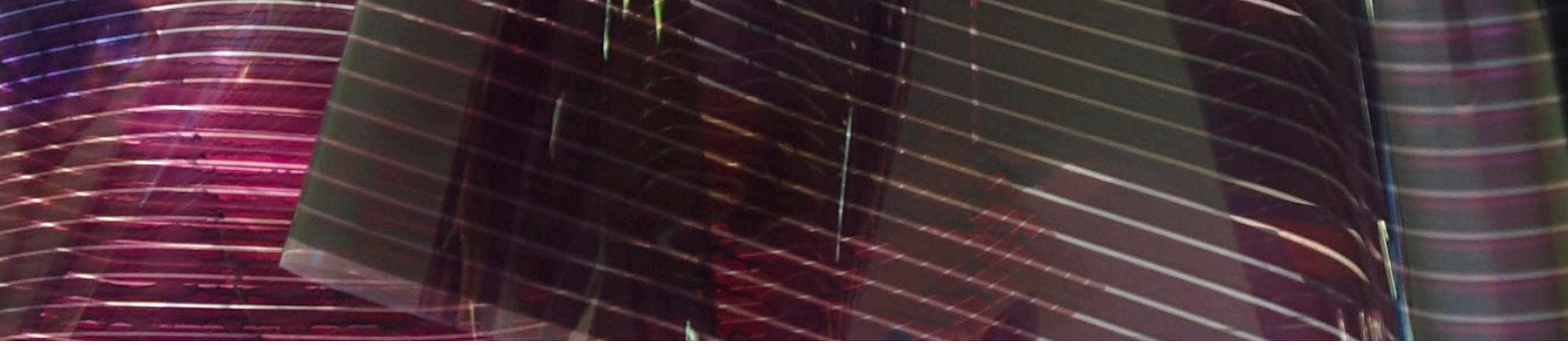
We've sequenced the first genome of the Night Parrot, one of the world's rarest and most elusive birds. It will unlock previously unknown data about the rare bird's genetics and biology. This will help scientists better understand the bird's biology and nocturnal habits.

Researchers will be able to compare this annotated genome with those of other, closely related parrots, shedding light on the reasons behind its scarcity and limited distribution compared to many of its relatives. It's unusual for a parrot to be nocturnal, so researchers will investigate the bird's faculties like navigation, smell, bill shape and its less-than-optimal night vision. They will also be able to run statistical analyses on the genome of this individual to estimate past population sizes of Night Parrot populations in Australia.

We sequenced the Night Parrot genome by applying our high-throughput DNA sequencing technology to tissue obtained from a specimen held in the Western Australian Museum, and that was found deceased by Traditional Owners in the Pilbara. The specimen, which is the best-preserved on display in the world, is now open to public viewing at the WA Museum Boola Bardip.

Our Applied Genomics Initiative is accelerating genomics research in Australia, providing a level of quality and detail that just wasn't possible even five years ago. The genetic data can be used to ensure that conservation programs maximise diversity in rare species, so that they are resilient and have the best chance of long-term survival.

Above, waterbirds, like the straw-necked ibis above, are indicators of a healthy environment. They play an important role in the Murray–Darling Basin ecosystem.



Future industries

Create Australia's future sustainable jobs and industries

Printed solar cells one step closer to commercialisation

We've led an international team to a clean energy breakthrough by setting a new efficiency record for fully roll-to-roll printed solar cells, which are more flexible than traditional silicon panels and can be deployed in previously unimaginable ways across space projects, urban construction, mining operations, emergency management, disaster relief, defence and personal devices like smartphones and watches.

Our new method has been able to produce solar cells with 11 per cent the efficiency of typical solar panels, where previous attempts have only achieved efficiency levels of 1–2 per cent. The record results were achieved with support from the University of Cambridge, Monash University, the University of Sydney and the University of New South Wales.

Our flexible solar was sent into space in March onboard Space Machines Company's Optimus-1, launched in Florida on Space X's Transporter-10 mission. The intent was to measure the cells' performance in low Earth orbit and not – at this stage – to power the satellite. Unfortunately, it was not possible to establish contact with the Optimus-1 satellite in orbit, so the performance data could not be collected. However, simulated space radiation exposure upon the solar cells demonstrated they should survive the tough conditions of space for the mission duration.

Above, our new method of generating printed flexible solar offers game-changing opportunities across major industry sectors in Australia.

Cultivating Australia's farming future to 2050

This year we published our CSIRO Ag2050 Scenarios Report, developed in collaboration with industry, research and government stakeholders to explore the future of farming in Australia by 2050, identifying key trends, trade-offs and opportunities.

Over six months, 100 stakeholders from 54 organisations participated in workshops, reviews and analyses to consider what productive, resilient and sustainable farming systems could look like in Australia by 2050. The report presents four evidence-based plausible future scenarios:

- Regional Ag capitals: A consolidated and technologically advanced sector, thriving and prioritising production of food and fibre goods.
- Landscape stewardship: A forward-thinking sector embracing new opportunities, novel technologies, and supporting the environment to flourish.
- Climate survival: A sector focused on climate adaptation and incremental changes allowing it to survive.
- System decline: A sector failing to address growing challenges and at a tipping point.

The report emphasises the importance of immediate action and collaboration across the agricultural sector to drive long-term transformative change to realise opportunities. The report is now being used in collaboration with industry and government stakeholders to tailor the four scenarios to local and regional contexts, identifying specific technological and innovative requirements to make cutting-edge scientific solutions accessible to achieve their desired future.

The Ag2050 Scenarios Report was led by CSIRO with financial and in-kind support from the Australian Department of Agriculture, Fisheries and Forestry (DAFF).

CSIRO attendees at Australia's premier agtech event, EvokeAg, Perth, February 2024. L–R: Pamela Tyers, Jen Taylor, Rose Roche (Ag2050 Lead) and Marty Mooij.

Engage and empower talent

Corporate Plan Objective 3: We attract world-class talent and strengthen our nation's STEM (science, technology, engineering and mathematics) pipeline. We build a culture that makes us an employer of choice and operate in an adaptable, resilient and responsive way.

A national STEM pipeline

Connecting schools and industry for long-term impact

As the national science agency, we support the growth of Australia's science, technology, engineering and mathematics (STEM) talent pipeline and future workforce. We do this through evidence-based programs, events and curriculum-linked resources to deliver greater access to cutting-edge knowledge, exciting hands-on learning and authentic insights into the career possibilities of today and tomorrow.

Our STEM Professionals in Schools program creates custom partnerships directly between teachers and STEM professionals to strengthen the links between key learning areas of the Australian curriculum and real-world STEM industry practices. There are currently more than 800 partnerships in the program nationwide.

A partnership enrichment campaign in 2023 saw a concerted effort across the program to assess partnership compatibility, and offer individualised support and assistance. There was also opportunity to action feedback towards enabling positive partnership experiences for everyone.

In 2023 we also delivered virtual and online interactions to broaden the reach of the program, including an entire school in NSW joining a live video link to meet with an environmental scientist working in the field in Antarctica. Students received a virtual tour of the polar research base and could ask their questions in real time.

Over the past year, roughly 30 per cent of the program's partnerships have involved schools based in regional and remote parts of Australia. This includes a school based in Far North Queensland who connected with a bioscientist from Australian Catholic University, which is also home to an Indigenous garden that can also be experienced via an interactive online tour. Students have gained knowledge of the cultural significance of the plants as well as their biochemistry. They have applied these learnings to identify, label, and propagate native seedlings on their own school grounds.

Five independent external evaluations of the program have consistently highlighted STEM Professionals in Schools' positive impact. The most recent report identified STEM Professionals in Schools as one of the only nationally-funded STEM education programs to target discrete equity groups with the inclusion of industry and business involvement, providing participants with highly valuable exposure to real-world STEM experiences and learning.

Opposite, CSIRO ecologist Dr Bruce Webber is partnered through the STEM Professionals in Schools program with teacher Hannah Reid from Churchlands Primary School in Perth Western Australia. He visits the school several times a year to support STEM learning activities, including observing the school frog pond's thriving ecosystem.

Members of the CSIRO iPhD team, with project supervisors and students.

Connecting STEM PhDs with industry opportunities

Our Industry PhD (iPhD) program brings together an industry partner, a PhD candidate, a university and CSIRO to co-develop a four-year industry-focused PhD project, providing PhD students with a unique skill set to focus on impact-driven research and delivering R&D to Australian businesses.

This year, our iPhD students attended launch camps in Brisbane, Perth and Melbourne facilitated by our ON Program to dissect their work, discover what others are researching, uncover new insights, and develop their understanding of the research journey with the expert guidance of an experienced facilitator.

The ON Launch Camp events encourage students to reflect on the purpose and impact of their work, with a more profound consideration of the broader industry-focused research ecosystem and an ever-evolving market. Students present their pitch and receive the support and feedback of their peers, supervisors and program facilitator, as well as attending networking events with members of the broader research community.

One of the iPhD projects underway combines educational research, information technology and science to help primary school students learn positive social behaviours. The Biobot Academy is a collaboration between Griffith University, Brisbane-based production studio Hyper Theory, CSIRO and PhD candidate Kristin Magarry aiming to use gamification to break the cycle of domestic violence. The project helps children improve their empathy and self-regulation skills by using technology and fun games to engage them, focusing on the importance of making authentic connections with others and leading with kindness. The modules have been mapped to the Australian Curriculum and aim to equip students with tools to maintain their mental health.

Future science and technology

Shaping our future science and technology

Science problems and the methods we use to solve them evolve significantly over time, driven by technology advancements, new discoveries and changing societal needs. Planning for Future Science and Technology (Future S&T) ensures we are well-positioned to tackle increasingly complex global challenges and work towards a brighter, more resilient future.

To ensure CSIRO remains at the forefront of innovation, we embarked on a co-design process to shape our Future S&T focus. Through collaborative engagement with internal and external stakeholders, we identified key opportunities and priorities to help guide our research and development efforts into the future.

Central to this initiative was a robust co-design methodology. We established cross-disciplinary internal working groups made up of science experts across twelve distinct domains. These groups explored potential emerging science and technology and identified the cutting-edge capabilities and methods needed to realise them.

Additionally, we consulted extensively to gather insights, experiences and new ideas from across the organisation. Our people engaged through surveys, workshops and online discussions. Over 750 staff attended workshops, 560 completed surveys, and 700 actively participated in online community forum discussions.

To enrich our understanding of the external environment, we conducted 33 interviews with industry, academic and innovation thought leaders to validate our internal findings and incorporate diverse perspectives. This external input was crucial in refining our strategy and ensuring our Future S&T priorities align with broader societal and market needs. The combined insights from our internal and external engagement efforts enabled us to identify and prioritise convergent and disruptive science areas.

Some of the key themes that emerged include:

- revolutionising materials discovery, design, and delivery with applications across various industries
- integrating Indigenous science and knowledge systems to address complex national challenges
- creating an integrated energy network for an emission-free future
- designing and controlling our climate
- developing ingestibles to predict and prevent diseases.

The Future S&T priorities will help guide our research portfolio and strategies, infrastructure investments and talent development, positioning us to tackle the complex global challenges of the future and create national benefit.

Science excellence

CSIRO performs excellent science to deliver impact to industry, society and the environment, maintaining our reputation and trust. Each year, we review and evaluate our science performance to produce a Science Health and Excellence report. We analyse various indicators to report on our science output (excellence) and the state of our scientific capability (health). We compare ourselves to similar organisations whenever possible to get a clear picture of how we're performing.

The 2023 Science Health and Excellence Report highlights CSIRO's critical role in Australia's innovation ecosystem. As a key player in Australian research, we significantly impact fields such as agricultural sciences, environment and ecology, geosciences, plant and animal science, space sciences, computer science, materials sciences, and chemistry. Our contributions are notable not just in terms of national output but also in academic impact. We act as essential connectors within the nation's collaborative network, enhancing the integration and effectiveness of research efforts.

A standout indicator is our production of high-value Australian Intellectual Property in specialised domains like biological analysis, nanotechnology, biotechnology, food chemistry, polymers, and materials. These areas often receive less attention from universities and private inventors in Australia, highlighting our unique role.

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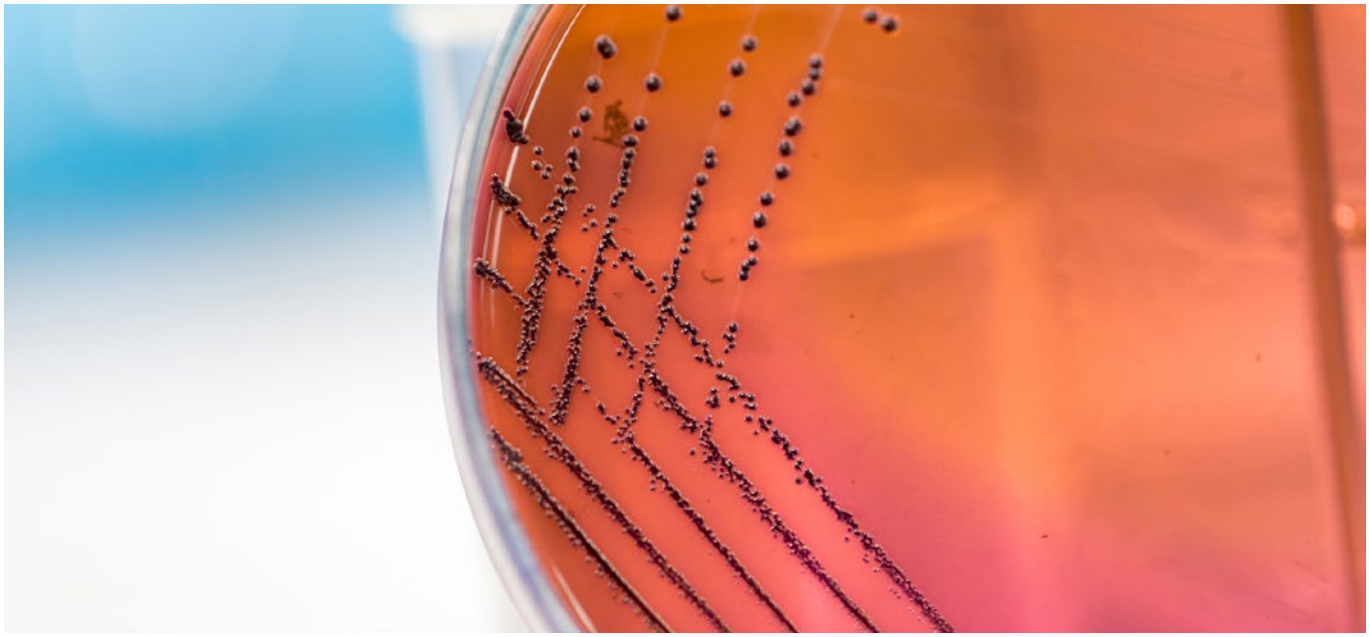


***E. coli*, pictured, can mobilise resistant genes more easily than other bacteria populations and act as a reservoir for AMR genes.**

Our research aligns strategically with government-identified high-priority areas, including Industry Growth Centres and Critical Technologies in the National Interest, supporting key national interests and contributing to economic and technological growth.

Organisation-wide, our citation impact remains excellent compared to similar applied research organisations. At the Research Unit or Research Field level, 46 per cent of our research ranks in the top 25 per cent against peers, with an additional 25 per cent in the top 50 per cent.

Approximately two-thirds of our publications involve Australian collaborators, and another two-thirds involve international partners, enhancing the quality and reach of our research. China has become our most frequent international collaborator, followed by the USA and the UK. We also collaborate heavily with the Group of Eight universities in Australia and global applied research organisations.

The 2023 Science Health and Excellence Report underscores our vital role in advancing scientific research and innovation in Australia. We continue to deliver high-impact research and maintain a robust collaborative network, reinforcing our position as a leader in the scientific community.

Read more in our Science Health and Excellence Report: csiro.au/reportingsuite2024

Tackling challenges is Impossible Without You

In recent years, we've grown our workforce through a focused recruitment campaign called 'impossible without you', that recognises we need diverse talent to solve Australia's challenges. Our Impossible Without You recruitment has strengthened CSIRO's research workforce.

For example, 8 new researchers joined our team to tackle the challenge of antimicrobial resistance (AMR). AMR is caused by bacteria and other microbes developing increased resistance to the drugs designed to kill them, largely due to increasing overuse and misuse of antimicrobials in human and animal medicine. The program aims to halt the rising death rate and economic burden of AMR in Australia by 2030 by enabling R&D and providing pathways to market for new One Health solutions.

Similarly, 2 early career researchers joined Towards Net Zero, our mission-oriented approach that brings together research, industry, government and communities to help Australia's hardest to abate sectors – including steel, aviation, and agriculture – halve their emissions by 2035. Our new recruits are working towards a low emissions steel value chain, aiming to reduce the environmental impact of the iron ore to steel value chain. This includes investigating less water-intensive methods to extract magnetite to produce iron ore, as well as exploring options for a pilot facility for low emissions ironmaking.

Max Fabila at Dharriwaa (Narran Lakes, New South Wales), which has been severely impacted by dry conditions.

Indigenous-led science for drought resilience

We are co-designing an approach for embedding Traditional Owner Knowledge and perspectives into drought research to build resilient communities.

By partnering with Aboriginal and Torres Strait Islander communities, we are co-developing innovative approaches to address the complex challenges posed by drought. A key focus has been the recruitment of Aboriginal and Torres Strait Islander researchers, such as Max Fabila, to lead projects that prioritise Traditional Owner Knowledge and values.

Max is a Jabirr Jabirr man with deep roots in the West Kimberley. He has a background in Indigenous design and a passion for preserving cultural knowledge.

Max's work with the Yuwaalaraay People in New South Wales and Fitzroy Catchment Traditional Owners in Queensland exemplifies this approach. Through co-design and collaboration, Max and the team are developing new research methodologies that respectfully explore and strengthen Traditional Owner Knowledge systems and science. For instance, by incorporating Traditional Ecological Knowledge about water-dependent species, such as birds and plants, with hydrological modelling, researchers can develop more accurate drought prediction models and early warning systems.

"I'm excited to apply my experience in co-design from the Indigenous creative industry to the big challenges we are trying to solve," Max said.

"Our culture has the power to reshape science and research in Australia, underpinned by 60,000-plus years of this continent's stories and knowledge."

By prioritising this input at every stage of the research process, we're ensuring outcomes are culturally relevant and beneficial to the community. This Indigenous-led research is not only advancing our understanding of drought from Australia's First Scientists but also empowering communities to develop their own solutions. By recognising the deep connection between Aboriginal and Torres Strait Islander Peoples and their land, we can work towards a future where drought resilience is built upon a foundation of respect, collaboration and sharing of knowledges.

Read more in our Indigenous Collaboration and Partnerships report: csiro.au/reportingsuite2024

Diversity floats to show support

This year we celebrated the diversity of CSIRO's people with both a float at the 2024 Sydney Mardi Gras Parade and by lighting up our floating lab, the research vessel (RV) *Investigator*.

'Science for a rainbow future' was the theme of CSIRO's 2024 Mardi Gras Parade float and something Maddy Lahm (she/her), a seagoing hydrochemist and proud lesbian, is working towards onboard RV *Investigator*. "I feel so lucky to be in a workplace where I can be openly gay," Maddy said.

This year, CSIRO's Mardi Gras Parade participants included the largest cohort of Indigenous and Torres Strait Islander marchers and allies, as well as many members of CSIRO's Neurodivergent Employee Network. CSIRO's Chief Executive Dr Doug Hilton marched to emphasise the importance of diversity and inclusion at CSIRO, saying: "We need diversity to tackle those really difficult scientific questions Australia is facing and anybody, irrespective of their sexual orientation or their background, can feel welcome at CSIRO and be part of that."

RV *Investigator* is part of the CSIRO Marine National Facility, which is supported by the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS).

Skills exchange marketplace

This year we launched a professional development opportunity for our people with a new online 'Talent Marketplace', offering opportunities to gain experience by working across different parts of CSIRO. It provides our people with new pathways to engage in fulfilling short-term projects and creates opportunities for collaboration with people with different skillsets. It also aims to address the ebbs and flows of seasonal workload requirements, build workforce agility, and provide development opportunities for people to grow their network and skills with meaningful, on-the-job experiences.

Leaders can list short-term resourcing requirements and employees can reach out to fill those opportunities or get matched by the system – much like AirTasker meets LinkedIn. Since launching in February 2024, over a thousand people are already on board the platform.

CSIRO's costumes for the 2024 Sydney Gay and Lesbian Mardi Gras are modelled here by CSIRO people (L–R): Alex Caputo, Mark Woodcock, Jayashree Srinivasan and Sarah Landers.

RV *Investigator* lit up in the colours of pride in her home port of Hobart.

World-class infrastructure

Corporate Plan Objective 4: We share our world-class national labs and facilities with universities, industry and government.

Shared national labs

We open and share our world-class infrastructure with industry, universities and governments to strengthen Australia's sovereign research capability.

Solving 120-year-old maritime mystery

A CSIRO team aboard research vessel (RV) *Investigator* has helped Heritage NSW solve a 120-year mystery with the discovery of the SS *Nemesis*, a 73-metre iron-hulled steamship that was lost at sea in 1904, resulting in the loss of 32 lives on board.

Australian company Subsea Professional Marine Services located the wreck during an underwater survey off Wollongong, NSW, and conducted an initial inspection using a remotely operated vehicle. Using the RV *Investigator's* advanced multibeam echosounders, CSIRO researchers mapped the wreck site and surrounding seafloor in high resolution and conducted a systematic visual inspection using a specialised underwater drop camera system.

The bathymetry (assessment of water depth) and camera survey data from RV *Investigator*, along with the previous imagery collected by Subsea, allowed Heritage NSW's maritime archaeology experts to conclusively identify the wreck as the SS *Nemesis*.

Like many wreck discoveries, locating the SS *Nemesis* was the result of a highly collaborative effort between research and heritage agencies and the maritime community. It's just one of many thousands of shipwrecks that lie along the Australian coastline, with many still to be found.

This project was supported by an allocation of sea time on RV *Investigator* by the CSIRO Marine National Facility, national research infrastructure supported by the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS) and operated by CSIRO, Australia's national science agency, on behalf of the nation.

Telescope gives closer look at theory-breaking stars

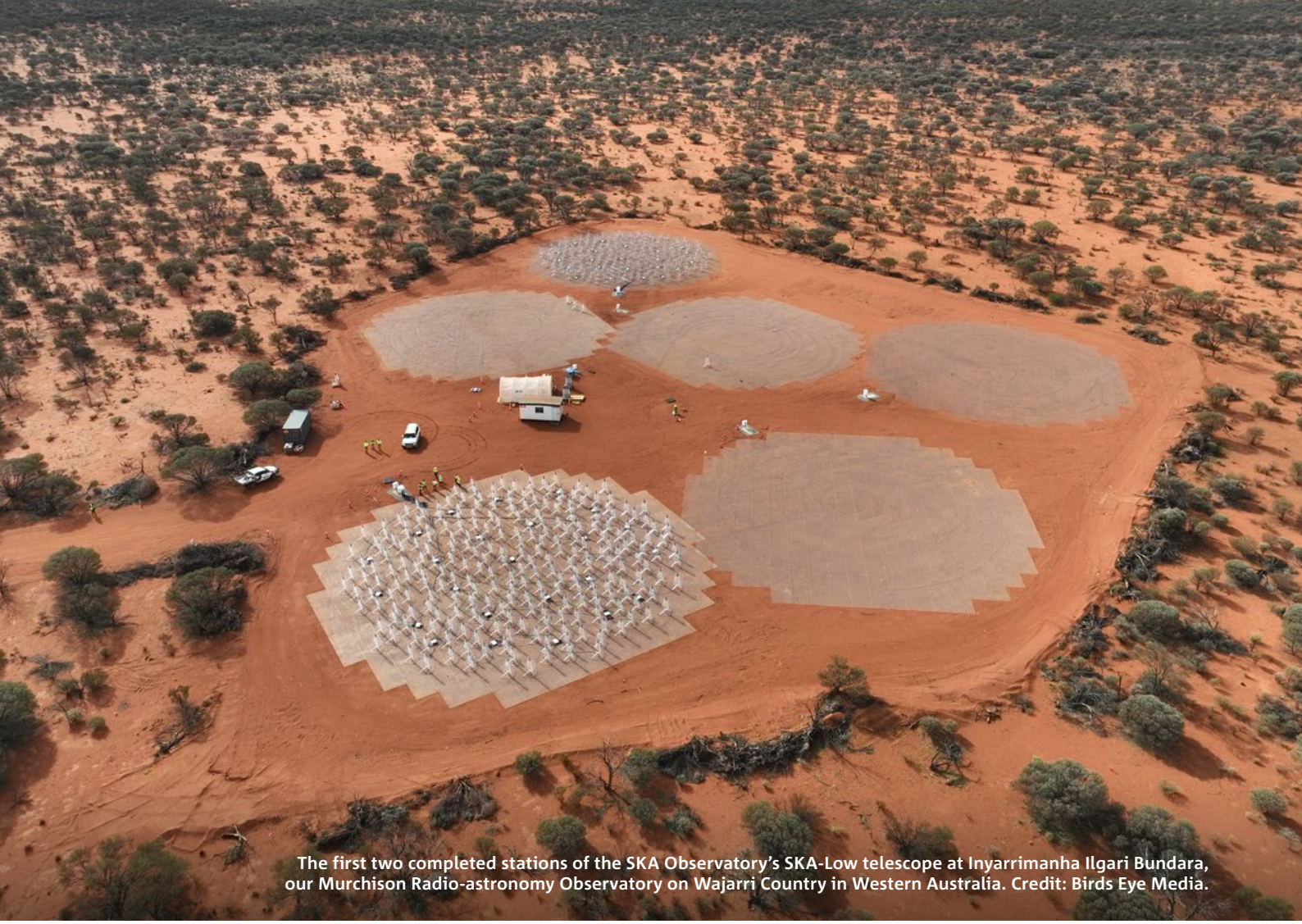
Researchers using Murriyang, our Parkes radio telescope on Wiradjuri Country in NSW, made a discovery this year that has shaken our understanding of physics in extreme environments.

The team detected unusual radio pulses from a magnetar, which is a type of neutron star and the strongest magnet in the Universe. Most are known to emit polarised light, however, our research found that this magnetar is emitting circularly polarised light, where the light appears to spiral as it moves through space.

Studies of magnetars such as this provide insights into a range of extreme and unusual phenomena, such as plasma dynamics, bursts of X-rays and gamma-rays, and potentially fast radio bursts. This magnetar's mysterious behaviour implies that interactions at the surface of the star are more complex than previous theoretical explanations. Researchers think that a superheated plasma may be acting like a polarising filter around the star.

Murriyang has been crucial to observing the magnetar's radio signals since 2018. The telescope is equipped with a cutting edge ultra-wide bandwidth receiver, which was designed by our engineers who are world leaders in developing technologies for radio astronomy applications. This means Murriyang will remain the radio telescope of choice for many astronomers and keep Australia as one of the best places in the world to discover more about our Universe.

CSIRO acknowledges the Wiradjuri People as the Traditional Owners of the Parkes Observatory site where Murriyang, our Parkes radio telescope, is located.



The first two completed stations of the SKA Observatory's SKA-Low telescope at Inyarrimanha Ilgari Bundara, our Murchison Radio-astronomy Observatory on Wajarri Country in Western Australia. Credit: Birds Eye Media.

Sharing the sky and stars into the future

In Australia, the global SKA Observatory (SKAO) is partnering with CSIRO to build and operate the SKA-Low telescope – Australia's first mega-science facility – on Wajarri Country in Western Australia. The Wajarri Yamaji, Traditional Owners and Native Title Holders, have been observing the sky for tens of thousands of years from the lands on which Inyarrimanha Ilgari Bundara, our Murchison Radio-astronomy Observatory, sits. Now, they're sharing their sky and stars with the world through the telescopes on site and partnering in work across the observatory.

Protecting Wajarri heritage underpins all activity on site, flowing from the strong protections provided by the Indigenous Land Use Agreement we signed with Wajarri Yamaji and the Australian and Western Australian governments in 2022, paving the way for the SKA-Low telescope. Our teams work closely with heritage service providers, the Wajarri Yamaji Aboriginal Corporation and the SKAO to ensure Wajarri heritage monitors are on site for any ground disturbing activities during construction, protecting Wajarri heritage and significant sites.

Ongoing SKA-Low telescope construction activities have seen up to 40 Wajarri people at any one time working at the observatory for the SKA project.

This is in addition to our Wajarri team members who support our Boolardy Accommodation Facility and teams maintaining the existing instruments on site.

In March, the SKAO installed the first of the 131,072 antennas that will make up the SKA-Low telescope, built on site by the first cohort of 10 SKA-Low field technicians, seven of whom are Wajarri. Together with the SKAO we established these new roles, co-designed and delivered with representatives from the Wajarri community and Central Regional TAFE in Geraldton, Western Australia. The field technicians will become experts in building and maintaining SKA-Low antennas and their components on site.

The new roles are intended to provide the skills needed to build the SKA-Low telescope, as well as transferable skills for roles in other industries, such as telecommunications and mining. The field technicians are assembling and installing the first groups of antennas that will make up the SKA-Low telescope, before taking on a leading role training and managing further teams of technicians in the future.

The SKA-Low telescope is hosted in Australia with support from the Australian and Western Australian governments. We acknowledge the Wajarri Yamaji as Traditional Owners and Native Title holders of Inyarrimanha Ilgari Bundara, our Murchison Radio-astronomy Observatory site, where the SKA-Low telescope is being built.

Research infrastructure

We develop collaborative research infrastructure integrated with digital technologies that optimises our safety, efficiency and scientific excellence.

Embedding responsible AI in Australian industry

CSIRO has developed breakthrough science, comprehensive guidelines and practices to ensure Australian industries can safely and responsibly manage AI throughout its lifecycle.

Our new book, *Responsible AI: Best Practices for Creating Trustworthy AI Systems* (Dec 2023), provides practical advice on the design, deployment and governance of AI systems, including more than 60 reusable best practices to help embed responsible AI practices into systems, supporting ethical development and governance.

We have also created tools such as QB4AIRA (May 2023), a comprehensive question bank for AI risk assessment; Towards a Responsible AI Metrics Catalogue (November 2023), which offers detailed metrics to enhance transparency, auditability, and trustworthiness in AI systems; and, in partnership with Alphinity Investment Management, delivered an adaptable, open-source solution for investors assessing AI's impact on portfolios.

Start-ups TrueRecognition and Reejig have used these tools to improve product features and trustworthiness, while larger organisations, including Westpac, Telstra, SEEK and ABC, have utilised these solutions to enhance their internal and external AI use. By driving and championing proactive measures in responsible AI, CSIRO aims to accelerate responsible AI adoption across industry and cement Australia's reputation as a global leader in safe AI deployment.

Innovating IT for stronger science

We transform how we do research by investing in new technologies to support cutting-edge science across CSIRO, with highlights this year including the launch of our new Virga high performance computer, as well as a laboratory information management system (LIMS) and Cloud Right project.

To meet the growing data needs of increasingly digital research, we worked with Dell Technologies to build a high-performance computer (HPC) system which will speed up scientific discoveries and help grow Australia's industry and economy. The HPC is named Virga after the meteorological effect of rain that evaporates before it reaches the ground and was named in recognition of CSIRO's decades of research into cloud and rain physics.

Virga HPC is a state-of-the-art Dell PowerEdge XE9640, the first of its kind in Australia, designed to optimise AI workflows while also being power-efficient. Sixty per cent of Virga is cooled by hybrid direct liquid cooling, which means liquid is predominantly cooling the unit, reducing the need for energy intensive air cooling.

The installation of Virga has not only modernised our IT infrastructure but also keeps us at the forefront of accelerated computing and Australian innovation, which will deliver significant benefits to our researchers and paves the way for future growth in AI, machine learning and digital science.

We're implementing a new enterprise laboratory information management system (LIMS) in partnership with research units to improve data management, storage and sharing of test results across our labs. LIMS will enable better understanding of workflows and standardisation of best-practice processes in labs by tracking samples, automating data collection and generating results.

Having a single LIMS across all of CSIRO will support the reproducibility and defensibility of our science, evolve and modernise our lab operations and simplify our work, making it more efficient. It will deliver significant benefits to our science by simplifying processes, increasing visibility of data and enabling greater collaboration between our science areas. LIMS will automate the collection of data and generate results so they can be easily shared across our labs and with our customers. Teams who have adopted the LIMS in their labs have reported time savings, improved data quality and visibility, as well as streamlined workflows. The new system also meets all our accreditation requirements and saves time when being audited by providing an audit trail.

The Eveleigh Sustainability Champions were active participants in CSIRO's Green Impact pilot program.

Our Cloud Right project was recognised for excellence in the application or innovative use of digital technology in support of research activities at the 2023 Council of Australasian University Directors of Information Technology (CAUDIT) Awards. Cloud Right makes CSIRO one of the first research organisations in Australia to establish secure, managed access across three public cloud providers, delivering benefits and services only available in the public cloud.

Cloud Right has made it safer, easier and cheaper for our researchers to analyse, collaborate and store their scientific data in the public cloud, and this data can be used for important research, significantly impacting people around the world. Our researchers have found the processing and analysis of data much faster and have been opened up to new fields of research, while our customers can tap into some of the world's best science and apply the knowledge directly from the platforms, all with strong security to protect our research.

Driving sustainability at CSIRO

As Australia's national science agency, we're focused not only on promoting sustainable practices through our research, but also through our operations. This year, we supported our people in discovering and adopting sustainable practices that have a positive social and environmental impact at CSIRO as well as in our homes and communities.

Over 14 weeks in 2023, 17 CSIRO teams with 72 active participants took part in a pilot of the Green Impact program, supported by Australasian Campuses Towards Sustainability. Together they completed more than 350 actions aligned with our Sustainability Strategy objectives and the United Nations Sustainable Development Goals. Through their participation they also engaged hundreds of colleagues through onsite events and activities.

Following the successful pilot, we ran our 2024 program over six months, challenging teams to complete up to 100 actions addressing active transport, biodiversity, energy, resource recovery, health and wellbeing, sustainable procurement, diversity and inclusion, and Indigenous culture and engagement.

Participants in our Green Impact programs are actively developing their own sustainability literacy and capacity and promoting a culture of sustainability at CSIRO.

Read more in our Sustainability Report: csiro.au/reportingsuite2024

As Australia's national science agency, CSIRO is solving the greatest challenges through innovative science and technology.

CSIRO. Creating a better future for Australia.

csiro.au/work-with-us

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