INTERNATIONAL SPACE CENTRE

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ANNUAL REPORT

2025

THE UNIVERSITY OF WESTERN AUSTRALIA

Front Cover: Topoloki Blocks (top) and Space Boot Camp 2025
This page: Space Boot Camp Space Rocks! with Professor Marco Fiorentini

INTERNATIONAL SPACE CENTRE | THE UNIVERSITY OF WESTERN AUSTRALIA

Contents

Foreword

> The strength and soul of the ISC lies in its members and their leadership.

Professor Danail Obreschkow
Director of the International Space Centre

2025 has been a year of achievement, consolidation, and long-term preparation for the International Space Centre.

As a people-focused centre, our strength lies in enabling individuals across disciplines and bringing them together. The achievements highlighted in this report are a testament not only to individual excellence, but to the synergies that emerge when diverse expertise connects with a shared purpose.

At the start of the year, we entered a new phase with strengthened governance and a more sustainable funding model. This has enabled important developments within our core team, including the appointments of Jessika Anderson as Administrator and Dr David Gozzard as Academic Lead, alongside the promotion of Larissa Wiese to Senior Manager and Deputy Director. Together, this executive team provides the structure and continuity needed to support the ISC's growing ambition.

The strength and soul of the ISC lies in its members and their leadership. We have now grown to a distributed network of over 200 members across 24 research nodes, spanning disciplines from science and engineering to medicine, law, and beyond. The role of the core team is to bring this community together, enable collaboration, and amplify its impact. This is reflected in coordinated efforts such as UWA's strong presence at the International Astronautical Congress, cross-node initiatives like the ARC Training Centre bid in Space Domain Awareness, and the deepening of international partnerships—for example through our engagement with the European Space Agency around the inauguration of its new deep space antenna.

Alongside the visible successes showcased in this report, much of our work this year has taken place behind the scenes, preparing major flagship initiatives. This quiet work has forged powerful national partnerships across academia, industry, and government, and laid the foundations for exciting projects to materialise over the coming years. A particularly exciting example on the horizon is the first Australian-led experiment on large parabolic zero-gravity flights, to be conducted by a UWA team in Europe in late 2026!

I would like to thank all ISC members, partners, and supporters for their continued commitment and trust. The groundwork we laid together in 2025 positions us strongly to produce impact and inspire—stay tuned.

PROFESSOR DANAIL OBRESCHKOW
Director of the International Space Centre

> Throughout 2025, ISC has delivered many examples of how space is for everyone in Australia.

Professor Harvey Millar
Chair of the Board of the International Space Centre

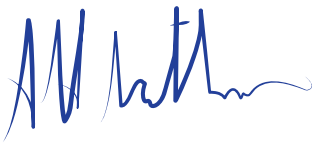
As Chair of the ISC Board, and speaking on behalf of all Board Members, it has been inspiring to witness the progress made in 2025 under the leadership of Director Danail Obreschkow supported by the ISC Executive Committee.

During this period, ISC has continued to mature in its governance, strengthen its financial sustainability, and expand its national profile.

We have also seen the Centre's 24 research nodes collaborate effectively, drawing on their collective strengths to deliver projects, create new initiatives, and work together in outreach and education. ISC's ethos and culture demonstrate how it has become both an enabler of space science and a trusted voice in the media and with government.

Throughout 2025, ISC has delivered many examples of how space is for everyone in Australia. Highlights featured in this report include the International Astronautical Congress 2025, the development of critical mass in Space Domain Awareness, and ISC's role in the national campaign supporting an ESA mission. By striving for inclusivity, ISC has harnessed the strengths of people from diverse disciplines, generations, and perspectives. A people-focused space sector will ensure the benefits of space flow across all areas of human endeavour. ISC has also continued its commitment to building meaningful connections with organisations, identifying the right people to create better solutions and bring communities together.

The Board's membership reflects a broad diversity of space-aligned expertise. It provides advice to the Director and the ISC leadership team as they prioritise opportunities, explore new ways to engage external partners, and strategically plan the use of ISC resources. The Board remains committed to working with the UWA Executive to maintain and strengthen ISC so it can achieve its goals in the year ahead and for many years to come.



PROFESSOR HARVEY MILLAR
Chair of the Board of the International Space Centre

INTERNATIONAL ASTRONAUTICAL CONGRESS 2025 UWA invested in an impactful showing at the IAC2025, featuring four booths, plus space on the WA Government stand.

Highlights of 2025

Strategically, the ISC trades on UWA's reputation as a global top 100 institution with a rich tradition of academic excellence and innovation, and leverages this strength to create sustained relationships with impactful partners to:

- Build the ISC and UWA's profile;
- Facilitate new research;
- Enable research commercialisation; and
- Become a trusted source in the space industry to become the 'go-to' for connections, and advice for government, academia and industry.

Internally, through our strong industry engagement, we can provide extra opportunities for students and researchers to widen their scope. At a broader level, we open up opportunities for diversified funding sources and promote our research infrastructure. We aim to see the ISC become a leading player in the development of West Australia and Australia's burgeoning space industry.

International Astronautical Congress 2025

The International Space Centre played a defining role for WA at the International Astronautical Congress 2025 (IAC2025), held in Sydney, positioning The University of Western Australia (UWA) as one of the most visible and engaged institutions at the world's leading space forum.

With a delegation of 18 representatives, comprising a significant proportion of Western Australia's presence, UWA delivered the largest footprint of any WA organisation outside of Government. Central to this was the TeraNet mobile optical ground station, which featured three booths and became one of the most visually prominent displays at the Congress. Alongside this, ISC researchers and staff participated in more than 20 pre-scheduled meetings, scientific sessions, and strategic engagements across the week.

The ISC was also proud to financially support the Women in Space Industry Australia exhibition produced by photographer Louise Whelan. It documented the lives and contributions of 24 women working in Australia's space sector, and captures a pivotal moment as the global space industry is advancing at remarkable pace.

IAC2025 served as a critical platform for both scientific exchange and high-level collaboration. For several ISC research areas, the Congress represents the premier global scientific meeting, and UWA researchers contributed actively to advance knowledge in their respective fields. At the same time, ISC leveraged the event to strengthen international relationships and drive institutional priorities.

A major milestone during the Congress was the launch of the bid for the proposed ARC Industrial Transformation Training Centre (ITTC) in Space Domain Awareness. This initiative attracted strong interest from international partners, including the Korean Space Science Institute and the Polish Space Agency, building on existing relationships and creating new pathways for joint research, training, and capability development.

The Congress also enabled significant bilateral engagement. Meetings with global agencies and stakeholders, including the European Space Agency and CNES, reinforced UWA's role as a trusted partner in international space activities. These discussions extended beyond the Congress itself, with a delegation from ESA visiting UWA immediately following IAC2025 to explore deeper collaboration and increased engagement in Western Australia.

Importantly, ISC's presence at IAC2025 was not limited to representation on the exhibition floor. The Congress formed the centrepiece of a broader program of activity, including international delegations to Perth, strategic workshops, and high-profile visits from global leaders in the space sector. These engagements strengthened UWA's position as a conduit between Western Australia and the global space community.

BELOW The ISC and TeraNet exhibition spaces on the main floor at IAC2025.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LC60

ARC ITTC Bid for Space Domain Awareness

In 2025, the ISC led a major national effort to establish an ARC Industrial Transformation Training Centre (ITTC) in Space Domain Awareness (SDA), positioning Australia in a leading role of the global SDA capability.

The proposed Centre responds directly to a critical national need: a shortage of industry-ready expertise in SDA across Australia's space and defence sectors. By integrating advanced research with industry-led training, the ITTC aims to build a highly skilled workforce capable of supporting both national security and commercial space growth.

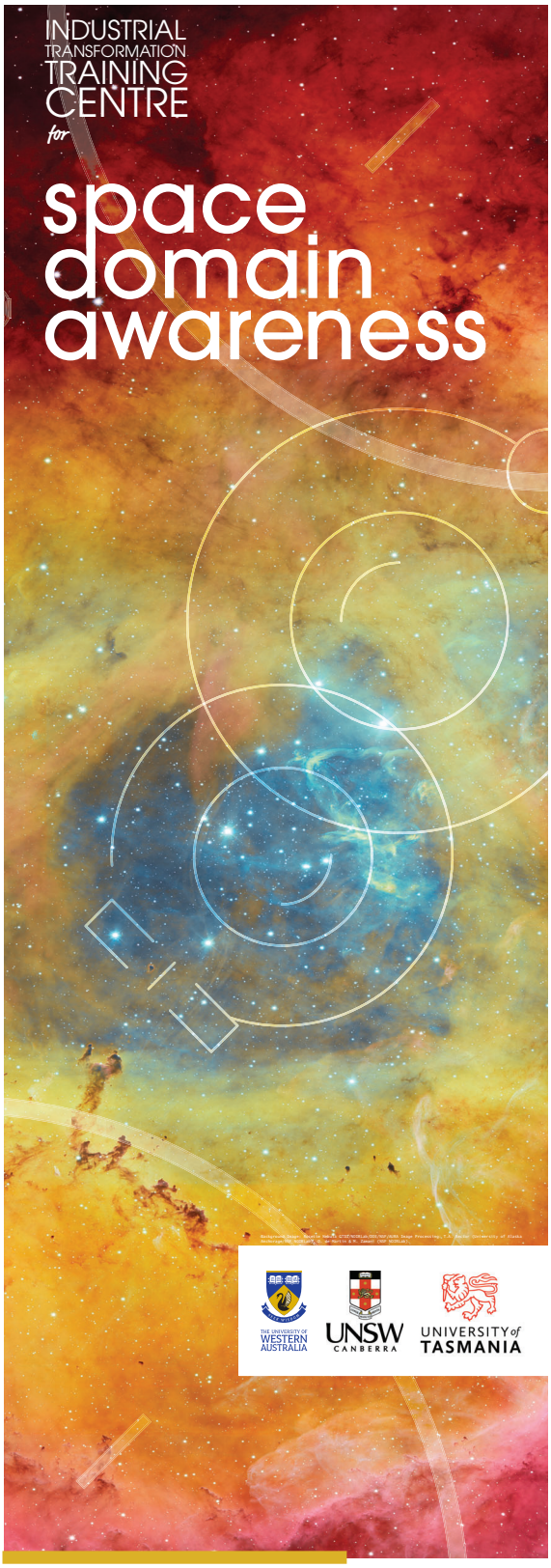
The bid brings together a strong multi-institutional partnership between UWA, UNSW and the University of Tasmania, combining complementary expertise in optical sensing, radio frequency technologies, data analytics, and space operations. At UWA, the ISC played the lead coordinating role, bringing together researchers, institutions and industry partners to shape a cohesive, nationally significant proposal.

Led scientifically by Associate Professor David Coward as proposed Centre Director, the ITTC focuses on cutting-edge SDA challenges, including tracking natural and human-made objects in space, multi-sensor data integration, AI-enabled analysis, and cyber resilience for space systems. These themes align closely with UWA's existing strengths and infrastructure, including optical ground-based sensing and advanced data processing.

A defining feature of the ITTC model is its deep integration with industry. Partners contribute both cash and in-kind support, working alongside researchers and students to co-design projects and ensure outcomes are directly aligned with real-world needs. This approach enables early access to emerging technologies, supports commercialisation pathways, and builds a pipeline of graduates ready to deliver immediate impact.

The proposed Centre includes approximately 25 graduate research positions representing a significant investment in Australia's future space workforce. Over its five-year duration, the ITTC is expected to attract substantial co-investment from industry and government, amplifying its national impact.

With the bid submitted in late 2025 and an outcome expected in late 2026, the ITTC has been a major focus of ISC activity. Regardless of outcome, the process has already strengthened national collaboration, deepened industry engagement, and reinforced UWA's leadership in space domain awareness.



ABOVE Marketing material and branding produce by the ISC for the bid.

Space Boot Camp 2025

ABOVE Space Boot Camp students and the Laser Communications team with the TeraNet-3 Mobile Optical Ground Station.

Immersion for high school students: training tomorrow's space researchers today.

With the generous support of the Fogarty Foundation, the International Space Centre's Space Boot Camp continued to grow in impact and maturity in 2025, delivering its most successful program to date. Strategic refinements to both cohort size and content level enabled a more immersive, university-style experience, with participant numbers streamlined to approximately 30-40 students to maximise engagement and learning outcomes.

The 2025 program introduced a more advanced academic framing, reflecting the increasing sophistication of Western Australia's space ecosystem. Students were exposed to complex concepts early, beginning with the structure of the early universe, before progressing through key thematic areas including Plants for Space, Space Law and WA's place in space, culminating in a hands-on, competitive rocket launch activity.

A second day combined campus-based demonstrations with field experiences, including a live demonstration of UWA's TeraNet optical communications capability, followed by a site visit to the Gravity Discovery Centre, the Australian International Gravitational Observatory (AIGO), and the Zadko Observatory. The optional evening stargazing session and dinner in Gingin proved particularly popular, with strong attendance from both students and their families, further extending the program's community engagement.

Participant feedback was overwhelmingly positive. Parents reported exceptionally high levels of satisfaction, with an average enjoyment rating of 4.61 out of 5 and an overall program rating of 9.23 out of 10. All respondents indicated that the camp exposed students to new and interesting knowledge about space, and that it successfully demonstrated potential career pathways in space-related fields at UWA. Presenters were consistently rated as highly engaging and effective communicators, and qualitative feedback highlighted the program as "a real eye opener" for students considering future study and careers.

Operational delivery was also noted as a strength, with feedback describing the program as "faultless," with clear communication and strong coordination throughout. The program continues to strengthen its reputation among both students and parents as a high-quality, inspiring STEM experience.

We'd like to thank the Fogarty Foundation for their continued support of the program, enabling Space Boot Camp to remain a cornerstone of ISC's outreach and talent pipeline activities, playing a critical role in inspiring the next generation of space professionals and connecting them with Western Australia's growing space sector.

Fogarty Foundation
Creating opportunity, realising potential

UWA-led campaign to support Australian-ESA mission

In 2025 the International Space Centre began leading a cross-sector campaign seeking government support for a human spaceflight mission to help anchor Australia to the global space economy. By leading this campaign around engagement with the European Space Agency, UWA has positioned itself as a credible, trusted coordinator of major national initiatives.

The outcome is uncertain: it's a tall ask to change the mind of Government. However, the activities of leading, the relationships formed in the sector and the media connections will continue to benefit the University and the ISC. They demonstrate UWA's capacity to lead in space beyond WA. The campaign will elevate the University's profile in Canberra and overseas, and reinforce UWA as Australia's most internationally connected space university. Importantly, it positions ISC as a neutral party across academia, industry and government.

The activity emerged following early indications that the Australian Government may not respond positively to ESA's anticipated approach regarding Australia's participation in a mission. In response, the ISC, supported by The University of Western Australia, undertook a structured, research-led advocacy process to ensure the opportunity was understood in terms of its national significance, including its implications for workforce development, returning science innovation to the Australian landscape, sovereign capability, and international collaboration.

The initiative positioned UWA as a neutral, trusted convenor of dialogue across academia, industry, and government. A national network of stakeholders was engaged, spanning universities, industry leaders, research organisations, and international partners. Through this process, ISC coordinated a significant body of support, culminating in a formal submission to the Prime Minister and relevant Cabinet Ministers in 2026. The submission was accompanied by a substantial package of correspondence from across the Australian space sector and adjacent industries, demonstrating broad national alignment behind deeper engagement with ESA.

Advocacy efforts were deliberately measured and non-public in their early stages, reflecting the sensitivities of government decision-making and international negotiations. As the campaign progressed, ISC also supported activities to raise the national profile of the opportunity, including strategic media engagement and contributions to the successful recognition of Bennell-Pegg as Australian of the Year 2026.

In parallel, ISC undertook extensive engagement with ministers, advisors, and agencies to communicate the structure and value of ESA partnership models, including barter-based arrangements aligned to ESA's "juste retour" principle. Briefings were provided directly and through trusted intermediaries, ensuring that key decision-makers were equipped with a clear understanding of the economic, scientific, and strategic benefits associated with participation in human spaceflight.

By early 2026, the advocacy effort had contributed to a broader national conversation. Relevant departments, including those represented during Senate Estimates, alongside Chief Scientists and industry leaders, were actively considering the opportunity and its implications for Australia's space sector.

This initiative reflects ISC's growing role as a national leader in space policy engagement, demonstrating the Centre's ability to convene stakeholders, shape strategic dialogue, and position Western Australia and the nation within emerging global space partnerships.

IT'S BETTER SPACE THAN STARRY

Perth uni leading the charge for award-winning astronaut's lift-off on back of historic NASA Moon feat

JOHN FLINT

Space fanatics hope moon joy from NASA's historic Artemis II mission will spark lift-off for Australian astronaut Katherine Bennell-Pegg.

The Federal Government is considering an invitation from the European Space Agency for the Australian of the Year to have a place on a space flight to the International Space Station.

With time running out for a decision, there's an increasingly urgent #FlyKatherine campaign to secure Ms Bennell-Pegg, 41, her maiden rocket flight and space mission.

It's being led by the University of WA's International Space Centre, which views the invitation as an unmissable opportunity with flow-on benefits for the nation's space industry.

But it's no free rocket ride. Australia will have to invest an undisclosed sum to clinch her crew position.

With Cabinet poised to make a decision, supporters hope the public's fascination with the Artemis II crew's journey to the

The astronauts are due to splash down off San Diego today after 10 days in the Orion spacecraft, in which they journeyed farther from home than any humans before them — 406,772 km from Earth.

The mission has been a feel good news story against the backdrop of war and economic gloom.

A few Australians have blasted into space in the past, but none representing their country. Ms Bennell-Pegg, who has qualified for long duration missions, would be the first under the Australian flag.

The Sydney-born space scientist and mum of two beat more than 22,500 applicants to be trained as an astronaut by the European Space Agency.

Whilst she was eligible to apply as a dual UK citizen, she completed the 13-month training program in Germany as an Australian Space Agency employee and was the first international candidate to do the course, which she aced. The discounted $500,000 cost was met by Australia.

International Space Centre deputy director Larissa Wiese has been a passionate and galvanising force behind the #FlyKatherine campaign and has visited Canberra twice to pitch to ministers.

Ms Wiese stressed the campaign was about much more than getting Ms Bennell-Pegg a ticket to space.

Funding would flow back to the nation's space industry in the form of research, commercial opportunities and capability development. She cited the UK's sevenfold return on astronaut investment.

Other industries would gain from more STEM graduates, inspired to study maths, engineering and sciences by Ms Bennell-Pegg's example.

Capabilities and tech developed by the space sector were already finding earthly applications, supporting mining and other industries.

"It would be hugely impactful (for Australia), and that's why we're really pushing for this to happen," Ms Wiese said.

"Also, if we don't take this opportunity, which really will end in a couple of weeks, we don't have another astronaut in the pipeline. We're just so lucky that we have Katherine.

"It seems ridiculous that we'd train an astronaut and not take up (this) opportunity."

ESA director-general Josef Aschbacher recently described Ms Bennell-Pegg a "very impressive astronaut".

The #FlyKatherine campaign team collected letters of support from universities, space organisations and businesses, industry associations, chief scientists, STEM organisations. Packages of nearly 80 were sent to the Prime Minister and senior Cabinet members.

"These letters represented tens of thousands of people across Australia," Ms Wiese said.

There was also a co-contribution fund with industry chipping in money, so it wasn't wholly government-funded.

The fund was kickstarted by $1 million commitment from Jim Whalley, director and co-founder of Nova Systems. The pledge was matched this week by businessman Dick Smith.

His offer was contingent on the Federal Government acting quickly.

In a letter to Anthony Albanese, Mr Smith said the opportunity was "narrow and time-sensitive", and urged the Prime Minister to support its inclusion in the May Budget.

As with the Apollo moon missions half a century ago, Australia played a role in Artemis II and will have bigger roles in future Artemis campaign missions, which aim to put a base on the Moon and lay the foundations for NASA's first crewed missions to Mars.

Australia's national science agency, the CSIRO, helped mission control in Houston stay in radio communication with the crew via the Canberra Deep Space Communication Complex and other facilities.

Also in the ACT, the scientists at Australian National University's Quantum Optical Ground Station at Mt Stromlo have been testing laser communications — up to 100 times faster radio — with Orion for NASA.

Artemis II is the first crewed mission to use lasers to transmit data from such a distance.

Laser communications systems for space missions are also being developed in Perth at the University of WA.

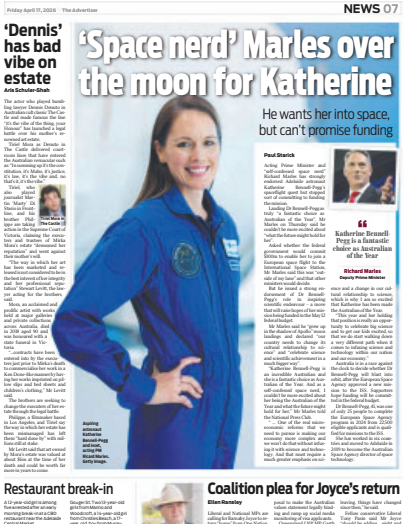
Ms Bennell-Pegg said that in a world full of conflict, Artemis II has been a powerful reminder of what can be achieved through working peacefully in partnership.

"During astronaut training, we learned about the overview effect — the cognitive shift that comes from seeing Earth from space," she wrote this week.

"You can't see borders from up there. Just a fragile, shared home and a powerful truth: We're all in this together."

The Australian Space Agency, in partnership with NASA, has been working with industry to design and build a lunar rover that will be flown to the Moon's South Pole region in 2030.

The Roo-ver, as it has been


NEWS 07

'Dennis' has bad vibe on estate

'Space nerd' Marles over the moon for Katherine

He wants her into space, but can't promise funding

Restaurant break-in

Coalition plea for Joyce's return


6 THE NATION

'I'll smash your teeth in' threat to Portelli

Cosgrove launches Aussie astronaut space campaign

Treaty has new voice of support


Talent must not be left on the launchpad

FUTURES

BUILDING A BIGGER, BETTER STATE

The Advertiser


As time's ticking to book Katherine a space mission, industry leaders urged ...

LET HER SHOOT FOR THE STARS

Angus rallies his troops

SA hosts Ukrainian celebration

Radio star's tragedy a driving fo

Leading the flight push is the International Space Centre at UWA, backed by a group of universities, industry bodies, chief scientists, STEM organisations, and senior politicals figures, who have all submitted nearly 80 letters of support to the PM and Cabinet.

The Adelaide Advertiser, February 25 2026
Writer Natasha Emeck


THE WEEKEN

THEAUSTRALIAN.COM.AU | WELCOME TO THE

Space ... the final frontier

Send our Aussie astronaut into orbit

NEWS P3

Western self

WEDNESDAY, APRIL 8, 2026 THE AUSTRALIAN

THE NATION 7

Dick Smith offers $1m to get Aussie astronaut on mission to ISS


Katherine Bennell-Pegg

WILLIAM ELLIOTT

Dick Smith has pledged $1m to help put Australian astronaut Katherine Bennell-Pegg on an International Space Station mission, saying the endeavour would encourage thousands of school-children to pursue careers in engineering, science and technology.

In an April 7 letter to Anthony Albanese, seen by The Australian, the entrepreneur urged the Prime Minister to personally support an Australian partnership with the European Space Agency, and said the Dick and Pip Smith Foundation would contribute $1m if the government moved this financial year.

"This is not simply about sending one Australian into space," he wrote. "It is about whether Australia chooses to seize a rare strategic opportunity that may not come again for decades."

Mr Smith said the opportunity was "narrow and time-sensitive", and urged Mr Albanese to support inclusion of the initiative in the May budget.

Mr Smith told The Australian the government needed to commit to the ESA proposal now, arguing that Australia had a rare chance to capitalise on a fully trained astronaut, build advanced manufacturing capability and inspire more young people to pursue science.

"I respect Albanese. I think he's a very good prime minister, and he's talked about new manufacturing, and space is where the money is," he said.

Mr Smith said putting an Australian into space would help drive science uptake among school students and strengthen the country's industrial base, rather than serving as a mere prestige exercise.

His letter said Australia stood to gain "immediate and long-term returns" from what he described as a relatively modest investment over several years, including stronger STEM participation, growth in highly skilled jobs, greater private investment in the domestic space sector and deeper partnerships in advanced technology, research and innovation.

He also wrote that Australian industry was already supporting the push with financial and in-kind contributions, and pointed to the economic return the sector believed could flow from the mission.

A spokesman for Science Minister Tim Ayres said the government had previously backed Ms Bennell-Pegg's astronaut training with ESA and was continuing to explore closer co-operation with the agency.

"Katherine Bennell-Pegg is an extraordinary Australian," he said. "Katherine's determination to become the first astronaut qualified under the Australian flag is an inspiration to us all, particularly young Australians."

The spokesman said the government had indicated at last year's International Astronautical Congress that it intended to explore closer co-operation with ESA, and that the Australian Space Agency continued to engage with the agency as part of those discussions.

Government sources said there was no firm deadline for acceptance of any proposal from ESA, and described the process as careful and ongoing as ministers worked through budget pressures ahead of the budget.

Mr Smith disputed the government's suggestion there was no urgency. "We should be making a decision as soon as possible."

Asked what Australia risked if the government did not act in this financial year, he said: "We could lose the chance of being able to do it at a very reasonable price. If we lose it, it could be a decade before we can put someone into space."

Mr Smith confirmed his $1m pledge was, for now, conditional on the government backing the proposal this financial year.

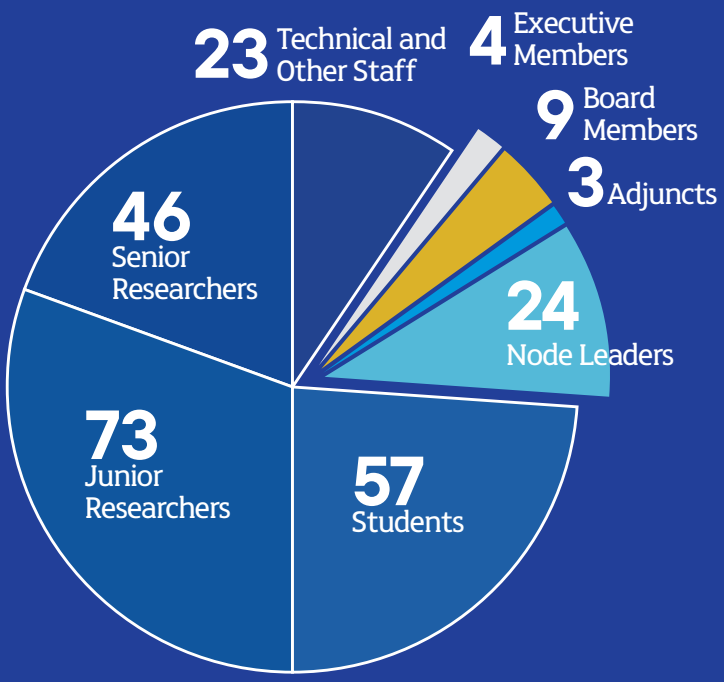
He said Ms Bennell-Pegg's qualifications made the timing especially compelling: "Because it's so incredible that we have someone fully trained, she's Australian of the year," he said.

Asked what he would say to critics who dismissed the idea as a vanity project, Mr Smith was blunt: "No, I think it is. I think it's both, but it's a very serious national investment."

ABOVE Resulting coverage from the national campaign to support a barter with the European Space Agency.

The ISC in Numbers

Members of the ISC



Engagement

40
Events led and supported

66
Publication bylines

119
Members Mission Control

New 2026 Grants

$851K

Funding Provided to Members

18
Students and ECRs supported with grants

$86K
Awarded to support space engagement and research activities

Audiences

3,109
LinkedIn Followers

1,907
ISC Email News Subscribers

$2.87m
Advertising Value Equivalency

53
Email Newsletters

128
Stories in the Media (61 in Australia)

300m
Reach

In 2025 the ISC's Space Boot Camp achieved organic gender equity for the first time.

Engagement in 2025

→ Seminars and Talks

Mission Control, Public and Internal Lectures

MAY Dr Mark Micire, former Head of Robotics at NASA Ames Research Centre, spoke to our Mission Control group at a special lunch in held at the eZone. He is now at the Fugro SpAARC remote operations centre, after leading the Woodside Robotics Lab Karda, and has operated robots in space, disasters, and extreme environments worldwide. Mark spoke on his work leading the SPHERES/Astrobee robots on the International Space Station.

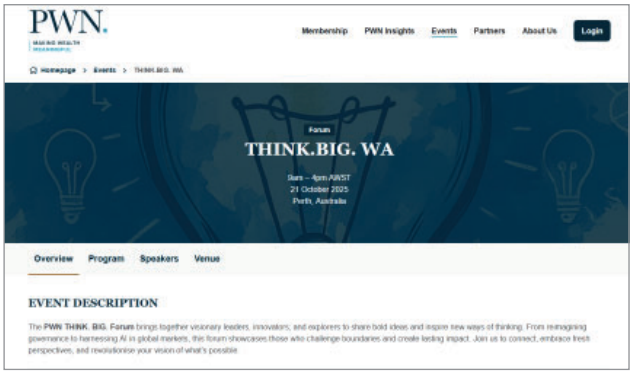
MARCH Human Spaceflight and Future Visions with Shelli Brunswick, COO of Space Foundation. Shelli brought a broad perspective and deep vision of the global space ecosystem—from a distinguished career as a space acquisition and program management leader and congressional liaison for the U.S. Air Force to her current role overseeing the Space Foundation. Open to the public, this talk was held in collaboration with the UN Consulate-General.

AUGUST *Telling Your Space Story with Jarryd Gardner.* Mission Control received a crash course in photography, editing and storytelling, thanks to the expertise of UWA's Media Content Producer Jarryd Gardner. Space researchers at UWA were incentivised to put their new skills to good use, through a YouTube Shorts competition, where they were encouraged to tell the story of why they love space.

AUGUST *Who cares about Low-Earth Orbit?* The ISC was delighted to present legal and scientific perspectives on protecting outer space, a lecture for GEOG3303 students on 'Emerging environmental issues in outer space'.

Professors Sascha Schediwy, Danail Obreschkow and Erika Techera introduced the third-year students with backgrounds in background in conservation biology, botany, zoology, environmental science, geography, and related science fields to the management of the space environment in Associate Professor Natasha Pauli's class.

JUNE As part of the Moon to Mars Demonstrator Mission Grant with the Australian Space Agency, the ISC supported the TeraNet team on school visits to demonstrate the use of laser communications in action. Here, Professor Sascha Schediwy introduces Moerlina Primary School to acquisition and tracking of satellites, right in their own backyard.



OCTOBER *Launching the Future: The Growth and Ambition of the Emerging Space Industries.* Deputy Director Larissa Wiese spoke at the Private Wealth Network's annual *Think.BIG* event at Perth Zoo. PWN is a membership-based organisation for families of significant wealth who want to make wealth meaningful. Larissa spoke on the Australian space research industry, challenges and opportunities, and how investment in research and innovation in space return to the education pipeline for future generations.

SEPTEMBER In collaboration with the Forrest Research Foundation and the International Centre for Radio Astronomy Research, the International Space Centre hosted a Question-and-Answer session with astronaut Shawna Pandya and CEO *The SETI Institute* Bill Diamond.

Conferences 2025

Meteoroids Sponsorship

The International Space Centre was delighted to sponsor the Meteoroids 2025 conference, a tri-annual conference of the IAU commission F1 which brings together the global community of experts on observing and studying (re-)entry phenomena. Topics range from origins of meteoroids and fireball phenomena to observational techniques and space situational awareness.

The sponsorship included the provision of two students travel bursaries, enabling a student from Canada and Switzerland to attend the event in Western Australia at the Curtin University venue.

International Astronautical Congress 2025

The 76th International Astronautical Congress (IAC 2025) was held from September 29 to October 3, 2025, at the International Convention Centre (ICC) Sydney. Focused on the theme "Sustainable Space: Resilient Earth," the event attracted over 7,500 delegates from 99 countries to discuss global space cooperation, technology, and sustainability. The ISC coordinated UWA's attendance and participation, with 18 representatives (some on travel grants provided by the ISC), and the logistics and coordination of four booths and the UWA presence in both the West Australian Government stand, and the Australian Space Agency stand. More detail on page 7.

Avalon Airshow

The Avalon Australian International Airshow is the Southern Hemisphere's largest aerospace and defence exposition, bringing together global leaders across aviation, defence, advanced manufacturing and increasingly, the space sector. In 2025, the event continued to reflect the growing convergence between air and space, with expanded participation from satellite operators, space agencies, launch providers and sovereign capability initiatives.

For the International Space Centre (ISC), participation in Avalon provides a strategic platform to position Western Australia's capabilities within this broader aerospace ecosystem. The event enables direct engagement with industry, government and international partners, supporting the ISC's objectives to strengthen national collaboration, showcase research strengths (including optical communications, automation and space domain awareness), and identify pathways for translation and investment. As the boundaries between aeronautics and astronautics continue to blur, Avalon offers a critical forum for the ISC to ensure that Australia's space research sector is well represented.

Southern Space Conference

UWA attended the Southern Space Conference as a delegate at the Avalon Airshow. The conference looked at the critical role of the space domain in addressing complex geopolitical, economic, environmental, and strategic challenges.

UWA Defence and Security Institute Masterclass 2025

The ISC participated in the UWA Defence and Security Institute's 2025 Masterclass Series, SRF-West 2027 – AUKUS Point Break, a flagship national forum convening senior leaders from defence, government, industry and academia to shape Australia's future security capabilities .

While centred on AUKUS and the development of sovereign submarine capability, the Masterclass highlighted the increasingly integrated nature of defence domains, where space plays a critical enabling role. Discussions on secure supply chains, advanced manufacturing, workforce development, and long-term capability planning directly align with space sector priorities, particularly in areas such as space domain awareness, communications, navigation, and data infrastructure.

For the ISC, participation in this forum reflects its role as a bridge between space research and national security priorities. Engagement ensured that space-enabled capabilities, and the expertise within ISC Nodes, are positioned within broader defence conversations, reinforcing the importance of space as critical infrastructure underpinning Australia's strategic resilience in the Indo-Pacific.

Workshops and Other Events

Polish Space Situational Awareness Workshop

September Polish-Western Australian Workshop on Ground Sensor Space Surveillance, was a landmark event celebrating international collaboration, innovation, and education in the space sector.

Held by the Space Situational Awareness Node and supported by the ISC, it was the culmination of 12 months' collaboration on space activities with the Polish Space Agency, Polsa, and industry counterparts. The Australia Research Council and Polish Space Agency funded a UWA project to identify space objects in orbit above Australasia. Associate Professor David Coward said "Australia's rapidly growing sovereign reliance on space are providing new opportunities and challenges. It is becoming critical to know what's in orbit above Australia."

The project, in its second year, is enabled by Polish PhD researcher Dorota Mieczkowska, based at UWA. Dorota is using state-of-the-art imaging equipment at the UWA Space Surveillance Hub and data from the Polish Space Agency to track space satellites above Australia.

The workshop provided opportunities for new WA partnerships in technology-based industries and universities, and to highlight STEM training as a career pathway into space

Attendees were welcomed by UWA Pro Vice-Chancellor (Research) Professor Andrew Page. The program featured an overview of Poland's space initiatives by POLSA, and an introduction from the West Australian government on the local technology and space landscape.

Einstein-First Welcome Reception

July The International Space Centre was proud to support the International Symposium on Teaching Einsteinian Physics. With an opening speech by Chair of the ISC Board Professor Harvey Millar, it was also supported through the logistic talents of Administration Officer Jessika Anderson. The event brought together educators, researchers, and policymakers to explore innovative ways of modernising school physics curriculum. Key themes included introducing quantum science and general relativity at earlier stages of education, using hands-on activities and models to support learning and equipping teachers with new tools and strategies. It was a fantastic opportunity to support the future of science education and engage with leader shaping the next generation of physics teaching.

European Space Agency's NNO3 Inauguration

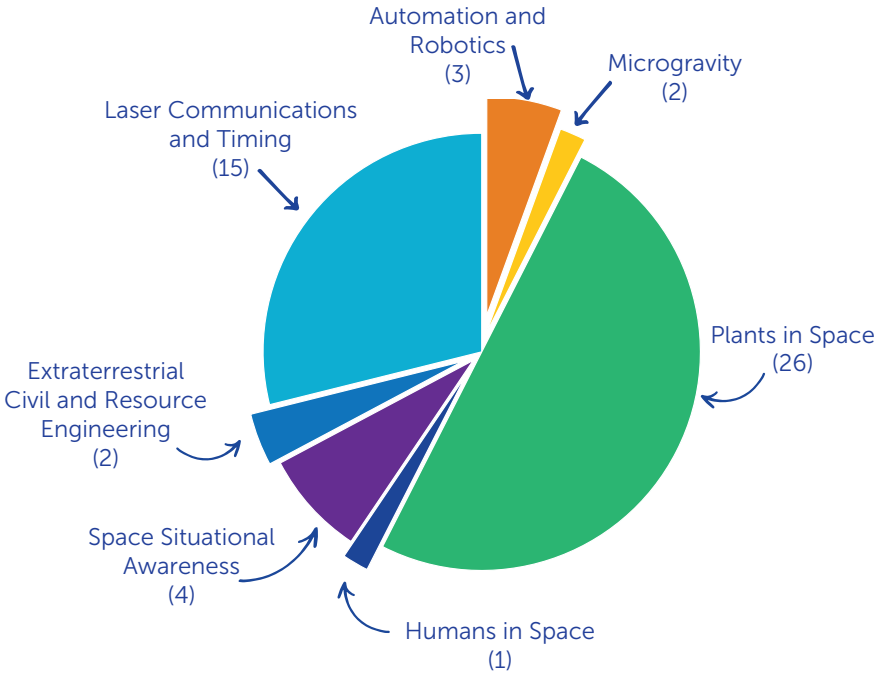
August UWA was delighted to offer networking support for the European Space Agency to celebrate the inauguration event of their latest 35m diameter deep space antenna; the fourth for Estrack, ESA's deep space tracking network. After four years of construction the antenna was opened immediately following the International Astronautical Congress 2025 in Sydney, to a host of Government, academia, industry and media. UWA also assisted the Agency with assembling the guest list due to local stakeholder knowledge and trusted local point of contact.

Speaking at the inauguration on 4 October, Josef Aschbacher, Director General of ESA, said: "This strategic investment reinforces ESA's deep-space communication capabilities and maximises the return of our missions' most valuable asset: data delivered from spacecraft voyaging far from Earth. New and exciting opportunities between the European and Australian space sectors are opening up with Australia announcing this week a mandate to begin negotiations on a cooperative agreement with ESA."

Prior to the inauguration, UWA hosted a round table discussion on potential collaborative efforts between the University and the European Space Agency with ESA's Head of Ground Operations Division Octave Procope-Mamert, Ground Stations Operations Engineer Guillermo Lorenzo Ten and Head of Ground Station Engineering Division Mehran Sarkarati. UWA was represented by Professor Anna Nowak, Professor Harvey Millar, Professor Simon Driver, Professor Danail Obreschkow, and Larissa Wiese.

Capability Activity

Significant events run or participated in by the Nodes in 2025



0-9

Automation and Robotics in Space
Annual ROS Workshop (Robot Operating System) (1)

Space Situational Awareness
International Asteroid Wwarning Network Campaign for tracking 3I-Atlas (5)

Plants in Space
PEAC Year 6 Online Extension Workshop (8) x 3

Automation and Robotics in Space
Australian Rover Competition, Adelaide (100)

Laser Communications and Timing
Australia New Zeland Conference on Optics and Photonics 2025 (1)

BHEX Mission Science Team Lead Visit (Peter Galison)

DTSG Quantum Optical Ground Station Workshop (3)

Northrop Grumman Australia TN-2 Site Visit (6)

Northrop Grumman Space Systems (US) TN-2 site visit (6)

TeraNet Booths at IAC2025 (8)

Geoscience Australia Visit (9)

Mitsubishi Electric Dual Visit (9)

German Aerospace Centre Visit (9)

10-99

Plants in Space
Centre for English Language Teaching Study Group (30)

Einstein First Conference (90)

Grow Kit Activity (37)

10-99

Horticulture TAFE Lecture (25)

Inner Mongolia University Guest Lecture (5)

Kings Park Garden Festical Plants for Space Booth (22)

National Science Week: Biggest Science Lab (53)

Meet the Scientist (3)

Mission on Mars, Melville Senior High School.(25)

STEM KIT Workshop (60)

Online Panel Discussion (13)

Einstein First Conference (90)

Plants Science Department University of Cambridge (30)

Online School Workshop (St Mary's, Broome) (11)

Laser Communications and Timing
DLR COAT workshop in Munich. Presentation by Alex Frost (20)

Presentation at EEE ICSOS, Japan (20)

Presentation of TeraNet to Polish Space Agency and Cohort (25)

OECC/PSC2025 Presentation (50)

STEMXX Sisters, Elrina Hartman, Bunbury Catholic College (50)

Plants in Space
Researcher Breakdown (31)

Teacher Development Workshop (35)

WA Museum/NSW Science Event (20)

Workshop-Biomolecules from Plants Enabling Deployable Technologies for Surgery in Space.(30)

Space Situational Awareness
Poland-Australia Workshop on Space Situational Awareness (25)

Microgravity
Cavitation Bubbles in MicrogravityInsights from Two Decades of Parabolic Flight (50)

Humans in Space
Media Infrastructure and the Moon

99+

Automation and Robotics in Space
Australian Rover Competition, Adelaide (100)

Warman Design and Build Competition (100)

Plants in Space
Bioinnovation Festival (100)

Future Science Talks. World Frienge (151)

National Science Week: Space Salad (323)

UWA Biomedical and Health Sciences Open Night (240)

Extraterrestrial Civil and Resource Engineering
Demonstration of interlocking blocks "Topoloki" on main stage at IAC2025 (200)

Presentation at 76th International Astronautical Congress (IAC) Sydney: Hybrid structures (150)

Space Situational Awareness
Future Science Talks, Associate Professor David Coward (250)

Launch of bid for ARC ITTC for SDA (100)

Laser Communications and Timing
TeraNet Booth at Avalon (1,000)

Government Visitors

The ISC hosted many State and Federal Government visitors including, amongst others, WA Chief Scientist Professor Sharath Sriram, Ms Kate Chaney MP (Federal Representative for Curtin), and the Hon. Melissa Price MP (Federal Member for Durack, Shadow Minister for Science, Technology and Innovation).

Supportive Outreach

Fogarty Foundation The ISC was proud to help tell the story of the Fogarty Foundation's support for Space Boot Camp an immersive, hands-on experience that brings the space sector to life for high school students. Participants explore everything from astrophysics and gravitational waves to zero-gravity research, space law, and growing food for life beyond Earth. Through the Foundation's video series we took a look inside the program that's inspiring the next generation reach for the stars.

Scitech's WA Space Zone The ISC supported the representation of the TeraNet laser communications research at UWA in the WA Space Zone, through the feature of the career of Research Associate Amrita Gill. The Zone celebrates the incredible people, organisations, and innovations shaping Western Australia's space industry.

Located just outside the Scitech Planetarium, the display showcases what's possible with a space career, right here in WA. From cutting-edge research to real-world applications, it's a glimpse into a future that's already unfolding around us.

Industry Participation

Throughout the year, the ISC executive team participated in many workshops and events that integrated our research and connections throughout the space community. These included the **Fogarty Foundation Partner Professional Development Day**, with a special focus on Artificial Intelligence. Held at Curtin University's CBD campus, the morning brought together the Fogarty Foundation partners to explore the opportunities and challenges of AI, share knowledge, and strengthen collaboration across their network.

We gratefully attended the **UWA Data Institute**'s valuable **Chief Scientist Vision** event, an introduction to WA Chief scientist Professor Sharath Sriram, where expert panellists provided thought provoking responses and highlighted challenges faced around ethics, data integrity, timeliness, understanding policy, terminology, negotiating intellectual property and data confidentiality.

Throughout the year we participated in many AROSE-coordinated events and Town Halls, and with the support of the ISC Board, joined the Space Industry Association of Australia.

Through close coordination with the West Australian State Government, the ISC was listed on the Space Industry & Defence West Capability Directory.

A highight was supporting the UWA Robotics Club to participate in Robopalooza, an annual space robotics festival featuring the Institute of Electrical & Electronics Engineers (IEEE) Tele-Robotics Competition simulating remote driving of a rover on the Moon.

Space Clubs @ UWA

UWA Aerospace

The ISC was delighted to sponsor 5 members of the UWA Aersopace Club to attend the International Rocket Engineering Competition in Midland, Texas. In June the crew entered their rocket Sven in the 10,000 COTS category, where it successfully launched and reached an altitute of 10,300 feet! "Project Sven "marked several firsts for UWA Aerospace. The team spent the past two years developing AURA, their custom-built SRAD flight computer, which was launched at the competition. It was also their first flight testing a CO_2 ejection recovery system. Finally, venturing into new territory, the team implemented a live video system on board the launch.

ABOVE UWA Aerospace compete at IREC in Midland, Texas

UWA Rover Club

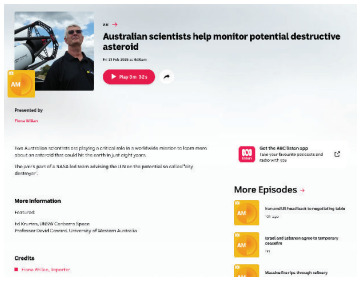
The UWA Rover Club was supported by the ISC with a commitment of $6,000 to assist in their goal of competing in the annual Australian Rover Challenge at the University of Adelaide. The student-built rovers operated on a simulated lunar surface and solve a number of tasks, such as descending from a lander, connecting a cable to a satellite base station, and examining soil samples. The team ranked 15 out of 24 in their first year of competition.

ABOVE UWA Rover Club in competition at Adelaide University

Media

Raising awareness, enabling the Capabilities

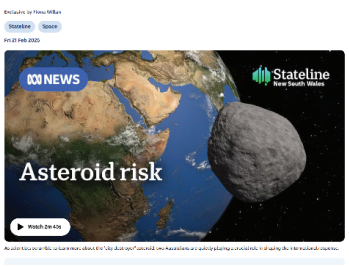
The International Space Centre promotes its Capabilities through outreach and PR, in turn benefitting the Schools they belong to, raising awareness of their research and capabilities. Below are just a few examples of exposure the ISC has enabled over 2025.



02 FEBRUARY 2025
ABC

Australian scientists help monitor potential destructive asteroid.
Two Australian scientists are playing a critical role in a worldwide mission to learn more about an asteroid that could hit the earth in just eight years. The pair's part of a NASA-led team advising the UN on the potential so-called "city destroyer".

https://www.abc.net.au/listen/programs/am/australian-scientists-help-monitor-asteroid/104964006



21 FEB 2025
ABC

Australian space scientists play crucial role in monitoring 2024 YR4 asteroid that could hit Earth in 2032.
Two Australian space scientists are playing a key role in international efforts to monitor an asteroid that could impact Earth in 2032.

https://www.abc.net.au/news/2025-02-21/stateline-australian-scientists-space-asteroid-risk-earth-2032/104958624

03 MARCH 2025
ABC BEHIND THE NEWS

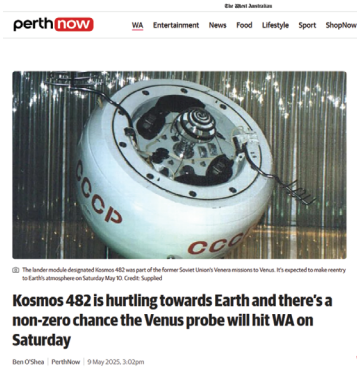
Asteroid YR4.
Scientists around the world are closely watching an asteroid, named 2024 YR4, which could get uncomfortably close to the earth in 2032.

https://www.abc.net.au/btn/classroom/asteroid-yr4/105005578

24 MARCH 2025
WA GOVT MEDIA RELEASE

WA Avalon 2025 delegates prepare for take off

https://www.wa.gov.au/government/announcements/wa-avalon-2025-delegates-prepare-take



9 MAY 2025
THE WEST AUSTRALIAN

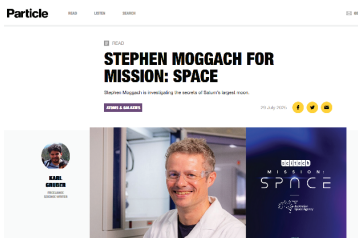
Kosmos 482 is hurtling towards Earth and there's a non-zero chance the Venus probe will hit WA on Saturday

https://thewest.com.au/technology/space/kosmos-482-is-hurtling-towards-earth-and-theres-a-non-zero-chance-the-venus-probe-will-hit-wa-on-saturday-c-18634199

11 MAY 2025
THE WEST AUSTRALIAN

Western Australia dodges bullet as Soviet-built Kosmos 482 lands in Indian Ocean, ending 53 years in orbit.

https://thewest.com.au/news/wa/western-australia-dodges-bullet-as-soviet-built-kosmos-482-lands-in-indian-ocean-ending-53-years-in-orbit-c-18656223



29 JULY 2025
PARTICLE MAGAZINE (SCITECH)

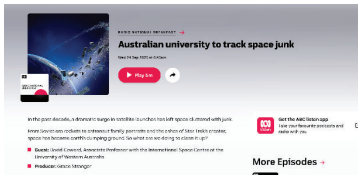
Stephen Moggach for Mission: Space
Stephen Moggach is investigating the secrets of Saturn's largest moon.

https://particle.scitech.org.au/atoms-galaxies/stephen-moggach-for-mission-space/

30 SEPTEMBER 2025
ABC 7.30

Stopping Killer Asteroids
An international team of "planetary defenders" are practicing protecting the Earth from a possible asteroid impact. While the threat they're responding to is hypothetical – the asteroid they've been practicing on is real. Fiona Willan reports.

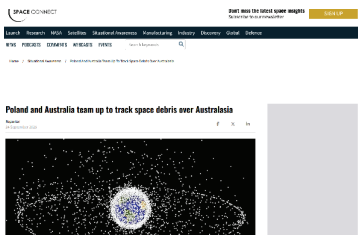
https://www.abc.net.au/news/2025-09-30/the-stargazers-protecting-the-earth-from-a/105837180



24 SEPTEMBER 2025
ABC RADIO NATIONAL

Australian university to track space junk
In the past decade, a dramatic surge in satellite launches has left space cluttered with junk. From Soviet-era rockets to astronaut family portraits and the ashes of Star Trek's creator, space has become earth's dumping ground. So what are we doing to clean it up?

https://www.abc.net.au/listen/programs/radionational-breakfast/australian-university-to-track-space-junk/105809196



24 SEPTEMBER 2025
SPACE CONNECT

Poland and Australia team up to track space debris over Australasia,
Australia and Poland have joined forces to tackle the growing threat of space debris, with researchers at The University of Western Australia leading an international project to identify and track objects orbiting above the region.

https://www.spaceconnectonline.com.au/situational-awareness/6741-poland-and-australia-team-up-to-track-space-debris-over-australasia

22 SEPTEMBER 2025
UWA IMPACT

Poland and Australia partner to track space junk.
An international team of researchers at The University of Western Australia is collaborating on a project to identify objects in space orbiting above Australasia. Associate Professor David Coward, from the International Space Centre at UWA, is lead scientist on the project funded by the Australian Research Council and Polish Space Agency.

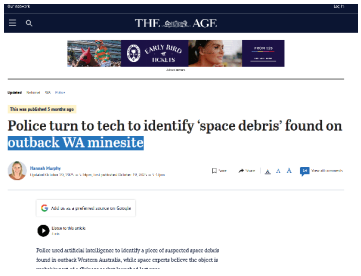
https://www.uwa.edu.au/news/article/2025/september/poland-and-australia-partner-to-track-space-junk

28 SEPTEMBER 2025

WA GOVERNMENT MEDIA RELEASE

WA space sector stars attending International Astronautical Congress.
Science and Innovation Minister Stephen Dawson is leading a delegation from the local space industry to the International Astronautical Congress (IAC 2025) in Sydney.

https://www.wa.gov.au/government/media-statements/Cook%20Labor%20Government/WA-space-sector-stars-attending-International-Astronautical-Congress-20250928



20 OCTOBER 2025

THE AGE

Police turn to tech to identify 'space debris' found on outback WA minesite
Police used artificial intelligence to identify a piece of suspected space debris found in outback Western Australia, while space experts believe the object is probably part of a Chinese rocket launched last year.

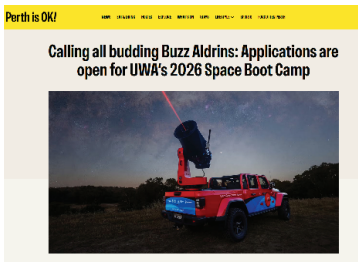
https://www.theage.com.au/national/western-australia/suspected-space-debris-found-after-fiery-landing-near-outback-wa-mine-site-20251019-p5n3mi.html

20 OCTOBER 2025

THE WEST AUSTRALIAN

Newman space junk likely part of Chinese rocket says experts as authorities flag months-long investigation
A Chinese rocket ship fuel tank that was discarded as the craft entered orbit and crashed back down to earth is the most likely source of the space junk that landed in WA's north on Saturday, experts predict.with satellites.

https://thewest.com.au/news/wa/newman-space-junk-likely-part-of-chinese-rocket-says-experts-as-authorities-flag-months-long-investigation-c-20406580

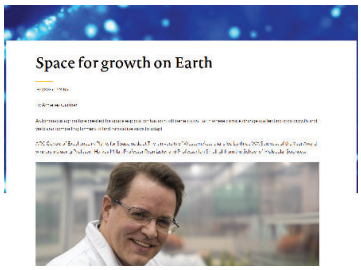


14 NOVEMBER 2025

PERTH IS OK!

Calling all budding Buzz Aldrins: Applications are open for UWA's 2026 Space Boot Camp.
The University of Western Australia has opened applications for its 2026 Space Boot Camp, an immersive two-day program run by UWA's International Space Centre for students entering Year 11 next year. And head's up, there's only 40 spots up for grabs.

https://perthisok.com/news/calling-all-budding-buzz-aldrins-applications-are-open-for-uwas-2026-space-boot-camp/



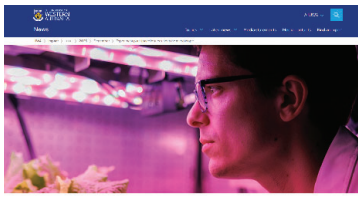
19 NOVEMBER 2025

UWA IMPACT

Space for growth on Earth
Autonomous agriculture created for space exploration has spin-off benefits on Earth where climate change is affecting crop growth and yield and compelling farmers to find innovative ways to adapt.

ARC Centre of Excellence in Plants for Space node at The University of Western Australia is led by three WA Scientist of the Year Award winners including Professor Harvey Millar, Professor Ryan Lister and Professor Ian Small, all from the School of Molecular Sciences.

https://www.uwa.edu.au/news/article/2025/uniview/summer/space-for-growth-on-earth



11 DECEMBER 2025

UWA IMPACT

Experiment puts space lettuce under the microscope
Lettuce samples from the International Space Station are being studied to determine the effects of microgravity on crop development.

https://www.uwa.edu.au/news/article/2025/december/experiment-puts-space-lettuce-under-the-microscope

THIS PAGE Polsa space situational awareness telescope at the Zadko Observatory. Photo taken by Mr John Moore.

ABOVE TeraNet-3 running a tracking and acquisition demo on the ISS (Image – the Bold Park astro image of the Jeep taken by Michael Goh, edited by Aliesha Aden)

Capabilities

→ Laser Communications and Timing

The Astrophotonics Group uses free-space laser communication to revolutionise a wide variety of applications at the International Centre for Radio Astronomy Research.

Transmitting information to and from space is not as easy as the movies make it seem.

We've become so used to instant communications on Earth that it may surprise you to know that there is not even a 4G data connection in space.

To communicate with spacecraft, you typically need the support of a Ground Station Network, whose antennae are ready to receive data as the spacecraft pass by. TeraNet-1 (formerly the WA Optical Ground Station) at UWA is the first in a new planned network of optical ground stations across Australia and New Zealand.

As we want to improve the rate of communications with space, we need to look for a more solid bandwidth. The most common electromagnetic frequency used for space communications is radio — but optical bandwidths have a much higher capacity and can transmit data at rates much faster than before: in fact, tens of thousands of times faster. Using optical communications (also called laser or infrared optical communications) we can transmit 4K video from the Moon.

Radio transmission would only give us the equivalent of the grainy videos we saw on the Apollo missions!

The challenge with optical communications is that the data transfer is easily disturbed by turbulence in the atmosphere. It's a little like making the change from a cassette to a CD—the quality is much better, but they are more fragile and prone to contamination.

The Laser Communications and Timing Node of the International Space Centre has produced world record-breaking results by transferring data across great distances through turbulence with little loss. They use amplitude- and phase- stabilisation technology, which is achieved using a very fast steering mirror that corrects for turbulence hundreds of times per second. In November 2024 this group achieved a data transfer rate from ground to a drone of 100GB/s (or the equivalent of 100SD movies per second!). The drone was flown to simulate a low Earth orbit satellite passing overhead. Optical communications also have the advantage of greater security. They can be pinpointed to a position on Earth, making them much harder to intercept.

Updates

- Professor Sascha Schediwy won the ANZOS John Love Award.
- Professor Sascha Schediwy finalist for the 2025 WA Mid-Career Premier's Science Awards
- Enrina Hartman engaged in STEMXX Sisters, August 30.
- Dr Andrew Lance published in Quantum Australia, December 10.
- Team member Shawn McSorley completed his two-month research collaboration visit with NIST, US (supported with travel grant from the ISC)
- Hosted visit by Peter Galison, BHEX Mission Science Team Lead in August
- David Gozzard gave TeraNet overview presentation for Polish Space Agency in September
- !AC2025 TN-3 exhibit and TeraNet overview presentation,
- Northrop Grumman Australia and US site visits to Mingenew in October
- Presentation at IEEE ICSOS Japan, October
- WA Defence Review Annual Publication
- Flying laptop campaign included test downlink deployments in New Norcia (WA) and Sydney (NSW)
- Astrogate Labs interface ground link test campaign joint work successfully completed November
- TeraNet represented at the WA State Government booth, Avalon International Airshow
- Student Alex Frost gave presentation on his uplink pre-compensation research with HartSCI at the DLR COAT workshop in Munich
- Hosted visit by Johannes Prell, German Aerospace Centre in February
- Hosted visit of Lisa Hall, Geoscience Australia Director of National Geodesy in February
- Return visit from Mitsubishi Electric
- TeraNet incursion at Moerlina Primary School June '26.
- TeraNet presentation at the OECC/PSC2025 in June
- DTSG Quantum Optical Ground Station Workshop in Adelaide with CSIRO and ANU
- Professor James Osborn (Durham University) visit July 31.

PROFESSOR SASCHA SCHEDIWY
International Centre for Radio Astronomy Research

ABOVE Nicolas Maron guiding Space Boot Camp students through the TeraNet-1 optical ground station at UWA.

Avionics for Remote Sensing

The UWA avionics research team develops world-leading electro-optic sensors, imaging devices, and electronic systems for space-based earth observation and space situational awareness.

The sensors created for satellites to collect information about the Earth are critical to the quality and range of data used to research important topics such as climate change, defence, disaster zones and agricultural monitoring. At UWA, we have a unique and complete supply chain to create hyperspectral and infra-red sensors.

The research team, led by Professor Lorenzo Faraone, develops world-leading electro-optic sensors, imaging devices, and electronic systems for space-based earth observation and space situational awareness.

Professor Faraone's team focus on:

- Material production for infra-red sensors and imaging arrays (molecular beam epitaxy (MBE) growth of device-grade HgCdTe);
- Tuneable filters for IR spectroscopic sensing (MEMS-based);
- Design and fabrication of IR imaging arrays up to 640×512 pixels;
- Modelling of atmospheric effects on optical propagation;
- They are also active developers of cutting-edge quantum sensing technologies, working in collaboration with UWA Professor Michael Tobar of the Quantum Technologies and Dark Matter Research Lab.

PROFESSOR LORENZO FARAONE
UWA School of Engineering
Head of the UWA Microelectronics Research Group (MRG)

Earth Observation from Space

Satellites provide a uniquely efficient way of making repetitive observations of Earth's land, coast and oceans that allow for a wide range of applications, especially as past observations now provide decades of data to analyse.

UWA's research team, overseen by Professor Charitha Pattiaratchi, focuses on:

- Seasonal and inter-annual variability of sea surface temperature, surface chlorophyll, ocean circulation and kinetic energy around Australia
- Mesoscale and sub-mesoscale eddy activity off WA
- Island wakes and ocean fronts in the Indian Ocean
- Marine heat waves and cold episodes around Australia
- Prediction and impacts of tropical cyclones in WA
- Quantifying vertical and lateral ocean transport due to fronts and eddies
- Meaningful monitoring of Tailings Storage Facilities using established and emerging monitoring technologies
- High-return rate measurements of coastal bathymetry (ocean depth)
- The Aerial Archaeology in the Kingdom of Saudi Arabia (AAKSAU) project
- Enhancing maritime safety, security, compliance, and law enforcement with the use of satellite data
- Hydrology from space: measuring floods and water resources using satellite remote sensing
- Satellite governance and remote sensing legislation

PROFESSOR CHARITHA PATTIARATCHI
UWA School of Engineering
UWA Oceans Institute

Distant Universe from Space Telescopes

Extragalactic astrophysics is a stand-out strength at The University of Western Australia's node of the International Centre for Radio Astronomy Research. Professor Simon Driver is leading the ISC Capability for studying the distant universe using space telescopes.

Galaxies typically emit radiation at all wavelengths and only a small fraction of this energy penetrates to the ground. In doing so the images that do reach the ground become blurred and distorted. Space telescopes are critical for both high-resolution imaging at optical and near-infrared wavelengths and to sample wavelength ranges not possible from the ground such as the x-ray and far-infrared.

This group specialises in "fusing" data from leading space and ground-based facilities to study the distribution of dark-matter, the evolution of galaxy properties over time, and the primary energy production pathways operating across the timeline of the Universe. This involves the processing of large and disparate data flows from many of NASA and ESA's flagship space telescope missions as well as those from other agencies.

Key focusses at the moment are the use of the Hubble and James Webb Space Telescopes to study the formation of the first galaxies, and to reconstructing the cosmic star-formation history and the cosmic black hole accretion history over the age of the Universe. Future efforts will focus on the recently launched ESA Euclid and NASA SPHEREx missions, and the upcoming Nancy Grace Roman mission.

Much of the space-telescope data processed by this Capability is downlinked through Australian-based facilities at Tidbinbilla, ACT and New Norcia, WA. The group also acts as a liaison with NASA and ESA around downlink activities and exploration of new and novel pathways for rapid data analysis at the downlink site and data fusion.

PROFESSOR SIMON DRIVER
International Centre for Radio Astronomy Research

Gravitational Wave Astronomy

This team is probing our Universe using the emerging astronomical messenger of gravitational waves (GW).

They will transfer signal-processing technologies developed for ground-based gravitational wave detectors to observations from space, as well as combine gravitational wave and electromagnetic (EM) information for breakthrough science and for a better understanding of our astrophysical Universe.

Their strengths include:

- Methods and strategies to detect gravitational waves from space;
- Studies of GW sources suitable for joint space-ground detections;
- Joint GW-EM coincidence detection and astrophysical implications; and cosmology using GW signals detected from space and the ground.

PROFESSOR LINQING WEN
UWA School of Physics, Maths and Computing

Radio Interferometry Observations from Space

The group for Radio-astronomy Interferometric Observations from Space (RIOS), co-led by Associate Professors Richard Dodson and Maria Rioja, is part of the UWA node of the International Centre for Radio Astronomy Research with strong international collaborations into next-generation observatories.

They are currently defining the instrumental specifications and requirements for the Russian Astro-Space Centre mission Millimetron. This extremely challenging mission proposes to improve the Event Horizon Telescope results by increasing the frequency by 50% and locating one antenna in space for joint observations with ground-based telescopes. Both of these two aspects introduce huge challenges, that can only be overcome with innovative observational and analysis methods.

ASSOCIATE PROFESSORS MARIA RIOJA AND RICHARD DODSON
International Centre for Radio Astronomy Research

Space Situational Awareness and Planetary Defence

Led by Associate Professor David Coward, the SSA Capability uses UWA's Zadko Observatory to pursue a space situational awareness and space surveillance program involving international agencies and partners.

The Zadko Observatory, or the ISC's Space Situational Awareness team, supports the operation of a suite of space surveillance detectors and maximises research and development via joint projects. The Observatory itself is hosted at the Gingin Gravity Precinct, on the Swan Coastal Plain, 80km north of Perth and UWA's campus. Established in 1998 with support of the Western Australian Government, the 4.7-hectare site is surrounded by natural woodland with high species diversity. The Observatory is home to the 1.0 metre f/4 fast-slew Zadko Telescope, the only metre-class research grade optical facility at this southern latitude.

Planetary Defence

The Zadko team, as part of the International Asteroid Warning Network (IAWN) uses The University of Western Australia's Zadko Telescope to pursue a space situational awareness and space surveillance program involving numerous international partners. Space Situational Awareness refers to keeping track of objects in orbit and predicting where they will be at any given time.

The Zadko Observatory hosts:

- two fully autonomous ground based optical stations for space surveillance and space traffic management for French based Ariane Group SAS.
- One fully autonomous optical station used for Space Domain Awareness for USA based company Numerica contracted to the US Defence Department.
- An autonomous, remotely-operated, alt-azimuth mounted PlaneWave Instruments CDK500 Telescope aligned with a ASA-300 optical instrument used for Space Situational Awareness contracted to the Polish Space agency (POLSA). This partnership with the Polish Space Agency has been recognised and supported by the Federal Government via an Australian Research Council Industry Linkage grant - Characterising satellites using un-resolved optical observations (LP210300698).
- In collaboration with Curtin University, light curves from lunar impact flashes using the Zadko Telescope and a specialized camera with a frame rate of 400 frames per second will provide high temporal resolution light curves that require less external validation and provide new insights into the behaviour of lunar meteoroid impacts.

To complement the Zadko Telescope, the Australian Space Academy (ASA) have recently installed within the Zadko Observatory a Celestron 14" (C-14) telescope which will be dedicated to the near-Earth space environment, with particular emphasis on space situational awareness and planetary defence.

The Zadko Observatory team has installed three VHF antennas across northern Australia, used for the global space-based multiband astronomical Variable Objects Monitor (SVOM) network. SVOM is a Chinese French space mission dedicated to the detection and study of gamma-ray bursts and their use for astrophysics and cosmology. Gamma-ray bursts are considered as the

brightest and the most energetic events in the Universe since the Big Bang.

The observatory hosts an autonomous, remotely operated wide field of view optical telescope used for Space Domain Awareness (SDA) campaigns of Low Earth Orbit objects for the Space Debris team at the Japan Aerospace Exploration Agency (JAXA).

The Capability is a member of the NASA International Asteroid Warning Network, and is a partner with UNSW (Canberra), CSIRO, UTas, Curtin in planetary defence research.

The site hosts the Falcon Telescope, a joint initiative between the United States Air Force Academy (USAFA), UWA and the Catholic Education Office of WA. The Falcon Telescope Network is a global network of small aperture (20 inch) telescopes developed by the Centre for Space Situational Awareness Research (CSSAR) in the Department of Physics at the U.S. Air Force Academy, in collaboration with educational partners. Falcon will be shared with U.S. and international university partners for the purpose of undergraduate space situational awareness (SSA) and astronomy research education as well as community STEM outreach.

Updates

- Poland-Australia workshop on Space Situational Awareness (SSA), hosted by UWA and the Forrest Foundation, led by the Zadko Observatory committee and Polish Space Agency, funded by ARC Linkage grant: Characterising Satellites using unresolved optical observations
- This Future Science Talks: Comedy Edition show in 2025 in the Perth Comedy Festival featuring Associate Professor David Coward.
- Led bid for ARC Industrial Transformation Training Centre for Space Domain Awareness, submitted December 2025.

ASSOCIATE PROFESSOR DAVID COWARD
UWA School of Physics, Maths and Computing
Zadko Observatory

→ Experiments in Variable Gravity: Hypergravity

ISC's researchers maintain strong links to the National Geotechnical Centrifuge Facility (NGCF), hosted at the Centre for Offshore Foundation Systems at UWA and directed by Professor Conleth O'Loughlin.

The NGCF is the largest geotechnical centrifuge facility in the world, and the only such facility in Australia.It hosts three large centrifuges: a 1.2m drum centrifuge, as well as 3.6m and 10m diameter beam centrifuges, for hypergravity experiments up to 350g.

PROFESSOR CONLETH O'LOUGLIN
School of Earth and Oceans
UWA Oceans Institute

Experiments in Microgravity

The microgravity research programme, led by Professor Danail Obreschkow, regularly partners with the European Space Agency (ESA) to conduct experiments aboard the Airbus A310 Zero G, the world's largest suborbital microgravity facility.

These parabolic flights offer repeated phases of 20-25s of microgravity (~0.001g), as well as comparable phases of hypergravity (~1.8g). Depending on experimental design, it is also possible to request intermediate levels of gravity, such as lunar (0.17g) and martian (0.38g) gravity.

UWA professor and private pilot Dongke Zhang has also led drop tower experiments, which offer even better levels of microgravity (~0.000001g) than parabolic flights but exhibit shorter phases of microgravity (<10s) and high accelerations (>5g) before and after.

PROFESSOR DANAIL OBRESCHKOW
International Centre for Radio Astronomy Research

Plants for Space (P4S)

Humans rely on plants for food, oxygen, and psychological wellbeing. To support a long-term presence in deep space it will be essential to have plants as our partners.

To achieve this we will need to breed and modify both plants themselves, as well as the habitats we grow them in. The Plants for Space Capability was recently awarded part of a $35m Centre of Excellence by the ARC, in a consortium of P4S universities and partners led by the University of Adelaide, to create food and medicine for space explorers. This Centre aims to create on-demand, zero-waste, high-efficiency plants and plant products to address grand challenges in sustainability for space and on Earth. Significant advances in plant, food, and sensory science; process and systems engineering; law and policy; and psychology are expected to deliver transformative solutions for space habitation – and create enhanced plant-derived food and bioresources to capitalise upon emergent and rapidly expanding domestic and global markets. Anticipated outcomes include industry uptake of innovative plant forms, foods, technologies, and commodities; and an ambitious education and international co-ordination agenda to position Australia as a global leader in research supporting space habitation.

PROFESSORS HARVEY MILLAR, RYAN LISTER, IAN SMALL
UWA School of Molecular Sciences
ARC Centre of Excellence in Plants for Space

Space Physiology and Life Sciences

Changes in brain fluid pressure in astronauts can adversely impair their vision while in space. The research group, headed by Professor William Morgan, uses pulse wave properties of the eye's blood vessels to estimate pressures in the brain fluid.

The Capability has been studying the relationship between brain fluid pressure, also known as intracranial pressure (ICP) and the eye for over twenty years. Recently, with collaborations with neurology and neurosurgery, they have found that the pulse waves that travel along the blood vessels at the back of the eye are produced by and travel from the brain fluid.

This discovery allows them to use sophisticated mathematical and imaging techniques to measure these pulse waves and infer the ICP. Until now, ICP could only be measured by drilling a hole through the skull and into the brain or passing a needle into the lower back, both of which are quite invasive, prone to some risks and tend to be rarely performed.

They are currently refining this technique to make it useful in hospitals and clinics as well as potentially in space. The need for a small size and fast analytical speed in space should accelerate its development as an important health tool on Earth.

In space, they anticipate that this breakthrough will allow regular monitoring of astronaut ICP and allow testing of treatments to reduce or eliminate dangerous elevations in ICP. In parallel, we are working on techniques that should favourably alter orbital and ICP that can be applied in space.

PROFESSOR WILLIAM MORGAN
UWA Medical School
Lions Eye Institute

Data Intensive Astronomy

Data science, data management and processing, and software engineering.

The Data Intensive Astronomy (DIA) research group at the UWA Node of the International Centre for Radio Astronomy Research, led by Professor Andreas Wicenec, brings a unique mixture of internationally recognised expertise in space-relevant computer science topics, including:

Machine learning and deep learning on general image and video object recognition, detection and classification, also applied to more general problems like time series analysis and general optimisation problems.

Development and operation of very large scale, globally distributed data management systems, including remote areas and space.

Exa-scale distributed processing software systems: These systems have been deployed and processed data on the largest super-computers in the world and very diverse platforms, including small- and large-scale cloud systems.

Development and optimisation of algorithms and generic solvers.

Development of large scientific software applications using modern professional software development practices and following strict delivery schedules. We have a pool of people practicing and certified in the Scaled Agile Framework (SAFe) for very large distributed agile development projects.

Their space-relevant projects include:

- Various radio astronomy projects, including the Square Kilometre Array, Murchison Widefield Array, Australian SKA Pathfinder as well as data reduction and support projects for the wider community.
- Projects in computer vision, object detection and classification.
- Operational ocean swell prediction improvement system:
- Wind forecast model for WA using data fusion from ground based and satellite sources.
- Gravitational wave detection.
- Previous involvement in various satellite projects including HIPPARCOS, DIVA and GAIA.

PROFESSOR ANDREAS WICENEC
International Centre for Radio Astronomy Research

Automation and Robotics

The Robotics and Automation laboratory, led by Professor Thomas Bräunl, has designed and built over 100 robots over the past two decades.

They have built mobile robots from a small scale to full size cars and buses, and robots that drive, walk, sail, dive or fly.

Robot communication and control is a central topic of their work. They have designed and built web-based and app-based remote robot command and control systems, and combine the latest sensor technology in Lidars, cameras, IMUs and (when possible) RTK-enhanced GNSS.

They employ deep-learning AI technologies for end-to-end learning for autonomous driving and detection tasks.

They aim to establish a command and control centre as well as a planetary rover testing ground similar to the 'Martian field' at NASA/JPL, Pasadena.

PROFESSOR THOMAS BRÄUNL
UWA School of Engineering

Psychology in Space

The human mind and body are central to the success of space exploration.

The Psychology in Space research Capability at the ISC leverages the expertise within the School of Psychological Science and Business School to tackle the psychological, organisational, and physiological challenges of space travel. Our strengths in cognitive psychology can help optimize astronaut decision-making and problem-solving in high-stakes environments. Psychopathology and resilience research can inform strategies to maintain mental health and adaptability during long-duration missions. Psychophysiology, including sleep science, is relevant to understanding the impact of microgravity and disrupted circadian rhythms on performance and well-being. Human factors research can enhance spacecraft design and mission protocols to improve safety and efficiency, while social psychology and management research relates to teamwork, leadership, and group dynamics in isolated, confined, and extreme environments.

By integrating these psychological perspectives, we contribute to the development of evidence-based strategies that support astronaut performance, well-being, and mission success—both in orbit and beyond.

ASSOCIATE PROFESSOR LIES NOTEBAERT
UWA School of Psychological Science

Civil and Extraterrestrial Engineering in Space

Development of techniques for in-space construction using space materials.

This research develops new methods of mortarless construction and mining extraction that are suitable for the low gravity and harsh environment found on extraterrestrial bodies. The team also investigate methods for deflecting those bodies that are on a collision course with Earth.

PROFESSORS ARCADY DYSKIN AND ELENA PASTERNAK
UWA School of Engineering

Planetary Mapping

Understanding the tectonics of terrestrial planets.

This team uses Synthetic Aperture Radar (SAR) data to map planetary surfaces, and understand surface and tectonic processes on Venus and other terrestrial planets.

Earth is the only planet in our solar system that has plate tectonics as a driving process. Plate tectonics, driven by heat escaping from the core of our planet, drives everything else, and forms continents, mountains, oceans, volcanoes and affects climate.

PROFESSOR MYRA KEEP
UWA School of Earth and Oceans

Planetary Geoscience

Planetary geoscience is the geological characterisation of space materials and extra-terrestrial life environments.

The Planetary Geoscience research capability focusses on mineralogical and geochemical studies of geological materials from space that have been ejected from the lunar surface, Mars and the Asteroid Belt. The research projects span across planetary geology, petrology, microanalysis, geochemistry, geobiology, sedimentology and stratigraphy.

PROFESSOR TONY KEMP
UWA School of Earth and Oceans

Space Energy

Energy is essential to all forms of life and fundamental to any human activity. In space exploration, energy supply, conversion and use are critical in every step of the journey, from rocket propulsion to life support and maintenance.

Energy will be a key factor in enabling off-Earth habitation, a sustained human presence and robotic operations in space. We will require the development of new energy technologies capable of delivering long-term, reliable power.

The Space Energy Capability is part of a consortium that won a $2.4m CRC-P grant, led by EntX Energy in 2022. The consortium includes the University of South Australia, the University of Adelaide, the ISC, as well as industry partners Duromer Products and DEWC Systems.

PROFESSOR DONGKE ZHANG
UWA School of Engineering

Chemicals for Space

Unlike Earth, space, the Moon, and Mars lack fossil fuel resources such as coal, petroleum, and natural gas.

While solar panels can power space stations and habitats, there are currently no solutions for supplying fuels, chemicals, pharmaceuticals, fertilisers, and daily consumables in these environments. This Capability aims to address this critical challenge by leveraging astrochemistry and astrochemical engineering, with a focus on astrocatalysis, to develop innovative strategies that ensure the sustainability of human life beyond our blue planet.

From gases to gases

Gas conversion processes play a crucial role in sustaining life support systems, particularly in the context of space exploration. Oxygen (O_2) generation is of paramount importance for space stations and future space habitats, as it is essential for human survival. To address this critical need, cutting-edge catalytic technologies are being developed to efficiently produce scalable quantities of oxygen from abundant resources such as water (H_2O) and carbon dioxide (CO_2).

In addition to oxygen production, other vital gas conversion processes include ammonia (NH_3) synthesis and decomposition, methane (CH_4) cracking, and methane dry reforming. These reactions are key to generating valuable products and managing waste gases in space environments. To optimise these processes for space applications, innovative catalyst materials, reactors, and reaction pathways are being engineered, considering the unique challenges and constraints of space missions. Solar energy will be the primary driving force, either converted into electricity for electrochemical reactions or directly utilised for photocatalytic, photothermal catalytic, or photoelectrochemical processes.

By integrating cutting-edge catalytic technologies with efficient solar energy utilisation, researchers aim to develop sustainable and self-sufficient gas conversion systems for space applications, supporting immediate needs and contributing to the long-term goal of establishing self-sustaining habitats beyond Earth.

PROFESSOR HONGQI SUN
UWA School of Molecular Sciences

Space Crystallography

Led by Professor Stephen Moggach, the Space Crystallography Capability aims to determine the crystal structures of molecular co-crystals that are likely to form on the surface of Titan – Saturn's largest moon.

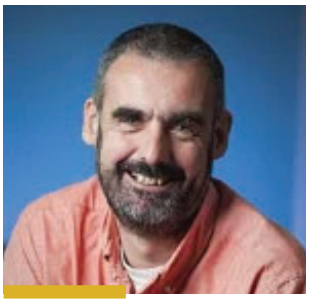
Titan has geological features that are somewhat similar to those found on Earth, with seas, lakes and sweeping dunes. Unlike the Earth, however, the temperature hardly varies, sitting at a constant value of around 92K. In addition, the surface composition is quite different to the Earth, and dominated by molecular materials, much of which are photochemically produced in the moon's atmosphere. These range from simple compounds such as ethane and acetylene, to more complex molecules (e.g. methylcyanoacetylene). These more complex molecular compounds first form as a haze layer in Titan's atmosphere, before being deposited onto the surface.

Interestingly, because of the active weather system on Titan, these deposited 'pure' compounds can mix by being buried in subsequent layers of organic material, or by dissolution in the liquid hydrocarbon seas, and could lead to the formation of molecular co-crystals.

PROFESSOR STEPHEN MOGGACH
UWA School of Molecular Sciences

Governance and Leadership

→ ISC CAPABILITY LEADERS



PROF SIMON DRIVER
Distant Universe from Space Telescopes

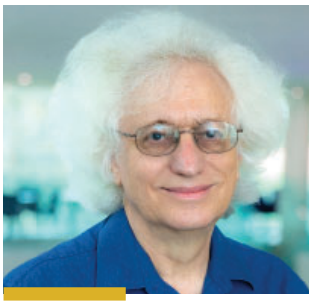
PROF LINQING WEN
Gravitational Wave Astronomy

A/PROF MARIA RIOJA CAPELLAN
Radio Astronomy Interferometric Observations from Space (RIOS)

A/PROF RICHARD DODSON
Radio Astronomy Interferometric Observations from Space (RIOS)

PROF CONLETH O'LOUGHLIN
Experiments in Hypergravity

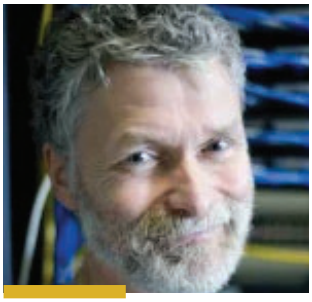
PROF DANAIL OBRESCHKOW
Experiments in Microgravity



PROF ARCADY DYSKIN
Extraterrestrial Civil and Resource Engineering

PROF ELENA PASTERNAK
Extraterrestrial Civil and Resource Engineering

PROF THOMAS BRÄUNL
Automation and Robotics



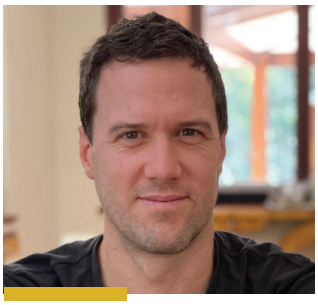
PROF ANDREAS WICENEC
Space Data Analysis

PROF SASCHA SCHEDIWY
Laser Timing and Communications

A/PROF LIES NOTEBAERT
Psychology in Space

PROF HARVEY MILLAR
Plants for Space

PROF IAN SMALL
Plants for Space



PROF RYAN LISTER
Plants for Space

PROF DONGKE ZHANG
Space Energy

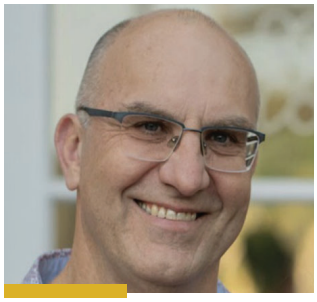
PROF CHARITHA PATTIARATCHI
Earth Observation from Space

PROF LORENZO FARAONE
Avionics for Sensing and Imagery

PROF STEPHEN MOGGACH
Space Crystallography

PROF HONGQI SUN
Chemicals for Space

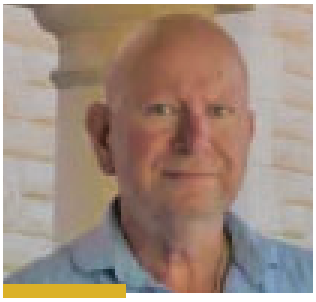
PROF MARCO FIORENTINI
Space Materials and Resources



PROF TONY KEMP
Planetary Geoscience

PROF MYRA KEEP
Planetary Mapping

PROF BILL MORGAN
Space Physiology and Medicine



A/PROF DAVID COWARD
Space Situational Awareness

MR JOHN MOORE
Space Situational Awareness

Board of the International Space Centre

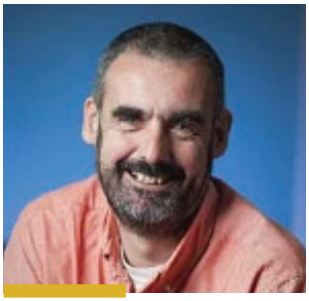
PROF HARVEY MILLAR
Chair of the Board

PROF DANAIL OBRESCHKOW
Director

PROF GIACINTA PARISH
AROSE Representative

DR VICKY JOHNSTONE
DVCR Nominee

PROF SIMON ELLINGSEN
ICRAR Representative

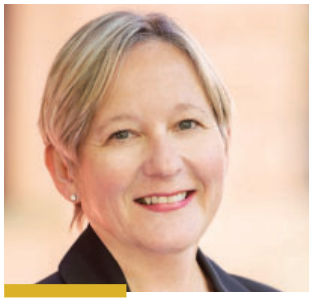


PROF SIMON DRIVER
Appointed Nominee to the Board

PROF BILL MORGAN
Appointed Nominee to the Board

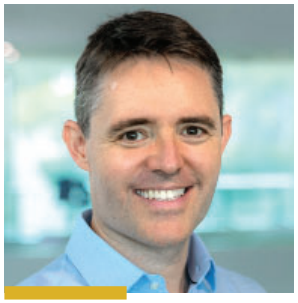
A/PROF LIES NOTEBAERT
Appointed Nominee to the Board

A/PROF PAUL MAGINN
Appointed Nominee to the Board



DR CAROLINE CHAPMAN
DVCR Nominee (Previous)

Executive Committee



PROF DANAIL OBRESCHKOW
Director of the International Space Centre

MRS LARISSA WIESE
Deputy Director of the International Space Centre

MRS JESSIKA ANDERSON
Administration Officer of the International Space Centre

Research Committee

DR DAVID GOZZARD
Research Committee Chair

In January 2026 David Gozzard joined the Executive as Academic Lead of the ISC, a new academic position to strengthen the ISC's multidisciplinary research.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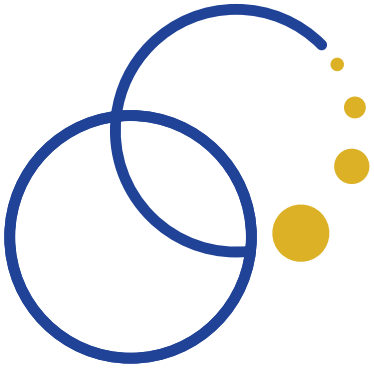
HOSTED BY



INTERNATIONAL SPACE CENTRE

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