



Development of the e-Virtual Space Laboratory



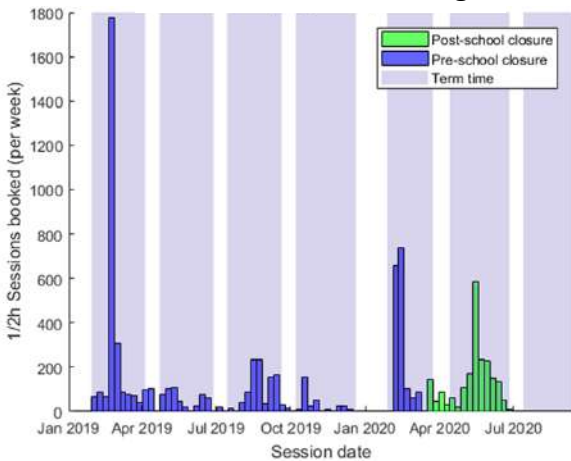
FARLabs: Freely Accessible Remote Laboratory



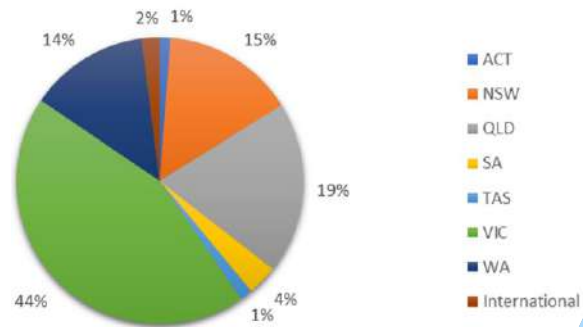
FARLabs: Freely Accessible Remote Laboratory

- FARLabs is currently used by over 250 schools in Australia and overseas. Its impact was recognized when it won the S-Lab prize for best international remote-access laboratory in 2014.

FARlabs School Bookings



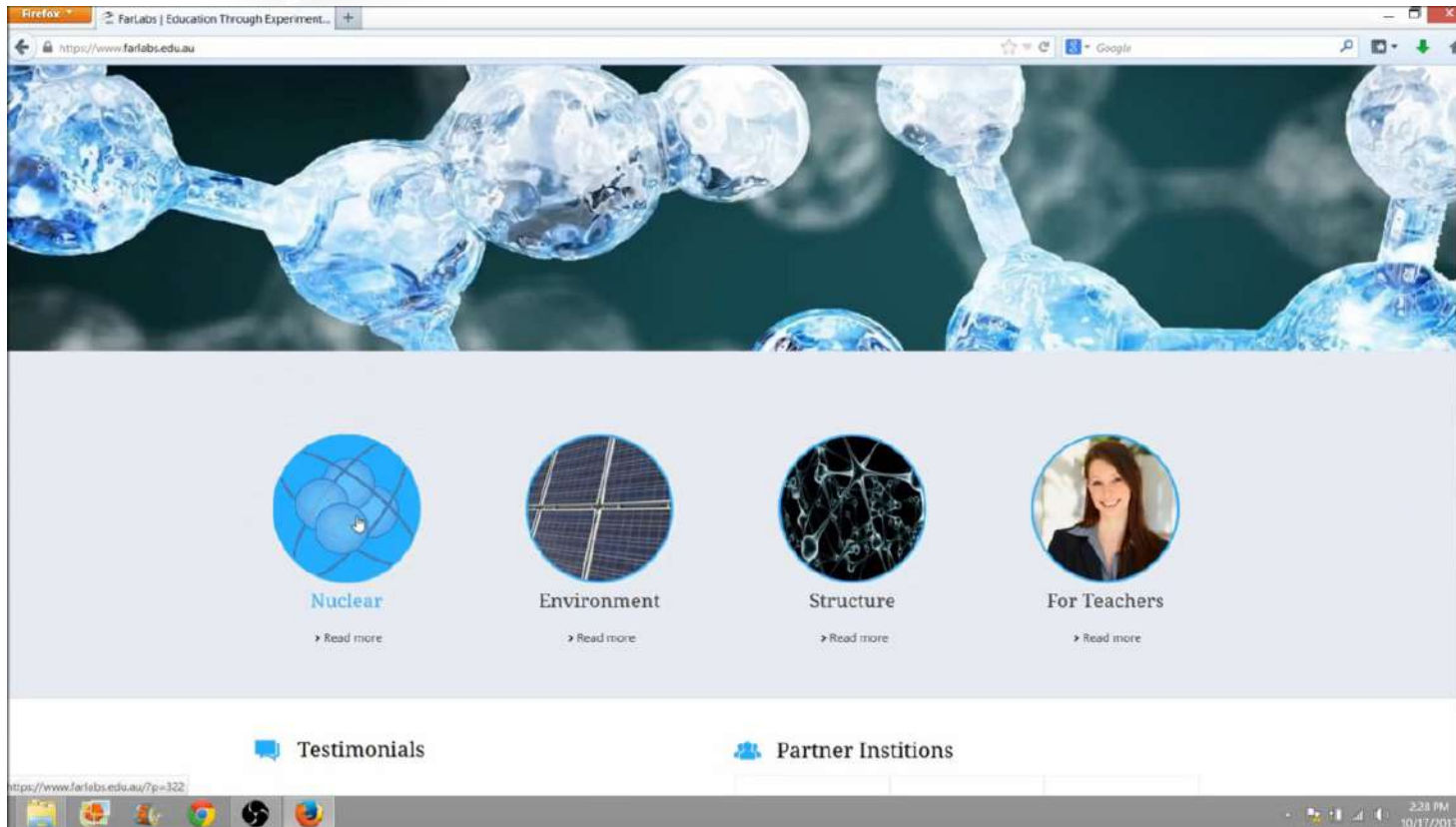
FARLabs School Locations



FARLabs: Freely Accessible Remote Laboratory

- **Current online experiments cover: Nuclear, Environmental and Structural Physics topics.**

“Actually seeing a real experiment that the students can interact with is brilliant!” – Carol Burgess, Teacher, Kennedy Baptist College



Example experiment: Measuring Radioactivity

- Students interact with the experiment from their classroom.
- Experiment involves monitoring radioactivity from a range of different sources.
- Outcomes: learn basic concepts of nuclear physics, can describe radioactive decay, learn concepts in nuclear fission

Development of the 'e-Virtual Space Laboratory'

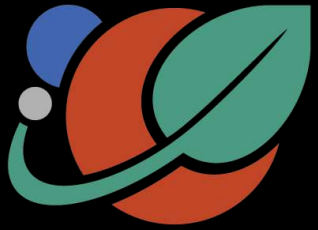
FARLabs/La Trobe aim to collaborate with international partners in space research to develop new experiments and new, curriculum-aligned, content into the classroom: **the e-virtual Space Laboratory**.

We will expand our national and international school network to provide teachers and students with access to online interactive experiments and downloadable materials including lesson plans and technical notes.

Experiment focus areas could include:

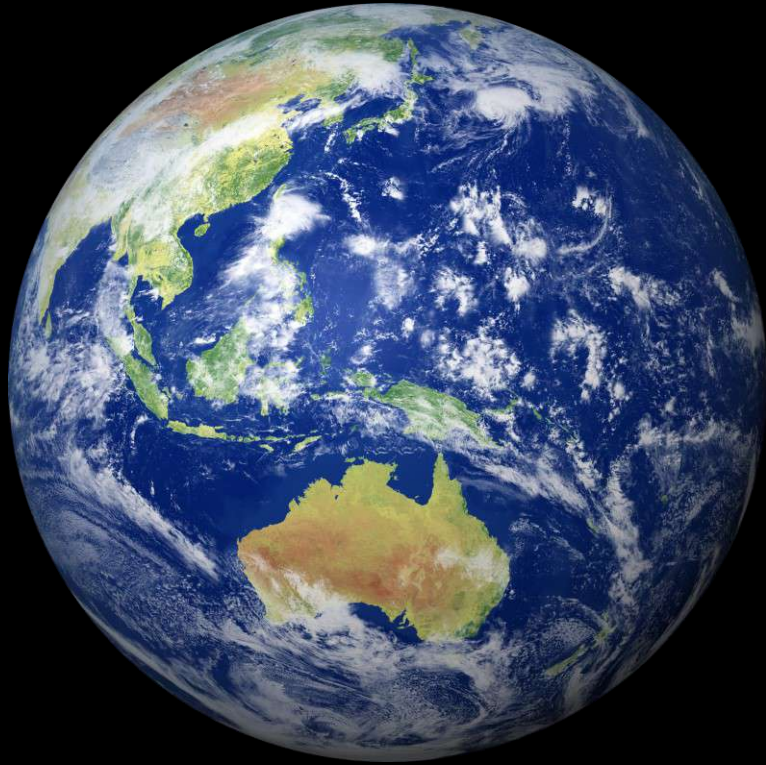
- Studying the effects of microgravity on biological organisms.
- Understanding how plants and food could be produced in space.
- Examining the long-term health impacts of space travel.





Plants for space

ARC CENTRE OF EXCELLENCE



IMPACT: **NOW**

2030

2040



3 year round trip



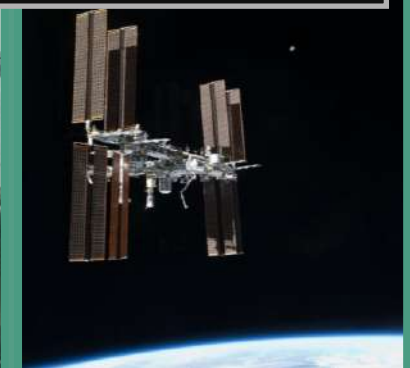
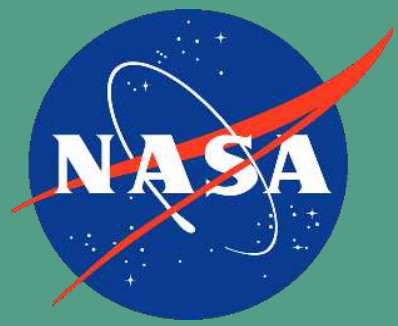


Veggie hardware & Advanced Plant Habitat



International Space Station

Plant experiments in Space



P4S: a unique multidisciplinary team for unique solutions

Food scientists
Plant scientists
Process engineers
Systems engineers
Psychologists
Nutritionists
Educators
Lawyers



Plants



products



processes



people



Zero-waste plant growth & processing



Plant-based solutions for health & well-being



Future-ready people & products



Global co-ordination & connectivity





recycle



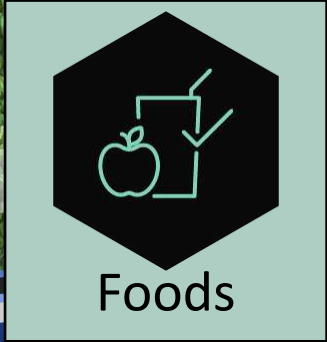
plants



law



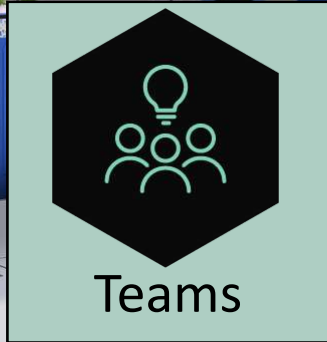
Medicine



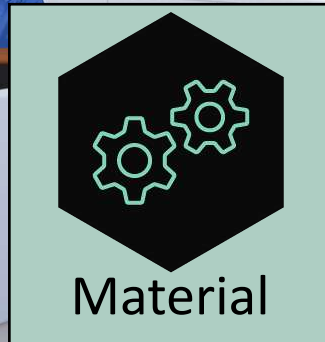
Foods



FLAVOUR



Teams



Material



**P4S
Products**

**AUSTRALIAN
research priorities**

**AUSTRALIAN
Manufacturing
priorities**

**AUSTRALIAN GOVERNMENT goals &
international markets**



Food

Food & Beverage

Australian Space Agency
+20,000 new jobs, \$12B industry

Advanced
manufacturing

Space

Global Space sector
\$420B (2020) → >\$600B (2030)

Environmental change

AUSTRALIAN AGRICULTURE
\$100B (farm-gate), 4× graduates
\$200B (total), 2× graduates

Global CEA
26% annual growth rate

Global biomanufacturing
2030 goal: \$30T



Preparing the next generation of leaders



Outreach



Equity & diversity



Training &
professional
development



Entrepreneurship



Industry
experience



Mentorship



Outreach and recruitment

Interstellar impact

July 28, 2021



University scientists lead the conversation on growing the space economy

Posted on Mar 2, 2022 by Stan Denham

The University of Adelaide's Professor Matthew Gilliam is



KIDSNEWS

NEWS SPORT KEY TOPICS Reading Levels Green Orange Red Search

Native duckweed could feed future astronauts bound for Mars

Nathan Davies, March 14, 2022 6:30PM



Genetically modified lettuce is the future of food and drugs in space, scientists say. Let us explain

ABC Science / By Genevieve Weale
Posted Sun 27 Mar 2022 at 5:00am

ASPB Meeting, Oregon, July 2022



The Advertiser

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Recipe for sustainability: Adelaide researchers solving the problem of feeding future space explorers

Developing a sustainable food source for trips to the moon and beyond is key to our success in space, according to one of the experts looking at how to grow food in space.

Lynn Camoren
2 min read · July 29, 2021 · 1:54PM The Advertiser



Taste in space: Putting flavour into astronaut food

If you hate airline food, spare a thought for astronauts. Freeze dried, then rehydrated, grey and lifeless meals make long missions even harder to bear. But Adelaide scientists think they have the answers.



Mentored in DNA work by:
Adil Khan, James Lloyd, Dylan Moss, Brendan Kidd, Meggie Zink, Ryan Lister

Mentored in protein work by:
Hui Cao, Bhagya Dilshanayake, Nathan Tivendale, Glenda Oh, Harvey Miller

Student Contributors:
Elliott Fourie, Thomas Hockley, Leighton Ditchburn, Eirian Beswick, Maddy Holland, Finian Devine, Choon Long Tan



Research Tuesdays

Crater to Plate
Tuesday May 10 - 17.30
In-person and online

Prof Matthew Gilliam and A/Prof Jenny Mortimer will answer the question: how will astronauts feed themselves on the round trip to explore Mars?

WAITE RESEARCH INSTITUTE
THE UNIVERSITY OF ADELAIDE

THE SCIENCE OF FOOD

EVEN ASTRONAUTS NEED TO EAT

Space is hostile and plants will need a hand to go where they've never gone before. University of Adelaide's Waite Research Institute is helping to find a way to make it possible

Professor Matthew Gilliam
Dr Deborah Devis

WHAT DO ASTRONAUTS EAT?

The challenges of growing plants in space

13th Australian Space Forum
Thursday 3 March 2022
Adelaide, South Australia



ABC NEWS

Just In Australia Votes Watch Live Coronavirus Politics World Business Analysis Sport

South Australian scientists use genetic modification to design crops for astronauts in space

Landline / By Kerry Staight
Posted Sun 11 Jul 2021 at 6:11am





LA TROBE
UNIVERSITY



LA TROBE
INSTITUTE FOR
MOLECULAR SCIENCE

Thank you

First Space Education event with Japanese students (2nd May)!

ENGAGE EXPLORE EXPLAIN ELABORATE EVALUATE

Experimental stations

Station 1 (Currently booked by another user)

Station 2 (Currently booked by another user)

Station 3 (Currently booked by another user)

Station 4 (Currently booked by another user)

Exploring Radioactive Decay



Australia



Japan



Funding: telematics trust St Peter's Primary School, Melbourne

Showa Gakuin School, Japan

Scienceworks Coordinator: Frazer Thorpe
Japanese School Coordinator: Okabe Akiumi
La Trobe Coordinators: Connie Darmanin, David Hoxley



Dr Kim Johnson

Dr Johnson is a senior lecturer in the La Trobe Institute for Sustainable Agriculture and Food. Dr Johnsons research looks at how plants change their growth in response to stress. She is passionate about communicating the importance of STEM in agriculture to make the way we eat more sustainable and enjoyable.



Prof Brian Abbey

Prof Brian Abbey is a Physics researcher at La Trobe University and joint Deputy Director of the La Trobe Institute for Molecular Science. Over the past 15 years Brian has been leading the development of new optical technologies for biological imaging employing techniques in coherent optics and nanotechnology. He is co-founder of Freely Accessible Remote Laboratories (FARLabs) virtual education platform and has received numerous prestigious awards including the AIPS Young Tall Poppy award, the 2022 Eureka prize for the innovative use of technology and the 2022 Victoria Prize for Science.

