PUTTING THE WONDER BACK INTO SCIENCE

DR. DANIEL ELDRIDGE
COURSE DIRECTOR
BACHELOR OF SCIENCE

SWINBURNE UNIVERSITY OF TECHNOLOGY


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SCIENCE AT SWINBURNE

350 undergraduate students in:

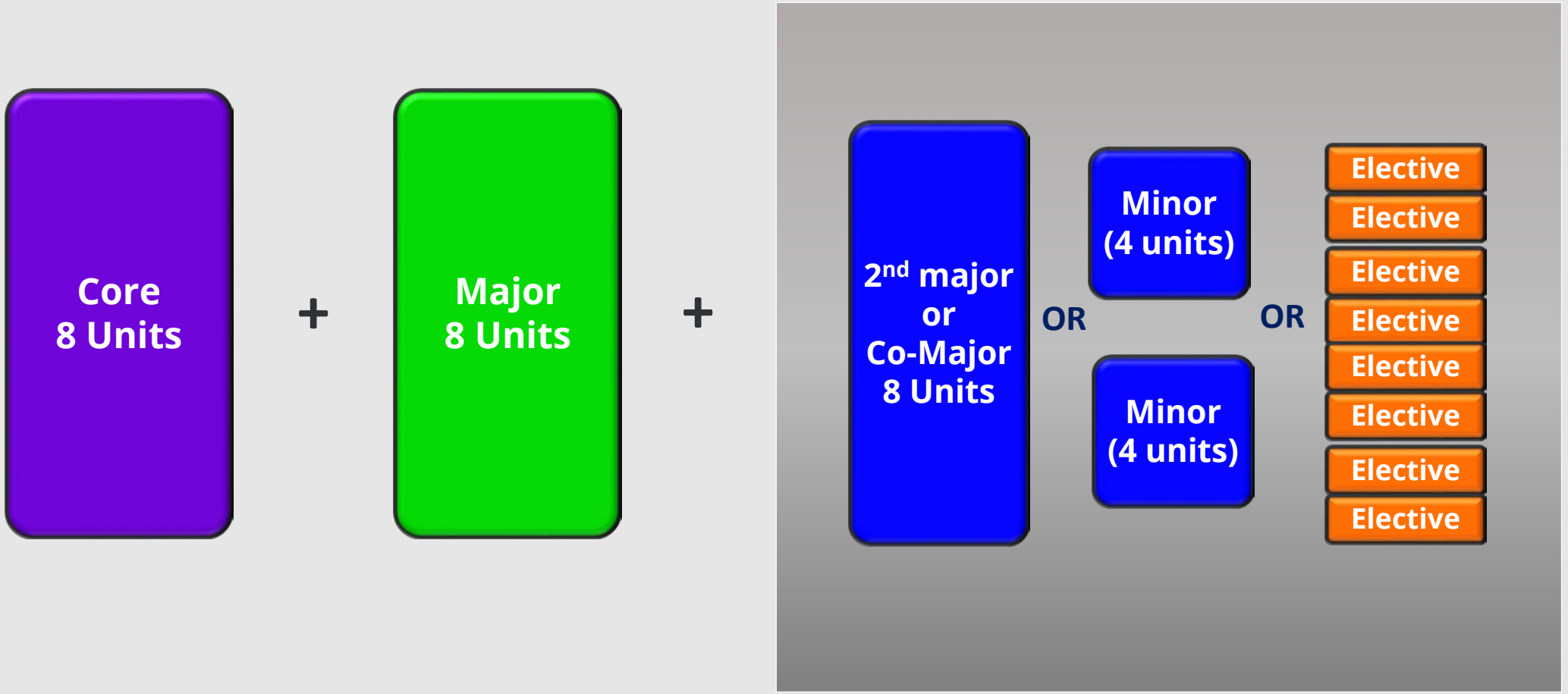
Applied Mathematics
Physics
Chemistry
Biochemistry
Biotechnology
Environmental Science

We also have over 150 research students in science

SWINBURNE UNIVERSITY OF TECHNOLOGY

BACHELOR OF SCIENCE

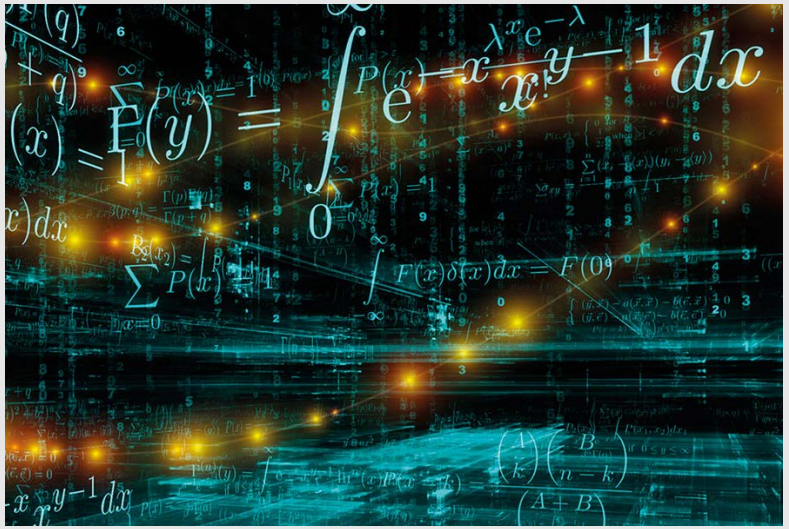
Course structure (single degree = 24 units)



SCIENCE AT SWINBURNE

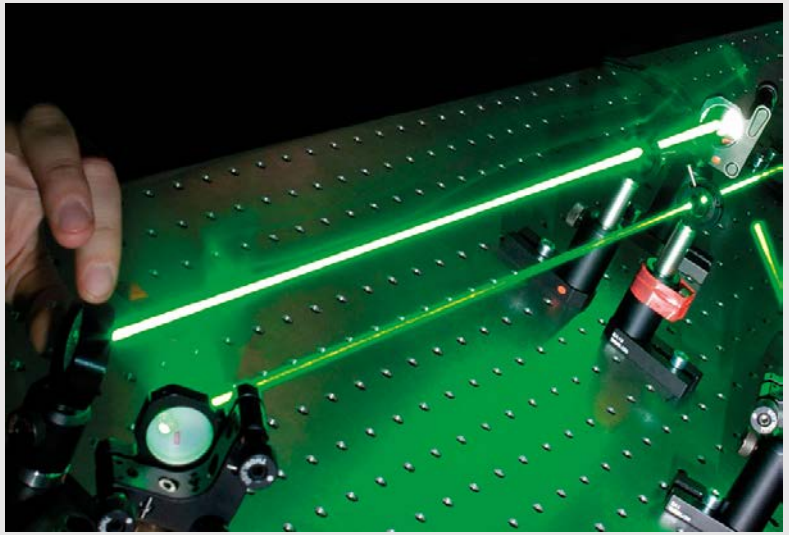
Applied Mathematics

- Provides the tools to model fundamental processes in sciences, industry, social sciences, consumer behaviour and finance.



Physics

- Develop a fundamental understanding of how our natural and technologically driven world works.
- For creative thinkers and problem solvers.



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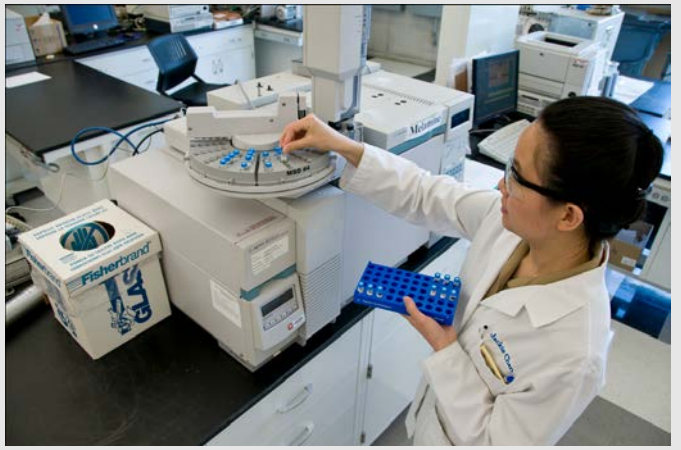
Chemistry

- Fundamental science of how reactions occur, particularly at a molecular level
- Study of matter around us and how we can manipulate it to suit our needs



Environmental Science

- Integrates physical and biological studies towards application to the environment
- Emphasise the underpinning science, including measurement, laboratory testing and management of the environment

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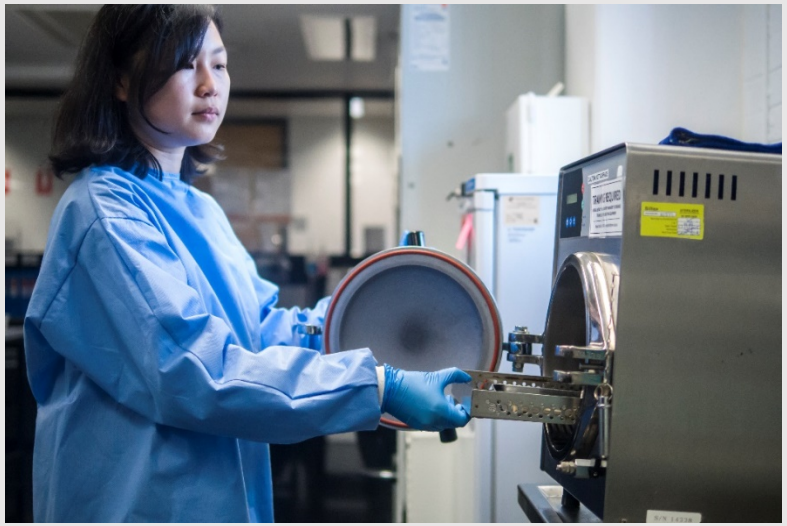
SCIENCE AT SWINBURNE

Biochemistry

- Chemical and physical-chemical processes and substances that occur in living organisms
- Closely related to molecular biology, the study of biological mechanisms and macromolecules

Biotechnology

- Employing living organisms (or parts of organisms) to make or modify products, improve plants or animals
- Emphasis on the cellular and molecular level control of biology



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EXAMPLE: BACHELOR OF SCIENCE

Biotechnology major, chemistry minor, environmental science minor

Core

Biology
Chemistry
Physics
Maths
e-science
Communication

Grand Challenge

8 Units

+

Biotechnology Major

Biotechnology,

Microbiology,

Biochemistry

8 Units

+

Chemistry

Environmental Science

8 Units

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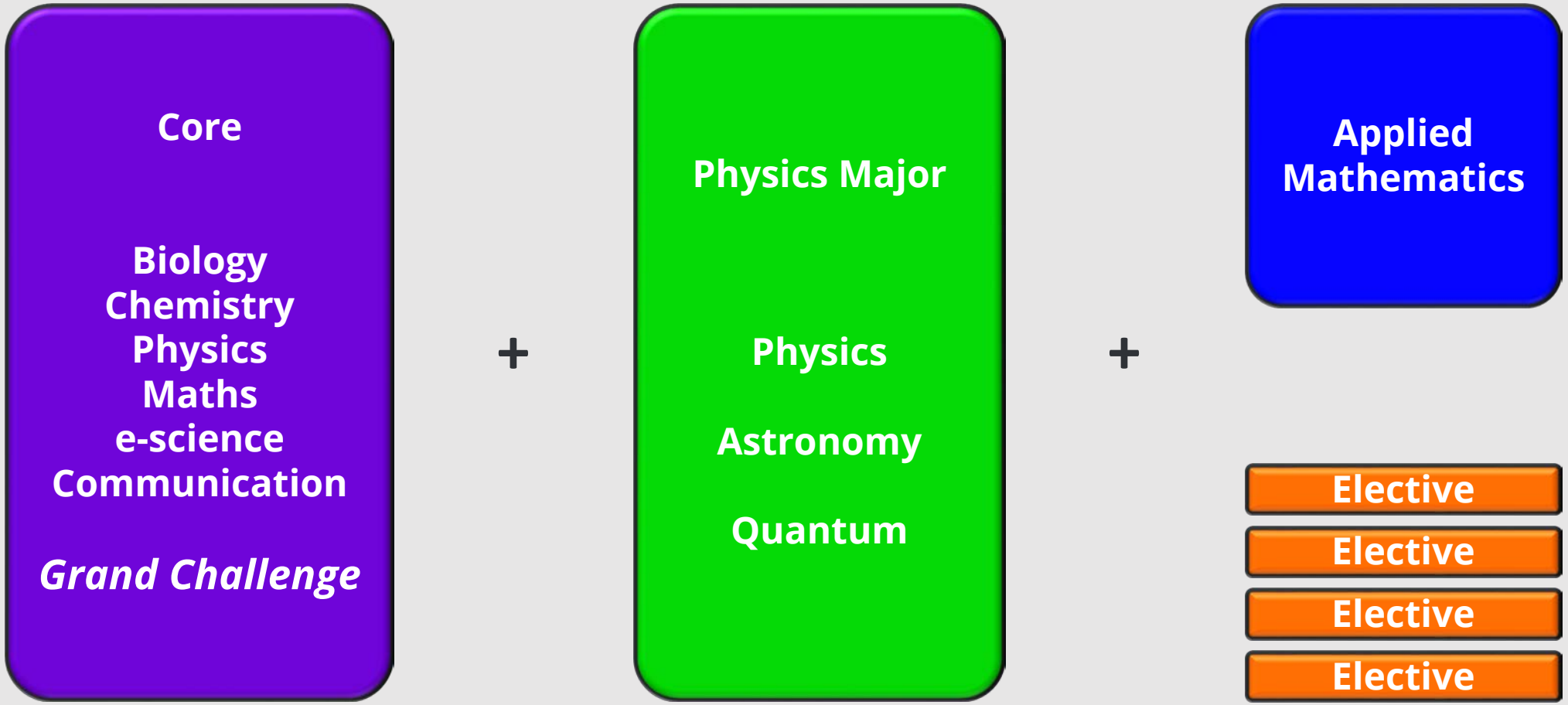
EXAMPLE: BACHELOR OF SCIENCE

Physics major, applied mathematics minor, 4 electives



EXAMPLE: BACHELOR OF SCIENCE

Chemistry major, environmental science major

Core

Biology
Chemistry
Physics
Maths
e-science
Communication

Grand Challenge

8 Units

+

Chemistry Major

Analytical

Physical

Organic

8 Units

+

Environmental Science Major

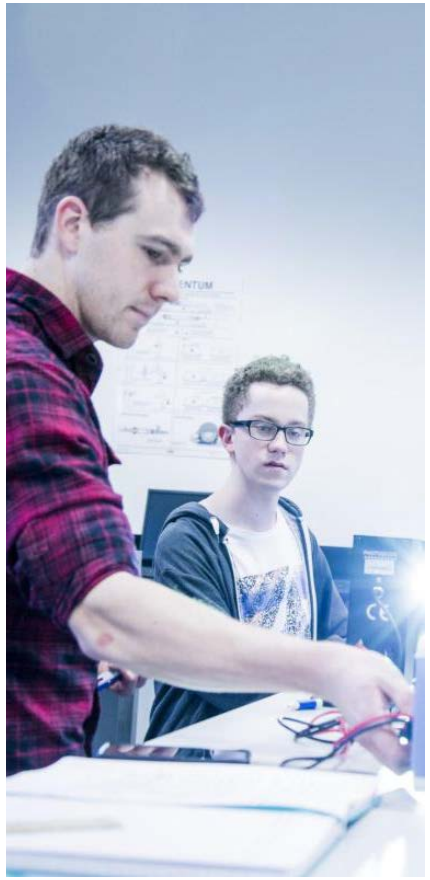
Water Science

Environmental Biology

Food Chemistry

8 Units

WHY SCIENCE AT SWINBURNE?



- Small classes
- Personal interactions
- Hands-on experiences
- Easily accessible
- Campus accommodation
- ARWU Top 200 Science
- Strong research exposure

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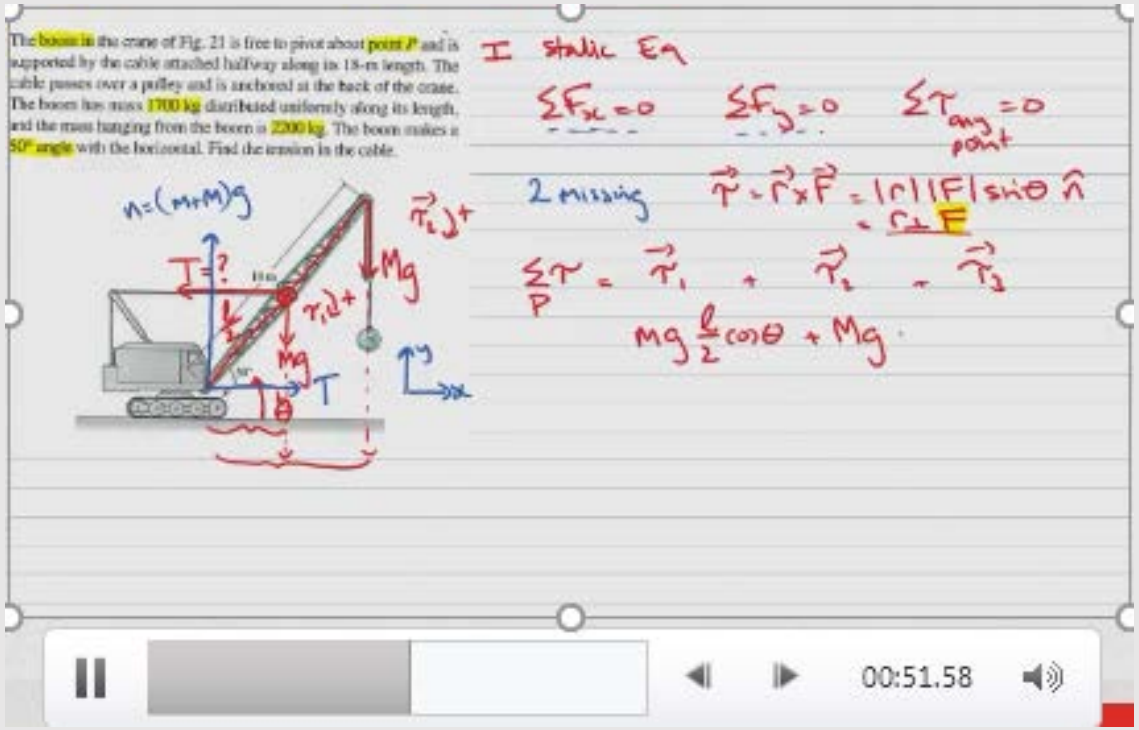
Students are well supported both on campus and online

"It is so much more helpful to have an actual person explain something to me than go on the internet"

MASH is our drop in centre for one-to-one help



Casting program provides 700+ how to videos

THE SWINBURNE ADVANTAGE

Professional Degrees

Gain the advantage with degrees that incorporate a 12-month full-time professional placement with a leading employer.

Work placements

Get the edge on other graduates with work experience in a paid six or 12-month full-time professional placement.

Professional Internships

Learn from the experts. We pair you with a host organisation for a minimum of 18 full days.

Industry-linked projects

Take the challenge of working in a team to fulfil a client brief from start to finish.

Accreditation placements

Fulfil your degree requirements while getting experience with well-regarded organisations.

Industry study tours

Discover how the world does business.

SWINBURNE UNIVERSITY OF TECHNOLOGY

CAREERS

- **Academia** (universities and research)
- **Agriculture** (wine industry, horticulture)
- **Analytical labs** (drug screening)
- **Business** (analyst)
- **Communications** (media, public outreach, museums)
- **Defence Science**
- **Education** (primary and secondary teaching)
- **Environment** (bioremediation, water companies)
- **Finance**
  (Data scientist, banking, stock exchange, modelling)
- **Food and beverage industry**
- **Forensics**
  (DNA typing, crime scene investigation)
- **Government** (policy advisors)
- **Health Industry** (hospital labs, research labs)
- **Industry**
- **Pharmaceutical industry**
- **Public health** (government departments, hospitals)
- **Research and Development**
- **Technical Sales**

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RESEARCH OPPORTUNITIES

- Big Bang Cosmology
- Galaxies and Globular Clusters
- Pulsars
- Stars and Planet Formation
- Supermassive Black Holes
- Gravitational Wave Astronomy
- Access to Keck observatories
- Access to Parks radio telescope
- Physical applied mathematics
- Dynamical systems
- Mathematical biology
- Microfabrication
- Nanofabrication facility
- Neuroimaging facility
- Nanophotonics and nanoplasmonics
- Laser assisted manufacturing
- Solar cell fabrication plant
- Ultrafast laser spectroscopy
- Ultracold Atomic Physics
- Theoretical Physics
- Quantum Gases
- Biophysics

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RESEARCH OPPORTUNITIES

- Genetics
- Biochemistry
- Cell biology
- Stem cell research
- Microbiology
- Infectious diseases
- Plant biotechnology
- Recombinant protein technology
- Proteomics
- Metabolomics
- Molecular virology
- Bioactive compounds
- Microbial enzymology
- Biopolymers
- Plant Biotechnology
- Bioremediation
- Water quality

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RESEARCH OPPORTUNITIES

- Nanomaterials
- Drug delivery
- Nanobiotechnology
- Antimicrobial materials and surfaces
- Biointerface science and biomaterials
- Tissue engineering /regenerative medicine
- Smart coatings
- Surface Science
- Analytical chemistry
- Electrochemistry
- Molecular modelling
- Theoretical chemistry
- Spectroscopy
- Inorganic catalysis
- Polymers

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SPACE TECHNOLOGY AT SWINBURNE

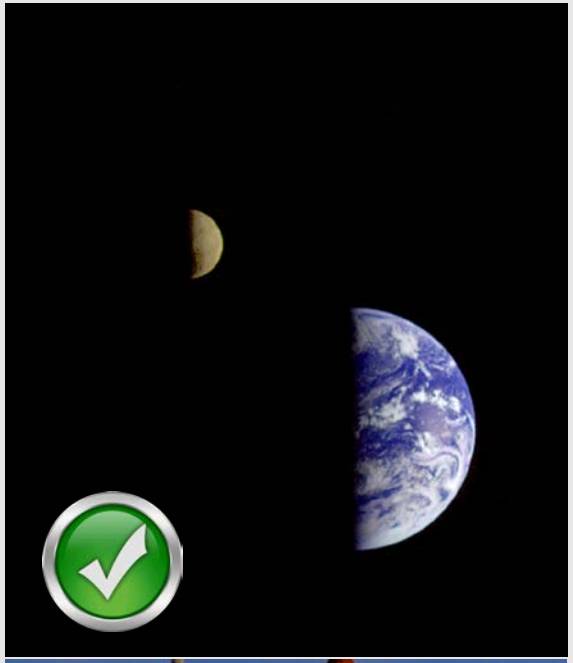
PROF. VIRGINIA KILBORN
DEAN, SCHOOL OF SCIENCE

SWINBURNE UNIVERSITY OF TECHNOLOGY

SWINBURNE Space Office

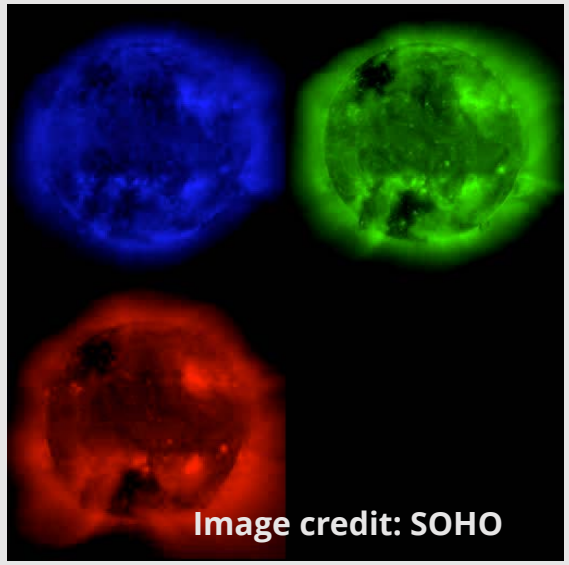
THE NEW SPACE INDUSTRY – WHAT DOES IT ENCOMPASS?

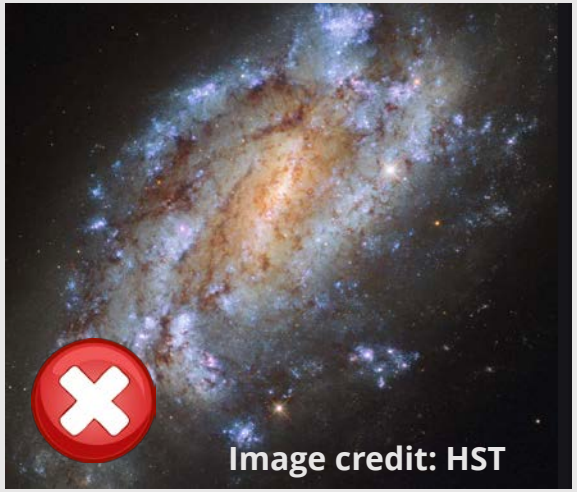
- Earth and moon, planetary exploration



Earth observation & communications via satellites

Solar weather





Astronomy (except space telescopes)

SPACE INDUSTRY LANDSCAPE

STRATEGIC SPACE PILLARS

VISION

A space industry that lifts the broader economy, inspires and improves the lives of Australians

INTERNATIONAL
Open doors
Leverage international bilateral and multilateral partnerships that, where consistent with our national interests, open the door for Australian innovators and grow a connected, respected, and globally competitive space industry in Australia.

NATIONAL
Increase capability
From our areas of strength and addressing our challenges, transform and grow an Australian space sector that lifts the broader economy, and leaps into areas of future competitive advantage.

RESPONSIBLE
Regulation, risk, and culture
Promote a space sector culture that is globally respected, ensures national safety and security under an appropriate regulatory framework, and meets international obligations and norms.

INSPIRE
Build future workforce
Partner in a vision to build an Australian space sector that inspires industry, researchers, government and the Australian community to grow the next generation of the space workforce.

FORECAST: GLOBAL SPACE INDUSTRY WORTH

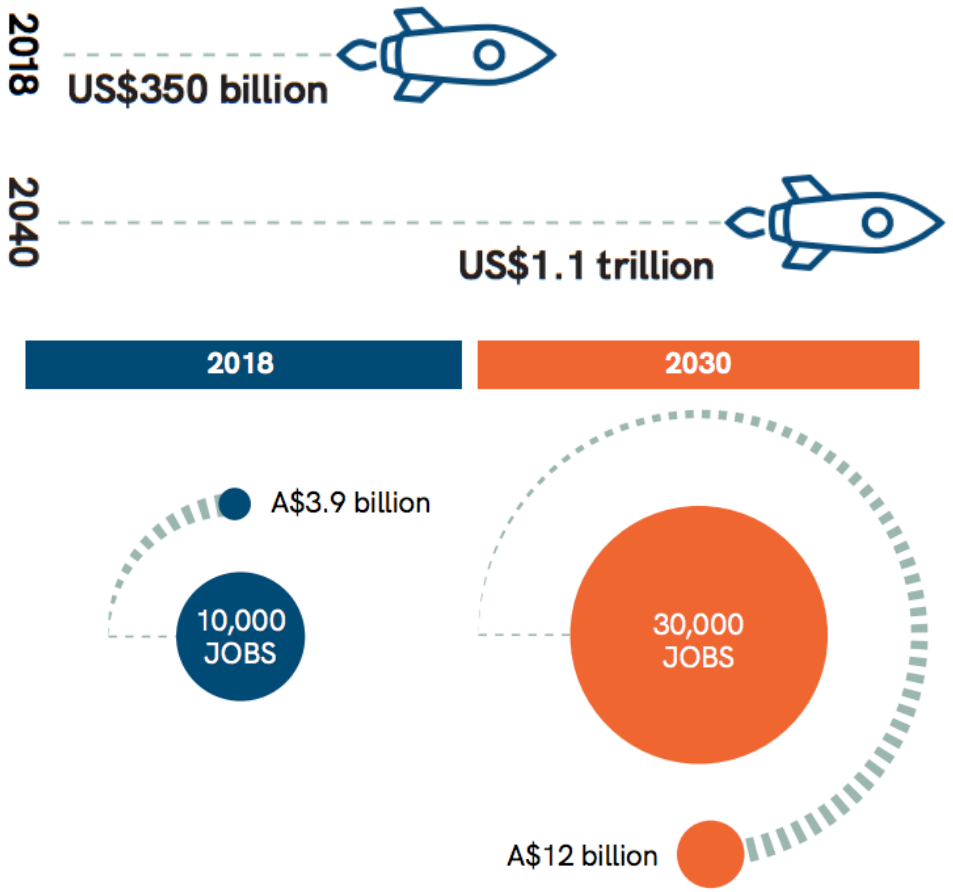


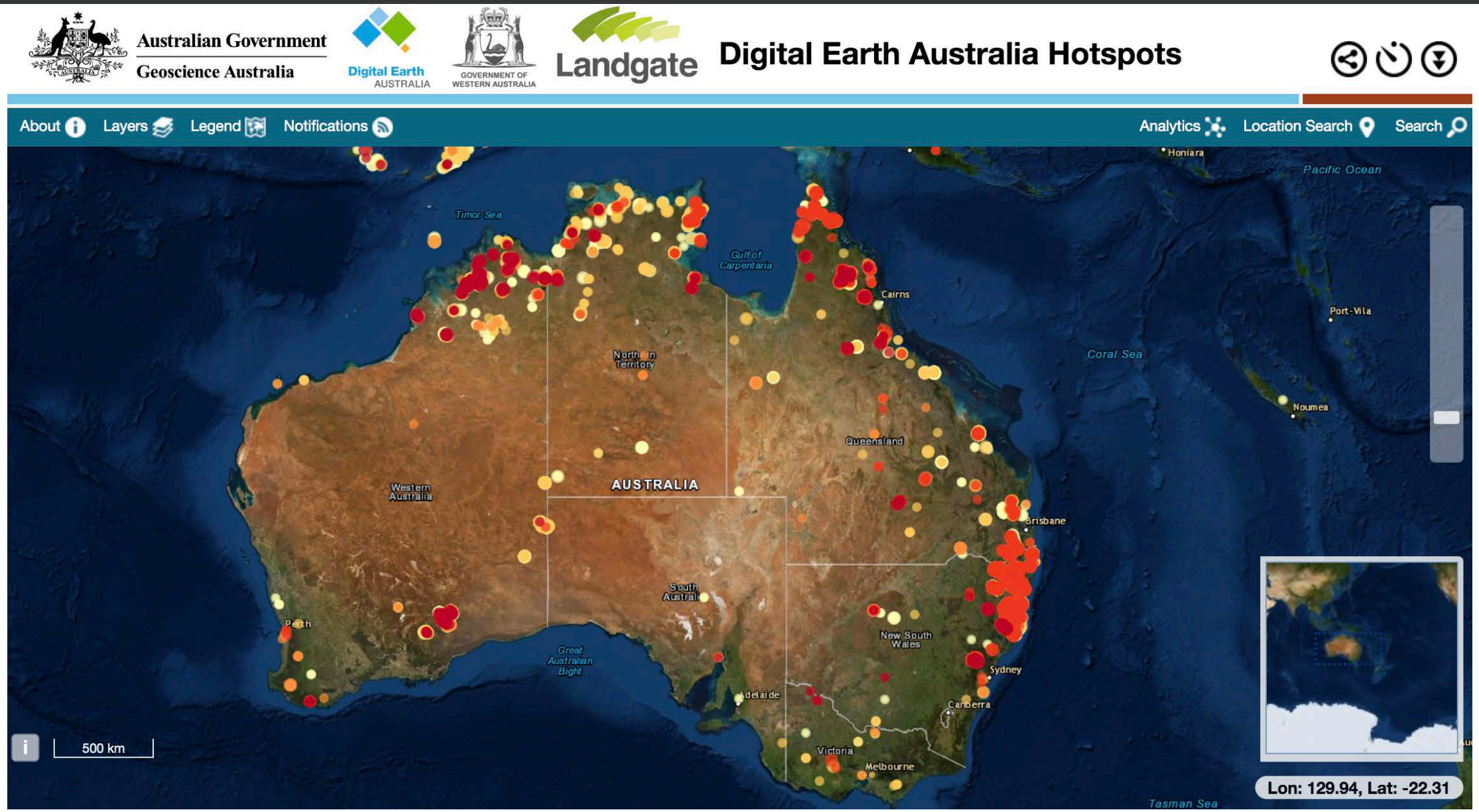
Image credits: Australian Space agency

WEATHER MONITORING

SWIN BUR NE Space Office

Image Credit: NASA

BUSHFIRE MONITORING



RESOURCE MANAGEMENT: WATER

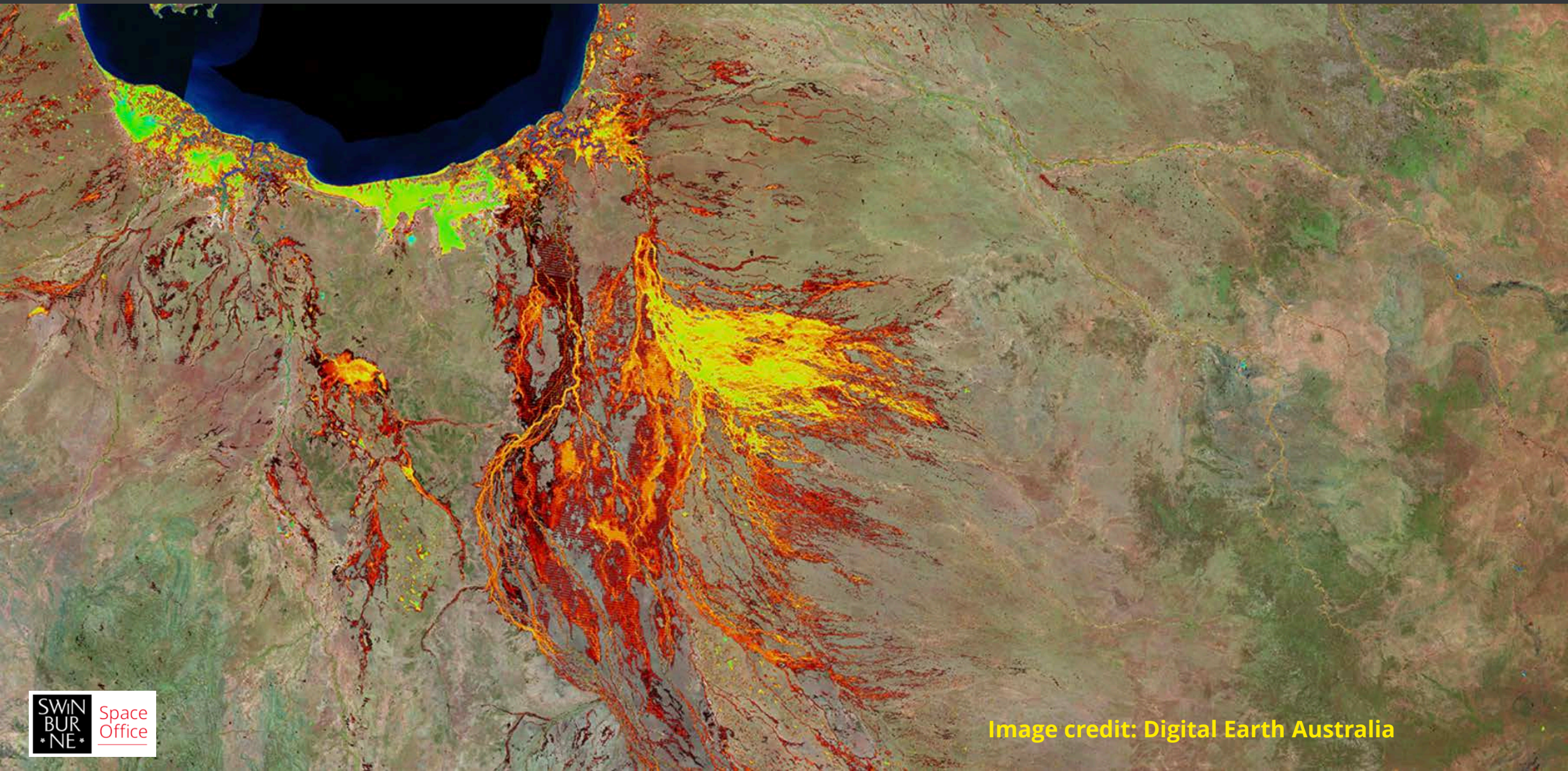


Image credit: Digital Earth Australia

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COMMUNICATIONS

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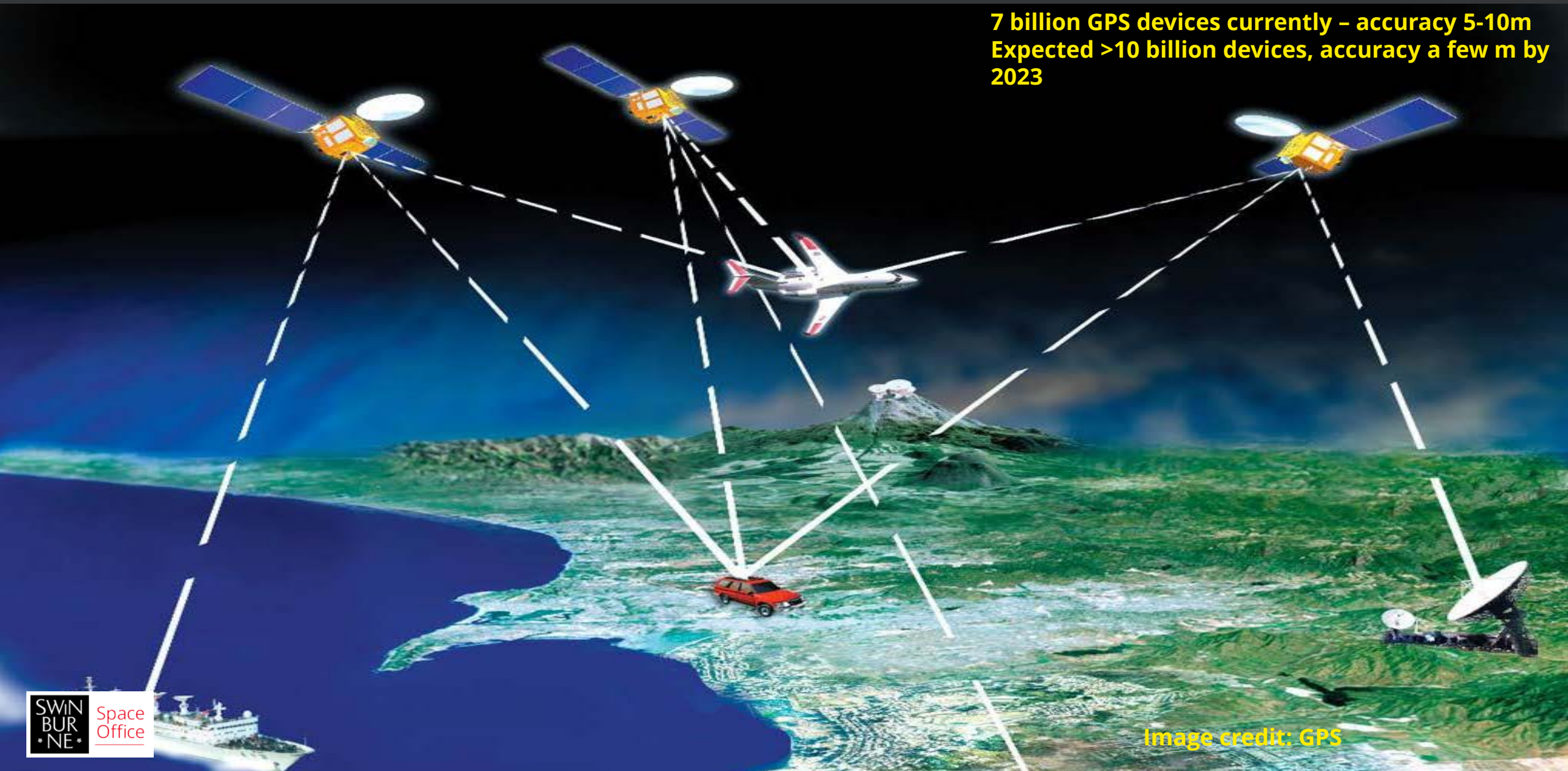
SATELLITE TRACKING - GPS



7 billion GPS devices currently – accuracy 5-10m
Expected >10 billion devices, accuracy a few m by 2023

Image credit: GPS

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AUTONOMOUS FARM VEHICLES

Image credit: ASI

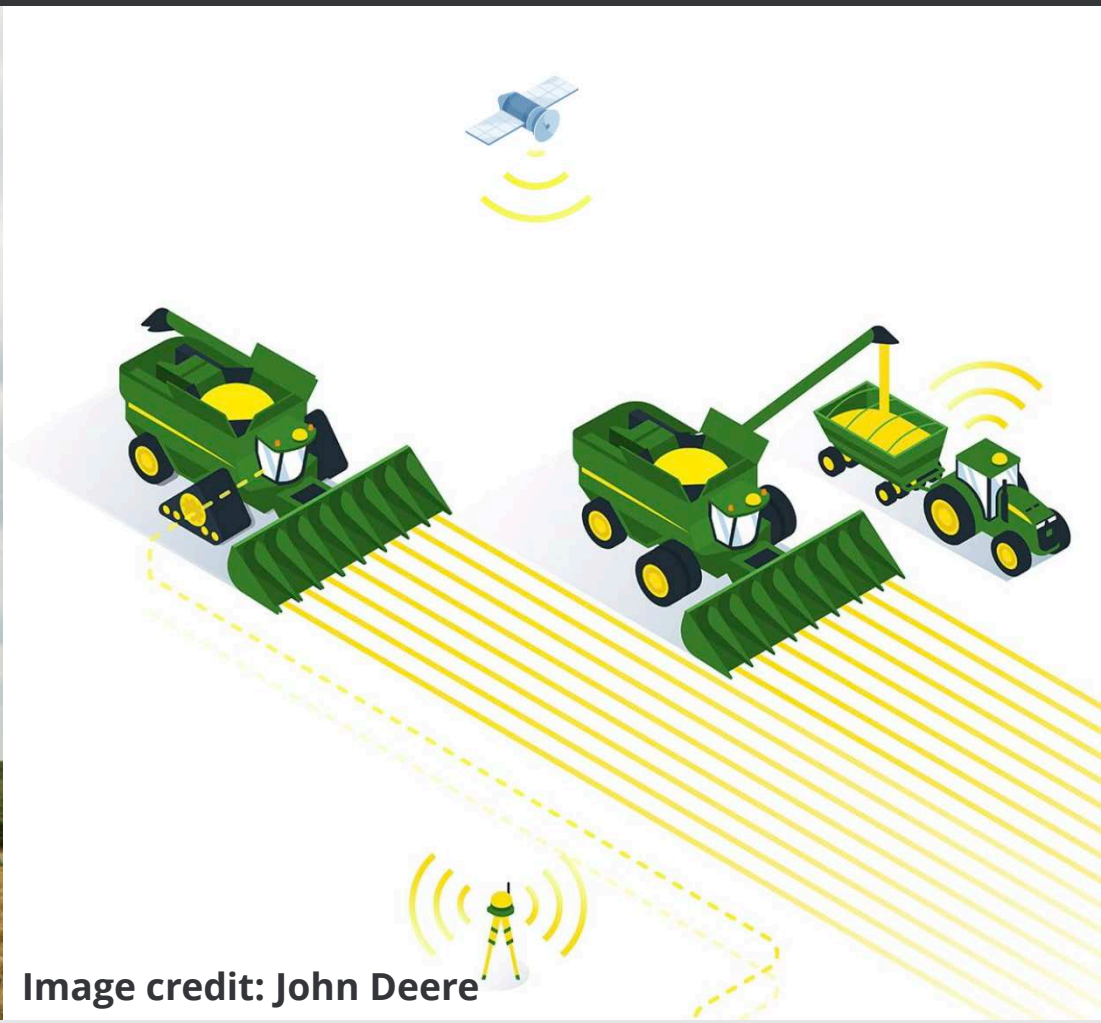

Image credit: John Deere

SATELLITE LIVESTOCK MONITORING

Image credit: Globalstar

Image Credit: Hayley Warden/The Courier

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SPACE TOURISM


Image credit: SpaceX

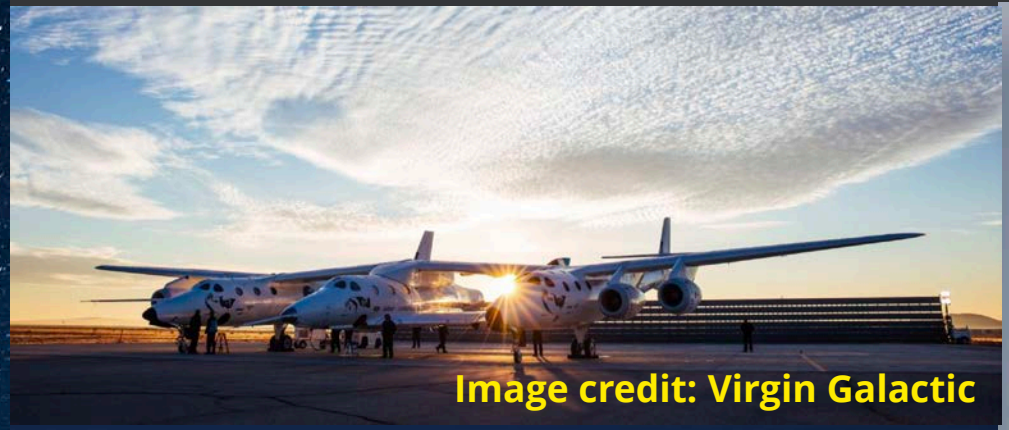
Image credit: Virgin Galactic

Image credit: Blue Origin


Image credit: Blue Origin

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NASA AIMS TO RETURN TO THE MOON BY 2024

Artemis program to send a man and woman to the moon
Image credit: NASA

SWINBURNE Space Office

SPACE TECHNOLOGY CO-MAJOR:
ANYONE CAN STUDY SPACE AT SWINBURNE

- 8-unit co-major available from 2021
- Designed to prepare students to contribute to the growing space industry in Australia and internationally
- Provides students real industry projects, working with the space industry in 3 projects
- Applying their degree (e.g. Science, IT, Engineering – even marketing) to the space industry
- Opportunities to work with researchers at Swinburne – and even to launch experiments into Space

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SWINBURNE UNIVERSITY & HAILEYBURY COLLEGE

SHINE

SWIN BUR NE Space Office

Rebecca Allen
Kim Ellis
Alan Duffy

Image Credit: James Josephides, Swinburne

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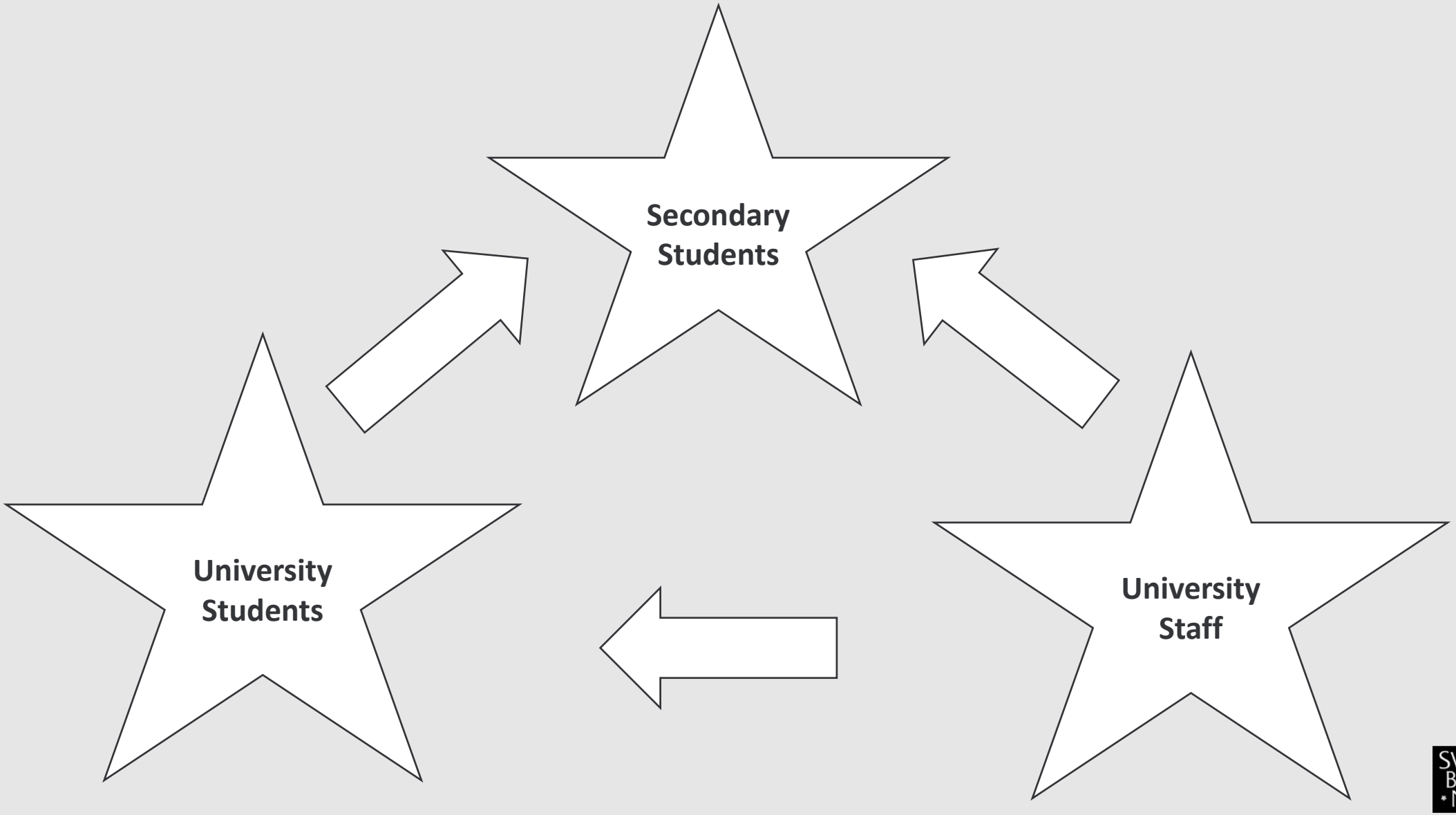

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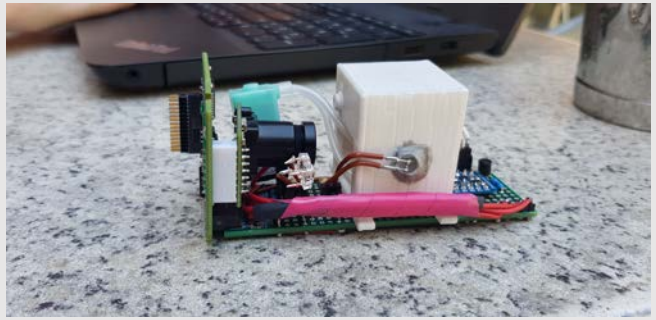
SWINBURNE UNIVERSITY & HAILEYBURY COLLEGE



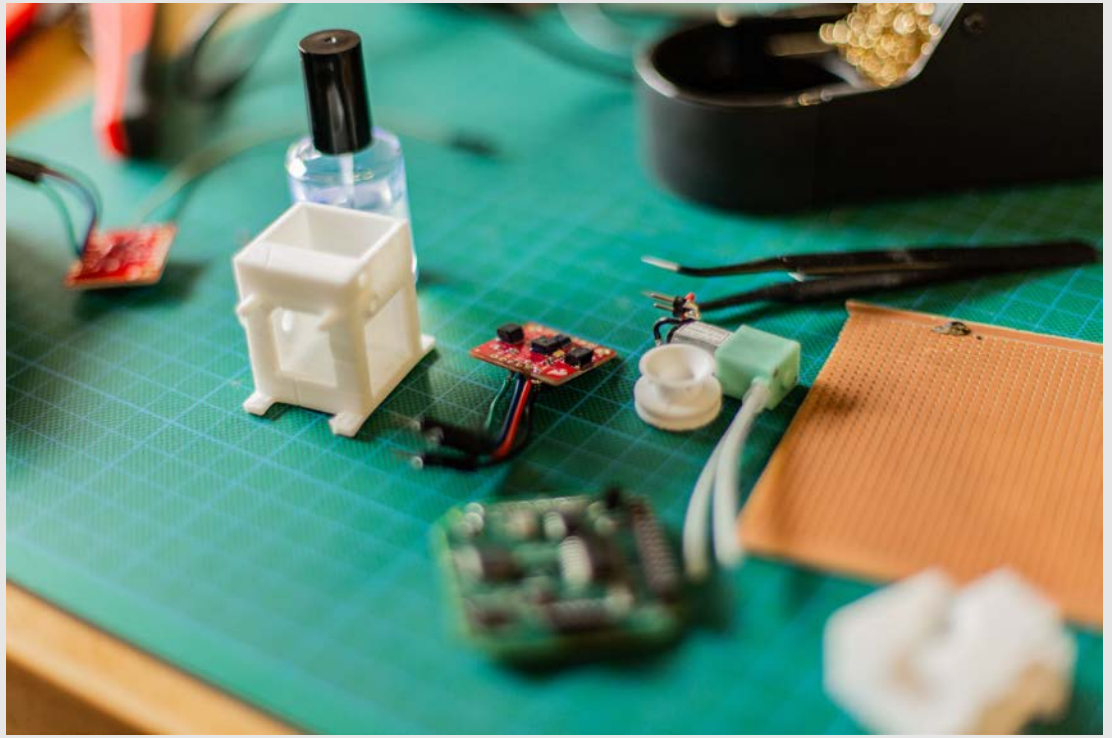


Image credits: Swinburne

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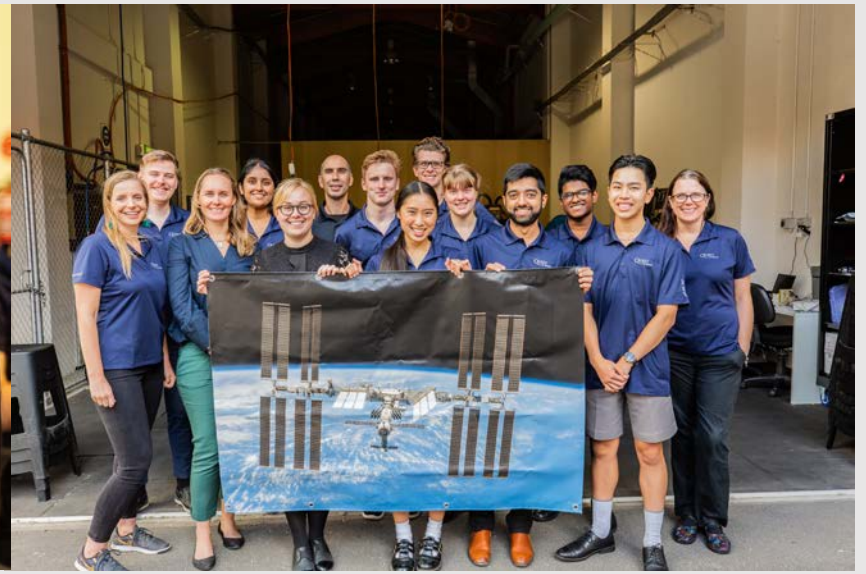

Work Experience

Project Management

Teamwork

Space Office

Image credits: Swinburne

SWINBURNE UNIVERSITY OF TECHNOLOGY

SWINBURNE SPACE OFFICE

*Short Courses
*Outreach and education
*Industry projects
*Space Consultation
*Fundamental research

SWINBURNE Space Office

Email: spacevic@swin.edu.au

PANEL

- **DR DANIEL ELDRIDGE** COURSE DIRECTOR BACHELOR OF SCIENCE
- **PROF. VIRGINIA KILBORN** DEAN, SCHOOL OF SCIENCE
- **AMY SAPOUNTZOGLOU** MANAGER, PAVE SCIENCE
- **DR ANT EDWARDS** SENIOR LECTURER
- **NICOLE DARMAN** ANALYTICS LEARNING AND DEVELOPMENT COORDINATOR, NAB
- **SIMONE WISNIEWSKI**, TALENT AND DESIGN ANAYLST, NAB