



FAR LABS

Freely-Accessible Remote Laboratories

Next-Generation Approaches to Science Education



**A TEACHER'S
INFORMATION GUIDE**

FREELY-ACCESSIBLE REMOTE LABORATORIES

- Online, equipment-based labs for the high school network
- Supplementing the current science curriculum
- Free, web-supported content



Remote Lab Access Presentation held in the VisLab at La Trobe University

The process
of evolving
FAR Labs
will be
guided
by the
advice and
feedback
received
from
teachers.

Involving Universities and institutions across Australia, as well as industry collaborators, we can deliver FAR Labs to the Australian high-school network. We aim to provide a world-class platform for developing next-generation approaches to science education.

FAR LABS PROJECT

Freely-Accessible Remote Laboratories (FAR Labs) are a network of sophisticated, web-connected scientific equipment that can be accessed and controlled over the internet.

Each experiment is designed to have clear learning outcomes and is complemented by detailed supporting material.

Teachers and high school students across Australia are invited to use this resource to broaden their exposure to university level research and build links between secondary and tertiary education.

Students will be able to see live video of the equipment, collect and analyse data in real time and talk to academics about their research in online forums.

FAR LABS WEBSITE

FAR Labs is working closely with the Victorian e-research Strategic Initiative (VeRSI) to build a state of the art website to support the experiments.

The website includes a booking system as well as comprehensive notes that support the experiments.

The website is completely browser-based and does not require installation of any software.

While registration is necessary there are no costs whatsoever.

The FAR Labs website can be found at **www.farlabs.edu.au**

Expanding Networks
Expanding the Mind



Solar Hot Water Unit, La Trobe University

By blurring the lines between tertiary level research and secondary level science education, the minds and interests of students can engage before making choices about their future careers.

ENGAGING STUDENTS

FAR Labs builds on existing networks, linking each of the three universities to local high-schools.

FAR Labs will engage students with limited access to sophisticated equipment due either to remote location or educational resourcing.

DISCOVER THROUGH ACCESS

Through the FAR Labs website, students will control live experiments using cutting edge research equipment.

Students will be able to collect, store and access data and review experimental notes and graphs.

The FAR Labs network allows students to participate in remote experiments from their classroom and engage with academics about their research.

A TEACHER'S GATEWAY

Teachers will be able to interact with advanced scientific laboratory equipment located at our Universities. The experiments and the supporting material are aimed at both middle school years (7-10) and VCE. In addition, science teachers will be provided with tools to aid them in their practical classes including notes for learning outcomes and assessments. These provide pathways for students to understand the process of scientific research. The supporting materials include:

- Downloadable slides
- Teacher's and student notes
- Videos
- Real scientific data and
- Examples of the impact that science has on society

Teachers can choose a level of engagement appropriate to their students' needs.

FAR Labs aims to make material accessible to middle (7-10) and senior (11-12) year levels.

FAR Labs program manager David Hoxley, demonstrating the radiation lab at La Trobe University

CONTINUAL DEVELOPMENT...

We currently offer remotely controlled experiments involving:

- radioactive sources, detectors and absorbers
- access to a beamline at the Australian Synchrotron
- a solar hot water system with sensors and linked to real-time weather data



La Trobe Institute for Molecular Science (LIMS)



Centre for AgriBioscience (AgriBio)

FAR LABS EXPANSION

The modular nature of this project means that we can provide access to the La Trobe based laboratory environment from day one.

As new experiments are developed the FAR Labs environment will grow and evolve in accordance with the needs and feedback of the teachers collaborating with us.

This ensures that access to our current suite of experiments and equipment reaches secondary schools as quickly as possible.

FAR LABS COMMUNITY

In parallel to developing the FAR Labs platform, we will be actively promoting the FAR Labs project. We will be hosting one day workshops at each partner university, as well as an end of year conference in partnership with STAVCON.

We invite all teachers to attend these events. Subsidies for travel and accommodation are available - ask us how.

SHARING RESOURCES

Practical lab work is an essential part of science education. To engage students, they need to see the ideas they have learned in class put into practice. This is also true of researchers.

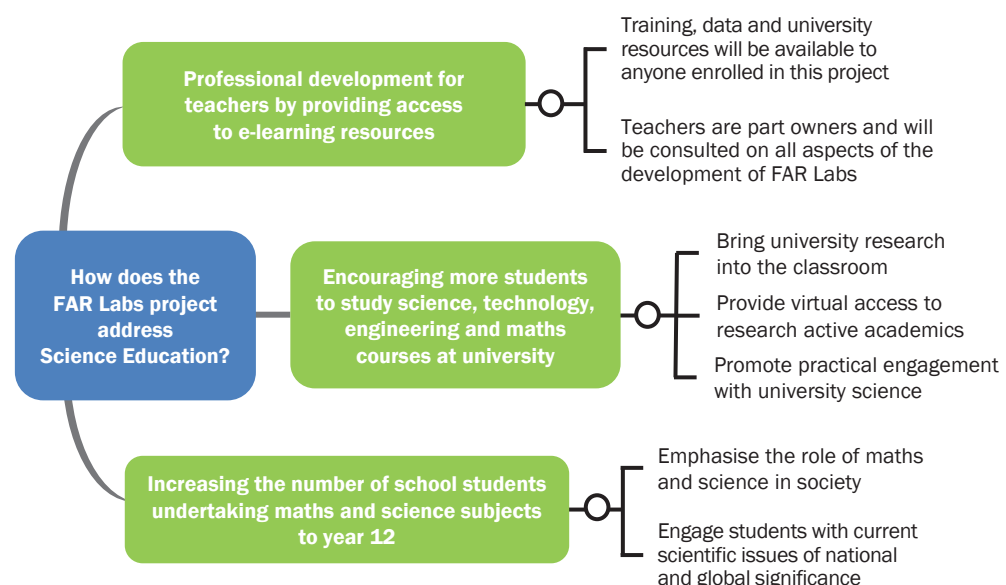
To enable this, La Trobe University hosts a new \$300,000 state-of-the-art Visualisation Laboratory (VisLab) which connects La Trobe researchers with scientific collaborators locally and around the world.

In addition, there are two newly developed research facilities at La Trobe University; the La Trobe Institute for Molecular Sciences (LIMS) and the Centre for AgriBioscience (AgriBio).

As FAR Labs evolves, additional practical tasks will be added to the range of experiments available.

The FAR Labs project meets the needs of high school science education in a variety of ways.

Our partner universities in Perth (Curtin University) and Townsville (James Cook University) have contributed research equipment relating to cyclone research, wind tunnel aerodynamics and astronomy.



OUR COLLABORATORS...

FAR Labs builds upon collaborations between a variety of stakeholders. This includes existing partnerships between schools and laboratory-based outreach programs, regional-to-capital collaborations and e-research and industrial partnerships.

THE LA TROBE UNIVERSITY MULTI-CAMPUS NETWORK

latrobe.edu.au

The La Trobe University campuses in Bendigo, Shepparton and Albury-Wodonga are closely integrated with each other, and local secondary schools, throughout northern Victoria.

The Bundoora campus has a strong working relationship with Quantum Victoria and Charles La Trobe Secondary College, both of which are located next to the Bundoora Campus.

Each of these nodes has advanced laboratories and e-learning facilities which local schools can experience within a short travel time, and combine with other campus outreach activities.

Practical support can then be given to teachers who want to link to the FAR Labs in their own schools.

VICTORIAN e-RESEARCH STRATEGIC INITIATIVE

versi.edu.au

The Victorian e-Research Strategic Initiative is a program funded by the Victorian Government to accelerate and coordinate the uptake of e-Research in universities, government departments and other research organisations.

VeRSI has substantial expertise in linking laboratory activities to users via the internet to create an exceptionally immersive virtual experience.

Some examples include the VisLabs at RMIT and Victoria Universities.

CURTIN UNIVERSITY

curtin.edu.au

Curtin University is fundamentally committed to providing regional education within Western Australia through campuses and education centres spread across the state, including Esperance, Geraldton, Kalgoorlie, Karratha, Margaret River, Northam, Port Hedland and Albany.

In addition, Curtin University has a long standing commitment to indigenous education and culture, and has the highest enrolment of Indigenous Australians of any university.

QUANTUM VICTORIA SCHOOLS PARTNERSHIP

quantumvictoria.vic.edu.au

Established in 2012, Quantum Victoria is positioning itself as a national and international leader of Science, Technology, Engineering and Mathematics (STEM) Education. Its programs embrace cutting-edge, aspirational technologies, with a focus on Games Technology, Virtual Reality, Gesture-based Computing, 3D Printing and Robotics.



Quantum Victoria Schools Partnership

AUSTRALIAN INSTITUTE OF PHYSICS / AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

aip.org.au

The Australian Institute of Physics is represented by a network of Physics educators, and has identified innovative outreach, to STEM teachers and students, as critical to the success of the recently launched Decadal Plan for Physics. In addition, the AIP Physics Education Group (PEG) provides a vehicle for the extension of the FAR Labs project to all states in Australia.

JAMES COOK UNIVERSITY

jcu.edu.au

James Cook University is a tropical university that understands the challenges and opportunities facing secondary schools in the far north of Australia. James Cook University collaborates with La Trobe to share undergraduate lab facilities linked by online, remote-access technology, enabling the combined lab resources to extend to schools in northern Queensland.



Angle Resolved Photoelectron Spectrometer, La Trobe University



LA TROBE
UNIVERSITY



WANT TO KNOW MORE?
Get in touch!

Program Manager

David Hoxley
D.Hoxley@latrobe.edu.au

Project Coordinator

Guido Cadenazzi
G.Cadenazzi@latrobe.edu.au

Teacher Liaison Officer

Paraschos Atsikidis
P.Atsikidis@latrobe.edu.au

Technical Officer

Callum Anderson
Callum.Anderson@latrobe.edu.au



Curtin University



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**Department of Industry, Innovation, Climate Change,
Science, Research and Tertiary Education**

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