Australian Government

ANSTO

# Collaborating with ANSTO

ANSTO uses nuclear research techniques to address many of the important issues of our time relating to our environment, human health and industry.

ANSTO does this using Australia's most sophisticated research infrastructure, including the Open Pool Australian Light-water (OPAL) multi-purpose reactor, the Australian Synchrotron, the Centre for Accelerator Science (CAS), the Australian Centre for Neutron Scattering (ACNS) and the National Deuteration Facility (NDF).

Every year, ANSTO researchers plus over 5000 visiting national and international researchers and industry researchers use our facilities.

ANSTO's many strategic international collaborations with some of the world's leading research institutes and universities help drive innovation for Australia and the world.

## OPAL multi-purpose reactor

OPAL is one of the world's most effective and reliable multi-purpose reactors.

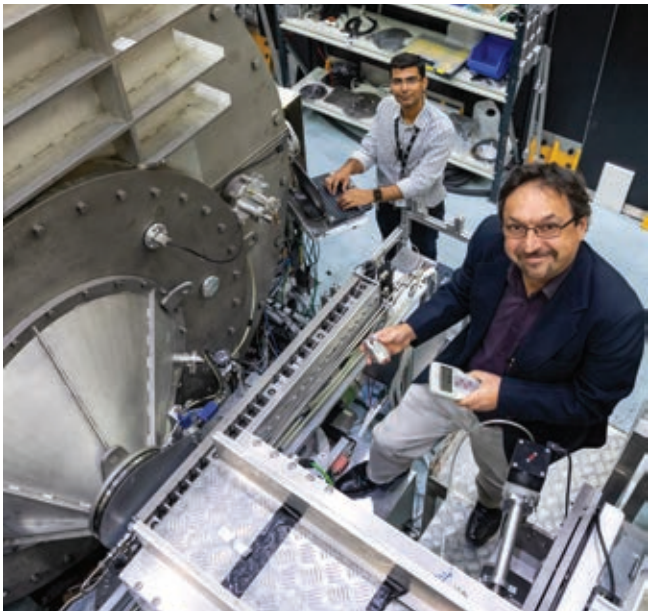
OPAL services ACNS, providing neutrons for scientific research, and enables specialised services such as neutron activation analysis, which is used by the minerals processing industry. OPAL exemplifies the nature of the collaborative, multi-faceted facilities that are made available at ANSTO.

The OPAL reactor provides neutron activation analysis for the Australian minerals processing industry.

## Australian Centre for Neutron Scattering

ACNS, which is partially funded through the National Collaborative Research Infrastructure Strategy (NCRIS), is home to 15 neutron-beam instruments, where scientists apply neutron scattering techniques to solve complex research and industrial problems.

ANSTO's neutron beam instruments can be applied to problems such as the development of renewable, clean energy technologies or new battery materials, and studying the structural integrity of materials such as railway tracks. Researchers can apply for access to these world-class facilities through ANSTO's merit-based access scheme.



Dr Jitendra Mata (left) and Dr Elliot Gilbert using the small-angle neutron scattering instrument, Quokka.

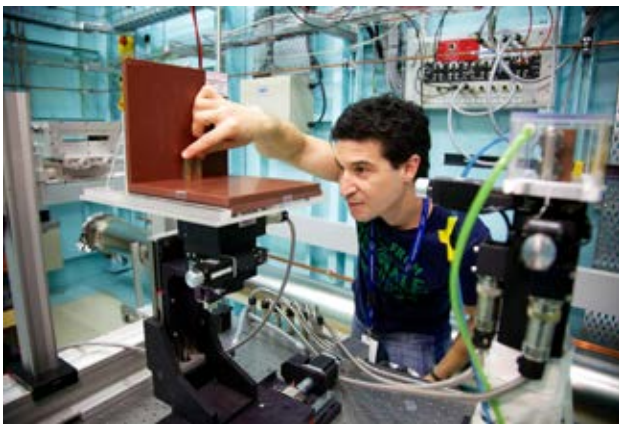
## Australian Synchrotron

ANSTO's Australian Synchrotron is one of the nation's best performing research facilities and supports a broad range of high-quality research, with applications ranging from medicine and nanotechnology through to manufacturing and mineral exploration.

The facility uses accelerator technology to produce a powerful source of light (X-rays and infrared radiation) many times brighter than the sun.

Its 10 beamlines harness this light to see the invisible structure and composition of materials from the macroscopic to the atomic, with a level of detail, speed and accuracy not possible in conventional laboratories.

The Synchrotron supports thousands of researcher visits annually, including representatives from almost every Australian and New Zealand university as well as over 200 companies, government agencies and departments, art galleries, museums and medical research institutes.



Frank Gagliardi, Medical Physicist from the Alfred Hospital, using the Australian Synchrotron's Imaging and Medical Beamline.

## Centre for Accelerator Science

CAS, which is partially funded through NCRIS, consists of four megavolt ion accelerators - the 2MV Small Tandem for Applied Research (STAR), the 10MV Australian National Tandem Research Accelerator (ANTARES), a 1MV low energy multi-isotope accelerator (VEGA) and a 6MV tandem accelerator (SIRIUS) - with 17 beamlines and end stations, 10 ion sources and a suite of sample processing laboratories.

ANSTO's research on Antarctic ice sheets is helping understand the impact of climate variability on global sea levels.

These facilities provide researchers with access to a suite of tools in one location including ion beam analysis and accelerator mass spectrometry for isotopic dating, air pollution, climate science, modification of materials for future nuclear reactors, radiation damage studies, forensic science, nuclear detector characterisation and microbiological studies.

## National Deuteration Facility

NDF, which is partially funded through NCRIS, provides a unique service to researchers, producing made-to-order molecules or proteins. In this nominated portion, hydrogen content is replaced with the isotope deuterium; this enables scientists to take advantage of the distinctly different interactions of these isotopes with neutrons (e.g. neutron scattering or diffraction) or in Nuclear Magnetic Resonance (NMR) measurements.

Deuteration in this way enables previously impossible investigations of the structure of medically and environmentally relevant proteins and biomolecules, synthetic polymers, or other nanotechnology or biotechnology-based materials.

NDF supports hundreds of scientific users from institutions across Australia and the world every year.

Anwen Krause-Heuer in the National Deuteration Facility labs, which are enabling scientists to perform previously impossible investigations.


**LOCATIONS**
Lucas Heights | NSW
Clayton | VIC
Camperdown | NSW

**PHONE**
+61 2 9717 3111

**EMAIL**
enquiries@ansto.gov.au

**SOCIAL**

**WEBSITE**
www.ansto.gov.au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