Australian Government

ANSTO

Using nuclear science to benefit Indigenous Australia

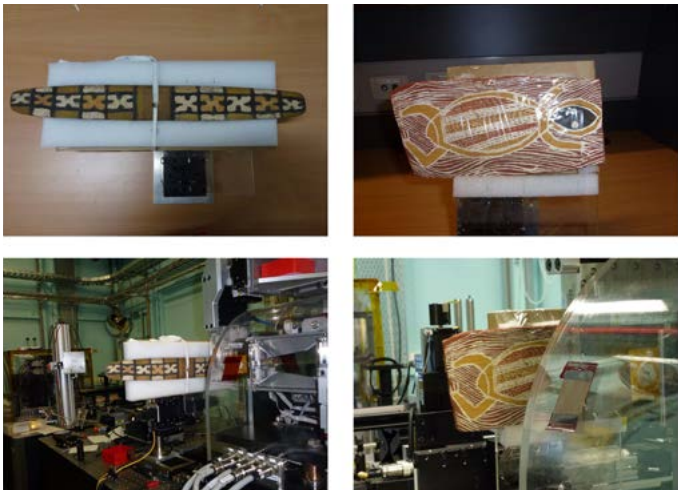
Science. Ingenuity. Sustainability.

Determining the composition and origin of mineral pigments

Naturally sourced mineral pigments are widely used in Aboriginal Australian culture and are applied to a variety of natural substances, such as wood and bark, to create culturally significant objects such as boomerangs and bark paintings.

ANSTO's Australian Synchrotron undertook the first non-destructive micro-X-ray fluorescence study of natural mineral pigments on Aboriginal Australian objects. The research was used to "geochemically fingerprint" the pigments to gain an insight into their complex mineralogy and elemental composition, and to trace their origin.

The study is helping to better understand the composition, technology and context of Indigenous Australian cultural expression.



ANSTO land recognition

ANSTO operates research facilities in three locations and acknowledges the traditional owners of these lands.

In Sydney, New South Wales, our Lucas Heights campus is located on the lands of the Dharawal nation and our Camperdown campus is located on the lands of the Gadigal people of the Eora nation. In Melbourne, Victoria, our Clayton campus is located on the lands of the Kulin nation.

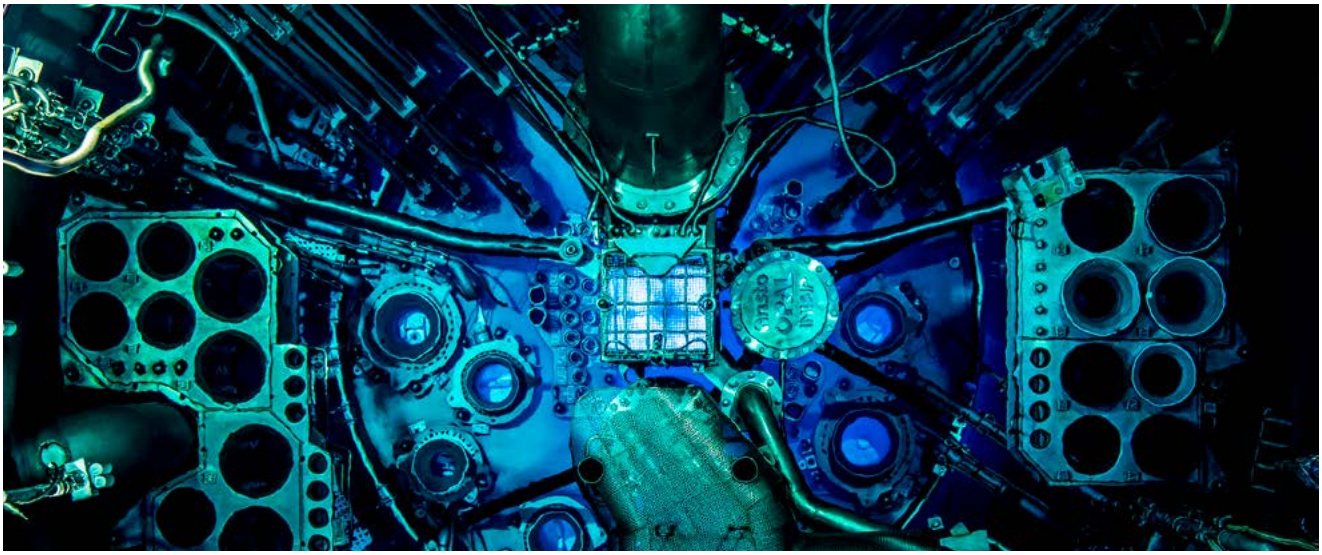
There are many indigenous rock carvings in the 1.6 kilometre buffer zone that surrounds the Lucas Heights site. The images are believed to be a record of the area's earliest settlers, the Dharawal people.

The Lucas Heights campus is located 35 minutes from the CBD of Sydney.

The Australian Synchrotron is located in Clayton, 30 minutes from the CBD of Melbourne.

Using nuclear for peaceful purposes

ANSTO was established in 1953 as a national nuclear research reactor to produce nuclear medicine, irradiate silicon for industry, and to produce neutrons for scientific analysis and research. The reactor has never produced neutrons for anything other than peaceful purposes.



ANSTO's OPAL multi-purpose reactor.

Helping clean-up land damaged by British nuclear testing

The British Government carried out nuclear weapons testing in South Australia between 1956 and 1963, which resulted in extensive radioactive contamination of land that was returned to traditional owners in 2009.

With expertise in the measurement of radioactivity, ANSTO assisted in some of the radioactivity assessments that were part of remediation activities.

More recently, this activity included:

- Survey of the levels of plutonium in soil, flora and fauna and the air of the former Maralinga Atomic Weapons Testing Range
- Study of the accumulation of plutonium in mammals inhabiting a test site on the former Maralinga Atomic Weapons Testing range

Using nuclear techniques for research

In undertaking research related to Australian Indigenous cultural heritage, ANSTO recognises the importance of undertaking it in consultation with local indigenous communities and groups.

Using nuclear expertise to protect Indigenous Australian health

ANSTO environmental researchers have assisted in the monitoring of toxic substances in aquatic bush foods at Magela Creek in the Northern Territory. The creek is near the Ranger Uranium Mine at Jabiru.

Environmental research at ANSTO also determined that there were very high levels of lead in crocodiles from Kakadu National Park. Nuclear techniques revealed that the crocodiles were eating magpie geese and other fauna shot with lead ammunition. The findings led to the ban of lead ammunition in the National Park.

Confirming the antiquity and resilience of Australian Indigenous settlements

Radiocarbon dating was used in a study of the food gathering practices of Australian Indigenous people who lived in Arnhem Land in the Northern Territory more than 40,000 years ago. The research by an archaeobotanist at Madjedbebe is providing a better understanding of how Indigenous Australians adapted to and used resources in the environment.

ANSTO has assisted a Monash University researcher with a project to establish the antiquity of pre-historic stone-walled aquaculture complex developed by the Gunditjmara people of southwest Victoria. The dating was done using charcoal from sediments that filled in channels where eels were trapped.

Research at ANSTO helped establish the age of a Narrinyeri burial ground in the Lower Murray River basin, which was found to pre-date the arrival of the first Europeans to Australia.

Technology at the Centre for Accelerator Science is used in the dating of ancient artefacts.

Dating Australian Indigenous rock art

ANSTO is collaborating on a large project to elevate the importance of the world-wide unique collection of Kimberley rock art by enhancing an understanding of the geo-biochemical character of rock art pigment, a more accurate dating of the rock art using advanced analytical techniques and to provide the first comprehensive study of landscape and climate change of the region over the past 100,000 years.

Nuclear techniques used to investigate Australian Indigenous cultural heritage

Non-damaging nuclear techniques have been used to reconstruct an ancient Australian indigenous stone tool that was embedded in a piece of limestone on Barrow Island (off the West Australian coast). The imaging revealed important information about the use of the tool and its possible origin without damaging the artefact.

Another nuclear technique has been used to analyse the composition of Australian Indigenous ochres and help determine its origin. Ochre has a complex geochemistry that makes it difficult to study but the method is proving effective in identifying the elements within it.

Australian Government

ANSTO

Science. Ingenuity. Sustainability.

Locations

Lucas Heights | Camperdown | Clayton

www.ansto.gov.au

Published June 2019