Researchers uncover chemistry behind ancient Indigenous art

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Alexandria Hunt and Dr Paul Thomas at a sacred site in Arnhem Land. Credit: Associate Professor Barbara Stuart

UTS researchers are working with archaeologists, anthropologists and the Northern Territory's Jawoyn community to chemically analyse ancient rock art and uncover its secrets.

UTS Associate Professor Barbara Stuart and PhD student Alexandria

Hunt are applying sophisticated techniques to understand the materials used by the artists and how their work has changed over time.

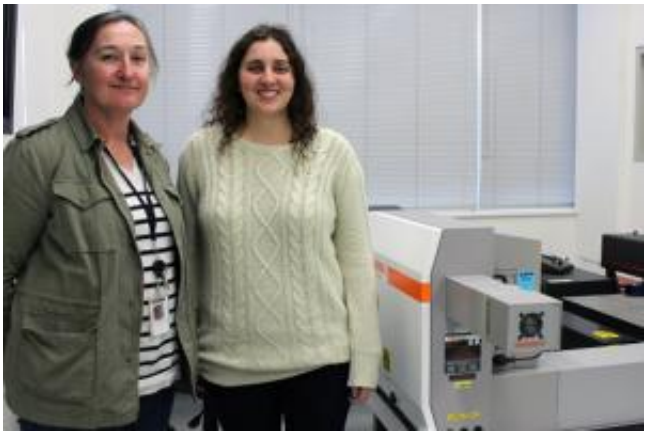
"One of my areas of interest has been working with archaeologists and applying chemical and analytical techniques to the study of archaeological problems," said Associate Professor Stuart.

While chemistry and archaeology are not a usual pairing, Associate Professor Stuart said that chemistry plays an important role in understanding archaeological sites.

"We are applying chemistry in an area that is a little less traditional. The chemistry tells you where materials were coming from, what types of materials they used and different practices at different times."

Alexandria was working on her honours project in forensic science in 2012 when she was presented with the opportunity to join the team.

In June of that year Alexandria and her two supervisors, Associate Professor Stuart and Dr Paul Thomas, visited the rock art sites in Arnhem Land for a week, where they worked with other professionals including archaeologists, environmental scientists, geologists and rock art experts.



Associate Professor Barbara Stuart and Alexandria Hunt. Credit: Sarah Carlisle

"We need to take samples but we try to take as small amount as we can so that we don't visually alter the paintings at all," Alexandria said.

"We were blessed before we could go to the sites… they are amazing and you can see how important they are."

During the trip, the team used a community campsite and worked in collaboration with an Indigenous elder, Aunty Margaret, who was pleased that people were interested in the Jawoyn culture.

"They have been very supportive of the whole process. It was a great privilege to go up and visit the site, which is very isolated," Associate Professor Stuart said.

"It's enjoyable from our point of view as scientists working in teams, but it was extra special going to such a historical and spiritual place and working on something that means so much to that community."

Alexandria said that the collaboration between specialists and the Indigenous community was important as it provided a fundamental cultural understanding that helped their research.

"We are lucky that there are still Aboriginal people who know about the sites. With chemistry you can link it to their studies and find out a lot more," she said.

Sample sizes taken from the sites were very small and will be returned after analysis, in accordance with tradition.

"I am running some tests to characterise the pigments," Alexandria said. "We are looking at what they were actually made from. Once I have that information I'll be able to work out the age of the paintings."

The study differs from previous Indigenous site analyses as it accounts for how pigments change over time due to biological processes.

"Traditionally such analyses have been more about elemental analysis, whereas we are looking at more sophisticated techniques to understand the whole of the paint and pigment structure and looking at chemical changes over time," said Associate Professor Stuart.

To gain complex data from the samples Alexandria used the infrared beam at the Australian Synchrotron in Melbourne, which provides a powerful light source that enables small samples to be examined with precision. Associate Professor Stuart said that it is only because of such developments in technology that this type of study is possible.

"Our key strength is our quality analytical equipment and that is something that UTS specialises in. I think the field in general is advancing and we are playing a part in that," she said.

Associate Professor Stuart hopes the project will lead to future collaborations and ongoing work in the field.

"They only rediscovered these indigenous rock art sites about six or seven years ago, almost accidentally, and this is just the tip of the iceberg."

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