

STUDENT PROFILES

ANU COLLEGE OF MEDICINE, BIOLOGY & ENVIRONMENT
ANU COLLEGE OF PHYSICAL SCIENCES



Kelly James: Bachelor of Global and Ocean Sciences (Honours)

Australian National University student Kelly James headed to the island of Catalina, off Los Angeles, in 2008 to culture microscopic marine organisms with the potential to shed light on past climates. James is part of a team led by Stephen Eggins, of the Research School of Earth Sciences, studying small marine animals called foraminifera.

The team is investigating the uptake of trace elements, such as magnesium, strontium and barium into the calcium carbonate shells of the animals. The aim is to find out whether foraminifer can be used to gauge the nutrient content of the water in which they grow, and how this is reflected in their shell chemistry.

James and colleagues also want to know if the uptake of trace elements can be used to monitor seawater temperature. If it can, the fossil skeletons of foraminifera in marine sediments could be used to investigate past climates in work that will aid in the understanding of the role of oceans in controlling climate. This is critical to the understanding of the ocean's role in moderating global warming.

James is enrolled in the Bachelor of Global and Ocean Sciences (Honours) degree offered by the College of Science. The degree is a multidisciplinary program spanning all scientific disciplines from biology, through the earth sciences to physics. The program, which has a big research component, comes at a time of growing demand for scientists educated in the field in the greenhouse world. The 2008 Catalina trip was part of the "special topic" component of the course in which students can choose to study a subject of their interest in their third year of the degree. James says such travel opportunities for undergraduate students are "unthinkable" at other universities.



Wes Cox: PhD

Wes Cox is well on his way to realising his childhood dream of working at NASA.

Cox, a PhD candidate at the Australian National University, is conducting research on a plasma propulsion device that could provide the technological push for long-distance manned space missions, perhaps even to Mars.

The device, the helicon double layer thruster (HDLT), was invented by Christine Charles, of the Space Plasma, Power & Propulsion Group at ANU's Research School of Physical Sciences and Engineering.

It accelerates plasma - a gas of ionised, or charged, particles - across a potential difference, providing thrust. The plasma is created by heating the gas with radiowaves.

"While a chemical thruster generates strong thrust, it only sustains it for seconds or minutes," Cox says. "The HDLT potentially provides a much weaker thrust but can sustain it for months or years."

"Over the lifetime of a long mission, this constant small thrust allows the craft to reach greater speeds than chemical rockets, which provide an initial immense speed but have to cruise for the remainder of the mission."

"And since it's potentially more efficient than a chemical rocket, the HDLT can provide thrust at a higher efficiency and consume less fuel - a critical factor in space missions."

Cox is investigating the effect of magnetic fields on the thruster. "I use a variety of probes to study the behaviour of the plasma under various conditions in the hope of optimising it for space flight one day."

Cox, who grew up near Bathurst in rural NSW, did his BSc (Honours) at ANU. He was originally attracted to the university by its strength in astrophysics, but later wanted to switch to applied science.

He divides his time between programming, data analysis and lab work - between "nuts and bolts and thinking about the big picture".

And the future? "I'd like to go to NASA. It would be pretty sweet. It's a childhood dream."

For more information

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