



Embracing astrobiology

'Astrobiology' is a term popularised in 1998 by a decision of the US space agency NASA to establish the NASA Astrobiology Institute (NAI). The then Administrator of NASA, Daniel Goldin, declared that "biology will be the science of the 21st century".

The NAI was established to promote research aimed at gaining a fundamental understanding of the full potential of living systems. Its goal is to understand how life begins and evolves, whether life exists elsewhere in the universe, and what the future holds for life on Earth and beyond. While such broadly interdisciplinary research is not entirely new, the NAI was to give it new vigour and new resources. And it has.

Australia and New Zealand are well-placed to play a major role in this field. As will be apparent from the articles in this issue, the oldest convincing evidence of life on Earth is found in this region. There is major new evidence of a global extinction and recovery event caused by the impact of an asteroid in South Australia. We have access to a wide range of 'extreme' environments in which to seek novel organisms, and areas analogous to those in which we wish to seek evidence of life on other planets and moons.

What is lacking locally is a coordinated national or bi-national effort. We have no



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space agency to provide infrastructure and lobby and negotiate on our behalf, and no well funded network of scientists, engineers and industry. We should wonder why 45 other nations have space agencies – all the major nations of Europe, and the USA, Canada, and many others. Who has it wrong?

In 1968 Australia was the fourth nation to launch its own satellite from its own territory, and many pockets of excellence remain, but they are isolated and minor on a national scale. This is a multi-billion dollar industry and is a source of

inspiration to us all. I know from experience that it is an effective way to attract good students into science and engineering. Aren't these things we should be doing to build a 'clever country'?

To many of us, the only way forward seems to be to build astrobiology, space science and space exploration programs from the ground up. There has been no significant Commonwealth Government action for decades, and constant lobbying has achieved little. In my opinion, the way to go is to foster and coordinate the specialist expertise we have, rather than attempting something grandiose.

I may be proven wrong, but I do not foresee a long-term role for Australia in launching space vehicles. However, I do see Australian scientists designing and building satellites (as we did recently with FEDSAT), and providing components and expertise for the exploration programs of other nations. By this means we will stay in the game, provide educational and employment opportunities for our young people, build local industries, and generate opportunities for technology transfer.

But more than that, the exploration of our home in space is inspirational. We can tend our sheep and not look beyond the furthest hillock or we can look upwards and outwards with other nations to explore other worlds.

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The Australian Centre for Astrobiology Centre of Research Excellence

A component of the Biotechnology Research Institute at Macquarie University

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Researchers at the Australian Centre for Astrobiology (ACA) are experts in a wide range of disciplines, drawn together by powerful objectives: to understand the origin and early evolution of life, and to search for life beyond Earth. We are involved in projects with both NASA and the European Space Agency. In the medium term, the ACA will go to Mars (at least robotically).

Our goals are to:

- Create a new Australian-based, interdisciplinary, research program by enhancing collaboration, particularly between Earth Sciences, Biology and Astronomy;
- Strengthen institutional links within Australia and New Zealand and with NASA and other space agencies; and
- Create an internationally recognised Centre of Excellence for teaching and research in Astrobiology.

The ACA is taking advantage of the opportunities afforded by the unique early rock record found in Australia, and the particular geological, biological and astronomical expertise of Australian and New Zealand scientists to focus on planetary science and the microbial aspects of astrobiology. The group brings together scientists who study:

- evolutionary biology
- microbial palaeobiology
- sedimentary and ore deposit geology
- geochemistry
- planetary sciences and astronomy

The ACA was formally established on 11 July 2001 in a ceremony presided over by Macquarie University Vice-Chancellor Emeritus Professor Di Yerbury. The ceremony was attended by Dr Rosalind Grymes, Associate Director of the NASA Astrobiology Institute (NAI), to formalise an international partnership between the ACA and the NAI. The ACA is one of only two international Associate Members of the NAI. This gives our students and senior members privileged access to NASA programs and resources.

Astrobiology, "the study of life in the Universe; and the chemistry, physics, and adaptations that influence its origin, evolution and destiny", blossomed in 1996 with the launch of NASA's Astrobiology Institute. The establishment of an Australian astrobiology group was prompted by our history of research excellence. Australian geologists and biologists have a distinguished record in revealing the emergence of the major branches of life, and the developing interaction between life and its environment. Australian astronomers are similarly distinguished in their studies of the Universe. The ACA brings these strengths together for the first time. While based at Macquarie University, the Centre includes scientists from other universities and government organisations, across Australia and also in New Zealand, the USA and Spain.

We have a strong program of public outreach, believing this to be both a responsible thing to do and a way to ensure our long-term future.

Visit our web site to learn more about us, including research opportunities for students. <http://aca.mq.edu.au>

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