

Summary of Discovery Projects Applications for Funding to Commence in 2006

Queensland

James Cook University

DP0665890 Prof RH Crozier; Prof P Schmid-Hempel

Approved Project Title Evolutionary immunology of social insects.

2006 : \$255,000

2007 : \$190,000

2008 : \$190,000

2009 : \$190,000

2010 : \$190,000

Primary RFCD 2702 GENETICS

APF Prof RH Crozier

Administering Institution James Cook University

Project Summary

Social insects are particularly abundant in Australia. They live in a wide range of habitats with social systems differing greatly in size and structure. They are both ecologically and economically important because they form a large part of terrestrial ecosystems and control much of the energy flow. Their immune system resembles the immune system of humans. Finding how the social insect immune system evolves will have the potential to help us manage them better, and yield functional insights into the human innate immune system. Placing the observed patterns in context also involves study of the associated microbes, finds how social insects interact with this important part of the environment, and may assist in land management.

DP0662907 A/Prof GP Jones; Dr S Planes; Dr SR Thorrold; A/Prof GR Russ

Approved Project Title Larval Dispersal And The Design Of Marine Reserve Networks: Benefits Within And Beyond Boundaries

2006 : \$100,000

2007 : \$90,000

2008 : \$90,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Institution James Cook University

Project Summary

Most marine organisms produce tiny offspring that are dispersed unknown distances by oceanic currents. Our present strategies to manage marine resources lack this vital piece of information. This study will apply two revolutionary techniques that finally enable us to determine how far marine larvae travel. Using the team that developed these techniques, field studies will for the first time measure both retention of fish larvae within marine protected areas and dispersal of larvae to adjacent fished areas on coral reefs. This information can be directly applied to optimize the size of reserves and their spacing in marine protected area networks.

DP0662910 A/Prof GP Jones; Dr PL Munday; Prof SJ Holbrook; Dr RJ Schmitt

Approved Project Title Coral Reef Fishes And The Global Decline In Reef Health: Is Biodiversity At Risk Or Resilient?

2006 : \$92,000

2007 : \$90,000

2008 : \$90,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Institution James Cook University

Project Summary

Successful management and protection of marine species depends on understanding the processes that control the biodiversity of marine communities at both local and regional scales. This study will develop a general model to predict the response of reef fish communities to declining habitat structure and diversity across the tropical Pacific Ocean. Using expertise and ecological tools developed in Australia, and in collaboration with scientists working on the other side of the Pacific, this project will develop a broad-scale understanding of the threats to coral reefs and play a leading role in the development of marine-biodiversity management plans for Australia and neighbouring regions.

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DP0665598 A/Prof TD Pham; A/Prof DI Crane; Prof H Yan

Approved Project Title **An Automated Bioimaging System for High-Content Cell-Cycle Screening**

2006 : \$68,000

2007 : \$50,000

2008 : \$57,000

Primary RFCD 2802 ARTIFICIAL INTELLIGENCE AND SIGNAL AND IMAGE PROCESSING

Administering Institution James Cook University

Project Summary

- 1) Providing a better understanding of the biological complexities that will advance knowledge in life science research and facilitate the development of new anti-cancer drugs.
- 2) Supporting Australian academic institutions in a challenging field of innovative research through international, interdisciplinary collaborations, and publications in journals of high quality scientific research.
- 3) Providing research training in a research venture that requires expertise and collaboration in the disciplines of biology, engineering, computer science, and mathematics.
- 4) Bringing economic and social benefits for Australia by enhancing important industries and existing technologies in medicine, and biotechnology.

DP0664840 A/Prof BL Willis; Dr KR Anthony; Dr SR Connolly; Dr MJ van Oppen

Approved Project Title **The role of algal endosymbionts in acclimation and adaptation of reef corals to climate change**

2006 : \$140,000

2007 : \$108,000

2008 : \$108,000

Primary RFCD 2707 ECOLOGY AND EVOLUTION

Administering Institution James Cook University

Project Summary

Understanding the potential of symbiotic zooxanthellae to enhance the thermal tolerance of reef corals addresses our first national Research Priority Goal aimed at the sustainable use of Australia's biodiversity. Given current trends in global warming, such knowledge is critical to underpinning the long-term management of the Great Barrier Reef, which has significant political and socio-economic importance on local, state, national and global scales for services ranging from fisheries to ecotourism. Understanding the potential for corals to form associations with different genetic types of zooxanthellae will significantly advance current knowledge of the likelihood that animals can adapt to climate change.