

Summary of Linkage Projects Proposals for Funding to Commence in 2007

Western Australia

The University of Western Australia

LP0776586 Dr TD Colmer; Prof Dr TJ Flowers; Prof K Siddique; Dr V Valdez; Dr R Varshney; Dr PM Gaur

Approved Project Title **Physiological and molecular characterisation of salinity tolerance in chickpea**

2007 : \$ 28,450
2008 : \$ 83,524
2009 : \$ 116,546
2010 : \$ 137,338
2011 : \$ 75,865

Primary RFCD 3002 CROP AND PASTURE PRODUCTION

Collaborating/Partner Organisation(s)

COGGO
ICRISAT

Administering Organisation The University of Western Australia

Project Summary

Chickpea is a grain legume often grown in rotation with cereal crops to enhance profitability and environmental sustainability of broadacre cropping systems in Australia, and elsewhere. Chickpea is sensitive to salinity, and thus can not be grown on soils affected even by mild salinity. Limited grain legume options currently exist for these soils. This project will improve salt tolerance in chickpea and thus allow it to be grown in areas too saline for current cultivars. The research contributes to the National Research Priority of 'An Environmentally Sustainable Australia', as new cultivars of chickpea with improved salt tolerance will enhance the profitability and sustainability of rotational cropping systems in Australia.

LP0776571 Dr A Ghadouani; Prof GA Codd; Prof GN Ivey; Prof K Havens

Approved Project Title **Production, Fate and Transport of Cyanobacterial Toxins in Waterways**

2007 : \$ 65,178
2008 : \$ 125,178
2009 : \$ 135,000
2010 : \$ 75,000

Primary RFCD 2911 ENVIRONMENTAL ENGINEERING

Collaborating/Partner Organisation(s)

Water Corporation

Administering Organisation The University of Western Australia

Project Summary

Australian waterways are under severe pressure from both large variation in precipitation patterns and various sources of contamination. In particular, the management of algal blooms costs Australians hundreds of millions of dollars a year. Through the use of a unique approach this project will provide the necessary information for a science based decision making strategies to eradicate, as much as possible, algal blooms and to reduce the risk of severe injuries to the public, livestock and the environment, resulting from contamination waterways by algal toxins.

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LP0776626 Dr PF Grierson; Prof MA Adams; Ms S Madden; Mr S White; Dr S van Leeuwen; Mr B Smith; Mr LR Evans

Approved Project Title **Dynamics of woody vegetation and water in the central Pilbara - understanding and managing for environmental change**

2007 : \$ 97,500
2008 : \$ 210,000
2009 : \$ 200,000
2010 : \$ 210,000
2011 : \$ 122,500

Primary RFCD 3008 ENVIRONMENTAL SCIENCES

APA(I) Award(s): 3

Collaborating/Partner Organisation(s)

Pilbara Iron Company (Services) Pty Ltd

BHP Billiton Iron Ore Pty Ltd

Department of Environment and Conservation

Administering Organisation The University of Western Australia

Project Summary

The development and application of technologies and knowledge for enhancing sustainable management of semi-arid environments are of high priority and significant economic, social and environmental benefit. The value of iron ore exports from the Pilbara is expected to grow by nearly 30% in the next year, while the projected production of iron ore over the next 4 years is expected to be valued in excess of 60 billion dollars. However, continued and rapid expansion in the development of these resources is contingent on environmental oversight and adoption of an adaptive management approach. This research will thus make a major contribution to understanding the Pilbara ecosystems that provide tremendous economic wealth for all Australians.

LP0776252 Prof JT Lambers; A/Prof GE Hardy; Dr PM Finnegan; Dr SJ Barker; A/Prof B Dell; Dr PA O'Brien; Dr M Tibbett; Dr G Yan; Dr S Barrett; Dr IJ Colquhoun; Dr BL Shearer; Mr N Sibbel; Dr MA Smith; Mr Z Spadek

Approved Project Title **Susceptibility to *Phytophthora cinnamomi* and sensitivity to phosphorus in native Australian plants: why are they linked?**

2007 : \$ 79,000
2008 : \$ 154,000
2009 : \$ 161,000
2010 : \$ 183,500
2011 : \$ 97,500

Primary RFCD 2704 BOTANY

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Department of Environment and Conservation

Alcoa World Alumina Australia

Worsley Alumina Pty Ltd

Dardin Agri-Holdings (Australia) Pty. Ltd. - a subsidiary of The Aztech Group Companies

Tiwest Pty Ltd

BHP Billiton Ravensthorpe Nickel

Chemistry Centre WA

Western Power

Administering Organisation The University of Western Australia

Project Summary

Phytophthora cinnamomi is the cause of "Phytophthora dieback", recognised by the Federal Government as a major threat to Australia's biodiversity. This project will enhance our understanding of interactions between species belonging to two iconic Australian plant families (Proteaceae and Myrtaceae) and this serious threat. This understanding will underpin the development of new chemicals to be used in combating the pathogen. In addition, it will provide molecular markers for phosphorus insensitivity and *Phytophthora* resistance that will be vital for Australia's horticultural industry as well as for the successful rehabilitation of minesites in areas suffering from "Phytophthora dieback".

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LP0776928 Dr EF May; Prof DL Trimm; Prof MA Trebble; A/Prof RD Trengove

Approved Project Title **Increased liquified natural gas (LNG) production efficiency through nitrogen and carbon dioxide capture using high-pressure cryogenic adsorption onto tailored nanopore substrates**

2007 : \$ 55,000

2008 : \$ 100,000

2009 : \$ 76,500

2010 : \$ 31,500

Primary RFCD 2906 CHEMICAL ENGINEERING

APA(I) Award(s): 2

Collaborating/Partner Organisation(s)

Chevron Australia Pty Ltd

Administering Organisation The University of Western Australia

Project Summary

This research will contribute to a more environmentally sustainable Australia because it will promote the use of natural gas as a fuel supply which produces significantly less greenhouse gases than oil or coal. It will contribute to the harnessing of some of Australia's largest gas reserves, like the Gorgon field, which are contaminated with large amounts of CO₂ and are not yet economically viable. The removal of N₂ from natural gas will reduce the cost of producing LNG which is the only method Australia can use to access global gas markets. The new adsorbent materials developed for this work may enhance other research programmes attempting to capture and sequester CO₂ from industrial flue gases.

LP0776780 Prof TC McCuaig; Prof ME Barley; Dr J Miller; Dr M Fiorentini; Dr SW Beresford

Approved Project Title **Tectonostratigraphic controls on the localization of Archaean komatiite-hosted nickel-sulphide deposits and camps in the Yilgarn Craton**

2007 : \$ 100,000

2008 : \$ 200,000

2009 : \$ 230,000

2010 : \$ 130,000

Primary RFCD 2601 GEOLOGY

APDI Dr M Fiorentini

Collaborating/Partner Organisation(s)

St Barbara

BHP Billiton

LionOre Australia (Nickel) Ltd

Administering Organisation The University of Western Australia

Project Summary

Nickel contributes \$2 billion per year to Australia's export income. Currently 80% of that comes from nickel sulphide deposits in regional Australia that are expected to be exhausted within thirty years barring significant new discoveries. Although discovery rates have been declining, as the 'easy' targets have been found, there remains considerable potential for future major discoveries. This project addresses the pressing need for new data and improved exploration techniques to enable industry to target new discoveries. As our nickel mines are located in remote communities such discoveries also have major benefits for regional Australia.

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LP0776926 Prof G Morahan; A/Prof JD Roberts

Approved Project Title **Establishment of the Australian Cane Toad Genome Program**

2007 : \$ 68,500

2008 : \$ 137,000

2009 : \$ 68,500

Primary RFCD 2702 GENETICS

Collaborating/Partner Organisation(s)

Department of Environment and Conservation

ISA Technologies

PathWest Laboratory Medicine WA

Administering Organisation The University of Western Australia

Project Summary

The Cane Toad is one of Australia's greatest environmental menaces, and is in the top 100 of the "World's Worst invader species". Over a billion toads infest Northern Australia, and they will soon invade WA and move further into NSW. Their poisons and voracious appetite could make many native mammals, birds and reptiles extinct. The only possibility to eradicate the Toad is by biological control, but there is no known control agent. We will identify the 'Toad's Achilles' heel' against which control agents can be developed. We can do this by identifying every Toad gene. This project forms the first step to this goal by establishing the Australian Cane Toad Genome Program. Toad control will help preserve Australia's unique natural heritage.

LP0776593 Dr DV Murphy; Dr PA O'Brien; Dr PL Clode; Dr IR Phillips; Prof D Jones

Approved Project Title **Identifying limitations to the establishment of microbial communities and sustainable nutrient cycling in bauxite residue sand under rehabilitation.**

2007 : \$ 60,107

2008 : \$ 122,070

2009 : \$ 136,176

2010 : \$ 147,507

2011 : \$ 73,294

Primary RFCD 2703 MICROBIOLOGY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Alcoa World Alumina Australia

Administering Organisation The University of Western Australia

Project Summary

Australia is the world's largest producer of bauxite. The process of refining bauxite to aluminium generates 2 t of residue for every 3 t of bauxite, creating a major residue management issue. Rehabilitation of residue disposal areas is critical for reducing impacts on the environment and surrounding community and ultimately aims to create a sustainable ecosystem following closure of the facility. This research will provide a detailed understanding of the establishment of microbial communities and the factors controlling the survival and functioning of microorganisms in bauxite residue sand. The outcomes will aid the development of improved protocols and strategies for bauxite residue rehabilitation in Australia and internationally.

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LP0777039 Prof Dr J Pan; Dr KD Do; Dr PL O'Neill

Approved Project Title **The Acoustic, Control and Aerodynamic Aspects of the Entecho Hoverpod**

2007 : \$ 70,000

2008 : \$ 140,000

2009 : \$ 140,000

2010 : \$ 70,000

Primary RFCD 2905 MECHANICAL AND INDUSTRIAL ENGINEERING

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Entecho Pty. Ltd.

Administering Organisation The University of Western Australia

Project Summary

The development of small aerial vehicles, both manned and unmanned is a growing market in the aviation industry. This market sector has the potential to provide cheap, environmentally friendly transport solutions for the defence purposes, law enforcement agencies and emergency and recreational vehicles. This project serves to enhance Australia's position in this market by helping a local company develop its technology in a cost effective and timely manner. The progress made in the three research aspects will also advance areas of science and technology with practical applications other than aerial vehicles.

LP0776951 Prof SB Powles; Dr KW Dixon; Dr DJ Merritt

Approved Project Title **A novel method of broad-acre weed seedbank management using a naturally occurring germination stimulant**

2007 : \$ 43,872

2008 : \$ 91,135

2009 : \$ 97,551

2010 : \$ 50,288

Primary RFCD 2704 BOTANY

Collaborating/Partner Organisation(s)

Botanic Gardens and Parks Authority

Administering Organisation The University of Western Australia

Project Summary

The discovery of a novel butenolide that promotes seed germination has potential to provide significant economic benefits for Australia's agricultural sector, providing a vehicle to move towards minimum-weed agricultural systems achieved through broad-acre stimulation of the weed seedbank. Our aim is for butenolide to promote uniform release of weed seed dormancy, increased germination, and greater synchrony in early stage seedling growth and thus more effective knock-down following herbicide applications.

LP0776887 Dr DA Reynolds; Dr EH Jones; Mr D Thomas; Dr L Bell; Prof AB Fourie

Approved Project Title **Remediation of Underground Contaminant Source Areas using Nano-scale, Zero Valent Iron and Potassium Permanganate**

2007 : \$ 40,000

2008 : \$ 75,000

2009 : \$ 35,000

Primary RFCD 2605 HYDROLOGY

APA(I) Award(s): 1

Collaborating/Partner Organisation(s)

Golder Associates

Administering Organisation The University of Western Australia

Project Summary

Land in parts of Australia valued in the hundreds of millions of dollars is currently contaminated by organic compounds to levels unsuitable for human health and safety. At many of these contaminated sites, the contamination is present as pure, separate phase oil that is trapped due to geology or other physical reasons. This remaining oil is a long term source of contamination, and is exceptionally difficult to remediate. The proposed research will investigate a novel and highly effective approach to destroying this contamination in the ground, helping to restore the value and utility of the land.