Major Grants for funding commencing in 2015

Examples of Tasmanian Discovery Projects

Tasmanian (TAS) research organisations will receive more than $4 million through the Australian Research Council *Discovery Projects* scheme for 12 new research projects commencing in 2015.

Some examples of the TAS projects are provided below.

To view the summaries of all successful projects, visit the [ARC announcements page](#).

**University of Tasmania**

*Lead Chief Investigator:* Professor Michael Breadmore (DP150100998)

*Summary:* Understanding the organisation, structure and mechanisms of the human brain and nervous system remains one of the biggest challenges of science. This project aims to develop a new cell culture platform to form defined molecular networks of brain cells and to monitor changes throughout the network in response to a small localised injury within the network. This innovative platform will be used to help understand changes within cells in response to physical damage to networks of brain cells. This is one of the major causes of death and disability in developed nations, and is identified as a risk factor for a range of neurodegenerative diseases including Alzheimer’s, Parkinson’s and motor neuron disease.

*ARC funding:* $415 500

**University of Tasmania**

*Lead Chief Investigator:* Professor Ross Large (DP150102578)

*Summary:* Surprisingly little is known about trace element trends in past oceans, even though these data are vital for interpreting the evolution of the Earth's atmosphere, evolutionary pathways of marine life and cycles of major mineral deposits. Using laser-based analysis of sedimentary pyrite in deep marine rocks, this project aims to produce, for the first time, temporal variation curves for 25 trace elements in seawater over the last 3.5 billion years. Preliminary research has validated the technique and demonstrated major changes in certain trace elements over geologically short periods. Outcomes will assist the minerals industry in the discovery of new deposits of zinc, copper, gold and iron ore in Australia.

*ARC funding:* $481 100

**University of Tasmania**

*Lead Chief Investigator:* Professor Sergey Shabala (DP150101663)

*Summary:* In this project, the key transport systems mediating salt sequestration in halophytes are planned to be characterised and linked with cell genetic and metabolic profiles. Salinity is a major environmental hurdle affecting crop production around the world. Halophytes (naturally saltloving plants) use specialised structures, called salt bladders, to sequester excessive salt outside their metabolically active parts. This feature is not utilised by crops however, and no information is available about the molecular mechanisms by which salt is pumped into bladder cells. This knowledge will allow breeders to utilise this, previously unexplored, trait to improve crop performance under conditions of salinity.

*ARC funding:* $402 800
University of Tasmania

**Lead Chief Investigator:** Professor David Bowman (DP150101777)

**Summary:** This project aims to document historical changes in the spatial grain of the patch burning mosaic in an Arnhem Land savannah with an unbroken history of management by Aboriginal people, and in adjacent areas where traditional management has ceased. The mosaic's spatial grain will be inferred by mapping the individual ages of the long-lived conifer Callitris intratropica. Prior research has shown that Callitris individuals can be reliably aged, and population structures are very sensitive to fire regimes: saplings only establish if unburnt for 10 years. This research is expected to provide the first direct test of the hypothesis that Aboriginal people maintained fine-grained fire mosaics in savannas, and inform bushfire policy debates.

**ARC funding:** $276,363

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University of Tasmania

**Lead Chief Investigator:** Associate Professor Andrew Bowie (DP150100345)

**Summary:** The scarcity of iron limits biological productivity and carbon uptake in the nutrient rich waters of the Southern Ocean. This project will explore for the first time the role of undersea "hot spot" volcanoes in supplying iron to surface waters, thus linking the solid earth and the biosphere. The project will measure iron abundance, reactivity and nutritional value in buoyant plumes emanating from vents near Heard/McDonald Islands, Australia’s only active volcanoes. The project aims to estimate the hydrothermal contribution to regional biological productivity and extrapolate to the whole Southern Ocean. Successful outcomes will benefit Australia by identifying iron sources that govern productivity and carbon uptake of an economically important ecosystem.

**ARC funding:** $233,400

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University of Tasmania

**Lead Chief Investigator:** Dr Anya Reading (DP150101005)

**Summary:** This project aims to improve our understanding of the severe ocean storms that impact Australia. The novel approach will make use of multiple decades of the background ‘noise’, recorded continuously by earthquake seismic observatories, to locate and analyse ocean storms through time and identify changes in storm tracks. An interdisciplinary interpretation will follow which combines the large body of new results from seismology with data from oceanography and meteorology. Significant advancement in our knowledge of severe storms will benefit Australia by indicating whether such storms are becoming more severe or, alternatively, if storm patterns are shifting.

**ARC funding:** $368,200