Call for Expressions of Interest for PhD Research Supplementary Stipends in

Materials Engineering, Botany and Ecology, Architectural Science

Expressions of Interest are called for several PhD research scholarships in Materials Engineering, Botany and Ecology, and Green Architectural Technology for an interdisciplinary ARC Discovery Project **"Towards Novel Biomimetic Building Materials: Evaluating Aboriginal and Western Scientific Knowledge of Sprinifex Grasses".** We encourage applications from candidates whose interests bridge these discipline areas.

Biomimetic theory advocates drawing from nature to find new technical solutions. This project will apply and advance biomimetic theory and produce practical outcomes in the context of Aboriginal traditional knowledge and new materials. Spinifex grasses have been largely ignored as a sustainable resource, despite their widespread distribution throughout Australia, and unique biology that has evolved within harsh environments. This project examines material properties and sustainable applications for spinifex using innovative methodology. Aboriginal traditional knowledge is combined with Western science to evaluate spinifex properties in the context of traditional Aboriginal uses, ecology, sustainable harvesting, and novel biomimetic materials. Material properties of spinifex, specifically for new building industry applications, will be evaluated in its natural state and replicated as a synthesized biomimetic material.

The project contributes to an environmentally sustainable Australia by examining the potential value of spinifex grasses as a natural resource. Aboriginal knowledge and Western science will be combined to identify potential technological applications for a widespread but uniquely Australian resource. The project promotes the well-being and health of Aboriginal people through seeking out a new economic enterprise for remote area groups.

Successful candidates will enrol at the institution of the chief investigator/s in the relevant field of study during 2009. Principal advisors will be drawn from the project investigators, comprising Prof Paul Memmott (UQ); A/Prof Susanne Schmidt (UQ); Prof Richard Hyde (U of Syd); Dr Darren Martin (UQ) and Dr Rod Fensham (Qld Herbarium).

Research Strand 1 – Materials Engineering:

Deriving new materials from renewable, non-petrochemical feedstocks is currently an area of great interest to materials engineers. We believe that the harsh conditions under which these plants thrive will engender them with some unique physical properties worth investigation. This project will involve in-depth study of the structure and properties of both the leaf and resinous components of various Spinifex species. These properties will be benchmarked against other natural fibres such as hemp and flax, and other natural resins such as acacia gum and lignin.

Research Strand 2 - Botany & Ecology:

This project component examines sustainable harvesting of spinifex. Field experiments will establish the effects of fire and harvesting on growth and recruitment of selected spinifex species and carbon and nutrient budgets of Spinifex grasses, to scale from plant to landscape level.

Research Strand 3 – Green Architectural Technology:

The hypothetical potential of spinifex as a cladding material was generated from a review of Indigenous architectural practices. One logical starting point for investigation is therefore to examine the environmental

performance of spinifex as typically used in its traditional Aboriginal shelter application. This work will be carried out at the new UQ Arid Zone Research Station under construction near Camooweal. A 'cradle to cradle' approach will be used to evaluate the performance of the spinifex materials. In this research we will link traditional Aboriginal knowledge of shelter building technology with scientific testing of the methods. Local Aboriginal collaborators will reconstruct traditional shelters and performance will be tested including properties relating to water-shedding, insulation, and flammability.

Successful candidates will work on topics within or across the project research strands and undertake field investigations in the remote north-west Queensland and central-east Northern Territory study area. Candidates work as part of an interdisciplinary team which includes Aboriginal community members, university researchers and postgraduate students.

Applicants should have an Honours or Masters degree in engineering, biological science, architecture or a related field. The scholarship pays a tax-free, top-up stipend at APAI rates with further funding for project operation costs.

Further information is available from Project Director Prof Paul Memmott on (07) 3365 3660 or p.memmott@uq.edu.au. A description of the project is available at www.aboriginalenvironments.com.

Closing date for expressions of interest 1 August 2008 to p.memmott@uq.edu.au or by post to Prof Paul Memmott, Aboriginal Environments Research Centre, PO Box 6114, St Lucia Qld 4067.