

Climate change and plant community resilience: Granite outcrops as refugial habitats

We are seeking highly motivated PhD students wishing to develop skills to make a difference in biodiversity conservation in a world threatened by climate change. Students will work with a dynamic and highly collaborative international research team examining the impacts of climate change on plant communities, and can be enrolled at Curtin University or the University of WA in Perth, Western Australia.

This integrated study is focused on climate change impacts, evolutionary scale dynamics, and assessment of granite outcrops as potential refugial habitats for conservation in the Australian Global Biodiversity Hotspot in the face of anthropogenic climate change.

We seek to develop conservation strategies for outcrop and surrounding flora; examine the evidence for reservoirs of genetic diversity; determine the mechanisms enabling the persistence of species and ecological communities; and examine species and community resilience to change.

This study is led by A/Prof **Grant Wardell-Johnson** (Curtin University of Technology) and A/Prof **Kimberly Van Niel** (University of Western Australia) and encompasses a team of academics and researchers from Curtin University (Prof **Ladislav Mucina**, Dr **Tom Schut** and **Postdoctoral Fellow** to be appointed), the WA Dept. of Environment and Conservation (Dr **Colin Yates** and Dr **Margaret Byrne**), the Royal Botanic Gardens, Kew (Prof **Stephen Hopper**), Trent University (Prof **Steven Franklin**) and the GIS/Remote sensing company AAMHatch (Mr **Chris Earls**).

This project takes a transdisciplinary approach to environmental management research, focusing on the application of concepts, theories, and methods across disciplines to address the following questions:

Delineating climate refugia

What are the characteristics of habitats that make them suitable as refugia under climate change? What is the impact of macro and micro scale distributions? Can these characteristics assist in enhanced understanding in conservation biology and future conservation planning?

Phylogeographic patterning

Does the phylogeographic record indicate a history of expansion and contraction? Are they acting as genetic reserves? Does the surrounding landscape also mirror these patterns?

Plant community structure and function

What is the nature of assembly rules that govern the organisation of plant communities across ecological and evolutionary time scales? What is the outcome of beta-niche turnover? Is climate change resilience predictable from community traits and turnover rates?

Resilience to climate change

Do granite outcrops provide more resilience to species and communities than the surrounding landscape? What are the life history traits that provide resilience to disturbance, including climate change? What is the effect of plasticity in life history traits and its interaction with climate change?

PhD projects linked to these questions may be undertaken in any of the following: population genetics, phylogenetics, GIS and remote sensing, biogeography, conservation biology, evolutionary theory and community ecology.

Specific areas of interest, such as rarity, endemism, vulnerability, fragmentation, metapopulation theory, ecosystem dynamics, disturbance ecology, biological traits, 2.5/3D modelling of outcrops, fusion of LiDAR and optical sensor data, and spatial and temporal characterisation of the landscape can be incorporated into the PhD project.

Curtin University admission requirements are available on <http://futurestudents.curtin.edu.au/fs/postgraduates>.

UWA admission requirements are available on <http://www.studyat.uwa.edu.au/postgrad/doctorates>.

Curtin University scholarships	UWA scholarships
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Further information on the broader ARC project and on each of the student projects is available from **Grant Wardell-Johnson** (g.wardell-johnson@curtin.edu.au).