CONSERVING BIODIVERSITY

“Investigating the interactions between the outcomes of human activities and the ecological structure and function at plant and animal assemblages is key to answering ecological questions linked to biodiversity conservation in ecosystems already under stress from drought and habitat destruction”

A recent addition to C3, Dr Paul Gribben is a biogeographer and marine biologist whose research into invasive estuarine plant species is helping to explain how invasive marine seaweeds cause widespread habitat destruction. His broader research into Ecosystem Engineering Theory is part of an international collaborative effort that is trying to understand the complicated interactions that occur when biodiversity is threatened and thereby prevent further estuarine destruction. In C3, Paul will be exploring biogeographic questions in relation to continental patterns in the invasion of marine habitats by introduced species.

MANAGING RESOURCES

“Improving our ability to manage forest and water resources and also improve numerical weather forecasting ability for Australia by looking at the relationships between climate and vegetation and the exchange of carbon dioxide and water between vegetation and the atmosphere”

Dr Zheng Li joined C3 from New Zealand in 2009. His expertise lies in micro-meteorology, computing, modelling and measuring and modelling trace gas fluxes. He is currently developing in-house technology that will improve the quality of sensor data that can be retrieved from individual trees. Together with Terrestrial Ecohydrology Research Group (TERG) team member Dr Daniel Taylor he has developed innovative methods of overcoming the problems associated with applying surface layer scintillometry in remote locations.

HOW TO APPLY?
For information and a step by step guide to apply for a research degree at UTS:Science please go to www.science.uts.edu.au/for/future/research.html

SUPERVISION
To find a suitable supervisor in C3, go to http://datasearch2.uts.edu.au/c3/members/index.cfm
For further assistance you can contact the UTS:Science Research & Development Officer on:
Phone: + 61 2 9514 2490
Email: science.research@uts.edu.au

FEES
Local applicants: www.sau.uts.edu.au/fees/postgraduate/research.html
International applicants: www.uts.edu.au/international/prospective/studying/fees/

SCHOLARSHIPS
UTS:Science offers generous competitive research and coursework scholarships attracting the best students to work with teams of world-class researchers. Information about UTS:Science scholarships can be found at http://datasearch2.uts.edu.au/science/scholarships/index.cfm
For international student scholarships please go to http://datasearch.uts.edu.au/international/prospective/studying/scholar/index.cfm
C3 members study present and future environmental impacts in a range of ecosystems from central Australia to bacteria that drive ocean carbon flux, to variations in biodiversity. The multidisciplinary nature of C3 means that researchers are just as likely to be physicists and remote sensing specialists as plant ecologists and aquatic physiologists. C3 is thus well positioned to develop cutting edge solutions to address many of today’s environmental challenges involving water sustainability, ecosystem resilience, CO₂ and global warming, and understanding the climate system.

C3 has built the capacity to integrate laboratory experiments, field measurement, and modelling and analysis methods to bring about its objectives. The data generated and the modelling software developed, from this cohesive research team provide the information and tools, that natural resource managers need to help protect specific habitats and to have greater confidence in preserving the natural environment within the broader climate change debate.

**RESEARCH AREAS**

C3 brings together terrestrial and aquatic researchers in a cross-disciplinary research program to develop and couple biogeochemical, energy balance, and climate models to improve our understanding of biological impacts to climate change at the regional scale.

- **Aquatic Processes Group:**
  - coral bleaching and ocean acidification
  - vulnerability of Antarctic systems to climate warming
  - invasive plant species ecology
  - vulnerability of Antarctic systems to climate warming
  - coral bleaching and ocean acidification
  - understanding the impact of these changes on coral reefs
  - improving predictions about antarctica

- **Biodiversity Research Group:**
  - invasive plant species ecology
  - climate influences on biodiversity
  - observing land surface processes from space

- **Ecological Modelling and Remote Sensing Research Group:**
  - modelling carbon and water exchanges between plant-atmosphere
  - observing land surface processes from space

- **Terrestrial Ecosystem Research Group:**
  - measuring and modelling water and carbon fluxes at multiple scales
  - the ecohydrology and ecophysiology of groundwater dependent ecosystems

- **Technology**
  - C3 members work within UTS:Science state of the art facilities with a range of technologies including:
    - Eddy covariance technology
    - Pulse Amplitude Modulated Fluorometry (PAM)
    - Laser Scintillometry
    - High resolution, live imaging microscopy
    - Sap flow sensing
    - Spectroradiometry and satellite technology

- **People**
  - C3 researchers are supported by a highly experienced team that includes technical officers as well as communication specialists.
  - Research commercialisation is fostered via UTS:Linkage with commercialisation partner UniQuest.

- **Field Work**
  - Field work is an integral part of the research undertaken in the C3. Research sites cover the diversity of Australian aquatic and terrestrial habitats, including the Great Barrier Reef, Antarctica, Sydney Harbour and the Pacific Ocean, Sydney basin, and zone Central Australia, Northern Territory savannas, tropical rainforests, and forests in NSW, Queensland and WA.
  - Active engagement with the remote sensing satellite community is an integral component supporting C3 field work.

**IMPROVING PREDICTIONS ABOUT ANTARCTICA**

*Dr Isabel Jimenez-Denness is a physicist with a biological bent. Her undergraduate studies in Switzerland were complemented with a PhD at U3 where her skills and background in thermodynamics helped unlock the secrets of heat transfer and bleaching mechanisms in coral. She received the Chancellor's award for the most outstanding thesis of 2009.*

*Dr Jimenez-Denness is now applying and modifying optical sensing technologies to measure primary production in Antarctic algal sea-ice ecosystems.*

**COLLABORATE WITH US**

Collaboration is at the forefront of C3 research program including:

**Volunteering and internships**

An important additional aspect of C3’s charter is to support the next generation of researchers to give them the skills and tools to improve our understanding of climate change issues. Increasingly C3 is attracting students with backgrounds in physics, mathematical modelling and chemistry to compliment traditional biological and environmental science graduates. Competitive scholarships for domestic and international students looking to further their careers via Honours, Masters and PhD programs are available. The C3 scholarship program may include the provision of a laptop, additional funding for travel to conferences as well as the opportunity to conduct field work.

**Postgraduate Research Degrees**

UTS:Science is committed to spearheading innovation through higher research degrees programs that are strongly linked to industry, the scientific community and the wider general public. All research degrees have a 100% research component aimed at producing a thesis that contributes new knowledge to the field of science and its applications.