



MANAGING WATER RESOURCES

"Microbial communities have rarely been included in setting of water quality criteria however, it is their microbial processes that maintain the quality of groundwater in pristine aquifers as well as restore it in contaminated aquifers."

Dr Josie Lategan, a microbiologist, is determining the immense value of microbial assemblages in groundwater ecosystem services. Her work demonstrates how industrial pollutants entering aquifers change the structure and composition of microbial communities and therefore, affect the natural water purification activities of microbes.

Dr Lategan's research is developing a microbial multispecies toxicity assessment tool that can be applied to derive water quality guideline values for a range of groundwater pollutants. Her strong background in developing microbes for industrial and disease management applications is currently extending her research into the environmental field by developing groundwater microbes as bioindicators and as laboratory-cultivable toxicity test organisms, leading to a widely applicable tool for ecological risk assessment in aquifers.



BIRD ECOLOGY

"My research involves investigating the environmental factors that determine the distribution and abundance of wildlife and how this relates to environmental management practises."

Dr Andrew Smith's PhD research has focused on the ecology of the Australian White Ibis. This bird has recently invaded all Australian major cities, where its high numbers are causing many ecological, economic and social problems. So far management has proven difficult, since little is known about this bird. Andrew has provided the framework for managing this problem bird in our cities. His work has received considerable attention from the public as well as wildlife managers and has been extensively covered in the media.

SCIENCE RESEARCH THEMES

science.uts.edu.au

THINK.CHANGE.DO

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 the cens, go to <http://datasearch2.uts.edu.au/research/strengths/es/members.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>

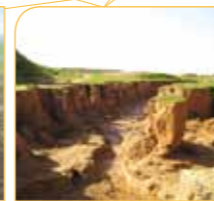
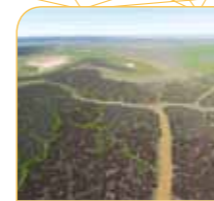
For international student scholarships please go to <http://datasearch.uts.edu.au/international/prospective/studying/scholar/index.cfm>

CONTACT

Associate Professor Richard Lim
Director
Centre for Environmental Sustainability (cens)
Faculty of Science
University of Technology, Sydney
PO Box 123 Broadway
NSW 2007 Australia
Tel: +61 2 9514 4037
Fax: +61 2 9514 4079
Email: Richard.Lim@uts.edu.au
www.research.uts.edu.au/strengths/es/overview.html

OTHER UTS:SCIENCE RESEARCH THEMES:

- > The ithree institute (i3)
www.ithreeinstitute.uts.edu.au
- > The Plant Functional Biology and Climate Change Cluster (C3)
www.c3.uts.edu.au
- > Institute for Nanoscale Technology (IINT)
www.nano.uts.edu.au
- > Centre for Forensic Science (CFS)
www.forensics.uts.edu.au



THE UTS **CENTRE FOR ENVIRONMENTAL SUSTAINABILITY (cens)** IS AN INTERDISCIPLINARY ENVIRONMENTAL RESEARCH GROUP CONTRIBUTING TO THE UTS SUSTAINABILITY CLUSTER THROUGH ITS RESEARCH, EDUCATION, TRAINING ACTIVITIES AND ITS EXTERNAL ENGAGEMENT WITH INDUSTRY.

The impacts of natural environmental disasters and human activities combine to impair ecosystem function and make them more susceptible to stress. Understanding the mechanisms underlying these impacts and stressor-response relationships requires a multi-disciplinary approach in order to provide advice on sustainable environmental management. The central aim of the Centre is to conduct research to provide multi-scale, cross-disciplinary information and decision-making support for sustainable natural resource management in Australia, at regional, catchment and local levels, in wilderness, rural or urban settings.



RESEARCH AREAS

The cens has a broad mix of interdisciplinary researchers that address environmental problems by adopting a unique multiple scale approach. There are experts working on projects ranging from molecular biology to landscape level ecological, geomorphic and hydrological investigations, on subjects as diverse as DNA analysis of bird populations, pollutant effects on invertebrates and fish in waterways, modelling of early warning systems for disaster management, indoor pollution effects on people, and environmental water allocations to semi-arid wetlands. This unique approach gives the Centre the singular ability to solve complex environmental issues facing Australia today and into the future.

COLLABORATE WITH US

The work of the Centre is highly regarded within the scientific community, government agencies and community organisations leading to several long standing partnerships with industry like the Centre for Ecotoxicology. The Centre is dedicated to working with government, the private sector and the community at large to provide scientific and management advice necessary to solve Australia's environmental problems.

CASE STUDY 1

Providing water for the environment



Semi-arid environments comprise some 80% of the Australian landscape. In these dry environments, floodplain-wetlands represent important sites for biological

productivity and diversity. Many Australian waterbirds rely exclusively on these wetland habitats for their breeding success. Ever increasing water demands by the agricultural and urban sectors mean these environments are under continual and increasing stress. Members of the cens are working to build an understanding of how water, the physical and the biological environment interact in these habitats to provide critical habitat for Australia's common, rare and endangered flora and fauna. The data is actively being used by local, state and federal government agencies to make critical land and water resource management decisions to help protect these environments for future generations.

CASE STUDY 2

Toxicants in the aquatic environment



Millions of litres of sewage effluent produced by Australians every day represent a valuable source of water in a dry country. That is, if we can clean it up to a suitable standard.

However, there is much debate about whether effluent can ever be treated to a sufficient level for reuse. To help resolve this issue, members of the cens have been looking at the effectiveness of sewage treatment technologies in removing endocrine disrupting compounds (EDCs) or the common pollutants in our urban river systems that can have significant health effects on riverine biota. The Centre's studies show that the large tertiary treatment plants around Sydney can reduce EDCs to levels below those in Sydney's rivers (where effluent is not discharged), and advanced tertiary treatment plants can remove them to below detection levels. Further research by the cens will expand this work to include other known pollutants leading to strong evidence to debate on the capacities to reuse treated sewage water.

CASE STUDY 3

Sustainable built environments



Over 80% of Australians live in urban areas and most spend up to 90% of their time indoors. Indoor environmental quality (IEQ) is critical to health and the sustainability of

future urban settlements. The cens research has shown that indoor plants significantly reduce levels of two classes of pollutants found in higher levels indoors than outside - volatile organic compounds (VOCs) which are emitted from plastic/synthetic furnishings, solvents, computers etc); and CO2 (from occupants' breathing). Research has shown that the presence of just one office plant, over a 3-month period, can reduce negative feelings of anger, anxiety, depression, fatigue, confusion and stress from 30-65%, (while negative scores in the no-plant reference group increased by about 30% over the same period). Investigations are now in progress to test how plants can be used in eco-retrofitting of city buildings, for health, and wellbeing.

Areas of expertise include:

- > Ecotoxicology
- > Stream ecology
- > Estuarine and coastal marine ecology
- > Terrestrial ecology
- > Plant and animal ecophysiology
- > Indoor air pollution
- > Microbial ecology
- > Molecular biology
- > Geomorphology, Hydrology
- > Geographic Information Systems (GIS) & remote sensing
- > Environmental chemistry
- > Mathematical modelling

The cens has established partnerships with:

- > National Water Commission
- > Murray-Darling Basin Authority
- > CSIRO Land and Water
- > NSW Department of Environment Climate Change and Water (DECCW)
- > NSW Department of Primary Industries (& Mineral Resources)
- > Sydney Water Corp; Sydney Olympic Park Authority (SOPA)
- > Western CMA; NRM South (TAS)
- > DHI Australia
- > Department of Primary Industries and Water (TAS)

Volunteering and Internships

The Centre has a wide range of volunteer and research internship positions available every year. Students interested in volunteering or taking on a research internship should visit the cens website at <http://datasearch2.uts.edu.au/research/strengths/es/members.cfm> to find a member who is doing research that interests them.

Recent research interns have worked on projects related to the impact of dams on stream communities, physiology of semi-arid plants, hydrodynamic modelling of wetlands, remote sensing of vegetation responses to wetting and vegetation health associations with soil nutrient availability and flood frequency. Positions are also available in stream ecology, ecotoxicology, bird ecology, indoor air quality, estuarine ecosystem structure and function and molecular biology.

Training Courses

The cens provides training across a range of platforms designed to meet the needs of industry professionals and the general public. These activities range from public lectures on critical environmental issues to our Contaminated Site Assessment, Remediation and Management (CSARM) short courses.

Through collaboration with the staff from contaminated sites section of the NSW Department of Environment, Climate Change and Water (DECCW), cens academics developed a six module short course series in Contaminated Site Assessment, Remediation and Management (CSARM). The modules cover areas such as risk assessment approaches, policy and regulation up-dates and current environmental technologies. The course targets professionals aspiring to become site auditors. For more information please go to the website <http://www.science.uts.edu.au/courses/csarm.html>

Student Research Opportunities

Domestic and international research students interested in the Honours, Masters and PhD programs should contact the cens or the UTS:Science Research & Development Office for information regarding research degree opportunities. Information about current research projects and scholarships (both internally and externally funded) are available on the cens website <http://www.research.uts.edu.au/strengths/es/index.html>

UTS:Science provides students with state of the art research facilities, and field and laboratory equipment offering student generous research support including a new laptop for every higher degree student and \$2,000 per year in research funding to be spent on your project. The cens also offers a writers club to help you learn how to publish in international journals. Prospective students or post-doctoral fellows should contact the Director of the cens or the UTS Science Research & Development Office regarding research in our specialty areas.

Postgraduate Research Degrees

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