

4.3 ACADEMIC UNITS:

4.3.1 School of Biological Sciences

Academic Staff

Head	Room	Telephone
Associate Professor Mark Dowton email: mark_dowton@uow.edu.au	35.G19C	4221 3013

Professors

Professor D.J. Ayre	35.G03	4221 3440
Professor A. Hulbert	35.G10A	4221 3437
Professor Bill Buttemer	35.G19	4221 4459
Professor M. Olsson	15.G14	4221 3957
Professor M. Walker	35.104	4221 3439
Professor M. Wilson	35.120A	4221 4534

Associate Professors

Associate Professor A.R. Davis	35.G01D	4221 3432
Associate Professor K.O. French	35.G15B	4221 3655
Associate Professor M. Ranson	35.103	4221 3291
Associate Professor S. Robinson	42.G03	4221 5753
Associate Professor R. West	35.G11	4221 4648

Senior Lecturers

Dr T. Minchinton	35.G09	4221 5188
Dr J. Wallman	15.G11	4221 4911
Dr R. Sluyter	35.107B	4221 3013
Dr R. Zhang	35.124B	4221 3427

Senior Fellow

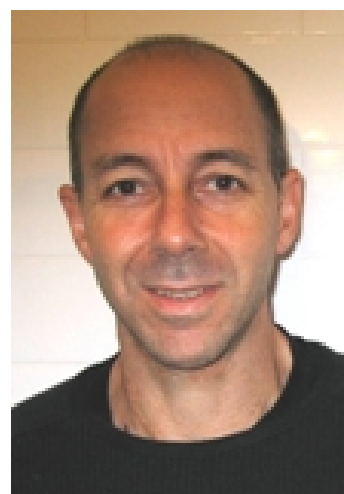
Dr A. Aquilina	35.122A	4221 3340
----------------	---------	-----------

Lecturers

Dr T. Kuit	41.177	4221 4916
Dr J. McArthur	35.122B	4221 5650

Course / Major Coordinators

BSc (Biological Sciences)	Dr Andrew Aquilina
Bachelor of Biotechnology, BSc (Biotechnology)	Professor Mark Wilson
BSc (Ecology)	Professor David Ayre



Assoc. Professor Mark Dowton

Degree Courses

The School offers Biological Sciences courses within the following degrees:

- (i) a three-year **Bachelor of Science (BSc)** with a major in **Biological Sciences**. This may be followed with a fourth Honours year - BSc (Hons) (see Sections 7.1 & 7.5).
- (ii) a three-year **Bachelor of Science** with one of the following prescribed majors:
 - **Biotechnology** (jointly with the School of Chemistry)
 - **Ecology** (jointly with other Science Schools and Mathematics and Applied Statistics)
 - **Environment** (jointly with the other Science Schools)

The details of these majors are given in Section 7.2.

- (iii) **BSc Advanced (Honours) Program** (see Section 7.4)
- (iv) a four-year **Bachelor of Biotechnology** (see Section 7.3) which is awarded either with or without Honours at the conclusion of the fourth year.
- (v) a three-year **Bachelor of Marine Science** (see Section 7.3). This may be followed by a fourth Honours year.

The School of Biological Sciences also contributes to:

- (vi) a four-year **Bachelor of Environmental Science** (see Section 7.3)
- (vii) a four-year **Bachelor of Medicinal Chemistry** (see Section 7.3)

All degrees can be taken on a part-time basis, but students must be able to organise their time to meet the scheduled class times.

Current Research Interests

This is useful information for students wishing to identify staff expertise in particular academic areas.

Dr Andrew Aquilina

Protein structure and function relationships. Many changes occur in a protein's sequence after the translation of genetic information by the ribosome. Research is aimed at understanding the ways in which both naturally occurring and introduced sequence modifications alter the structure and function of large multisubunit proteins, in particular mammalian heat shock proteins.

Professor David Ayre

Marine Ecology and Genetics: Evolutionary consequences of varying patterns of reproduction and dispersal, self-recognition and aggressive interactions in marine invertebrates. Conservation of marine eco-systems. Mating systems and population genetics of native plants.

Professor Bill Buttemer

Vertebrate Physiological Ecology: Effects of size, season, and phylogeny on avian energetics. Interaction between energy demand and season on immune function in birds. Behavioural thermoregulation in ectotherms. Thermoenergetics of endothermic animals. Effect of diet on aerobic endurance.

Avian Field Endocrinology: Patterns of glucocorticoid and reproductive hormone release in free-living birds in relation to season, phylogeny, and habitat. Interaction between glucocorticoid secretion and reproductive behaviour in birds.

Associate Professor Andy Davis

Chemical Ecology: The relative importance of natural products as mediators of interactions between organisms, particularly compounds that play a role in preventing fouling of marine invertebrates. Larval Ecology: Pelagic and Early benthic stages as determinants of subsequent patterns of invertebrate distribution and abundance.

Ecological impacts of introduced marine pests: specifically examining impacts on encrusting communities on rocky reefs.

Associate Professor Mark Dowton

Molecular evolution, particularly of the mitochondrial genome. Research is aimed at understanding the ways in which DNA mutates and evolves, and the biological patterns that these mutations reveal. Molecular studies are focused on understanding how genes move in the mitochondrial genome, and why the rate of mutation has accelerated in certain animal groups.

Associate Professor Kristine French

Terrestrial Ecology and Rainforest Ecology: Plant/animal interactions, seed ecology and seed dispersal. Spatial patterns of biodiversity in Australian habitats. Community and population studies in avian ecology. Rainforest Ecology. Weeds and their interaction with native fauna.

Professor Tony Hulbert

Animal Physiology: Evolution of endothermy in vertebrates. Cellular basis of resting metabolism. Thermo-regulation and environmental physiology. Thyroid function and thyroid hormone action in vertebrates. Dietary fats and their effects on body function.

Dr Jason McArthur

Bacterial pathogenesis and disease: Current research is investigating the pathogenesis of post-infectious kidney disease. Studies are aimed at developing animal models for kidney disease, investigating bacterial protein interactions within kidney glomeruli and investigating immune cell recruitment and kidney inflammation during disease progression.

Dr Todd Minchinton

Population and community ecology of plants and animals living in coastal and estuarine habitats, including rocky reefs, mangrove forests, and salt marshes. Assessing the influence of humans on the structure, function, and biodiversity of natural ecosystems. Consequences of dispersal and recruitment to the structure of species assemblages.

Professor Mats Olsson

How fast can evolution proceed in the wild (are new species evolving while we are watching)? Do females use immunological cues for selecting partners that increase the disease resistance and viability of their offspring? Why do animals age when the currency of evolution is reproducing offspring, which are only produced before reproductive senescence?

Associate Professor Marie Ranson

Cellular and Molecular Biology: The role of cell-surface plasminogen activation in cancer metastasis. Links between tumour progression (aberrations in cell-cycle events and cell migration) and cell-surface plasminogen activation. Targeted alpha therapy using components of the plasminogen activation system for the control of micrometastatic cancer. Histopathology of cancer (breast and other cancers of epithelial origin). Structure-function analyses of the interaction between plasminogen and cell-surface receptors. Utilisation of the human plasminogen activation system by pathogenic micro-organisms: contribution to virulence and disease.

Associate Professor Sharon Robinson

Photosynthesis: Mechanisms for optimising light interception, understanding the biochemistry and physiology of photoprotection, photoinhibition and photoacclimation. Photosynthetic development in rainforest plants. Interactions between photosynthesis, respiration and nitrogen metabolism in plants. Effects of plant virus infection on photosynthesis and plant nitrogen metabolism. Impact of changes in UV and visible radiation on Antarctic plants. Phytoremediation.

Dr Ron Sluyter

Cell and Molecular Biology: The role of the P2X7 receptor and purinergic signalling in health and disease. Specifically the role of P2X7 in inflammation and immunity, the skin immune system, red cell biology and tumor biology.

Professor Mark Walker

Genetics and Molecular Biology: Development of acellular and live oral recombinant vaccines against the causative agent of rheumatic fever, *Streptococcus pyogenes*. Molecular and genetic analysis of human and veterinary pathogens. Development of recombinant oral and intranasal vaccine delivery systems for the stimulation of immunity against the veterinary pathogen *Mycoplasma hyopneumoniae*.

Dr James Wallman

Systematics and biology of insects: Evolutionary relationships and biogeography of Australian flies, especially blowflies (Calliphoridae). Biology of aging in blowflies. Ecology and conservation of endangered Australian insects.

Forensic entomology: Morphological and molecular methods for identification of flies of forensic importance. Heat generation by maggots and its forensic implications. Effects of temperature on blowfly development and adult blowfly behaviour. Ecology of carrion in south-eastern Australia.

Associate Professor Ron West

Coastal and estuarine ecology; biology of estuarine communities; environmental impacts in estuarine environments; fish biology; fisheries; fisheries policy; aquaculture; coastal zone management; and, integrated catchment studies.

Professor Mark Wilson

Molecular Cell Biology: Discovering previously unknown mechanisms that operate in the human body to defend it against diseases and pathologies that arise from the inappropriate deposition of "damaged" (partly unfolded) proteins. The current focus is on how clusterin (and other recently identified novel extracellular chaperones) inhibits protein aggregation and targets them for disposal via receptor-mediated endocytosis and lysosomal degradation. Techniques commonly used in these studies include cell culture, confocal microscopy, flow cytometry, together with spectrophotometry and many other protein analytical methods. Planned future studies will make use of small animal models.

Dr Ren Zhang

Plant Molecular Biology: Regulation of plant development. Plant-microbe interactions. Genetic manipulation of plants and fungi for food and medicinal uses. Phytoremediation (use of plants for cleaning up the environment).