

4.3.2 School of Chemistry

Academic Staff

Head	Room	Telephone
Associate Professor Stephen Wilson email: stephen_wilson@uow.edu.au	18.102A	4221 3505

Professors

Professor J. Bremner	18.123	4221 4255
Professor N. Dixon	18.G10	4221 4346
Professor D. Griffith	18.217	4221 3515
Professor L. Kane-Maguire	iCampus	4221 3559
Professor D. Officer	18.221	4221 4698
Professor S.G. Pyne	18.121	4221 3511

Professorial Fellow

Professor G.G. Wallace	iCampus	4221 3319
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Associate Professors

Associate Professor J. Beck	18.104	4221 4177
Associate Professor P. Keller	18.222	4221 4692
Associate Professor S. Ralph	18.226	4221 4286

Senior Lecturers

Dr S. Blanksby	18.223	4221 5484
Dr C. Dillon	18.129	4221 4930
Dr D. Jolley	18.125	4221 3516
Dr G.M. Mockler	18.218	4221 3514
Dr D. Skropeta	18.213	4221 4376

Lecturers

Dr M. Cameron	18.128	4221 3365
Dr M. Kelso	18.115	4221 5085



Assoc. Prof. Stephen Wilson



Dr Glennys O'Brien

Dr M. in het Panhuis

Dr G. O'Brien
(Director of First Year Studies)**Course / Major Coordinators**

BSc (Chemistry) Assoc. Prof. Stephen Wilson

Bachelor of Medicinal Chemistry, BSc
(Medicinal Chemistry) Assoc. Prof. Paul Keller
(Autumn)
Dr Carolyn Dillon (Spring)Bachelor of Nanotechnology, BSc
(Nanotechnology) Dr Marc in het Panhuis and
Prof. Geoff Spinks
(Engineering)

Honours Program Assoc. Prof. Stephen Wilson

Degree Courses

The School offers Chemistry courses within the following degrees:

- (i) three-year **Bachelor of Science** (BSc) with a major in **Chemistry**. This may be followed by a fourth Honours year – BSc (Hons) (see Sections 7.1 and 7.5).
- (ii) a three-year **Bachelor of Science** in one of the following prescribed majors:
- **Biotechnology** (jointly with the School of Biological Sciences)
 - **Medicinal Chemistry**
 - **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 Medicinal Chemistry** (see Section 7.3)
- (v) a four-year **Bachelor of Nanotechnology** (see Section 7.3)

The School of Chemistry also contributes to:

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

Associate Professor Jenny Beck

Interactions between proteins, DNA and drugs. A variety of techniques, particularly mass spectrometry, are being used to investigate a range of biochemical interactions including, for example, between DNA and proteins involved in replication, in proteins involved in cellular differentiation, between ethanol and human proteins to study the effects of alcoholism, in anti-inflammatory drugs to probe the causes of side effects that occur with long-term treatment regimes.

Dr Stephen Blanksby

The reactions of ions and molecules are investigated in the gas phase using sophisticated mass spectrometric techniques and quantum chemical calculations carried out with the aid of supercomputers.

Professor John Bremner

Medicinal chemistry involving the design, synthesis and properties of new compounds with specific biological activity. Synthesis and properties of new heterocyclic molecules. Natural products and medicinal plants.

Dr Carolyn Dillon

Medicinal Inorganic Chemistry and Synchrotron Radiation Techniques: Investigations of the mechanisms of arsenic toxicity for the development of arsenic anti-cancer agents; for example, the potent anti-leukemia agent, arsenic trioxide. The biomolecular and intracellular reactions of arsenic compounds are being studied using conventional laboratory techniques including mass spectrometry through to synchrotron radiation methods such as arsenic mapping and X-ray absorption spectroscopy to determine the targets and chemical structures of arsenic in cells.

Professor Nicholas Dixon

Biological Chemistry, focussing on the relationship between protein structures and functions: interactions among the 30 proteins in the bacterial DNA replication machinery are studied as model systems to understand function of large dynamic macromolecular machines. Techniques include molecular genetics and protein chemistry. Functional studies using surface plasmon resonance biosensor technology and single-molecule methods are coupled with structural studies by NMR, X-ray crystallography and mass spectrometry in collaborating laboratories.

Professor David Griffith

Atmospheric trace gas analysis using Fourier transform infrared spectroscopy. Atmospheric reaction mechanisms, especially of gases involved in the Greenhouse Effect.

Dr Marc in het Panhuis

Materials Science: Assembly of polymers, surface active and carbon host materials into materials displaying multi-functional and intelligent properties. Continuous search for novel molecules or materials which when combined into a composite materials demonstrate enhancement in properties not possible for each constituent on its own. Spectroscopic, microscopic and electrical characterisation of materials. Biocompatible materials. Ink-jet deposition of materials.

Dr Dianne Jolley

Analytical method development, ecotoxicology, and water and sediment chemistry.

Professor Leon Kane-Maguire

Novel chiral conducting polymers and their use in electrochemical asymmetric synthesis of drugs and the separation of enantiomeric compounds. The use of organometallic complexes for the synthesis of radiopharmaceuticals.

Associate Professor Paul Keller

Bio-Organic Chemistry and Asymmetric Synthesis: The development of novel chiral ligand for the synthesis of sterically hindered systems. New synthetic methodologies in fullerene chemistry. Medicinal Chemistry: The design and synthesis of new anti-viral agents, using synthesis and computer-aided molecular modelling technologies. The design of novel small ligands aiming at the prevention of pre-term labour.

Dr Michael Kelso

Organic and Medicinal Chemistry: Design and synthesis of dual-action anti-tumour prodrugs activated by hypoxia, improving the effectiveness of Paclitaxel chemotherapy, new drugs for preventing breast cancer metastasis, anti-microbial agents against drug resistant organisms, synthesis and DNA binding properties of anthracycline antibiotics, *P. aeruginosa* biofilm dispersing prodrugs for treating lung infections of Cystic Fibrosis patients

Dr Garry Mockler

Co-ordination chemistry. The study of the structures and properties of model compounds of copper proteins.

Dr Glennys O'Brien

Environmental chemistry - water and sediment chemistry; trace metals in sediments; and water and sediment quality.

Professor David Officer

Development of functional material and nanomaterial systems including the development and application of functionalised conducting polymers and carbon nanotubes and the synthesis and use of porphyrins (artificial chlorophyll) in solar cells.

Professor Will Price

Physical properties and structure of liquids and solutions, especially experimental transport and pVT studies. Separation systems based on conducting polymers. Aspects of food chemistry particularly related to extraction/processing.

Professor Stephen Pyne

The development of new methods of organic synthesis and asymmetric synthesis. The asymmetric synthesis of bioactive and pharmacologically active molecules, novel amino acids and peptides. Drug design and development. Natural products chemistry.

Associate Professor Stephen Ralph

Nanofiltration using carbon nanotube and conducting polymer membranes. Interactions of metal drugs with proteins and nucleic acids.

Dr Danielle Skropeta

Marine Natural Products Chemistry: The discovery and development of new classes of drugs from Australian marine fauna. This involves bioassay-guided fractionation of marine fauna extracts, purification using various chromatographic methods and structural identification of the bioactive agent using nuclear magnetic resonance spectroscopy and mass spectrometry. Our current targets are deep-sea marine fauna, marine carbohydrates and novel anticancer agents.

Professor Gordon Wallace

Intelligent polymer research. Synthesis and processing of Intelligent polymers and fabrication of devices containing them. The use of these materials and devices as chemical or bio sensors, membrane separation systems, artificial muscles and advanced coatings (corrosion protection, photovoltaics) is being pursued.

Associate Professor Stephen Wilson

Atmospheric chemistry. The measurement of UV-B irradiance, and the determination of photolytic production rates. Studies of the sources of man-made compounds in the atmosphere.