



Bachelor of Applied Science (Honours)

Information for applicants - 2012

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Faculty of Applied Science

September 2011

Summary of the Course

Name of degree

Bachelor of Applied Science (Honours) (Course # 223ZA)

Course duration

Full-time is 9.5 months from your start date; part-time is 19 months. A first or second semester start is available.

Aims

The Honours degree provides intensive training in research for students seeking to pursue an academic or research career in a field of applied science related to the focus of their first degree. It is a research-based degree and assessment is principally by thesis examination. The course is offered for study in fields of applied science.

The aims of the course are to (1) learn to conceive, plan and carry to completion a discrete piece of original research, in close association with a professional scientist in the field, (2) critically review special topics of relevance to applied science in greater depth than would be possible at final year undergraduate level, and (3) gain exposure to an active research environment, to interact with research staff and to participate in discussion on current issues in science.

Structure

The content of the course is defined by an Honours Contract formalised in the first month after enrolment in conjunction with your supervisor. As well as the completion of a research project and thesis, students are mentored in research activities such as journal clubs, literature review, essay and research proposal writing and seminar and conference presentations. The thesis comprises 75-80% of the assessment and is examined by two independent scientists.

Admission requirements

Applicants must meet normal University requirements for admission to an undergraduate course; have completed a Bachelor's degree in science or applied science from a recognized tertiary institution within the last two years and achieved a minimum grade point average of Credit (5) in their course during the last two years, or possess qualifications deemed equivalent.

Places are limited. Normally not all candidates who are admissible are able to be offered a place in the honours course and selection is based on merit and supervisor availability. Applicants are encouraged to approach University academic staff early to discuss projects and supervision.

Supervision

Honours students are required to undertake their research in association with one of the areas of research strength of the University. Initial enquiries concerning potential projects and supervisors can be directed to the Honours Course Conveners below or staff listed at the end of this document.

Environmental Sciences:

Dr Bernd Gruber, Rm. 3C30, Tel. 6201 2297, Bernd.Gruber@canberra.edu.au

Biomedical Sciences:

Dr Reena Ghildyal, Rm. 3D51, Tel. 6201 5755, Reena.Ghildyal@canberra.edu.au

Forensic Studies:

Prof Chris Lennard, Rm. 7D7, Tel. 6201 2160, Chris.Lennard@canberra.edu.au

Professional recognition?

The Honours degree is the main entry path into postgraduate study leading to a research career in science. Gaining a result of First Class Honours will make you strongly competitive for Australian Postgraduate Awards and for industry-sponsored scholarships. These scholarships support you while undertaking postgraduate study by research at the Masters and Doctoral levels. These higher degrees can be pursued at the University of Canberra or other universities and research institutes around the world. In addition to research laboratories, honours degrees are also valued by employers in government and industry.

Are there scholarships available?

The University offers Honours Scholarships based on academic merit (GPA and prizes are important criteria). There are separate closing dates, further information and application forms for these scholarships. They are offered only once a year for new full-time students starting in the following year in either semester 1 or semester 2.

Watch <http://www.canberra.edu.au/scholarships/honours> for the latest information!

Scholarships may also be available through research centres, usually associated with particular staff and projects. Make enquiries there.

How do I apply?

Students apply direct to the University Student Centre. Students' application forms applying for honours (with accompanying honours supplementary form) need to be submitted no later than 4 February 2012. Students may require a month or more to prepare supporting documents (eg referees report and tentative project proposal) after appropriate discussion with their chosen supervisors.

Application forms are available from the UC Student Centre and on the web at <http://www.canberra.edu.au/research-students>

Make sure you complete both the **Direct and the Honours Application Forms** available there.

Course enquiries

For advice and further information please contact:-

Environmental Sciences:

Dr Bernd Gruber, Rm. 3C30, Tel. 6201 2297, Bernd.Gruber@canberra.edu.au

Biomedical Sciences:

Dr Reena Ghildyal, Rm. 3D51, Tel. 6201 5755, Reena.Ghildyal@canberra.edu.au

Forensic Studies:

Prof Chris Lennard, Rm. 7D7, Tel. 6201 2160, Chris.Lennard@canberra.edu.au

The Honours Curriculum

The curriculum details are specified in a contract drawn up in consultation with your supervisor in the first weeks of your course. It is based around the following agreed components.

Literature Review (required)

The literature review is normally on the topic chosen as the research topic. The review should be critical, and particular attention should be paid to current issues and conflicts of theory, practice and opinion. It need not be exhaustive, and factual information not required to appreciate the current state of research related to the research topic should be omitted. The review should be completed early in the course before the direction of the research is irreversibly set. It is optionally assessable, depending on whether or not it will subsequently form a major part of the thesis.

Set Reading (optional)

The candidate will be required to critically read specified items, which are selected to broaden perspectives and may not be directly related to the thesis topic. The candidate should be prepared to present and discuss one or more of these at a journal club session.

Research Proposal (required)

The research proposal is to be completed not later than two months after commencement of honours. It would normally be developed following the literature review. It is optionally assessable for marks depending on the input of the supervisor.

Essay or equivalent substantial written work (optional)

The essay is to be on a topic agreed between candidate and supervisor(s) but which is not directly related to the thesis topic. The essay may be assessable for marks, with emphasis in assessment placed on the ability to develop cogent argument.

Seminar (required)

Honours candidates are required to present an open seminar on their work. It should be delivered after results of the research are known, but before the work is fully committed to paper, to enable feedback from staff and candidates to be incorporated in the thesis. It is optionally assessable for marks.

Participation in Research Activities (required)

Honours candidates are required to participate in the regular activities of their discipline and/or research centre, including participation at regular seminars, lab meetings and journal club sessions or other such activities routinely organised. There should be clear evidence of prior preparation where applicable (circulated material having been read) and genuine attempts to participate. Candidates are also strongly encouraged to participate in conferences, attend seminars off-campus, and be prepared to deliver and discuss a précis of the conference or seminar at a journal club session. Participation at conferences either through oral presentations or posters is strongly encouraged and financial support to do so may be provided by disciplines and/or research centres.

Thesis (required)

Honours candidates are required to undertake a research project and prepare a thesis of up to 80 pages (1.5 spaced, excluding figures, tables and appendices). This will form the major assessment for the course, worth 75 or 80%.

Contact List of Supervisors

Please note that there are other research staff in the Faculty and centres who are able to supervise Honours students by negotiation with the Dean or their Director. Make inquiries to staff listed here. All these staff can be emailed as:- firstname.familyname@canberra.edu.au

Research Centre	Staff Member	Tel. Extn. (6201+)	Office
BMS	FRESE, Dr Michael	2243	3D39
BMS	GAHAN, Dr Michelle	5358	3D49
BMS	GHANEM, Dr Ashraf	2089	3D41
BMS	GHILDYAL, Dr Reena	5755	3D51
BMS	RAO, Dr Sudha	6206 8681	3D38
BMS	SIMSON, Dr Luby	2533	3D50
Forensic Studies	KELLY, Dr Tamsin	2590	7D9
Forensic Studies	LENNARD, Dr Chris	2160	7D7
Forensic Studies	McNEVIN, Dr Dennis	2634	7D8
Forensic Studies	ROBERTSON, Dr James	2870	7D18
IAE	BOHM, Dr Margi	2058	3A36
IAE	CHO, Dr George	5650	3B19
IAE	DOWNEY, Dr Paul	2169	3C29
IAE	DYER, Dr Fiona	2452	3B7
IAE	EZAZ, Dr Tariq	2297	3C30
IAE	FITZSIMMONS, Dr Nancy	2237	3C21
IAE	FOSTER, Dr Simon	2540	3C43
IAE	GEORGES, Dr Arthur	5786	3C51A
IAE	GRUBER, Dr Bernd	6206 3804	3C27
IAE	HONE, Dr Jim	2979	3C32

IAE	LINTERMANS, Dr Mark	2853	3B7
IAE	MAHER, Dr Bill	2531	3C34
IAE	McQUEEN, Dr Ken	2520	3C41
IAE	SARRE, Dr Stephen	5657	3C4
IAE	WHITE, Dr Duanne	2083	3B20

Potential Honours Projects (and Supervisors)

Dr Michael Frese (Assistant Professor in Virology)

Room: 3D39 **Phone:** 6201 2243 **Email:** michael.frese@canberra.edu.au

Research Interests:


- Mx-mediated resistance against influenza viruses
- Interferon-induced RNA editing
- ADAR1 proteins in haematopoiesis, neuronal signalling and innate immunity
- Generation of genetically manipulated mice (knockout and knockin)

Potential Honours Projects:

- Analysing RNA editing in the brain (co-supervision with Prof. Klaus Matthaei – John Curtin School of Medical Research, Australian National University)
- Developing a cell culture system for rabbit caliciviruses (co-supervision with Dr Tanja Strieve – CSIRO Entomology, Black Mountain Laboratories)

Comments:

Michael's research interests are in the area of virology and immunology with a special focus on interferon-induced proteins that show antiviral activities. If you are interested in any of the above listed projects please come and talk with Michael.



Dr Michelle Gahan (Assistant Professor in Molecular Biology)

Room: 3D49 **Phone:** 6201 5358 **Email:** michelle.gahan@canberra.edu.au

Research Interests:


- Biosecurity and microbial forensics, including developing ways to rapidly identify biological agents, such as bacteria and viruses, which may be used to harm the people of Australia or our agricultural and livestock industries.
- Understanding the pathogenesis of respiratory viruses (including human metapneumovirus, respiratory syncytial virus and rhinovirus), the interactions between viruses and infected hosts that lead to virus-induced inflammatory disease and the mechanisms of disease processes triggered by viral infections.

Potential Honours Projects:

- Anthrax detection at Canberra airport (Co-supervised with Dennis McNevin - Forensics and Paul Roffey - Australian Federal Police)
- Differentiation of Anthrax and environmental *Bacillus* species (Co-supervised with Dennis McNevin - Forensics and Paul Roffey - Australian Federal Police)
- Pathogens in illicit drugs: a health survey (Co-supervised with Dennis McNevin – Forensics and Paul Kirkbride – Australian Federal Police)

Comments:

Michelle's research interests are multi-disciplinary and centre on the fields of infectious diseases and biosecurity and involve techniques in microbiology and molecular biology. If you are interested in any of the above listed projects jointly supervised by Michelle and other members of the Faculty of Applied Science and Australian Federal Police please come and talk with Michelle.



Dr Ashraf Ghanem (Assistant Professor Inorganic Chemistry)

Room: 3D41 **Phone:** 6201 2089 **Email:** ashraf.ghanem@canberra.edu.au

Research Interests

- Chirality and drug development from analysis to access to enantiomerically pure drugs using chromatography or enzymatic/metal catalysis.
- **Industry-oriented research** targeting chiral drugs, pheromones, flavours, fragrances, inhalation anesthetics and research chemicals. Our aim is to prepare high-calibre postgraduate research students for the very competitive job market so that they can either join industry or academia.
- Our research is heavily funded by major companies in the field of chromatography (Dionex, Thermofisher) and Chirality (Daicel, Japan) resulting in over 55 international publications in the field of Chirality and pharmaceutical separation.
- Fabrication of innovative micro and nano-devices used in the development of new chemical production routes and products that consume less of the resources of nature and minimize risks on human health and our environment either during manufacturing or during or after functional use of the chemicals. Our devices will lead to significant new intellectual property having high commercial potential worldwide. These devices will be used in a wide range of areas of national and international importance including biotechnology, drug discovery; environmental, clinical, and forensic analysis.

Potential Honours INDUSTRIAL Projects:

- Fabrication of new microsystems with chiral monoliths for pharmaceutical applications.
- The First Production of Australian Highly Thermostable Lipase from Thermophilic Bacterium for Industrial Pharmaceuticals applications.
- The Thalidomide tragedy: lessons from the past and future opportunities in micro and nano chiral separation.

Comments:

You will join an international team with strong track record and collaboration with industry working on an industrially supported project dealing with the fabrication of new chiral silica monoliths for micro and nano enantioselective pharmaceutical separations of right and left handed molecules.

Apply advanced knowledge to resolve problems in relation to the separation of chiral pharmaceutical compounds and the access to single drug form.

Please visit our web site www.chiralitygroup.com to learn more about our potential industrial collaborations and opportunities in our group.

Funds might be available for the talented students who wish to pursue a PhD career afterwards.



Dr Reena Ghildyal (Assistant Professor in Comparative Physiology)

Room: 3D51 Phone: 6201 5755 Email: Reena.Ghildyal@canberra.edu.au

Research interests:

The overall research interest of the group is to understand the molecular mechanisms that underlie respiratory viral pathogenesis. The ultimate aim is to exploit this basic information either to identify new targets for the development of urgently needed antivirals or to assist in generating attenuated virus for vaccine approaches. Reena's specific research interests are:

- The importance of regulated subcellular localization of proteins in pathogenesis.
- The process whereby rhinovirus and respiratory syncytial virus antagonise host antiviral response.
- The mechanism of rhinovirus induced asthma exacerbation.

Potential Honours Projects:

- Effect of rhinovirus 3C protease on the host apoptotic response.
- Nucleocytoplasmic trafficking in asthma pathogenesis.
- Deciphering the assembly and budding pathways of respiratory syncytial virus.
- Does Respiratory Syncytial Virus Inhibit the Expression of Interferon and/or Interferon-Induced Proteins? (co-supervised with Dr Michael Frese)

Comments:

If you are interested in finding out how viruses cause disease in the respiratory system, send Reena an email. Technical approaches used in the various projects include cell biology, biochemistry, molecular biology, immunochemistry, tissue culture and virology.



Dr Sudha Rao (Assistant Professor in Molecular Biology)

Room: 3D38 Phone: 6206 8681 Email: sudha.rao@canberra.edu.au

Research Interests: There are many facets of transcriptional regulation that orchestrate the timed and coordinated expression of genes essential for development and the phenotypic plasticity of eukaryotic organisms. The molecular mechanisms that underpin the expression of genes in lower eukaryotes have been extensively studied, but in comparison there is still much to be learnt about the transcriptional mechanisms controlling mammalian genes. The major thrust of Sudha's research group has been to unravel complex epigenetic-signatures in transcription programs in the context of human T cell biology, as well as to understand the dysregulatory mechanisms operating in cancer settings. In this exciting era of epigenetic research, we look forward to unveiling how the mammalian genome can be regulated by the complex interaction of chromatin regulation, signal transduction kinases and microRNAs in normal and disease states.

Potential Honours Projects

- Deciphering the epigenetic signatures in cancer stem cells in breast and prostate cancer models.
- Transcriptional memory in human T cells.
- Novel nuclear signalling kinases in the control of microRNAs

Comments: The aim of the Honours projects will be to: **(i)** Provide students with a foundation in molecular biology, state-of-the-art genomic technologies, cellular biology and structural biology; **(ii)** Research experience with leading Immunology & Epigenomic laboratories via

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collaborative projects with ANU, Melbourne University and AMR; **(iii)** The opportunity to make a novel contribution to the field of epigenetic regulation in mammals. Sudha can develop a detailed programme of research work for projects after discussing with interested students any of their own ideas and requirements.



Dr Ljubov Simson (Associate Professor in Biomedical Sciences)

Room: 3D50 **Phone:** 6201 2533 **Email:** luby.simson@canberra.edu.au

Research interests:

- Validation of novel phytochemicals and natural therapeutics for use in cancer therapy
- The role of the immune system in the effectiveness of cancer therapies – cancer immunotherapy
- Adult stem cell mobilisation
- Elucidating the innate and adaptive roles of the eosinophilic leukocyte

Potential Honours projects for 2011:

- Validating the use of mistletoe extracts in cancer therapy
- Validating the use of novel arsenicals in cancer therapy (collaboration with Simon Foster)

Examples of previous Honours projects:

- The role of the eosinophil in mistletoe-mediated tumour cytotoxicity
- Harnessing Eosinophils in Tumour Eradication Strategies
- Evaluating chinese herbals in tumour immunotherapy
- Effect of Viral Infection on Eosinophil Biology
- Novel Small Sulphated Saccharides in Mature Leukocyte and Haematopoietic Stem/Progenitor Cell Mobilisation
- Role of Heparin in Eosinophil Recruitment During Inflammation



Dr Tamsin Kelly (Assistant Professor in Forensic Toxicology / Analytical Chemistry)

Room: 7D9 **Phone:** 6201 2590 **Email:** Tamsin.Kelly@canberra.edu.au

Research interests:

- Clandestine drug chemistry
- Forensic toxicology; detection of drugs in biological specimens, including plasma, hair and urine
- Application of analytical instrumentation (including high performance liquid chromatography (HPLC), liquid chromatography-mass spectrometry (LC-MS-MS), capillary electrophoresis (CE) and gas chromatography (GC)) and chemometrics for a variety of forensic applications
- Chiral analysis using capillary electrophoresis

Potential Honours projects:

- Chiral analysis of methylamphetamine and amphetamine using Agilent Bioanalyzer 2100 (in collaboration with Australian Federal Police and ACT Governmental Analytical Laboratory (ACTGAL)) (continuation of project commenced in Semester 2 2011)

- Development of LC-MS-MS methods for the detection of drugs in biological specimens, including plasma, hair, oral fluid and urine (specific focus of the project can be negotiated within this broad subject area)
- Investigation of the stability and compatibility of medication combinations in syringe drivers used in palliative care by LC-MS-MS (in collaboration with School of Pharmacy, Faculty of Health)
- Application of novel compounds for stereoselective separations of chiral drug compounds using capillary electrophoresis
- Additional potential Honours projects are likely to be available in collaboration with ACTGAL

Examples of previous Honours projects:

- Fate of pseudoephedrine in soil (Project undertaken in collaboration with Australian Federal Police)
- Enantioseparation of methylamphetamine by capillary electrophoresis: a survey of methylamphetamine samples seized in the ACT (Project undertaken in collaboration with ACT Governmental Analytical Laboratory)
- Accelerant survey and database matching (Honours project undertaken at Curtin University of Technology in collaboration with Chemistry Centre Western Australia)
- Development of a quantitative method for 3,4-methylenedioxyphenyl-2-propanone (MDP2P) in whole blood (Honours project undertaken at Curtin University of Technology in collaboration with Chemistry Centre Western Australia)
- Rapid separations by capillary electrophoresis for forensic analysis (Honours project undertaken at Curtin University of Technology)



Professor Chris Lennard (Professor of Forensic Studies)

Room: 7D7 **Phone:** 6201 2160 **Email:** chris.lennard@canberra.edu.au

Research interests:

- Fingerprint detection and enhancement techniques
- Detection and identification of explosives and explosive residues
- Chemical analysis of trace evidence
- Evaluation of portable analytical equipment for on-site forensic analyses

Potential Honours projects:

- Assessment of the relative performance of wet powder suspensions compared to cyanoacrylate fuming for fingerprint detection on plastic substrates
- Evaluation of fingerprint detection sequences on porous substrates
- Analysis of smokeless powder residues in FDR (Firearm Discharge Residue) collection kits
- Application of LIBS (Laser-Induced Breakdown Spectroscopy) for the elemental analysis of trace evidence

Examples of previous Honours projects:

- Evaluation of a next-generation portable GC-MS for the analysis of explosive residues and illicit drugs
- Characterising the responses of insect odorant receptors to volatile chemicals of forensic relevance
- Pre-treatment of dry latent fingerprints for enhanced detection by cyanoacrylate fuming



Dr Dennis McNevin (Assistant Professor in Forensic Studies)

Room: 7D8 Phone: 6201 2634 Email: dennis.mcnevin@canberra.edu.au

Research interests:

- DNA extraction from degraded tissues (bone, teeth, hair) for use in disaster victim identification (DVI)
- Forensic species identification
- Forensic population genetics and ancestry
- Environmental forensics
- Biosecurity
- New genotyping technologies

Potential Honours projects:

- Forensic species identification using high resolution DNA melting temperature analysis
- Isolation of single cells using laser capture microdissection (LCM)
- Anthrax detection at Canberra Airport (co-supervised with Dr Michelle Gahan and the Australian Federal Police)
- Differentiation of Anthrax and environmental Bacillus species (co-supervised with Dr Michelle Gahan and the Australian Federal Police)
- Oil spill fingerprinting using fluorescence spectroscopy
- Oil spill fingerprinting using pyrolysis gas chromatography mass spectrometry (Py-GC-MS)

Examples of previous Honours projects:

- Evaluation of DNA extraction methods for disaster victim identification (DVI)
- Tissue preservation techniques for disaster victim identification (DVI)
- Development of a mitochondrial DNA genotyping assay for inferring biogeographical ancestry
- Effect of hair treatment on DNA extraction from hair
- Use of real time PCR for forensic species identification



Professor James Robertson (Professor in Forensics)

Room: 7D18 Phone: 6201 2870 Email: james.robertson@canberra.edu.au.

Research Interests:

The examination of botanical, soil, fibre and hair trace material in the forensic context including interpretation and use as intelligence. Forensic science in the legal system. Wildlife forensic.

No recent honours but recent published work has included papers on hair transfer and persistence, hair DNA and hair microscopy, drug intelligence, wildlife forensic, soils and the use of DNA evidence in the legal system.

Potential Honours projects:

- Examination of black polyester and acrylic fibres (with the AFP)
- Forensic applications of confocal microscopy to fibre examination (with the AFP)



Dr Margi Böhm (Senior Lecturer in Atmospheric Science and Statistics)

Room: 3A36 **Phone:** 6201 2058 **Email:** Margi.Bohm@canberra.edu.au

Research Interests:

- Multi-disciplinary projects that link biotic and abiotic factors in an effort to improve the understanding of ecological consequences from human activities; specifically climate change. Mainly interested in how land characteristics and vegetation influence atmospheric turbulence and transfer mechanisms with respect to momentum (e.g., wind throw) and gases like CO₂.
- Linking atmospheric data and statistics with biological indicators so that we can develop improved air quality standards with the aim of moving standard setting to a pro-active rather than reactive mode.
- Investigating how living organisms interact with their environment, under conditions of increasing pollution levels and climate change.

Potential Honours Projects:

- Wind tunnel studies of the effect that changing terrain and vegetation has on wind throw and gas transfer between the land surface and the lower atmosphere. This work is funded by CSIRO and provides students with a unique opportunity to work with world leaders in the field of micro-meteorology.

Examples of Previous Post Graduate Projects:

- Honours (current). Momentum adjust at the leading edge of a forest.
- PhD (2011). UC Sports Science. Developing an improved understanding of kayak paddle physics and the development of an instrument to better measure the force applied by the paddler.
- Honours. ANU Engineering Dept. Developing an automated method for the effective cleaning of the ANU solar dish.

Comments:

Margi's interest abilities are multi-disciplinary. If you are interested in how the atmosphere and landscapes/ecosystems interact or if you are interested in climate change, come and talk with Margi.



Professor George Cho (Professor in Geographic Information Systems)

Room: 3B19 **Phone:** 6201 5650 **Email:** George.Cho@canberra.edu.au

Potential Honours Projects:

- Topics on issues with using Geographic Information Systems in Ecology and Biodiversity, Waterways, Catchments, Environmental Policy and Law
- Problems with data collection, data sharing, data analysis
- Modelling with GIS and its issues
- Mapping with GIS and its challenges – Web mapping
- Policy issues in using GIS – law, privacy, intellectual property
- Cartograms



Dr Paul Downey (Assistant Professor in Plant Ecology)

Room: 3C29 **Phone:** 6201 2169 **Email:** paul.downey@canberra.edu.au

Research interests:

- Ecology and management of alien plant (weed) invasions
- Restoration ecology
- Effects of climate change on plant populations
- Mistletoe ecology
- Plant-animal interactions
- Prioritization of conservation actions – management of protected areas
- Urban ecology
- Plant ecology in Australian landscapes (including semi-arid, alpine and coastal ecosystems)

Potential Honours projects:

- Effects of management regimes on plant and bird communities in semi-arid Australia (several projects)
- Climate change and alien plants – understanding the impacts on native plants
- Pine re-establishment following the Canberra fires
- Weed invasions into urban woodlands in Canberra
- Mistletoe ecology and genetics
- Ecology of riparian vine weeds
- Establishing management thresholds for eradication
- Other – if you have a project or idea related to Paul's area of interests please discuss it with him.

Examples of previous Honours Projects:

Dr Paul Downey joined the Faculty in late 2010.



Dr Fiona Dyer (Research Fellow in Applied Ecology)

Room: 3B7 **Phone** 6201 2452 **E-mail:** Fiona.Dyer@canberra.edu.au

Research Interests:

- Freshwater systems: Linking hydrology, geomorphology and water quality with ecological responses in freshwater system
- The behaviour of urban lakes, ponds and wetlands
- Environmental flows
- Assessing the condition of freshwater systems

Potential Honours Projects:

- Ecological and/or water quality responses to changing water level regimes in urban lakes and ponds
- Sediment characteristics of urban lakes and ponds; responses to wetting and drying
- Linking water quality and ecological responses in the upper Murrumbidgee River



Dr Tariq Ezaz (Assistant Professor in Genetics and Comparative Genomics)

Room: 3C30 **Phone:** 6201 2297 **Email:** Tariq.Ezaz@canberra.edu.au

Research Interests:

- Sex determination and sex chromosome evolution
- Molecular Genetics and cytogenetics
- Comparative genomics, cytogenetics and transcriptomics
- Molecular marker development
- Bioinformatics
- Wildlife genetics
- Environmental genomics (gene-environment interaction)

Potential Honours Projects:

- Comparative genomics of Australian dragon lizards (several projects)
- Cross species gene mapping in reptiles (several projects)
- Development of gene dense cytogenetic map in Australian Dragon lizards *Pogona vitticeps* for comparative cytogenetic analysis

Examples of Previous Honours Projects:

Development of gene dense cytogenetic map in Australian Dragon lizards *Pogona vitticeps* for comparative cytogenetic analysis



Dr Simon Foster (Assistant Professor in Environmental Chemistry / Analytical Chemistry)

Room: 3C43 **Phone:** 6201 2540 **Email:** simon.foster@canberra.edu.au

Research interests:

- Understanding the biological pathways of metal and metalloid metabolism and elucidation of the chemical forms of organometallic compounds.
- Development of analytical solutions to measure metals and metalloids in environmental and biological samples.
- Use of metal signatures and isotopic ratios for identification of material origin (province) or synthesis pathway of a substance (illicit drugs or pharmaceutical forgery).

Potential Honours projects:

- Accumulation and sub-lethal effects of juvenile hormone mimics (JHMs) in honeybees.
- Determining the synthetic routes of illicit drug manufacturing – can isotopic ratios of elements be used to discriminate synthetic methods.
- Arsenic metabolism in tissue cultures – are arsenic metabolic products culture technique specific?
- Analysis of arsenic compounds in certified reference materials.
- The use of multiple isotopes ratios to determine the origin and source of hydroponically cultivated crops.

Examples of previous Honours Projects:

- Jessica Farrant – 2011 – Arsenic metabolism and sub-cellular distribution in Hep2G cultures.
- Michael Orr – 2010 - Characterisation of the temporal chemical, physical and biological characteristics of micro sized coastal lagoons on the south coast of NSW.

- Nicole McDerby – 2009 - Assessment of cortisol levels as markers of stress in urine and plasma of mechanically ventilated patients in intensive care.
- Emma Newland – 2009 - Construction and metal binding characteristics of artificial Antarctic sediment for in-situ re-colonisation experiments.
- Toroskeh Mavarani – 2009 - Synthesis and model metabolic reactions of arsenicals base on DMA(III) with biological relevance.
- Kristy Telford – 2007 - Investigations into the extraction, speciation and biogeochemical cycling of antimony in the environment.
- Elliott Duncan – 2007 - Uptake and transformation of arsenic species by marine microalgae.



Dr Bernd Gruber (Assistant Professor in Spatial Analysis/Ecological Modelling)

Room: 3C27 **Phone:** 6206 3804 **Email:** bernd.gruber@canberra.edu.au

Research interests:

- Spatial population dynamics
- Population viability analysis
- Effects of climate change on animal populations
- Mark-recapture studies
- Reserve site selection
- Modeling ecosystem services
- Ecological statistics and methods
- Population genetics

Potential Honours projects:

- Comparing efficiency of reserve site selection in Australia and Europe
- Monitoring the earless dragon in the ACT
- Other – if you have a project or an idea related to areas of interest please discuss it with Bernd.

Examples of previous Honours Projects:

Dr Bernd Gruber joined the Faculty in late 2010. Recent diploma theses supervised at his former employee, the Centre for Environmental Research UFZ, Leipzig, Germany include: Woche, S. (2010). Yield increase of apples due to the release of native Red Mason Bees (*Osmia rufa*) in apple orchards, University of Bernburg, Germany.

Lampa, S. (2009): Mark-recapture study on otters (*Lutra lutra*) in Upper Lusatia (Eastern Germany) using microsatellite genotyping of faecal DNA, University of Leipzig, Germany.



Professor Jim Hone (Professor in Wildlife Management)

Room: 3C32 **Phone:** 6201 2979 **Email:** Jim.Hone@canberra.edu.au

Potential Honours Projects:

- Effects of mammalian herbivory on vegetation. This is a field-based project.
- Effects of feral pig ground disturbance on vegetation. This is a field-based project.
- Effects of climate change on wildlife population dynamics. This is a desktop-based project using published data.

Examples of Previous Honours Projects

- Bowler, B. 2010. Effects of climate on predator-prey dynamics; coyotes/hares/climate in the Yukon, Canada.
- Boyle, M. 2009. Effects of climate on population dynamics of bird and mammals.
- Abbott, S. 2006. Evaluation of the Kluane (Yukon) ecological monitoring programme.



Associate Professor Mark Lintermans (A/Prof in Freshwater Fisheries Ecology & Management)

Room: 3B7 **Phone:** 6201 2853 **Email:** Mark.Lintermans@canberra.edu.au

Research Interests:

- Freshwater fish ecology
- Interactions between native and alien fishes
- Ecology and management of local threatened fishes Macquarie perch, Two-spined blackfish, Trout cod, Murray River crayfish and Murray cod,
- Environmental flows

Potential Honours Projects:

- Spawning behaviour and location of spawning sites of Macquarie perch in Cotter River
- Timing of spawning in Macquarie perch in response to environmental flows below Tantangara Dam
- Impacts of sewage effluent on movement of Murray River crayfish
- Timing of spawning and habitat use by larval Two-spined blackfish in Cotter River
- Use of spawning tubes by Two-spined Blackfish in a reservoir
- Predation by alien fish on percichthyid larvae and period of detectability in predator stomachs

Examples of Previous Honours Projects:

- Impacts of coldwater discharge on Two-spined blackfish
- Ecology of parasitic *Eustrongylides* on Spangled perch in Lake Gregory
- Swimming performance of alien fish in the Cotter River
- Swimming performance of different life phases of Macquarie perch
- Genetics of two-spined blackfish in southeastern Australia



Professor Bill Maher (Professor in Eco-Chemistry)

Room: 3C34 **Phone:** 6201 2531 **Email:** Bill.Maher@canberra.edu.au

Research Interests:

Research into the cycling of nutrients, trace metals and metalloids in marine and freshwater ecosystems in order to understand the *fate* and *effects* of chemical contaminants in these systems

- Understanding the biological factors (growth, age, gender, sexual maturity, and seasonal food supply) that control the uptake and retention of contaminants in aquatic organisms

- Understanding the effects contaminants have on the health of aquatic organisms and communities such as subcellular damage by metals and metalloids and endocrine disruption by pesticides
- Understanding the strategies aquatic organisms use to store and detoxify contaminants such as metal incorporation into proteins and the elucidation of the chemical forms of elements
- Understanding the reactivity of carbon in aquatic systems and the roles carbon plays in the nutrition of animals and the cycling of nutrients.

Prospective honours projects:

Our policy is to match honours student's interests with the above research interests. I would be happy to explore topics with interested students.

Examples of Previous Honours projects:

Armitage, G. Redox release of phosphorus from sediments.

Barwick, M. Investigating the origins and bio-magnification of trace metals Se, Cd, Mn, As and Cd within food webs of fish communities in Lake Macquarie, NSW.

Burt, A. Trace metal accumulation in transplanted *Anadara trapezia* and their physiological response along a contaminant gradient in Lake Macquarie.

Chariton, A. The effects of the pesticide endosulfan on the physiology and morphology of aquatic and semi-aquatic organisms in north west New South Wales.

Chambers, N. Trace metal accumulation in the gobie *Arenigobius fienatus* and their physiological response.

Dann, R. Hydrogeochemistry and biogeochemistry in Stephens Creek Catchment Broken Hill.

Ellison, G. Factors affecting the accumulation and distribution of trace metals in *Sacrostera cucullata*.

Gay, D. Spatial and temporal variation of trace metals in *Bembicium nanum*.

Herfort, A. The measurement of MFOs in the Yabbie (*Chelax Destructor*) as an indicator of sub lethal exposure to pollutants.

Kuo, W. The effects of sediment selenium on the recolonisation of benthic macrofauna in Lake Macquarie NSW – a manipulative experiment.

Levy, J. Arsenic speciation, uptake, metabolism and toxicity in tolerant and sensitive freshwater algae.

Mathieu, J. Epilithic metabolism resulting from altered nutrient and grazing conditions from a point source of sewage effluent.

Mikac, K. A health assessment of five coastal lagoons using benthic in fauna and environmental variables.

Podreka, S. Effects of DDE on embryonic development, hatching success and sex differentiation in marine turtle *Chelonia mydas*.

Price, A. Accumulation, distribution and cycling of arsenic in Lake Macquarie, NSE, Australia.

Spooner, D. Impact assessment of aquaculture within Botany Bay: The use of a new galvanised mesh cage produced by BHP.

Tukai, R. Arsenic in marine macroalgae, occurrence and speciation.



Dr Ken McQueen (Professor in Earth Science)

Room: 3C41 **Phone:** 6125 0575 **Email:** Ken.McQueen@canberra.edu.au

Research Interests:

Ken's main research interests are in the areas of earth science and geochemistry/biogeochemistry, particularly related to regolith (including soils) and landscape

evolution. He also has interests and expertise in resource and environmental management and assessment of geoheritage.

Potential Honours Projects:

- Three dimensional landscape mapping using integrated data sets.
- Understanding arsenic distribution in iron oxides and oxyhydroxides.
- Uptake of metals by Cypress pine (*Callitris glaucophylla*)
- Minesite rehabilitation and heritage.

Examples of Previous Honours Projects:

Gonzalez, O.R., 2001. The geology and landscape history of the 'El Capitan' area, Cobar, NSW.

Glanville, D.H. 2003. Regolith-landform mapping, leucitite basalt and the landscape evolution of the Byrock region, Northwestern NSW.

Bewert, K.E., 2003. A regolith landform approach to environmental management in the Cadia mining area, Central NSW.

Neimanis, M. J., 2005. Rehabilitation of the Mount Boppy minesite, near Cobar, NSW.

Comments:

Some projects come with additional support.



Prof Stephen Sarre (Professor in Wildlife Genetics)

Room: 3C4 **Phone:** 6201 5657 **Email:** sarre@iae.canberra.edu.au

Research interests:

- Conservation Genetics of endangered reptiles
- DNA analysis of superabundant mammals
- Trace DNA analysis of mammals
- Sex Determination in Reptiles

Potential Honours projects:

- Conservation genetics of Grassland Earless Dragons
- DNA population estimation of bettongs in Mulligans Flat
- Genetic fences for goats in western NSW
- Population genetics of kangaroos in the ACT

Examples of previous Honours projects:

- Habitat use of the grassland earless dragons
- Mitochondrial DNA variation among rats and small marsupials for species identification.
- Micro-satellite population markers in possums.



Dr Duanne White (Assistant Professor in Catchment Systems)

Room: 3B20 **Phone** 6201 2083 **E-mail:** duanne.white@canberra.edu.au

Research Interests:

- Surface processes in Antarctic ice free environments
- Behaviour of the Antarctic and Greenland ice sheet
- Metal contamination in soils

Applied Science Honours Course Information – September 2011

- Geothermal exploration
- Paleotemperature records from boreholes

Potential Honours Projects:

- Reconstructing Australian paleotemperatures since the last ice age
- Direct measurements of heat production in the Antarctica
- Soil development in East Antarctica
- Sources of windblown sediment in the Rauer Group, Antarctica
- Impact of sediment recycling on dating changes in the Antarctic Ice Sheet
- Environmental impacts of Geothermal Energy
- Heavy metal phases in Australian landfills

