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2006 was a year of development for the School; staff worked collectively to develop a new junior and intermediate curriculum with the objective of reducing teaching loads and to improve integration of the School’s teaching across its various constituent disciplines. The changes provided a strategy for the School to efficiently and optimally deploy its undergraduate teaching resources in an overall context of significant budgetary constraints.

Whilst continuing to teach, learn and carry out research, half of the School settled into working from temporary quarters in the demountable village colloquially dubbed ‘Baxter’, and the other half endured the endless sound of impact drilling, dust and on-going maintenance related to the Madsen refurbishment. Our undergraduate students were initially misplaced, then bemused by the relocation of lecture and practical classes, but rapidly settled into the new locations. Of more concern was the disruption of post-graduate research activities due to limited or absent laboratory facilities, generating a need to find new facilities with much equipment in storage. Technical staff called in favors from around the University and arranged what commonly seemed the impossible. Everyone felt the pinch in some shape or form.

Nonetheless, the School successfully ran its profile of undergraduate teaching, including its diverse field excursions. The Asia-Pacific field School had to quickly divert from Fiji to avoid local chaos from another
coup; everyone apparently enjoyed concentrating on local issues in Vanuatu instead. The complexity and ambiguity of rocks at Broken Hill continued to confound third year students in July; there must be something in the water.

The School farewelled our financial assistant, Emma Stewart, and missed her bright and efficient involvement in all School activities. We wish Emma luck in continuing her studies in the United Kingdom, and welcomed Lubos Spatina to take over her role. Staff and post-graduate students experienced distress from the death of post-graduate student, Dararat Kaewkuntee, in February. Awkwardness related to her family being overseas heightened the sense of loss.

In 2006, the School had 31 full-time and part-time enrolled PhD students, 9 full-time and part-time enrolled MSc students, and 30 Honours students. 7 PhD and 2 MSc research students graduated in 2006. Research income for the School in 2006 was $1,811,740 with most funding coming from the Australian Research Council (ARC) through the Discovery and Linkage schemes. The research achievements of Adriana Dutkiewicz were recognized through her receipt of the Dorothy Hill Award from the Academy of Science. This award recognizes exceptional achievement in the Earth sciences by a female researcher under 40 years of age. Dr Pascal Philippot, research director at the French CNRS and leader of the “Ancient and Modern Geobiosphere” research team at the Institut de Physique du Globe of Paris (IPGP) visited the School of Geoscience from August 2006 to July 2007. Dr Philippot’s visit was funded by an ARC Linkage International Fellowship, entitled “Chemistry of the Archaean Ocean and its Impact on Earth’s Early Atmosphere and Ecosystems”. This project involved Dr Patrice Rey and Adriana Dutkiewicz from the School of Geosciences, and Dr Craig Marshall from the School of Chemistry. Drs Eleanor Bruce and Dan Penny continued their research into infrastructure, ecology, growth and decline of Angkor in association with researchers in the Faculty of Arts. Assoc. Prof. Dietmar Müller obtained funding through a special ARC initiative to develop the Earthbyte Group, involving Auscope, to provide advanced simulation and computing modelling tools for geoscientists from a wide range of organizations. Prof. Paul Wessel from the University of Hawaii spent his sabbatical year in the School; Paul shared his expertise in marine science, spatial data analysis, and scientific software infrastructure design and worked on the integration of his software with EarthByte infrastructure.

In September, the Earth Resources Foundation ran another successful Edgeworth David Day with a conference addressing the exploration, extraction and future of uranium. Dr Clarence Hardy, President of the Australian Nuclear Association, delivered an engaging speech on Uranium Policy in Australia at the Annual dinner.

Geoffrey Clarke
Head of School
Staff

Head of School
Geoffrey Clarke, B.Sc., Ph.D.
Metamorphic petrology, thermobarometry and field geology in East Antarctica and New Caledonia

Professors
John Connell, B.A., Ph.D, F.A.S.S.A.
Third world development (South Pacific), cultural geography
Andrew D. Short, M.A., Ph.D.
Coastal sedimentary environments and morphodynamics

Edgeworth David Professor of Geology and William Hilton Hovell Lecturer
Peter J. Davies, B.Sc., Ph.D.
Sea level change, reef growth in the southwest Pacific Ocean (especially the Great Barrier Reef)

Professor of Geophysics
Iain Mason, B.Sc Eng., M.A., Ph.D.
Development of geophysical technology, drilling and drill hole analysis

CRC Mining Professor of Geophysics
Peter Hatherly B.Sc., Ph.D.
Mining and engineering geophysics, seismic exploration and geophysical log analysis

Associate Professors
Source and fate of contaminant in catchments and estuaries; sediment toxicity, environmental geochemistry
Deirdre Dragovich, M.A., Ph.D.
Arid geomorphology, weathering, environmental geomorphology
Philip Hirsch, B.A., M.Phil., Ph.D.
Resource management, environment and rural development (SE Asia)
Dietmar R. Müller, M.Sc, Kiel Ph.D. Calif
Analysis of tectonic plate motions, continental margin tectonics, and seafloor mapping

Senior Lecturers
Eleanor Bruce, B.Sc, Ph.D.
Geographical Information Systems (GIS), Coastal Management
Peter Cowell, B.A., Ph.D.
Coastal Morphodynamics, GIS
Robert Fisher, Ba Dip. Ed., Ph.D.
(Part-time)
Stephen Gale, M.A., Ph.D.
Quaternary Environmental History, Sedimentary Geomorphology
Construction geology, environmental geology, reinforcement of soil slopes by vegetation
Michael Hughes, B.Sc., Ph.D.
Physical sedimentology in ancient and modern marine environments
Phil McManus, B.A., Grad. Dip., M.E.S., Ph.D.
Sustainability, Nature, Urban Geography
Bill Pritchard, B.A., Ph.D.
Economic Geography, Global Restructuring of Agriculture and Food Industries
Patrice Rey, B.Sc., Ph.D.
Structural geology and tectonics
Derek Wyman, B.Sc., Ph.D.
Economic geology
Lecturers
Julie Dickinson, B.Sc, M.Sc., Ph.D.
Stratigraphy and Sedimentology
Kurt Iveson, B. Econ (Soc. Sci.), Ph.D.
Urban and Political Geography
Melissa Neave, B.A., Ph.D.
Fluvial and Arid Zone Geomorphology

Research Fellows
Elaine Baker, Ph.D.
Adriana Dutkiewicz, Ph.D.
Carmen Gaina, B.Sc., Ph.D.
Jonathan Hargreaves, B.Sc., D.Phil.
Florence le Hebel, B.Sc., Ph.D.
Elizabeth Moylan BAppSc(Hon), Grad Dip VET, PhD
Jeffrey Neilson B.A., B.Sc., Ph.D
Daniel Penny, B.A (Hons.), Ph.D.
Maria Sdrolias, B.Sc., Ph.D.
John You, Ph.D.

Honorary Professor
Eric Waddell, B.A., M.Sc., Ph.D.

Honorary Associates
David F. Branagan, B.Sc., Ph.D.
David E M Chapman, M.Eng.Sc., B.A., Ph.D.
Greg Crough, B.Ec.
Donald Emerson, B.Eng., M.Sc, Ph.D.
Wayne Erskine, B.A., Ph.D.
Richard Facer, Ph.D.
Stephanie Fahey, B.A., Ph.D.
Robert Fisher, B.A., Ph.D.
Gabor Foldvary, Ph.D.
James Gardner, B.Sc., Ph.D.
Peter Hoare, M. Sc., Ph.D.
Julie Hollis
Henk Heijnis, Drs., Ph.D.
Ronald Horvath, M.A., Ph.D.
John Hudson, M.Sc.
Mark Hutchinson, B.Sc., Ph.D.
Jock B. Keene, B.Ag.Ec., B.Sc., Ph.D.
Keith Klepeis, B.Sc., Ph.D.
Gordon Packham, B.Sc., Ph.D.
Graeme Philip, B.Sc., M.Sc., D.Sc., Ph.D.
Peter Roy, B.Sc., Ph.D.
Bruce Thom, BA, MA, Ph.D.
Robin F. Warner, B.A., Ph.D.
Keeva Vozoff, B Phys, M.Sc., Ph.D.
Ted Wheelwright, DFC, MA

Geosciences Administrative & Technical Staff

Administrative Staff
Marilyn Horgan  Finance and Administration Manager
Lubos Spatina  Administration and Finance Officer
Belinda McMillen  Student Liaison Officer

Senior Technical Officers
Nelson Cano  Water, Sediment and Chemical Laboratories Manager
Tom Savage  Water, Sediment and Chemical Laboratories Manager
Graham Lloyd  Field Support Officer
David Mitchell  Field Support Officer
Ivan Teliatnikov  Senior Computer Systems Officer
John Twyman  Senior Computer Systems Officer
Teaching Staff Profiles

Gavin Birch
Gavin Birch initiated Environmental Geology at Sydney University. His recent interests are in the source, fate and effects of contaminants in marine, estuarine and fluvial environments, mainly in the Sydney Harbor region. This work involves mainly the behaviour of heavy metals, but includes organic contaminants and nutrients in the aquatic environment. Gavin’s specialties are in the toxicity of marine sediments and in the chemistry and remediation of stormwater.

Eleanor Bruce
Eleanor Bruce’s research interests are in environmental spatial analysis and modelling. More specifically this research has focused on examining processes of habitat loss in urban coastal environments, the use of GIS and remote sensing in vegetation change detection and landscape heritage management, marine zone planning and evaluating the impact of spatial data uncertainty in environmental decision-making. Eleanor is currently working on a collaborative ARC Linkage funded research project with UNESCO and Department of Environment and Heritage.

Geoff Clarke
Geoff Clarke has contributed to all aspects of the textural analysis of high-grade metamorphic rocks. This field-based ARC research on high-P Cretaceous granulites integrates data from structural, petrologic and isotopic studies to study geological processes critical to the formation and modification of continental crust. Other ARC-funded research on the application of equilibrium thermodynamics has defined the P-T domains of common blueschist and eclogite facies assemblages, something that could not be done by direct experimentation, and established new approaches to the study of equilibrium during metamorphism. Clarke also has an ASAC-funded field programme examining lower crustal processes that formed high-grade rocks in MacRobertson and Kemp Lands, Australian Antarctic Territory.

John Connell
John Connell’s principal research interests are concerned with political, economic and social development in less developed countries, especially in the South Pacific region and in other small island states. Much of this research is currently oriented to issues of rural development, migration (especially of skilled health workers) and inequality. A second research theme is on decolonisation and nationalism, with particular reference to New Caledonia. More recently, he has been working on cultural geography, especially of music, food and tourism. He has recently published two books on the geography of music, both with Chris Gibson, now at UNSW, and formerly a PhD student in the School.

Peter Cowell
Peter Cowell’s research interests are in the geomorphology of coasts and continental shelves and specifically, the nature of change in coastal landforms and the processes responsible for such change (coastal morphodynamics). The research involves combined use of field data and computer modelling to yield information that is otherwise unattainable, with the application of formal methods for managing uncertainty. This approach is applied to estimation of sediment transport and coastal change relevant to coastal management and coastal impacts of climate change, as well as to geological exploration. Research is being undertaken on four continents in collaboration with other coastal scientists from Australia, Europe and the Americas. This has focused on coasts (involving clastic sand and mud deposits), but also includes behaviour of sand islands on coral atolls.

Peter Davies
Peter’s current research interests include the causes of sedimentary cyclicity, sea level change and reef growth in the South West Pacific, the Origin of the Great Barrier Reef, and the impacts of global climate change on reef growth. Seismic
studies in carbonate sequences are related to the development of petroleum reservoirs and new ideas for exploration, while theoretical studies are examining the future interface of energy needs and possible climatic repercussions. A teaching module has been published on Salinity in new South Wales (Curse of an Ancient Land) for teachers and Secondary students. The Portable Remotely Operated Drill (PROD) - a major research innovation - is now operating commercially.

Julie Dickinson
Julie considers all aspects of sedimentary geology to be of interest, with particular emphasis on using field mapping, stratigraphy and sedimentary petrology to identify the dominant controls on basin evolution and sedimentation. More specifically her research includes the investigation of neotectonics evident in the Tertiary sedimentary basins of SE Australia, the formation of marine phosphate deposits, the influence of climate change on fluvial systems and the application of high-resolution marine surveying techniques for the investigation of depositional processes on continental shelves.

Deirdre Dragovich
Deirdre Dragovich’s current research in environmental geomorphology includes the development, persistence and dating implications of desert varnish, especially in relation to aboriginal rock engravings; and the nature and rate of deterioration of (stone) historical buildings in the urban environment, where surface loss may be accelerated by visitor impacts and pollution. Research is also continuing on dryland salinity and on erosion following bushfires in temperate and subalpine areas of NSW.

Bob Fisher
Bob Fisher is an anthropologist. His PhD research was a study of human ecology, focusing on strategies for adapting to drought in the Thar Desert in Rajasthan. He specialises in social and political ecological aspects of natural resource management, particularly involving community forestry. After working in Nepal with the then Nepal-Australia Forestry Project in the late 1980s, he taught at the University of Western Sydney, Hawkesbury, before becoming Deputy Director of the Regional Community Forestry Training Center in Bangkok from 1997 to 2001. He has done research or consultancies in a number of countries, including Mozambique, Iran, Kyrgyzstan, Nepal, India, Pakistan, Laos, Vietnam and Cambodia. Teaching interests focus on social and political aspects of natural resource management.

Stephen Gale
Stephen Gale has research interests in Quaternary environmental history, human environmental impact during the late Holocene, long-term geomorphic evolution and sedimentary geomorphology. He has worked in glaciated, karstic and alpine terrains, and, more recently, in semi-arid and lacustrine environments. He is currently using sedimentological techniques to shed new light on the early colonial history of Australia.

Peter Hatherly
Peter is an exploration geophysicist with research interests directed towards understanding the geological settings of ore deposits (coal and metaliferous) and how this information can be used to operate mines more safely and productively. His prime interests concern seismic and logging techniques but he has worked with many other geophysical techniques. Within CRC Mining, he coordinates a number of projects in mining geophysics which involve researchers from a number of universities and external organisations.

Philip Hirsch
Philip Hirsch has research interests in natural resource management, rural change and the politics of environment in Southeast Asia, notably Thailand, Cambodia, Laos and Vietnam and the wider Mekong Region. He is involved with collaborative field projects in each country. Specific interests include water governance, river basin management, deforestation, environmental impact of development, rural social differentiation and agrarian change, the role of NGOs in development, resource tenure,
changing relations between village and state, and community-based natural resource management. Recent and current research work includes projects supported by the Australian Research Council, Australian Water Research Facility, Australian Agency for International Development, International Development Research Centre, Asia Research Centre and Australian Centre for International Agricultural Research, and Social Sciences and Humanities Research Council (Canada).

Tom Hubble
Tom Hubble’s research has been mainly in the field of engineering and environmental geology. Current research projects and interests include: the characterization of the mass collapse mechanisms on the Hawkesbury-Nepean River; the evaluation of the stabilizing mechanisms that trees and their root systems develop in soil slopes; and the development and implementation of quality control protocols for dimension stone. He is currently a Pro-Dean in the Faculty of the Science, received an Australian College of Educators Quality Teaching Award (NSW) in 2004 and is a co-author of a textbook developed for the NSW HSC course in Earth and Environmental Science.

Michael Hughes
Michael Hughes has research interests in coastal processes and seabed dynamics. This includes all coastal environments dominated by waves, tides and/or oceanic currents. Currently active research projects include beach morphodynamics, surf zone waves and runup, coastal response to climate change, tide-dominated continental shelves, bedform dynamics, sedimentary structures and palaeohydraulics. His research approach combines field and laboratory experimentation with model development and application.

Kurt Iveson
Kurt is primarily interested in the relationship between cities and citizenship. He is currently engaged in two research projects within this broad theme. The first project is concerned with the urban dimensions of being ‘public’. This research explores the ways in which activities such as ‘hanging out’, political protest, cruising, and graffiti writing have produced new styles of public discourse in and through the city. The second project is concerned with urban planning practice, and asks how it might better blend views about spatial equity with views of the worth of social diversity and the importance of encounter in urban life. This research is being conducted jointly with Prof Ruth Fincher (University of Melbourne).

Iain Mason
Iain Mason is involved in building borehole radars, seismic instruments and imaging software with which to map near planar, faulted ore bodies – Australian coal seams, North Sea reservoirs, South African platinum and gold reefs, and kimberlite diatremes and in using old maps and satellite images to model significant sites (e.g. Gallipoli) numerically in 3D.

Phil McManus
Phil McManus’ research integrates urban and environmental issues. His research into sustainable cities includes urban forestry, industrial ecology, perceptions of nature in urban environmental issues and urban environmental history. His research in environmental geography includes thoroughbred breeding and the uses of nature, science and tradition. To date this work has been focused on the Upper Hunter region of NSW, but is now being extended internationally. Phil’s interest on the construction and transgression of urban and rural divides includes research with John Connell at Country Week Expo. He is also involved, along with Bill Pritchard, in research looking at social, economic and environmental changes in farming practices and in small towns in dryland agricultural regions.

Dietmar Müller
Dietmar Müller’s research is focussed on global and regional Earth system problems by linking onshore and offshore observations based on geophysical/geological data and kinematic/dynamic process modelling, exploring the possibilities of the emerging area of e-geoscience. He founded the international EarthByte project (www.earthbyte.org)
which aims at building the infrastructure for a virtual geological observatory through
the GPlates software consortium. He has spearheaded the concept of “Exploration
Geodynamics”, i.e., the use of geodynamic modelling as a resource exploration
tool. Related work includes the modelling of current and palaeo-stress fields of the
Indo-Australian Plate, linked to stratigraphy and fault analysis from seismic data,
and tying basin-scale observations to models of mantle convection and lithospheric
deformation.

Melissa Neave
Melissa Neave’s main area of interest is in the field of fluvial geomorphology with a
focus on arid and semi-arid hillslope processes. She has worked on the biogeomorphic
influences of small mammals in a Chihuahuan desert ecosystem in the American
southwest, used rainfall simulation to model the effect of surface crust formation on
runoff and sediment generation and is currently investigating links between hillslope
sediment transport and soil salinity levels.

Bill Pritchard
Bill Pritchard is an economic geographer with primary research interests in the
globalization, especially as it relates to food and agriculture. During the past five
years he has researched and published a number of sector-specific analyses (the
global processing tomato sector, the NSW wine industry, the breakfast cereals
industry and Australian supermarket restructuring) as well as on global institutions,
foreign investment and Australian agri-food policy. He has additional research
interests in Australian regional restructuring and northern Australia. He is currently
the chief investigator on two ARC Discovery Projects dealing with issues of agri-food
restructuring and development, as they apply to Indonesia and India; and from 2005-06
was Chief Investigator for the Building Institutional Capacity in Asia project funded by
the Japanese Ministry of Finance. Recent publications include Agri-food Globalisation
in Perspective (2003, Ashgate, with David Burch), Developing Regional Australia
(2003, UNSW Press, with Andrew Beer and Alaric Maude) and Cross-continental
Food Chains (2005, edited, Routledge, with Niels Fold). Bill is a member of the ARC
Research Network on Spatially Integrated Social Science, and is convenor of the
Australian and New Zealand Agri-Food Research Network.

Patrice Rey
Patrice is a tectonicist interested in the evolution of the continental lithosphere
through tectonic processes, and the evolution of tectonic processes through time. His
research activities are therefore problem-driven and process-oriented, and supported
by research strategies involving quantitative multidisciplinary approaches, based on
field work, numerical modelling and physical modelling. Patrice produced work on
the seismic reflectivity of ductile shear zones in the crust. In the last five years he has
been investigating the tectonics processes that have shaped the surface of the early
Earth in the Archaean era (4.03 to 2.5 Ga).

Andrew Short
Andy Short is interested in the processes and morphology of coastal systems. Present
research focuses on all 11,000 Australia beach and dune systems, both in terms of the
morphodynamics of representative systems in variable wave and tide environments,
and in the nature, hazards and usage of all Australian beach systems. He is also
examining the size, nature and stability of the nations 2500 coastal barrier systems,
as well as local through regional barrier sediment budgets. Locally he continues
long term beach monitoring, enhanced in 2004 with Linkage grant support for video
imaging and regular DDPS surveys. Since 1991 he has been National Coordinator
of the Australian Beach Safety and Management Program in co-operation with Surf
Life Saving Australia. In 2003/4 he completed a similar survey of Hawaiian beaches
for the Hawaiian Lifeguard Association.

Derek Wyman
In 2006, Derek’s continued collaborative research with the Ontario Geological Survey
concerning the recently discovered 2.7 billion year old diamond deposits found in
northern Ontario (the world’s oldest). The lamprophyric host rocks in these deposits
challenge conventional models of diamond formation because of the shallow mantle origins and provide unique insights into the tectonics of continent formation in the late Archean. The first two major papers related to this research were published in 2006 and Derek presented the findings at the Penrose conference on “the beginning of Plate Tectonics”. Following a year-long visit by Prof. Wang Qiang in 2005, Derek continued collaborative research in Chinese tectonics and magmatism with a 33 day visit to China involving extensive field work in the Xinjiang Uygur Autonomous Province of northwest China. Papers arising from the research began to be published in 2006 and Derek took up co-supervision of a PhD study at Guangzhou. Both the diamond studies and research in China are ongoing, as are other studies of Archean magmatism and geodynamics. Derek Supervised a 2006 Honours study of igneous intrusions and their potential effect on coal mining at the Dendrobium deposit, which was sponsored by BHP Coal.

Research Staff Profiles

Elaine Baker
Elaine is the director of the UNEP Shelf Programme at the University of Sydney. This programme is an initiative of GRID Arendal in Norway and was established to assist coastal states in preparing submissions for extended continental shelf under the United Nations Law of the Sea. Elaine is working with colleagues from Geoscience Australia and SOPAC to assist countries in the South West Pacific with this task. Elaine is also the director of the University of the Sea Secretariat. The University of the Sea is a partnership between the University of Sydney, the University of New South Wales, the University of Technology Sydney, the Australian National University, the University of Tokyo, the Korean Ocean Research and Development Institute, Tongji University China, the Partnership for Observation of the Global Oceans Canada, the National Institute of Oceanography Goa, the Indonesian Research Centre for Marine Technology and the Intergovernmental Oceanographic Commission of UNESCO - http://www.usims.org.usyd.edu.au/floating.html

James Boyden
James is a software developer and mathematician with interests in computer graphics, signal processing, scientific visualisation and computational geometry [computer science] and geometry, topology and theoretical fluid dynamics [mathematics]. He also has a grounding in theoretical physics, with interests in kinematics, dynamics and electrodynamics. James is currently working as a developer and programmer for the GPlates software as part of the EarthBytes project.

James Clark
James is a programmer and information model developer. He currently works within the EarthByte project to develop the GPlates Markup Language (GPML), which is designed to become the cornerstone of a web-based virtual plate tectonic observatory. GPML will allow the integration of a plate tectonic Data Model into the international Geographic Markup Language standard.

Adriana Dutkiewicz
Adriana’s current research projects exploit Archaean and Proterozoic oil-bearing fluid inclusions and their geochemical compositions, including biomarkers, to constrain hydrocarbon-ore fluid interactions, the pressure-temperature conditions under which they co-exist, the diversity of the primordial biosphere and the nature of life’s earliest habitats. Biomarkers extracted from oil inclusions may even constrain the ages of branch points on the phylogenetic tree of life. Her most recent research has focused on Precambrian basins in Australia, Canada and Africa.

Jonothan Hargreaves
Jonothan is developing borehole radar systems used to map Diamond, Platinum and Gold bearing orebodies in South Africa and Canada. His current research interests include high speed, low power electronics for downhole data acquisition systems,
and synchronisation techniques to allow several receivers in different boreholes to record simultaneously.

**Elizabeth (Bess) Moylan**
Bess is currently employed as a research associate on the ARC funded “Living with Heritage” project. Her research involves developing spatial representations to investigate Heritages issues relating to Cultural Landscapes. Spatio-temporal models are being used to explore and monitor landscape change and the application of GIS for Heritage and Natural Resource Management.

**Jeff Neilson**
Jeff’s research focuses on the geography of tropical agriculture and commodity trade. This interest is explored through the application of global value chain analyses to rural products grown by communities in the Global South. Jeff is currently working on two ARC Discovery projects. The first is concerned with traceability and private regulation within developing countries’ agriculture, with case studies of the cocoa, coffee and tea industries across Indonesia and India. The second project is examining recent shifts in Indian agriculture towards export, and high-value, domestic markets, with the emergence of contract farming, supermarket provisioning and high-input floriculture. Jeff has also been involved in various agribusiness development activities in eastern Indonesia under the International Finance Corporation’s Small and Medium Business Development Program (IFC-PENSA).

**Dan Penny**
Dan Penny’s major research interests include long-term environmental change and variability in Indochina, particularly monsoon variability and plant biogeography. The interaction between people and the natural environment is a particular focus of interest. Dan is currently investigating the demise of Angkor, Cambodia, using micro-palaeontological techniques (pollen and spores from higher plants and ferns respectively, and algae, particularly diatoms). Angkor was capital to a sprawling medieval empire that encompassed much of the Indochinese peninsula between the 9th and sometime after the 15th Century AD. The research seeks to explore the timing of and reasons for Angkor’s decline and eventual collapse.

**Maria Sdrolias**
Maria is an EarthByte ARC research fellow who is working on global models and databases for the evolution of the ocean basins. She is particularly interested in subduction and back-arc basin processes, including deciphering the origin of major plate tectonic events and their manifestation in the geological record.

**John You**
John is an EarthByte ARC Senior Research Fellow. His primary interests are physical oceanography, paleoceanography and climate change over geological time periods. He has been the driving force behind porting the National Center for Atmospheric Research (NCAR) Community Land Model coupled to the NCAR Community Atmosphere and Ocean Model to the Australian Partnership for Advanced Computing (APAC) supercomputer. He is currently working on modelling the causes of past global temperature extremes such as the Miocene global climate optimum to improve our understanding of current and future global warming.
2006 Units of Study

Geography

GEOG 1001 BIOPHYSICAL ENVIRONMENTS (6cp)
Dr Stephen Gale and Dr Melissa Neave
This Unit of Study provides an introduction to the Earth’s biophysical environments. It begins by considering the earth’s place in the universe, its origin and its development, and the nature and evolution of the Earth’s structure. This is followed by an investigation of the evolution of the Earth’s physical environment and its development to its present stage over time. With this background, the Unit of Study goes on to examine the Earth’s hydrosphere and atmosphere and the major landforms produced by the interaction of atmospheric and ocean processes with the earth’s surface, including fluvial, arid, coastal and glacial systems.

GEOG 1002 HUMAN ENVIRONMENTS (6cp)
Professor John Connell and Dr Kurt Iveson
Human Environments develops understanding of processes and consequences of interactions among people and between people and their environments. Questions, challenges and issues that stem from the relationships and transformations in the built, natural, social and spatial environments are introduced and examined in the context of globalisation. Social structures are explored and developed in the context of local changes in Sydney, as it becomes a world city, regional Australia and also the Asian and Pacific island region.

GEOG 2311 LANDSCAPE PROCESSES (6cp)
A/Professor Deirdre Dragovich and Professor Andy Short
This unit of study is concerned with the morphology and evolution of landscapes and the processes that have formed them. Attention will be directed towards slopes, the basic units of landscapes, and the processes leading to slope development and change in different environments. Landscape features will be examined in relation to evidence of past and present process regimes, especially the way in which these regimes are influenced by climate. Field and practical work will involve interpreting landscapes in the Sydney Region. Other geomorphological environments to be considered are glacial landscapes, periglacial landscapes, karst landscapes, and aeolian (desert) landscapes.

GEOG 2321 FLUVIAL AND GROUNDWATER GEOMORPHOLOGY (6cp)
Dr Mel Neave and Dr Willem Vervoort
This Unit of Study provides an introduction to the fundamentals of fluvial geomorphology (the study of surface water as an agent of landscape change) and groundwater hydrology. The fluvial geomorphology section of the unit will describe the movement of water in stream channels and investigate the landscape change associated with that movement. Topics to be covered will include open channel flow hydraulics, sediment transport processes and stream channel morphology. Practical work will focus on the collection and analysis of field data. The quantity and quality of the groundwater resources are closely linked to geology and fluvial geomorphology. The groundwater section of this unit is based around four common groundwater issues: contamination, extraction, dryland salinity and groundwater-surface water interaction. In the practical component, common groundwater computer models such as FLOWTUBE and MODFLOW will be used to further explore these problems.

GEOG 2411 ENVIRONMENTAL CHANGE AND HUMAN RESPONSE (6cp)
A/Professor Deirdre Dragovich and Dr Eleanor Bruce
Environmental change occurs at time scales from seconds to centuries or longer, from the sudden and catastrophic to gradual transformations barely
noticeable at human time scales. Some kinds of environmental change are largely caused by humans, but in other cases humans are helpless before the uncontrollable forces of nature. Environmental change is explored in these categories, including land degradation and desertification, and salinity; and how humans are both implicated in these problems and respond to them. Included in the unit of study will be a variety of techniques for the analysis of environmental problems, especially the use of geographic information systems (GIS) as a way to organise, integrate and interpret spatial information. We will also consider some fundamental questions that emerge from the use of GIS techniques in spatial analysis including the representation of spatial features, handling data uncertainty and decision support.

GEOG 2421 RESOURCE AND ENVIRONMENTAL MANAGEMENT (6cp)
Dr Phil McManus
This Unit of Study forms an intermediate level treatment of Environmental Geography and Natural Resource Management. It is designed to evaluate human interaction with the biophysical environment and use of the Earth’s surface and its resources. Emphasis is upon human impacts on environments through social, economic and political processes and through deliberate decision making and management. Policy responses are considered at a range of scales. The Unit of Study examines the nature and characteristics of selected resource processes with reference to Australian and other national and international contexts, and on a more global and regional scale, focuses on the changing relationship between people and environments in tropical Asia and the Pacific. A field trip is integral to the Unit of Study.

GEOG 2511 ECONOMIC GEOGRAPHY (6cp)
Dr Bill Pritchard
In this Unit of Study, students will be introduced to questions and debates about spatial character of economic and political activities. This includes the issues of why economic development is uneven between places and regions, how entities such as large corporations spatially organize themselves in order to further their goals, and how to assess the impacts of globalisation. Lecture and practical material will be organized in such a way that students are encouraged to connect theories with contemporary ‘real world’ economic and political issues. These include debates on regional development planning, industrial clustering, the role of the global financial sector, trade liberalization and the World Trade Organisation. As a component of the Human Geography stream, this unit of study does not require assumed knowledge of economics. Rather, it uses the insights and perspectives of human geography to critically debate regional, national and global economic issues.

GEOG2521 URBAN AND CULTURAL GEOGRAPHY (6cp)
Professor John Connell and Dr Kurt Iveson
By their very nature, cities are full of different people doing all sorts of different things. These activities all have their own geographies people make the most of spaces available to them, and they shape and produce new kinds of urban space through their actions. But these geographies are neither stable nor uncontested. Sometimes, groups of people clash with each other and with urban authorities in trying to make space for different cultural practices. This unit of study examines the cultural dimensions of everyday life in cities. We will consider a range of different practices which use and shape urban space for example, shopping, eating, playing sport, listening to and making music, having sex, going out, worshipping, etc. By considering these various practices, the course seeks to understand how different groups of people perceive, construct and contest urban space, primarily in western contexts (and with particular attention to Australia). At the completion of this unit of study, students will possess a theoretical and practical understanding of how social and cultural processes shape everyday life in contemporary urban societies.
This course is split into two sections: marine ecosystems and coastal geomorphology. The marine ecosystem section describes some of the ways that the properties of the oceans affect marine organisms. It also introduces coral reefs and other marine ecosystems, together with their productivity, biological oceanography, the reproductive biology of marine organisms, and marine biological resources. The second section provides an introduction to coastal geomorphology by examining the geographic variability of coasts as the sum effect of variations in terrestrial, climatic and oceanographic factors. These factors are introduced in terms of the main physical processes (geology, sea-level, waves, tides, winds) governing coastal geomorphology on a range of space-time scales. Geographic variation in the physical processes is illustrated by reference to the local coast: ie, Sydney. The illustration is amplified by drawing comparisons with other parts of SE Australia, and with overseas examples (especially from coastal environments very different to that of Sydney).

Australian coastal environments are dynamic systems responding to input sediments and processes as well as solid boundary conditions. The first half of this Unit focuses on high-energy wave and wind dominated coastal systems; in particular the beach-surf zone, dunes and barriers, including their Holocene/Quaternary evolution. The regional impact of waves, tides, embayments, and other environmental parameters in controlling morphology are addressed. The second half of this Unit focuses on the smaller-scale processes controlling beach-surf zone morphology. In particular, how waves and currents drive beach and bar morphodynamics via sediment transport. The practical program uses real data sets collected during recent research programs and during a weekend field excursion, and they address issues specifically relevant to Australia’s coastline.

Coastal Management is about how scientific knowledge is used to support policy formulation and planning decisions in coastal environments. The Unit links coastal science to policy and practice in management of estuaries, beaches and the coastal ocean. The principles are exemplified through specific issues, such as coastal erosion, pollution, and impacts of climate-change. The issues are dealt with in terms of how things work in nature, and how the issues are handled through administrative mechanisms. These mechanisms involve planning strategies like Marine Protected Areas and setback limits on civil development in the coastal zone. At a practical level, the link between science and coastal management is given substance through development and use of ‘decision-support models’. These models involve geocomputing methods that entail application of simulation models, remotely sensed information, and Geographic Information Systems (GIS). The course therefore includes both principles and experience in use of these methods to address coastal-management issues. (It thus also extensive use of computers.) Although the focus is on the coast, the principles and methods have broader relevance to environmental management in particular, and to problem-solving in general. That is, the course has vocational relevance in showing how science can be exploited to the benefit of society and nature conservation.

This is a project-based course that tackles the field and laboratory methods that allow us to reconstruct environmental change. It focusses on the environmental...
changes of the Quaternary and particularly on those changes experienced by the Australian environment since the time of human contact. The course stresses the application of particular techniques to solving field problems and to answering palaeoenvironmental questions.

GEOS3018 RIVERS: SCIENCE, POLICY AND MANAGEMENT (6cp)
GEOS3918 RIVERS: SCIENCE, POLICY AND MANAGEMENT (Advanced) (6cp)
Dr Mel Neave
The Unit of Study is concerned with understanding the functioning of river catchments from both natural science and social science perspectives, at a variety of scales. The catchment as a morphodynamic process-response system is addressed with an emphasis on the relationships between processes and landform entities. Similarly, relationships within social, economic, and political systems are explored within the catchment context, with particular emphasis on the interactions between the social system and bio-physical system. Empirical context for the unit will primarily be drawn from the Murray-Darling, Mekong, and Hawkesbury-Nepean catchments. Fieldwork in the latter is integral to the Unit of Study.

GEOS 3053 ASIA-PACIFIC FIELD SCHOOL - ASSESSMENT A (6cp)
GEOS 3953 ASIA-PACIFIC FIELD SCHOOL - ASSESSMENT A (Advanced) (6cp)
GEOS 3054 ASIA-PACIFIC FIELD SCHOOL - ASSESSMENT B (6cp)
GEOS 3954 ASIA-PACIFIC FIELD SCHOOL - ASSESSMENT B (Advanced) (6cp)
A/Prof Phil Hirsch, Prof John Connell
These Units of Study constitute a Field School run over a five week period in January-February, prior to the commencement of the semester. In 2006 the Field School was held in South-East Asia (Thailand, Vietnam and Laos) In other years it may be held in Fiji. It is run in close association with local universities, whose staff and students participate in some components of the course. It focuses on environmental and development issues in the context of rapid social change.

GEOS3511 UNDERSTANDING AUSTRALIA’S REGIONS (6cp)
GEOS3911 UNDERSTANDING AUSTRALIA’S REGIONS (Advanced) (6cp)
Dr Bill Pritchard
Regional difference in Australia is becoming more acute. This has major implications for the life chances and economic prospects of people across Australia. Thus Unit of Study examines these issues, using extensive case study material and introducing students to new approaches in regional development theory to account for and explain this state of affairs. A non-compulsory field trip of approximately five days duration to rural Australia is a component of this unit. (Students who cannot or who do not wish to attend the trip complete an alternative assignment.) This Unit provides students with a solid grounding for graduate employment or further studies in the field of regional development.

GEOS3512 CONTEMPORARY GLOBAL GEOFGRAPHIES (6cp)
GEOS3912 CONTEMPORARY GLOBAL GEOFGRAPHIES (Advanced) (6cp)
Professor John Connell
This Unit of Study provides students with detailed exposure to contemporary thematic areas of human geography research. It seeks to apply the conceptual material introduced in intermediate human geography Units of Study to ‘real-life’ research problems, as a platform for engaging students with research issues, frameworks, conceptual debates, methods, and problem-solving techniques. For 2007 the content of this Unit of Study will involve assessment of the geographical implications of tourism. Lectures and practical classes will cover relevant conceptual and methodological issues, and will involve economic, cultural, political and environmental themes. It will primarily focus on Australia and the Asia-Pacific region.
GEOG3521 SUSTAINABLE CITIES (6cp)
GEOG3921 SUSTAINABLE CITIES (Advanced) (6cp)
Dr Phil McManus
Study on urban and regional sustainability analysis involves an integrated series of lectures, practical work and field visits. It develops themes introduced in second year geography, providing a set of conceptual and analytical tools for examining the social, economic and environmental sustainability of ways in which we manage urban and rural regions. The first part of the unit focuses on themes in urban sustainability, including topics such as utopian visions for cities, urban history, ecological footprint analysis, bioregionalism, transport options, urban form and urban policy with reference to sustainable futures. The second part of the unit examines debates on social and economic sustainability in the Australian context, including topics such as the ‘triple bottom line’, social capital, the impacts of de-industrialisation, ‘new economies’ of the service sector, Indigenous rights, and the economic and social impacts of large resource developments.

GEOG3522 CITIES AND CITIZENSHIP (6cp)
GEOG3922 CITIES AND CITIZENSHIP (Advanced) (6cp)
Dr Kurt Iveson
What does it mean to be a ‘citizen’, and what has this got to do with cities? This Unit explores the urban dimension of contests over the meaning of citizenship. The first half will consider historical configurations of urban citizenship, from the Greek city-states of antiquity through to imperial, colonial and industrial cities. The second half will then focus on contemporary globalising cities. A series of case studies will consider the production of new configurations of urban citizenship across a range of cities in the world, looking at issues such as: asylum-seekers and the city; children and the city; homelessness in the city; ‘culture jamming’ and new forms of urban protest; trans-national social movements. The Unit will involve a substantial practical component, encouraging students to draw on their own experiences of city life to reflect on the meanings of citizenship.

Geology/Geophysics

GEOL 1001 EARTH & ITS ENVIRONMENT (6cp)
Professor Peter J. Davies (coordinator)
The aim of this Unit of Study is to provide students with an understanding of how the Earth works, its origin, plate tectonics, surface processes, evolution of life and geologic time. The crises in resources and fossil fuel and implications for our economy will be discussed and an assessment made of our own impact on the Earth together with the role of geologists in protecting and monitoring the environment. Students will learn techniques and types of observations used to decipher the history and evolution of the Earth, and dating sediments and rocks. Laboratory classes and a one day field trip in the Sydney region will involve exercises in observing and describing Earth materials and in interpreting Earth history from geological information, including fossils and maps.

GEOL 1002 EARTH PROCESSES & RESOURCES (6cp)
GEOL1902 EARTH PROCESSES and RESOURCES (Advanced) (6cp)
Dr Geoff Clarke and Dr Tom Hubble
This unit will examine the chemical and physical processes involved in forming the Earth, ranging from those involved in mineral formation to those controlling the nature of the Earth’s interior, volcanoes and metamorphism. Lectures and laboratory sessions on mountain building processes and the formation of ore deposits will lead to an understanding of the forces driving our planet. Processes such as weathering, erosion and nature of sedimentary environments are related to the origin of the Australian landscape. In addition to laboratory classes there is a one-day field excursion to the Lithgow area.

The Advanced unit has the same objectives as GEOL1002 and is suitable for students who wish to pursue aspects of the subject in greater depth. Entry is restricted and selection is made from the applicants on the basis of their performance to date. Students that elect to take this unit will participate in
alternatives to some aspects of the standard unit and will be required to pursue independent work to meet unit objectives. Specific details for this unit of study will be announced in meetings with students in week 1 or semester 1. This unit of study may be taken as part of the BSc(Advanced). NB: Departmental permission is required for enrolment; a UAI above 93 or a distinction in GEOL1001 is normally required for admission. This requirement may be varied and students should consult with the unit of study coordinator.

GEOL1501 ENGINEERING GEOLOGY (6cp)
Dr Tom Hubble (coordinator)
The aim of this Unit of Study is to provide Engineering students with an understanding of how the Earth works, its origin, plate tectonics, surface processes, evolution of life and geologic time. The crises in resources and fossil fuel and implications for our economy will be discussed and an assessment made of our own impact on the Earth together with the role of geologists in protecting and monitoring the environment. Students will learn techniques and types of observations used to decipher the history and evolution of the Earth, and dating sediments and rocks.

GEOL2111 VOLCANIC HAZARDS AND SOLUTIONS (6cp)
GEOL2911 VOLCANIC HAZARDS and SOLUTIONS (Advanced) (6cp)
Dr Derek Wyman (coordinator)
This unit expands upon the concepts introduced during the junior Units of Study in Geology and uses a problem solving approach to investigate geological processes and materials that are important in Asia, Australia, and the South-West Pacific. The main topic covered in the unit is the strategies used to identify, predict and mitigate the primary and secondary hazards associated with volcanism. The unit of study has an emphasis on developing a thorough knowledge of the analytical techniques and methods applied to evaluating the hazards associated with these phenomena as well as providing students with the fundamental geochemical and geological knowledge required to interpret the data collected during these investigations. The unit includes a two- to three-day field trip to study volcanic rocks in NSW.

GEOL2112 ENVIRONMENTAL GEOLOGY AND CLIMATE CHANGE (6cp)
A/Professor Gavin Birch and Professor Peter Davies
The Earth sciences provide an essential framework for understanding environmental changes that arise from short-term and long-term geological processes. This Unit of Study introduces students to a range of geological phenomena that can impact detrimentally on society and the environment. As the welfare of much of the world’s population is sensitive to climate change, a component of the course will include an examination of global climate change over a variety of timescales ranging from millions of years to tens of years. The record of recent climate change and projections of future climate change will be reviewed in the context of their natural and human causes.

GEOL 2123 GEOLOGICAL METHODS (6cp)
GEOL 2923 GEOLOGICAL METHODS (Advanced) (6cp)
Professor Peter Hatherly
This unit of study further develops the ability of students to perform geological investigations and expands their knowledge of the range of techniques available to collect and interpret geological and geophysical data. Students will enhance their understanding of some common geological environments and the basic physical, chemical and biological processes that form sedimentary rocks, metamorphic rocks, and natural resources. This knowledge and understanding will then be applied to developing three-dimensional geological models of particular sites and solving geological problems in the field and laboratory. The unit will include a five-day excursion to the Canberra area.
GEOL 2124 FOSSILS AND TIME (6cp)
A/Professor Dietmar Müller and Dr Julie Dickinson
This palaeontology and stratigraphy Unit of Study is aimed at geoscientists, archaeologists, biologists, marine and environmental scientists who use fossils or stratigraphic data to determine ages, environments or evolutionary lineages. It provides an overview of fossil biodiversity, concentrating on invertebrate animals but also covering vertebrates, plants and microorganisms, with an emphasis on those groups that are most environmentally or stratigraphically useful. It also considers the main methods of stratigraphic correlation and age determinations, concentrating on litho- and bio-stratigraphy but also covering the more modern techniques of chemo-, magneto- and sequence-stratigraphy as well as radiometric age dating.

MARS2005 GLOBAL OCEANS (6cp)
MARS2905 GLOBAL OCEANS (Advanced) (6cp)
Dr Michael Hughes and Dr Julie Dickinson
This course is split into two sections: physical and geological oceanography. Major physical oceanography topics include the physical and chemical properties of ocean water, ocean circulation, waves and tides. Major geological oceanography topics include the origins and geological history of ocean basins, ocean volcanism, sediments and continental margins. Both the regional oceanography and continental shelf of Australia are emphasised. Although this is principally a lecture-based course, you will receive feedback on your understanding of the course content through regular assignments and six tutorials. The learning outcome you should expect at the end of the course is a broad knowledge of the fundamental concepts in physical and geological oceanography, and their particular relevance to the Australasian region. This provides the necessary background for senior-level Marine Science courses in which you will learn more advanced concepts, and also become involved in the practical and field-based aspects of marine science.

GEOS3003 THE DYNAMICS OF CONTINENTS AND BASINS (6cp)
GEOS3903 THE DYNAMICS OF CONTINENTS AND BASINS (Advanced)(6cp)
A/Professor Dietmar Müller and Dr Patrice Rey
The Earth’s crust hosts mineral and energy resources that have sustained our civilisation over the past five thousand years. These resources are formed along plate boundaries and in sedimentary basins. They are the by-products of dynamic and thermal processes that have affected the lithosphere since its formation in the Archaean. This Unit focuses on the understanding the thermal and mechanical aspects of lithospheric deformation and basin formation and evolution. The main topics of this module include: Mantle convection, oceanic lithospheric evolution, heat transfer in the lithosphere; Isostasy and vertical motion of the Earth’s surface; Plate boundaries, body forces and the dynamic of the Earth’s lithosphere; Rheology of the lithosphere; Continental break-up and the formation of continental margins and basins; Thermo-mechanics of sedimentary basins; Thermo-mechanics of orogenesis; and, Thermal consequences and tectonic feedback of geodynamic processes. Practical classes are designed to enhance computational and communication skills as well as building a profound knowledge in Tectonics and Geodynamics. The Unit is relevant to all students interested in using computational methods to learn how the Earth works.

GEOS3004 GEOPHYSICS, IMAGING, OIL/ORE PRODUCTION (6cp)
GEOS3904 GEOPHYSICS, IMAGING, OIL/ORE PRODUCTION (Advanced) (6cp)
Professor Iain Mason
This Unit examines the use of computer-based geophysical techniques to map high value sites that range from oil fields and mine sites to archaeological digs. Lecture topics introduce the creation, inversion and application of 2D and 3D potential and wave fields that are among the data sources for micro-gravity surveying, magnetism and aero-magnetism; radiometry, short-and long-range
surveillance and tracking techniques. The course is designed around the fact that major strides have been made in digital data acquisition and data reduction. Practical classes extend skills in computer aided image processing.

GEOS3006 MINERAL DEPOSITS (6cp)
GEOS3906 MINERAL DEPOSITS (Advanced) (6cp)
Dr Derek Wyman
Global-scale tectonics and continental growth are examined in terms of their relationships to mineral deposits over the last 3.5 billion years. Deposits of metals and precious gems are linked to igneous rocks and hydrothermal fluids, which provide the basis for exploration strategies, account for specific ore deposit characteristics, and determine appropriate mining techniques. Representative ore deposits from New South Wales, Australia, and overseas will be included as case studies for a wide array of mineralisation types. Practical components of the course will introduce specimens of ore deposits and associated rocks and the spatial analysis of geological data at the Global to district scale. In addition to laboratory classes there will be a four-day field excursion to active and historic mining sites in NSW.

GEOS3007 REMOTE SENSING: IMAGING THE EARTH (6cp)
GEOS3907 REMOTE SENSING: IMAGING THE EARTH (Advanced) (6cp)
Dr Geoff Clarke and Dr Derek Wyman
This Unit of Study initially addresses the evolution of the Australian landscape, involving tectonic influences, long-term climate variation and the effects of bedrock weathering. The Unit then provides a comprehensive introduction to the use and manipulation of computer-based imaging techniques at the microscopic to macroscopic scales in the Earth Sciences. The application of image analysis as a tool in the interpretation of remote sensing techniques to geological terrains and landscapes is covered in computer-based practical exercises that use a mixture of Landsat thematic mapper, airborne radiometric and magnetic databases. Integrated lectures and laboratory exercises focus on the use of processed images in mineral exploration, tectonic analysis, and environmental studies.

GEOS3008 FIELD GEOLOGY AND GEOPHYSICS (6cp)
GEOS3908 FIELD GEOLOGY AND GEOPHYSICS (Advanced) (6cp)
Professor Peter Hatherly and Dr Patrice Rey
This Unit is an essential component of all Geology & Geophysics majors. All students will undertake a range of exercises, but may elect to concentrate on aspects that emphasize Geology and/or Geophysics: (1) field mapping and the analysis of geological objects in the field, in weakly to complexly deformed sedimentary and volcanic sequences; (2) field investigations of mineral deposits and their relationships to host rocks; and (3) the practical application of magnetic and electrical methods commonly employed in the search for mineral deposits. The field course complements other subject areas in Geology & Geophysics and will give students experience in the field identification of rocks and minerals, regional geology, stratigraphy, structure and rock relationships.

GEOS3016 SEAFLOOR PROCESSES AND IMAGING (6cp)
GEOS3916 SEAFLOOR PROCESSES AND IMAGING (Advanced) (6cp)
Exploring the sediments and rocks that make up the continental shelves and deep ocean floor requires the use of remote sensing techniques, and the analysis of geological and geophysical data. This Unit teaches analytical and interpretive skills in both these areas, with a focus on the interaction of physical, biological and chemical processes on the sea floor. The aim of this Unit is to provide the student with skills to analyse sea floor environments and interpret a variety of relevant geological and geophysical datasets, including include side-scan sonar, swath-mapping, magnetics, gravity, and seismic reflection data. Students will also gain the skills to investigate marine sedimentary successions. The practical exercises will provide an introduction to standard data analysis tools such as Matlab, and the use of Australian and world data-bases. Students
will also be introduced to seafloor samples from the shelf, slope and deep-ocean, where the role of physical and biological activity on the sediment characteristics will be examined. The Unit is relevant to students interested in seafloor environments, marine geology and geophysics, and computer-based marine data analysis.

**GEOS3017 GLOBAL ENERGY (6cp)**
**GEOS3917 GLOBAL ENERGY (Advanced) (6cp)**

Professor Peter Davies and Dr Gavin Birch

This Unit is aimed at geoscientists, biologists, environmental and marine scientists who are interested in the energy resources, particularly in the context of the evolution of coral reefs and how they have been affected by changing short and long-term environmental conditions. This interdisciplinary Unit provides an introduction to offshore energy and coral reefs and explores this complex system in relation to geology, biology and ecology as well as the oceanographic setting. The Unit acquaints students with tools currently being used in the industry and is underpinned by modern concepts of basin architecture and petroleum economics. Exploration techniques include the principals and practice of electrical logging, source rock evaluation and reservoir quality assessment. The controlling influence of basin architecture is examined in terms of critical factors such as hydrocarbon source, migration and entrapment are used to demonstrate climatic and tectonic control. Students will also become familiar with the factors and processors that control the structure, morphology, sediments and distribution of coral reefs and how they function as part of larger ecosystem. The Unit is based on problem solving by groups and is underpinned by closely integrating geology, geophysics, marine science and economics. The theoretical base developed in course work will be used to solve a real-world exploration case study, using petroleum industry techniques and by simulating an economic competitive environment. The Unit included a 5 day field trip to the Great Barrier Reef.
**Grants**

**Research Grants: (Australian Research Council)**

Birch, G., An innovative strategy for stormwater remediation and reduction of contaminant supply from catchments, Australian Research Council, $29,500

Birch, G., Modelling contaminant dynamics in a well-mixed/stratified estuary, Australian Research Council, $60,343

Birch, G., An innovative strategy for stormwater remediation and reduction of contaminant supply from catchments, Australian Research Council, $25,000

Bruce, E., Fletcher, R., Johnson, I., Living with Heritage: Integrating time, place and culture for World Heritage conservation, Australian Research Council, $70,000

Dickinson, J., Spreading ridge sedimentation processes: a novel approach using Macquarie Island as a natural laboratory, Australian Research Council, $20,000

Dutkiewicz, A., Biosphere hydrocarbon and ore fluid interactions in the Early Precambrian, Australian Research Council, $162,769

Connell, J., Reinventing rural places? The extent and impact of festivals as regeneration strategies, Australian Research Council, $10,000

Muller, R.D., Integrating Global Multidimensional Datasets to Underpin Subduction Process Modelling During the Past 60 Million Years, Australian Research Council, $62,424

Muller, R.D., Simulating the evolution of the Southern Ocean and Australia’s Palaeo-environment over 40 million years, Australian Research Council, $62,424

Muller, R.D., Zomaya, A., Clarke, G., The EarthByte software and database system, Australian Research Council, $114,444

Penny, D., Fletcher, Barbetti, Pottier, Urban Infrastructure, Inertia and Ecology, the growth and decline of Angkor, Cambodia, Australian Research Council, $50,280

Pritchard, W., Neilson, J., Traceability as a mode of ordering: implications for developing countries’ participation in international agrofood, Australian Research Council, $105,407

Pritchard, W., Indian agriculture in the 21st century: The political economy of market reforms, Australian Research Council, $20,380

Rey, P., Chemistry of the Archaean Ocean and its Impact on Earth’s Early Atmosphere and Ecosystems, Australian Research Council, $136,210

**Other Grants**

Baker, E., Feasibility study for the development of a facility for continental shelf delineation, United Nations, $101,585

Baker, E., Creating a Society with Pluralistic Values, Toyota Foundation, $57,123
Birch, G., Impact of contaminants on estuarine and fluvial sediments of Brisbane Water, Gosford City Council, $8,666

Dragovich, D., Effects of catchment land use on sediment movement and sediment sources, CSIRO, $3,500

Dragovich, D., Dryland salinity in the Macquarie River Catchment central west NSW, AINSE, $4,050


Gale, S., Human environmental impact and the Aboriginal abandonment of Kangaroo Island, Australian and Pacific Science Foundation, $5,250

Hirsch, P., Australian Mekong Resource Centre, AusAID, $59,194

Hirsch, P., Mekong Learning Initiative, Oxfam - $99,162

Hirsch, P., The challenges of the agrarian transition in South Asia, Social Sciences & Humanities Research Council, Canada, $33,623


Mason, I., Geophysical Imaging, University of Oxford, $468,678

McManus, P., Feasibility study for potential future uses of White Bay to reduce Sydney’s “ecological footprint”, $5,333

Muller, R.D., PETROMAKA 163395/S30 - Frontier Science and exploration: The Atlantic – Arctic, $25,487

Short, A., Large scale climatic control of coastal erosion and shoreline changes based on long term survey dataset and video monitoring technology, Surf Life Saving Australia Limited, $1,300

**Consultancies**


Cowell, P., Byron Shire Council – expert witness in Land and Environment Court, $2,979

Cowell, P., NSW Department of Environment & Conservation, $27,000

Hughes, M., URS Australia Pty Ltd: Mortlake Estuarine Sediment mobility study, $27,245

Hughes, M., United Kingdom Higher Education Funding Council: Swash Process Measurements, $17,030
Publications

Books


Book Chapters


Branagan, D & nbsp, 2006, Geology and the artists of the fifteenth and sixteenth centuries mainly Florentine, *The Origins of Geology in Italy*, ISBN: 1.01E+11


Refereed Journal Articles


Brown, B., Muller, D. and Gaina, C., Circum-Antarctic palaeobathymetry: Illustrated examples from Cenozoic to recent times, *Palaeogeography Palaeoclimatology Palaeoecology*, v. 231, no. 1 to 2, p. 158+
Clarke, G., Harley, S.L. and Kelly, N.M., Monazite behaviour and age significance in poly-metamorphic high-grade terrains: A case study from the western Musgrave Block central Australia, *Lithos*, v. 88, 2006, p. 100-134


Connell, J., Nauru: the first Pacific failed state?, *The Round Table The Commonwealth Journal of International Affairs*, v. 95, no. 383, p. 47-63


Dutkiewicz, A., Volk, H., George, S.C., Ridley, J. and Buick, R., Biomarkers from Huronian oil-bearing fluid inclusions: An uncontaminated record of life before the Great Oxidation Event, Geology, v. 34, no. 6, p. 437-440

Gale, S., Gale, R.J.B. and Winchester, H.P.M., Inorganic pollution of the sediments of the River Torrens South Australia, Environmental Geology, v. 50, no. 1, p. 62-75


Hirsch, P., Governing water as a common good in the Mekong River Basin: issues of scale, Transforming Cultures, v. 1, no. 2, p. 104-113


Hubble, T., Packham, G.H. and Philip, G., Late Silurian or Early Devonian corals from the continental slope off southern New South Wales, Alcheringa, v. 30, no. 1, p. 33-42

Hughes, M. and Aagaard, T., Sediment suspension and turbulence in the swash zone of dissipative beaches, Marine Geology, v. 228, p. 117-135

Hughes, M. and Baldock, T. E., Field observations of instantaneous water slopes and horizontal pressure gradients in the swash-zone, Continental Shelf Research, v. 26, no. 5, p. 574-588


Penny, D., The Holocene history and development of the Tonle Sap Cambodia, *Quaternary Science Reviews*, v. 25, p. 310-322.


Pritchard, W., The political construction of free trade visions: the geo-politics and geo-economics of Australian beef exporting, Agriculture and Human Values, v. 23, no. 1, p. 37-50


Rey, P. and Houseman, G., Lithospheric scale gravitational flow; the impact of body forces on orogenic processes from Archaean to Phanerozoic, Geological Society Special Publications, 2006, no. 253, p. 153-167

Sdrolias, M., Muller, D., Controls on back-arc basin formation, Geochemistry Geophysics Geosystems - G 3, v. 7, no. 4, p. 1-40


Thebaud, N., Philippot, P., Rey, P. and Cauzid, J., Composition and origin of fluids associated with lode gold deposits in a Mesoarchean greenstone belt (Warrawoona Syncline Pilbara Craton Western Australia) using synchrotron radiation X-ray fluorescence, Contributions to Mineralogy and Petrology, v. 152, no. 4, p. 485-503


Warner, R., Natural and artificial linkages and discontinuities in a Mediterranean Landscape: Some case studies from the Durance Valley France, Catena, v. 66, no. 1, p. 236-250


Whittaker, J. and Muller, D., Seismic stratigraphy of the Adare Trough area Antarctica, Marine Geology, v. 230, p. 179-197

Williams, N, Gale, S., Harle, K.J. and Heijnis, H., The vegetation history of the last glacial-interglacial cycle in eastern New South Wales Australia, Journal of Quaternary Science, v. 21, no. 7, p. 735-750


Zeng, T.Q., Hui, F., Haijun, H. and Wang, K., River mouth bar formation, riverbed aggradation and channel migration in the modern Huanghe (Yellow) River delta, *Geomorphology*, v. 74, no. 1 to 4, p. 124-136

**Refereed Conference Publications, Conference Papers, Conference Abstracts and/or Presentations**


Sindle, T., Mason, I., Hargreaves, J. and Cloete, J., 2006, Adding Value to Exploration Boreholes by Improving Trajectory Survey Accuracy, 2006 Australian Mining Technology Conference

Postgraduate Research

Geography

Candidates who were awarded their degree in 2006

Duncan Cook (PhD) A 2000 year record of environmental change from Tocal Homestead Lagoon, eastern Australia (Dr Stephen Gale)

Tira Foran (PhD) Rivers of contention: Pak Mun Dam, electricity planning, and state-society relations in Thailand, 1932-2005 (A/Prof Phil Hirsch)

Riko Hashimoto (PhD) Morphostratigraphy and evolution of estuarine-deltaic lowlands on embayed wave-dominated coasts: Holocene examples from southeastern Australia (Professor Andy Short)

Cameron McAuliffe (PhD) Multicultural futures: the negotiation of identity amongst second generation Iranians of Muslim and Baha’i background in Sydney, London and Vancouver (Professor John Connell)

Elizabeth Moylan (PhD) Influence of the temporal component in landscape history studies (Dr Peter Cowell/Dr Eleanor Bruce)

Kaviphone Phouthavongs (MSc) Employing GIS in fisheries management in the Mekong River Basin: a case study of Lao PDR (A/Prof Phil Hirsch/Dr Eleanor Bruce)

Tanya Schindler (MSc) Cyclogenesis in the Coral and Tasman Seas (Professor Andy Short)

Students enrolled in 2006 (who have been awarded degree in 2007)

Alison Gates (PhD) Acclimatisation as environmentalism: the idea and practice of plant introductions in southeastern Australia before 1900 (Dr Phil McManus)

Max Kwiatkowski (PhD) Nostalgic landscapes, identity and photography among Sydney’s Polish community (Professor John Connell)

Viliam Phraxayavong (PhD) Changing geopolitics of aid to Laos (A/Prof Phil Hirsch)

Students enrolled in 2006 (research continuing)

Paula Brown (PhD) Fisheries co-management in Vietnam (A/Prof Phil Hirsch)

Joanna Burston (PhD) Coastal inundation hazard along the New South Wales coast (Professor Andy Short)

Rowena Butland (PhD) Perceptions of place in the management of heritage space (Dr Eleanor Bruce)

Marc Daly (PhD) Shoreface equilibrium and consequences for climate change impact predictions (Dr Peter Cowell)

Michelle Dominis (PhD) Sensitivity of landscapes to the development of dryland salinity (A/Prof Deirdre Dragovich)

Josephine Gillespie (PhD) World heritage obligations and local communities: land law and justice at Angkor, Cambodia (Dr Eleanor Bruce)
Jasmine Glover (PhD) Title to be advised (Dr Bill Pritchard)

Salette Figueiredo (PhD) Title to be advised (Prof Andrew Short)

Deanne Hickey (Msc) Relationship between wetland hydrology and fine scale vegetation distribution (Dr Eleanor Bruce)

Phil Holmes (PhD) Economic and environmental viability of pastoralism in Australian arid rangelands (A/Prof Deirdre Dragovich)

Georgina Houghton (PhD) Community participation in forestry in Vietnam (A/Prof Phil Hirsch)

Leah Lui-Chivizhe (MSc) Movement on the margin: identity construction and Torres Strait Islanders in Sydney (Professor John Connell)

Jessica McLean (PhD) Indigenous water values in the Ord: a political ecology analysis (Dr Bill Pritchard)

Daniel Montoya (PhD) Water management in the Murrumbidgee: community-government relations (Dr Phil McManus)

Young Ng (PhD) Geoparks and geotourism: management approaches to geological heritage in China (Dr Phil McManus)

Thanh Phuong Nguyen (PhD) Shoreline change in the Red River mouth, Vietnam, using remote sensing and GIS (Professor Andy Short)

Andrew Pitt (Msc) Surfing reefs: the role of bathymetry (Prof Andrew Short)

Kevin Prakoonheang (PhD) Skilled return migration and development in Laos (Professor John Connell)

Daniel Robinson (PhD) Biodiversity related traditional knowledge in Thailand: intellectual property relations and geographies of knowledge regulation

Hugh Smith (PhD) Scale analysis of sediment dynamics in an upland headwater catchment, South-eastern Australia (A/Prof Deirdre Dragovich)

Darren St-Georges (MSc) Organic foods in Sydney (Dr Bill Pritchard)

Sushma Raj (MSc) Employment networks of Fijian Indians in Sydney (Professor John Connell)

Annie Sutton (PhD) The Fijian Indian community in Sydney (Professor John Connell)

Ann Turner (PhD) The evolution of institutional arrangements in railway administration, NSW and Queensland (Dr Bill Pritchard)

Geology

Submitted a/o Accepted 2006

Dyksterhuis, Scott (PhD) Finite Element Modelling of Lithospheric Stress and Deformation

Schroeter, Florian (PhD) Mineral Trace Element Distribution in Amphibolite to Granulite Mafic Rocks
Golding, Christopher (PhD) Estuarine health indicator based on macrobentic sensitivity ranking

Halpin, Jacqueline (PhD) The metamorphic evolution of Kemp and MacRobertson Lands (Rayner Complex), east Antarctica

Heine, Christian (PhD) The formation and evolution of accretionary crust

Weir, Felicia (PhD) Berm building processes on high-energy beaches

Thebaud, Nicolas (PhD) cotutelle From Synchrotron Characterisation of Gold-Bearing Fluids to Archaean Geodynamics: Investigating Rock-Fluid interactions in a mid-Archaean Foliation Triple Junction (Warrawoona Syncline, WA)

Enrolled 2006
DePaoli, Matthew (PhD) High-Pressure Granulite To Eclogite Facies Metamorphism: Mechanisms Of Formation And Tectonometamorphic Implications, Fiordland, New Zealand

Lee, Sareena (MSc) Modelling contaminant transport in the Port Jackson Estuary
Thornborough, Kate (PhD) Effects of Climate Change on Reef growth & Development of the southern GBR

Continuing 2006
Austen, Felicity (PhD) Biogeochemical Processes & Stormwater Remediation

Clarke, Stuart (PhD) Mantle convection and the effect of dynamic topography on the crust

Daniel, James (PhD) Sediment Dynamics on a Tide-Dominated Inner Shelf, Torres Strait

Davis, Brett (PhD) Primary Sources of Stormwater Contaminants in a Highly Urbanised Catchment of Sydney Harbour, Australia

Duclaux, Guillaume (PhD) Characterization of energy and mass transports in the continental lithosphere at the Archaean-Proterozoic transition: Insights from Terre Adélie (East Antarctica) and Gawler Craton (South Australia)

Dicaprio, Lydia (PhD) The dynamic history of the Australian Region since the Mesozoic

Whittaker, Joanne (PhD) Reconstruction of plate movements in and around the Indian Ocean

Apostolatos, Carmen (MSc) Spatial and temporal change in heavy metal concentrations in the Port Jackson estuary using the Sydney Rock Oyster (Saccostrea glomerata)

Hunt, James (MAppSc)

Rochford, Louisa Margaret (MSc) Stormwater Inputs of Trace Elements to Port Jackson

Olmos, Marco (MSc) Heavy Metal Contamination in NSW Estuaries
Honours Research

Geography

The Honours program in Geography is an additional one-year period of study taken following the completion of an undergraduate degree. The purpose of the program is to pursue in depth research on a specific topic—providing skills for those wanting an academic career, to advance potential employment opportunities, or simply to allow students to further explore the intricacies of a topic about which they are enthusiastic. In 2006 21 students successfully completed Geography Honours degrees in the Faculties of Science (B.Sc., B.Sc. (Marine Science) and B.Sc. (Environmental Science)), Arts (B.A. and B.Lib.Stud.) and Economics & Business and a number of these have continued on to pursue postgraduate studies. Other students have obtained employment in a variety of exciting fields, doing important work for government agencies, private companies and for Non-Government Organizations. The exemplarily work of Geography Honours students at the University of Sydney has been recognized through the receipt of several awards for presentations made at the Geography Honours Conference of the NSW Geographical Society. In 2005, Sophia Alison received a commendation for her presentation from the Jim Rose Award Committee while in 2006 both Vivira Cadungog and Anna Warr received commendations.

Geography Honours theses completed in 2006

Alison, Sophia: The ‘branding law of corporate social responsibility’ in the Australian processing tomato industry (Dr Bill Pritchard)

Begg, Robbie: Culturing commitment: serious leisure and the folk festival experience (Prof John Connell)

Brittain, Claire: From management to advocacy: positioning community landcare in native vegetation debates (Dr Bill Pritchard)

Brown, Lionel: Orbiting Oberon: contemporary migration in an Australian country town (Prof John Connell)

Cadungog, Vivira: Modelling estuarine morphological change (Dr Peter Cowell)

Denby, Leanne: Action on climate change at the local level: worthwhile or futile? A look at local councils within Sydney (Dr Phil McManus)

Doyle, Kate: Information networks in peri-urban aquaculture. How does the context of peri-urban Pathumthani Province, Thailand, affect information networks in tilapia aquaculture? (A/Prof Phil Hirsch)

Giordano, Maia: The making of a child-friendly city: exploring a rights-based approach to children at the local level (Dr Kurt Iveson)

Hardwick, Sarah: The implications of beach type for the fate of marine oil spills (Dr Peter Cowell)

Harris, Celeste: Impact of artificial entrance opening on water-storage capacity in an intermittently closed and open coastal lagoon (Dr Peter Cowell)

Howcroft, Emma: Lands, brands and wine bottle labels: the consumption and commodification of Coonawarra (Dr Bill Pritchard)

Hutson, Melanie: A green revolution? Australian businesses and ISO 14001 environmental management systems certification (Dr Phil McManus)
Liew, Stephanie: Oh, the places you’ll go! Singaporean migration to Sydney (Prof John Connell)

McGrath, Larry: Towering incentive: procuring globality through skyscraper construction (Dr Kurt Iveson)

O’Brien, Anne: Just transitions in the Hunter? Entitlement and responsibility in the BHP Newcastle steelworks closure, and lessons for environmentalists challenging the Hunter coal industry (Dr Phil McManus)

Parris, Connie: Mistletoe: ‘mate or menace’? Factors that influence the degree of infestation (A/Prof Deirdre Dragovich)

Rae, Elspeth: The morphodynamics of Deeban Spit, Port Hacking: a dynamic estuarine spit (Prof Andy Short)

Schapira, Ariel: Refern, Gateway to Waterloo: the changing role of the state in urban development—a case study of the Redfern Waterloo Authority (Dr Kurt Iveson)

Swan, Alexandra: The geomorphic effects of the removal of a large dam from an ephemeral river system in central western NSW, Australia (Dr Mel Neave)

Verdich, Madeleine: How can Launceston “get it”? The attraction and retention of the creative class (Dr Bill Pritchard)

Warr, Anna: Red earth, blue sky: Australian Geographic’s image of Australia (Prof John Connell)

Geology & Geophysics

Geology & Geophysics Honours theses completed in 2006

Bray, Andrew: Observations and applications of guided electromagnetic waves excited by a borehole radar (Prof Iain Mason)

Cruickshank, Bride: Modelling nutrient load to the Port Jackson Estuary, Australia (Dr Gavin Birch)

Dryburgh, Matthew: The origins and composition of coloured laminae in sediment from Lord Howe Rise, Tasman Sea (Dr Julie Dickinson)

Harvey, Sophia:

Herold, Nicholas: Coupled Land and Atmosphere Simulations of the Miocene Climatic Optimum (A/Prof Dietmar Muller and Dr John You)

Jones, Glynn: Terrace Structures in Borehole Radar Data (Prof Iain Mason)

Keenan, Scott: 3D Rock Mass Modelling by Geophysical Methods (Prof Peter Hatherly)

Moran, James: Igneous intrusion in the Dendrobium area, Southern Coalfield (Prof Peter Hatherly)

Roediger, Anita: Brittle faulting of the George Fisher North Deposit, North-western Queensland, Australia (Dr Patrice Rey)
School Units

AMRC

The Australian Mekong Resource Centre is a University Centre based at the School of Geosciences and is engaged in outreach-oriented research on environmental, natural resource management and social issues associated with development in the Mekong Region. AMRC works with NGOs, government and a range of research partners in Australia and the countries of the Mekong Region. AMRC receives core support from the Rockefeller Brothers Foundation and project support from a wide range of sources. AMRC has ongoing work on fisheries, forestry and other resource and environment issues, but recent work has been increasingly focused on water in an international development context, for example:

- AMRC is running a three year Discovery Project funded by the Australian Research Council on risk construction and distribution associated with water resource infrastructure in the Mekong Basin
- AMRC is conducting a research project for the Australian Water Research Facility on Water Governance in Context: Issues for Development Assistance
- AMRC Director Associate Professor Philip Hirsch is a lead writer on the International Water Management Institute’s river basin management chapter for its global Comprehensive Assessment on freshwater.
- AMRC is conducting a study of water governance in the Mekong Basin and the role of the Mekong River Commission

In addition, AMRC is involved in a range of projects and other activities, for example:

- AMRC coordinates the Mekong Learning Initiative, a curriculum sharing and collaborative research program on natural resource management involving nine universities in five countries of the Mekong Region (supported by Oxfam America and the Open Society Institute). In 2004, ran two regional workshops under this program.
- AMRC is the Australian Partner organisation for a number of Youth Ambassador placements in the Mekong Region
- AMRC serves as a base for a range of postgraduate and Honours thesis projects
- AMRC also helps run the Southeast Asia Field School, which in January 2006 took 22 geography students to Vietnam, Laos and Thailand for five weeks.

The Administrator is Dr Doug Bailey. Further information on AMRC can be found at:

Marine Science

There were a number of developments in the teaching of Marine Science at Sydney during 2005. All units were standardized to a 6 credit point size, during 2004 and the Intermediate units “came on-line” during 2005, meaning all units are now worth 6 credit points. This required some change in content, particularly since the loss of the Marine Techniques unit meant the incorporation of this content within the remaining 3 Intermediate units, and the inclusion of tutorials into the teaching where previously only lectures were given. The tutorials have been approvingly accepted by the students. The inception of Advanced units also required some changes to the teaching. Student numbers were similar to 2004 across the board but there was a significant decrease in non-Science students taking Intermediate MARS units due to the fact that the Faculty of Arts had withdrawn Marine Science as a Science subject that their students could take. Measures have been taken to redress this issue with the Faculty of Arts and it is hoped that 2006 will see a reversal of this policy.
In the postgraduate coursework program, Applied Science (Coastal Management), student numbers enrolling specifically in this program remain low (~8), although numbers in the individual units (~15) are reasonable due to intake from other programs such as Environmental Science.

**USIMS**

The University of Sydney Institute of Marine Science (USIMS) coordinates the teaching program and research in marine science and promotes interdisciplinary research across the University of Sydney. It also leads the University’s participation in the Sydney Institute of Marine Science (SIMS) which opened in Nov 2005 (then called the Sydney Harbour Institute of Marine Science).

Two significant developments during 2006 were the consolidation of participation in SIMS, and the success in obtaining substantial funding together with other SIMS members to operate the NSW Node of the Integrated Marine Observing System (IMOS), a capability in the National Collaborative Research Infrastructure Strategy (NCRIS) program. SIMS is a consortium of the Universities of Sydney, NSW, Macquarie University and University of Technology, Sydney and is located at Chowder Bay near Middle Head on Sydney Harbour.

SIMS will operate the NSW IMOS node instrumentation moorings as part of the Australian National Mooring Network and coordinate the use of national IMOS facilities in the NSW region. NCRIS funding of $2.4 million over four years has been allocated to NSW IMOS and an additional amount of approximately $2.9 million will be provided as capital, operating costs, and in-kind by Sydney Water, Manly Hydraulics Laboratory, NSW Dept. of Environment and Conservation and SIMS. In addition, there are two national IMOS facilities operated through SIMS. One is the Autonomous Underwater Vehicles (AUVs), operated by the Australian Centre for Field Robotics at the University of Sydney ($400k NCRIS funding and $655k in kind from the University). The other is the Australian Acoustic Tagging and Monitoring System, operated by Macquarie University ($1.74M from NCRIS and $2.6M from other sources). USIMS is also a partner in the Acoustic Observatory facility operated by Curtin University ($700k from NCRIS and $600k from other sources).

The One Tree Island Research Station in the southern part of the Great Barrier Reef is a University facility, directed by Professor Maria Byrne. This is the first ‘normal’ year with the completion of the building and boat. The new boat is fully equipped and will be able to be used for large groups of students. There has been a restructure of staff and this will be a considerable cost saving, and the facility is almost breaking even. The facility was successful in obtaining a large equipment grant that will be used for 2 or 3 components including a swath mapper for the boat and AUV. The new boat will enable blue water research for post graduates Possibilities for linkage grants with the Capricorn bunker group and different consultancies. To mark the upgrade, a secure student award has been offered. Two positions will be available for awards over a 3 year period for $3000/annum.

USIMS is participating in BlueNet, the Australian Marine Science Data Network linking the data repositories and marine resources in academic and government institutions. It is an extension of the nation’s marine on-line, virtual facility – the Australian Ocean Data Centre Joint Facility. During 2006, A/Professor Dietmar Müller was appointed to direct this program within the university (the BlueNet “Champion”) and Edwina Tanner was recruited as the data administrator/curator.

The Australian Marine Mammal Research Centre (AMMRC) is a joint program between the University and the Zoological Parks Board of NSW, and is located at Taronga Zoo. The zoo is completing a $65 million facility, “Great Southern Oceans” for housing the seals and this includes a laboratory complex with wet and dry laboratories and office accommodation for staff and students.
Project SEA SERPENT was successful in obtaining an ARC linkage grant with Woodside and Santos for almost $500k over the next three years in a collaboration led by Dr Adele Pile at the University of Sydney. The collaboration involves research groups from the Universities of Western Australia, Wollongong and Hawaii, and the University of Technology, Sydney, as well as Sydney. Directorship of USIMS passed from A/Professor Dietmar Müller to Adjunct Professor Doug Cato during the year. Dietmar was the founding director and we thank him for his efforts in establishing USIMS.

**CRC Mining**

**Geophysical Imaging Group**

The aim of the Cooperative Research Centre for Mining is to significantly enhance mining industry performance in terms of economics, safety and environmental impact. This is to be achieved by working on:

- reducing short-range geological uncertainty,
- advanced monitoring and control of machines,
- characterising and controlling the overall mine production system, and
- introducing radically new mining methods.

The Geophysical Imaging Group at the University of Sydney undertakes research for the CRC’s Geological Sensing Work Area. For the past year, work has focused on development of seismic, wireline logging, borehole radar and interactive visualisation and interpretation tools.

Field work continues to be undertaken in mines in Australia, South Africa and Canada. There is close collaboration with the mining industry professionals in those countries. The Australian Coal Association Research Program also supports our activities with grants in borehole log analysis and seismic inversion. Close collaboration continues with the University of Stellenbosch in South Africa with reciprocal visits being made by postgraduate students and research fellows from both groups.

In 2006 the group was made up of the following staff and students from the School of Geosciences.

- Prof Peter Hatherly,
- Prof Iain Mason,
- Dr Jonathan Hargreaves,
- Dr Carina Simmat,
- Mr Tim Sindle,
- Mr Phillip Manning,
- Ms Margarita Pavlova,
- Mr Takeshi Sato.

In addition, for many of our projects we worked closely with Dr Binzhong Zhou of CSIRO Exploration and Mining, Brisbane.

**Environmental Science**

TBA
The second “University of the Sea” training program took place in the Tasman Sea region onboard the research vessel Marion Dufresne, from 7th to 26th February, 2006. During these 20 days the ship sailed two legs: Auckland-Noumea (7th to 11th) and Noumea-Sydney (12th to 26th). Nineteen students and four staff participated. The students came from 7 countries (Fiji, Indonesia, Republic of Korea, Solomon Islands, Sri Lanka, Australia and New Zealand), with a wide range of backgrounds, from oceanography to biology to physics to engineering to geosciences. Most were PhD and MSc students, with some doing fourth year science Honours. Two were early career scientists in Indonesia and Sri Lanka. The staff consisted of Associate Professor Jock Keene (Cruise Leader, University of Sydney), Professor Greg Skilbeck (University of Technology, Sydney), Dr Julie Dickinson (University of Sydney) and for the first leg only, Professor Patrick DeDecker (Australian National University).

During the first leg the ship was in transit as there was no formal research program, however underway data was collected. The students had lectures on seafloor mapping, ocean productivity, paleoclimate, oceanography and deep sea drilling results. In the afternoons they were divided into three groups and did practical exercises on navigation, swath mapping bathymetry, seismic reflection profiling, ocean properties, coring techniques and analysis of sediment cores using the Multi Sensor Track. A plankton tow allowed students to examine the microscopic life in the ocean. This was interspersed with tours of the ship’s winches, bridge, engine room and safety training. The day before the ship reached Noumea was a Conference Day, when students gave oral presentations of their research projects. For many it was their first public presentation and for some, their first given in English.

The cruise was part of a cooperative research program exploring the sea floor on either side of the France/Australia Exclusive Economic Zone boundary. This leg of the cruise was named MD153 and the three research projects were ZoNéCo 12 (after the zone of economic cooperation), AUSFAIR (after the Fairway sedimentary basin that occurs beneath the sea floor in this area) and climate change. The scientists had the projects funded through their institutions: Geoscience Australia, Institut Francais pour l’Exploitation de la Mer (Ifremer, France) and Institut de Reserche pour le Developpement (IRD, New Caledonia).

The overall aim of the research was to determine the nature of particular seismic reflectors and young fault lines and folds in the sediments discovered on previous cruises, to see if they were related to methane gas or hydrothermal fluids. Three sedimentary basins (New Caledonia Basin, Fairway Basin and Capel Basin) were investigated by:

- Collecting 40 meter long Calypso Cores and heat flow measurements over areas of possible fluid migration to the seafloor from gas hydrates (‘frozen’ methane) or other sources.
- Acquiring swath bathymetry, sub-bottom seismic profiles, gravity and magnetic data on transits to and from the sampling sites.
- Dredging to determine the geology of the basement and syn-rift rocks on the eastern flank of the Lord Howe Rise.

The Calypso Corer was also used to obtain a long paleoclimate record from the New Caledonia Basin, which will provide information on seasurface temperature and plankton productivity for the past 600,000 years.
From day one the students were fully integrated with the research. The Chief Scientists briefed the students on the program and other scientists gave lectures on their special interests. Students were divided into six teams to stand watch under the supervision of the research scientists. The ship works 24-hours a day, and the students had 4 hours on watch followed by 8 hours ‘off’, during which time they were preparing reports and their group poster. While on watch, the students were trained in various oceanographic techniques including: piston coring, dredging, CTD, XBT, magnetometer, gravity meter, plankton tows, seismic reflection profiling, multibeam mapping and navigation. The student watchstanders, under the direction of a senior scientist, were responsible for carrying out the research program during their watch. This involved surveying the sea floor for the best sampling site, monitoring underway data collection, sampling methods and procedures, processing and logging the samples, core analysis using the Multisensor Track, sub-sampling for shore-based studies and archiving all samples in cool-rooms onboard.

This was a unique opportunity for practical oceanographic research training. The students gained skills by doing, by working in a team, and by communicating the results. A reception was held onboard when the ship reached Sydney. The French Ambassador to Australia presented each student with a Certificate confirming their participation and completion of the training program and research tasks. Post cruise all students were sent a cd containing a representative selection of the collected data (3.5KHz seismic profiles, cores, CTD, MST, dredges, heat flow, multibeam), Power Point lectures presented, a preliminary cruise report and ship track. Since returning to their home institutions, students have given talks on their experience at sea and they have reported that there was widespread interest in the opportunity provided by the University of the Sea.
Seminars

Mekong Discussion Group

The AMRC hosts a fortnightly seminar series, known as the Mekong Discussion Group, during the University semester. Students, researchers and others are invited to present seminars on contemporary issues related to the Mekong Region. The group provides participants with the opportunity to meet and network with researchers and groups involved in a wide range of initiatives in the Mekong Region and Australia.

Time: 4:00-5:00pm on the advertised dates
Where: The Conference Room (Rm 474), Madsen Building, University of Sydney

7 April Mekong Water Governance Project. Presented by Phil Hirsch (AMRC Director), Kurt Morck Jensen (DANIDA), Naomi Carrard (AMRC Research Assistant)

10 March Southeast Asia Field School 2006: slide show and report back by students. Presented by 2006 Southeast Asia Field school students

5 May SPECIAL SEMINAR IN HONOUR OF DARARAT KAEWKUNTEE: Post-tsunami Integrated Coastal Zone Management in Thailand. Presented by Andy Short, Phil Hirsch, Bob Fisher, School of Geosciences

12 May Environmental law in the Mekong: the Mekong Agreement. Presented by Ben Boer, Professor in Environmental Law, Faculty of Law

19 May GIS in Cambodia. Presented by Kath Sund, Living with heritage GIS Coordinator, School of Geosciences

26 May The involvement of French NGOs in Laos. Presented by Francois Guegan Researcher, formerly Universite de haute, Bretagne

28 July Report on AMRC Political ecology of risk project. Presented by Andrew Wyatt, AMRC Research Program Manager

11 August Biopiracy in Thailand: threats to traditional knowledge and bio-resources, emerging norms and potential solutions. Presented by Daniel Robinson, PhD student, School of Geosciences

23 August The struggle for democracy in South-east Asia. Presented by Giles Ji Ungpakorn, Faculty of Political Science, Chulalongkorn University, Bangkok

25 August Sustainability codes in the global coffee sector: research findings from India and implications for Vietnam. Presented by Jeff Neilsen, Postdoctoral Research Fellow, School of Geosciences

8 September Thai politics and political economy: how different is the lead-up to the second general election of 2006? Presented by Gavan Butler Honorary Associate, School of Economics and Political Science

13 October Book launch: In the Naga’s Wake. Presented by Mick O’Shea
The TGIF (Thank God it’s Friday) presentation series continued its long history with many intriguing and multifaceted talks held throughout the academic year. This year, the seminar series was relocated to a new and prestigious building, ‘The Demountables’, with many perks including, air conditioning for our long and hot Australia summers. Following a long and firmly entrenched tradition, the TGIF seminars presented a series of informative informal talks, presentations and/or discussions given by our fellow Geoscience colleges, students, and friends in a friendly environment, with modest finger food and beverages. In addition, TGIF provided a relaxed environment for the discussion of current research undertaken by local and visiting academics, friends of the School, and globetrotting postgraduate students. The student contingent of presentations consisted of scientific fieldwork/expedition slideshows from various field research areas, as well as, research based honours presentations. Essentially, and most importantly, the 2006 TGIF series provided an effective method in displaying to the school’s community, the cutting-edge science conducted by various people within the school. To encourage attendance at the weekly talks by a broader audience, coloured notices were displayed throughout the Demountables, and undergraduate Geosciences students were included in the TGIF mailing list (some might say spammed). After an initial shaky start, (i.e. times and location) the seminar series hit the ground running, with the presentations being held at the 4.30pm time slot every Friday during semesters.

The TGIF series in 2006 covered a wide range of topics including results from Australian and overseas fieldwork. These included a plethora of presentations given by our highly specialized in-house academics:

- Marco Olmos – ‘The muddy search for indicators of estuarine health’,
- Dr. Elaine Baker – ‘UNEP shelf programme in the South West Pacific’,
- Dr. Tom Hubble – ‘Likelihood of recurrence, expected damage, the politics, interesting shots of standing astride the San Andreas’,
- Prof. Peter Hatherly – ‘Characterising the ground - The potential for wireline logging’,
- Dr. Patrice Rey – ‘The role of the mantle in Archaean orogenic processes’,
- Dr. John You – ‘Oceans role in climate change’ and,
- Assoc. Prof. Gavin Birch – ‘Dining on Dioxin’, just to name a few.

Visiting academics and friends presented various recent findings and insists, including:

- Dr. Pascal Philippot – ‘Synchrotron techniques applied to Archaean problematics’,
- Dr. Armstrong Osborne – ‘Illite dates from the world’s oldest caves’ and,
- Dr. Dan Penny – ‘The greater Angkor project’.

In early March and late October, honours students were called upon to give a series of presentations on their current research. Presenting them with the opportunity to practice public speaking and get some preliminary feedback on their research from their peers and the School’s knowledgeable Academics.
# Presentations / Prizes

## Earth Foundation Scholarships and Company Awards

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<thead>
<tr>
<th>Year Entering</th>
<th>Name</th>
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<tbody>
<tr>
<td>1st Year</td>
<td>Katherine Silversides</td>
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<td>Zoe Hatzopoulos</td>
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<td>Grace Shephard</td>
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<td>Jacqueline Murray</td>
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<td>2nd Year</td>
<td>Vashti Singh</td>
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<tr>
<td>Coffey</td>
<td>Kara Matthews</td>
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<td>Geosciences</td>
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<td>Scholarship</td>
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<td>3rd Year</td>
<td>Samantha Clarke</td>
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<td>URS Scholarship</td>
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<td>4th Year</td>
<td>Joshua Knight</td>
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<td>Ken Richards</td>
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## University and School Awards

### Undergraduate Awards

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<th>Scholarship</th>
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<tbody>
<tr>
<td>CE Marshall Scholarship</td>
<td>Amanda Murphy</td>
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<td>University Prize for Geology</td>
<td>Amanda Murphy</td>
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<td>Jack Mahoney Memorial Prize</td>
<td>Katherine Silversides</td>
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<td>Olga Marion Browne Prize for Field Work</td>
<td>Kara Matthews</td>
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<td>Deas -Thomson Scholarship in Mineralogy</td>
<td>Halina Kuczma</td>
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<td>Fugro Geophysics Prize</td>
<td>Hannah Power</td>
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<td>Prospects Supplies Pty Ltd - Sunto Prize</td>
<td>Halina Kuczma</td>
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<td>Quodling Testamonial Prize</td>
<td>Samantha Clarke</td>
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<td>Leo A Cotton Prize in Exploration Geophysics</td>
<td>Hannah Power</td>
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<td>Sheila Mitchell Swain Memorial Prize</td>
<td>Halina Kuczma</td>
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<td>Edgeworth David Prize in Paleontology</td>
<td>Callista Haris</td>
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<td>Professor Griffith Taylor Prize for Geography</td>
<td>Katherine Wilson</td>
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<td>Professor James McDonald Holmes Prize for Geography</td>
<td>Katherine Wilson</td>
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<td>S&amp;L Raam Prize</td>
<td>Halina Kuczma</td>
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<tr>
<td>Slade Prize for Geography 1 Practicals (shared)</td>
<td>Anastasia Sintchenko</td>
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<td>Tahria Sheather</td>
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<td>WH Maze Prize for Intermediate Geography</td>
<td>Amelia Roberts</td>
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41
<table>
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<tr>
<th>Scholarship/Medal</th>
<th>Winner</th>
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<tr>
<td>GS Caird Scholarship for Geography 3</td>
<td>Sophie Pieters-Hawke</td>
</tr>
<tr>
<td>Rev AS McCook Memorial Scholarship for Geography</td>
<td>Bradley Ruting</td>
</tr>
<tr>
<td>Geological Society of Australia</td>
<td>Halina Kuczma</td>
</tr>
<tr>
<td>Edgar Ford Memorial Scholarship for Geography</td>
<td>Tamsin Lloyd</td>
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</table>

**Postgraduate Awards**

<table>
<thead>
<tr>
<th>Scholarship</th>
<th>Winner</th>
</tr>
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<tbody>
<tr>
<td>George Harris Scholarship</td>
<td>Matthew de Paoli</td>
</tr>
<tr>
<td>Deas-Thomson Scholarship in Geology</td>
<td>Matthew Lawrence</td>
</tr>
<tr>
<td>L A Richardson Memorial Prize</td>
<td>Andrew Bray</td>
</tr>
<tr>
<td>Elliston Medal</td>
<td>Nicholas Herold</td>
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</tbody>
</table>

*2006 Geoscience Prize recipient, Vashti Singh with her proud family at the Nicholson Museum*