Mark Wainwright farewells the Faculty p.4

Profile – Mah Bow Tan p.15

Faculty History p.16
This year has been one of transition for the Faculty and the University. After 10 years as Dean, during which Engineering at UNSW has become firmly established as Australia’s leading engineering faculty, Professor Mark Wainwright has taken up the position of Deputy Vice-Chancellor (Research and International). I have been privileged to serve as Acting Dean while the search for a permanent successor was underway and I’m pleased to announce that the new Dean will be Professor Brendon Parker, who comes to us from his position of Dean of Engineering at The University of Wollongong.

At the same time, the University itself is undergoing unprecedented change, with Council currently working towards the appointment of a new Vice-Chancellor, who will replace Professor John Niland in 2002. New Deans have or will be appointed for the Faculties of Science, Law, Arts and Social Sciences and Commerce and Economics. The new Faculty of Science has been forged out of the old Faculties of Science and Technology and Life Sciences and we look forward to even closer collaborations with this Faculty in the future. We have two new programs shared with Science, the Bachelor of Engineering in Bioinformatics and the Bachelor of Engineering in Photonics, as well as continuing our current combined degree programs.

From the beginning of 2001, the Master of Technology Management program has been administered by the Faculty of Commerce and Economics, as will be the Master of Business and Technology from the beginning of 2002. Our two Faculties have been working to reorganise the way the program is administered, while strengthening its distance-delivery, with the concept that the resulting teaching model will form the basis for other initiatives with masters programs.

The Institution of Engineers, Australia (IEAust) has accredited all the Faculty’s undergraduate programs this year, and during the process were most complimentary about the Faculty’s teaching programs in all Schools. A special word of thanks is due to Professor Francis Tin-Loi, for guiding our submission, and for the special work he has done this year as Acting Associate Dean (Academic).

The Faculty continues its research successes. We have increased the number of ARC Discovery grants this year to 21, and continue to be successful with a further 21 Linkage grants. We have also enjoyed successes in collaboration with other institutions, and in other grant programs. Particular congratulations go to...
Dear Readers,

We’ve received no letters this issue — and considering the more than 200 responses to our survey I’m not surprised! This is just a brief note to remind you that we’re very keen to hear from you and to have your opinions, both positive and negative, on UNSW ENGINEERS and any other matter of interest.

Also, in place of the letters in this issue, we thought you might be interested to share with us some of the fascinating responses to the survey from those marked ‘okay to share’.

There was Professor Leslie Woods, retired chair of the Mathematical Institute at Oxford University, who referred to “The excitement of the creation of the University in the 1950s”, and to “JP Baxter trying to run the University as a business, with himself as managing director”.

And David Hughes (BSc (Industrial Chemistry) ’79) who especially recalled “Mark Wainwright — a loud clown who was passionate about his stuff (Chemistry that is!)”.

Ken Findlay (BE (Mining) ’52), along with many others, made the comment about General Education subjects that, “At the time we begrudged the time taken up in what was a very demanding course. In retrospect I would not change a thing. These subjects were vital to ‘round out’ our education.”

Monty Seton (BE (Mechanical) ’95), recalled “hard yakka, Foundation Day, the smell of the library, bands, friends and discovery”.

And Judy Yiu-Sze Cheng (BE (Computer Engineering) ’97), remembers students from Computer Engineering being seen as “geniuses, while those from Commerce and Economics and Law were seen as social function coordinators.” She also says that her career highlight to date was “coming into the office for standby in the early hours of this millennium, while the whole city [was] still in bed recovering . . .”

Though Peter Stuart’s (BE (Mechanical) ’73) university focus seemed to involve trying to get a girlfriend. “There were only two girls out of 100 students in my year. I tried to get to know girls doing Arts, but fear and trepidation would set in as soon as I announced I was doing Engineering. Engineers seemed to have a bad reputation.”

Given the detail and warmth of the memories of those who responded to the first round of the survey, we’re hoping that those who didn’t find the time last issue, might complete a survey now. Either way, we look forward to hearing from you and take the opportunity to wish you a wonderful Christmas and prosperous 2002.

Blanche Hampton, Editor.

To continue our attempts to more accurately represent the Faculty’s history, if anyone knows the names of the students in this classic UNSW photograph (left), would they please let us know.

Do you know someone who would like to receive UNSW ENGINEERS?

Please contact Marjorie Fox, at the Faculty of Engineering Administrative Unit, email <marjorie.fox@unsw.edu.au>, phone +61 2 9385 4023, fax +61 2 9385 5456.
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email <unswengineers@eng.unsw.edu.au>
Professor Martin Green, who was awarded one of 15 prestigious Commonwealth Fellowships. In the light of our close relationship with Physics and Quantum Computing, we might also claim a second Commonwealth Fellowship recipient, Professor Bob Clark.

The Commonwealth is introducing new methods of funding for postgraduate students, and the Faculty is working to attract research students, particularly into the Master of Engineering program, where we have an innovative scheme for students wishing to continue with a research degree immediately following their Bachelor of Engineering at UNSW. These developments could also prove popular with students from Europe and Scandinavia who may wish to complete the last two years of a five-year program at UNSW, having started it in their home country.

The Faculty intends to work more closely with industry and with all our alumni, developing opportunities to expand the Faculty’s role in Australian science, engineering and technology. A dedicated position will be created to facilitate this process, with the appointee working within the office of Public Affairs and Development.

As a Faculty, we are known for our capacity to initiate and embrace change and we are looking forward to what will be a new era for Engineering at UNSW.

Associate Professor Tim Hesketh
Acting Dean, Faculty of Engineering

VALE Emeritus Professor Lou Davies 1923—2001

First appointed as a Visiting Professor of Electrical Engineering in the School of Electrical Engineering in 1965, Dr Lou Davies spent two days a week at UNSW and three days with Amalgamated Wireless (Australasia) (AWA), working untenured at the University for nearly 20 years. He was also Head of the Department of Solid-State Electronics, later the Department of Electronics, and believed in having strong links between industry and universities. In 1985, he reduced his time at the University to that of Honorary Visiting Professor, as his duties as General Manager of AWA’s Microelectronics Division took much more of his time. He took his BSc at Sydney University and his PhD at Oxford. His research interests were primarily in semiconductor and device physics, integrated circuits, electrets and surface acoustic waves. He was made an Officer of the Order of Australia in 1978 and an Emeritus Professor in 1991, and was a Fellow of the Australian Academy of Technological Sciences and of the Australian Academy of Science.

Honorary Doctorates since June 2001
Professor Brian Anderson (Computer Science and Engineering)
Professor Neville Roach (Computer Science and Engineering)
Mark Wainwright was appointed a lecturer in the then School of Chemical Technology in the Faculty of Applied Science in 1974. He had never intended to take up an academic career, but after completing a Master of Applied Science degree in Chemical Engineering at the University of Adelaide, and a PhD at McMaster University in Canada, chance saw him come to Sydney. And in a forerunner of what was to become Mark Wainwright’s innovative and informal style, he didn’t attend an interview for the position, but applied for it by audio cassette.

“I told the Head of School, Professor Fred Ayscough, how much he needed me and how really delighted I was to teach thermodynamics,” laughed Mark. “I had always hated thermodynamics, but coming in on the ferry everyday from Mosman I taught myself the subject, and did a pretty good job of teaching the students I think.”

Mark had been conducting large-scale research in Canada with good industry funding, so was unsettled by his first research budget with the School of $250. He persisted though and was rewarded by the first of his honours year students, Neil Foster, now a leading UNSW researcher. He then began supervising a run of top PhD students, went on to obtain an ARC grant at his first attempt in 1975, and hasn’t looked back. Mark’s most well-known research is in skeletal metal catalysis, for which he has won significant recognition.

Mark became Head of the Department of Industrial Chemistry in 1981 and then Head of the Department of Chemical Engineering in 1989, when he was awarded a Personal Chair for his research in catalytic reaction engineering. He is one of only two academics in the Faculty of Engineering to hold this award. As Head of Chemical Engineering, he also began encouraging the School to move to the Faculty of Engineering. “It was a very difficult process because Chemical Engineering and Industrial Chemistry (CEIC) was seen as the jewel in the crown of the Faculty of Applied Science and there was a lot of pressure to stay there. In the end though, CEIC moved to the Faculty of Engineering where it has continued to thrive.”

Dean of Engineering (1991–2000)

“When I was appointed Dean of Engineering on 1 June 1991, the Faculty was very traditional with five Schools, Mechanical, Civil, Electrical, Computer Science and Engineering, and Surveying, which had split from Civil some years before. The disciplines were quite different too. Electrical Engineering was all about electrical power generation and transmission; Mechanical Engineering was about manufacturing and mechanical engineering in general; Civil Engineering was always construction, water engineering and hydrology and hydraulics and transport and so on. The School of Computer Science and Engineering had broken away from Electrical Engineering and Computer Science earlier that year, and the Graduate School of Biomedical Engineering was still a research centre started by Peter Farrell, now CEO of ResMed.

“When I took over the Deanship, the Faculty Unit consisted of Ann Baker, a part-time casual clerk, a half-time administration officer and a Faculty Photographer. My first act was to appoint Maureen Noonan from Chemical Engineering as my PA and then I appointed a Senior Administration Officer, Robyn Horwood. The Heads of Schools had been crying out for an effective Faculty Unit, and I did my best to supply them with one. We’ve come quite a way since then, and I believe we’ve had the best Faculty Unit in the University by a long way.

“As I leave the Faculty, we have essentially doubled the number of Schools and introduced many new degree...
programs, many of which are unique to UNSW and most of which were firsts in Australia, so it is quite a different Faculty. We now have Schools of Biomedical Engineering, Chemical Engineering and Industrial Chemistry, Computer Science and Engineering (now the biggest School in the University), Electrical Engineering and Telecommunications, Mechanical and Manufacturing Engineering, Mining Engineering, Petroleum Engineering, Photovoltaic Engineering and Surveying and Spatial Information Systems. The changes in the Faculty over the last decade have been much greater than any other period.

Under Mark Wainwright, the Faculty expanded its research focus, took a much greater interest in international affairs, completely revamped its marketing, and began establishing important relationships with alumni. "While the Faculty was internationally known for pure and applied research and ranked among the top Australian universities in terms of research grants and publications, it is now the leading faculty of engineering in terms of attracting competitive and industry research funding.

"The previous Dean, Chris Fell, had already foreseen the benefits in internationalisation and had initiated a strong focus on international student recruitment. From that basis, I appointed Tony Robinson as Associate Dean (International), and we established our position as the national leader by a long margin. Our work internationally, particularly in Asia, has been vital to the Faculty’s success.

"In terms of marketing, engineering around the country was finding it hard to attract students and I felt we needed a quite different approach. If we just looked at what other universities did, we weren’t going to get anywhere, whereas if we looked at best practice outside, we were going to learn a lot more. I hired a marketing consultant to do a survey for us. Students are consumers whether for rock music or clothing and they are consumers of education as well. It seemed fairly radical at the time, but that report was really important and now we lead the University in marketing of education.

"The whole alumni area was somewhat neglected, a feature not unusual in Australian universities at the time. We have many great people overseas and in Australia and they contribute both time and effort into promoting the University in terms of student recruitment, research linkages and other activities.

"Another area that we really pushed and which will deliver long-term benefits is scholarships. We now have a huge program of PhD Research Scholarships, and also Women in Engineering Research Scholarships. The Heads of Schools are now convinced about the benefits and have become very good at attracting Research Scholarships and Endowments. They really got behind the drive to establish Rural Scholarships as well. Scholarships, particularly those which are endowed, are about securing the future, rather than just the present.

continued overleaf
The Co-Op Program at UNSW, introduced in the late 1980's, continues to be the leader in Australia.

"I am particularly pleased to have established a Dean’s Advisory Council. It is important to have the CEO’s of many of Australia’s leading companies give their time to provide the Faculty with the benefit of their expertise.

"Another change during the past decade has been the major refurbishment program, most notably, the new building for Computer Science and Engineering. Most buildings occupied by Engineering have undergone considerable renovation and this is planned to continue. An early regret was the removal of the Engineering Fountain, a UNSW landmark. Many staff and alumni contacted me about this loss and I have lobbied to have a new water feature developed on the site."

The future of engineering

"Engineering now is just so different from what it was, and in the last decade I’ve seen it moving into much more rapidly changing areas. There has been enormous growth in IT, but we see the pure computer sciences as getting smaller and IT which is integrated with other areas of engineering being a growth area. There will also be growth in other areas, particularly biomedical engineering and engineering aspects of biotechnology. Biomedical engineering will also support other engineering disciplines — certainly with chemical engineering, computer, mechanical, materials, electrical and telecommunications engineering and so on. Photonics is moving ahead in leaps and bounds in the telecommunications area. Mechatronics will become increasingly important as motor vehicles become increasingly electronic. I don’t have a crystal ball as to where its going, but it certainly will be a lot different than what we know now.

"As engineering is changing so our graduates will need to have a much broader approach to life. Our engineering degrees will have to be much more multidisciplinary and be more associated with engineering principles, rather than specific examples. Many people end up in management, but if they wish to stay in a technological area, technology will be changing fast, so we’ll have to focus on breadth in their education while they are here, and let them pick up specific skills once they leave.

"The roles women play in engineering will also improve over time, but it will be slow. We’re getting more women in through our scholarship schemes, and they are particularly bright students. We are trying to attract more women to the academic staff, but women are also keenly sought after by industry. Of all the women who have taken on Faculty research scholarships, none have come back to academic appointments and some have been hired by industry before they have finished their PhD’s. Industry needs the different perspective that women bring to the solution of engineering problems, so they’re in big demand."

In retrospect

"I’ve been really lucky to have great staff in the Faculty Unit, but a lot of the growth has also been due to the enthusiasm of the Heads of School. I am just so appreciative of their support . I want to wish the incoming Dean, Brendon Parker, and the Faculty all the best with the challenges and opportunities the future will bring."
Biomedical Engineering

New Web-based Biomedical Technology course by Anne Simmons

Recognising the potential of information technology to revolutionise the teaching and learning process, the School launched its first fully web-based course in July. BIOM9410, The Regulatory Requirements of Biomedical Technology, is a postgraduate subject describing the regulatory environment surrounding the design, manufacture and marketing of medical devices around the world. It seeks to equip students with a knowledge and understanding of standards and quality systems as they apply to the biomedical device industry.

Assisted by a Faculty grant, Associate Professor Anne Simmons from the School and Associate Professor Tony Koppi, Head of EdTEC, developed a concept to transform the BIOM9410 course structure into a suite of distance education resources using a hybrid WebCT/CD strategy. The traditional didactic paradigm of learning used in previous BIOM9410 courses was replaced with a student-centred, group-based, collaborative form of learning using web-based technology as the primary tool.

In the web-based course, a collection of reference materials is provided to students for reading and review. This comprises web-friendly presentations developed from previous lecture material, links to relevant references, databases and websites and presentations by industry experts describing real life experiences. The students then use this reference material to perform activity-based assignments in small groups.

The BIOM9410 course is coordinated by Anne Simmons who is currently based in Hong Kong. Anne is assessing the course in terms of ease of communicating with and providing feedback to students, levels of interactivity and communication within the student group and with the coordinator, attainment of course goals by the student group, skills and knowledge acquired by the students compared with the levels acquired using the standard didactic method and academic workload.

Biomedical Engineering is using the BIOM9410 project as a pilot program in web-based education and the experience gained will help determine the future use of this technology in the School. In any event, web-based technology offers a new and exciting tool in the lecturer’s educational arsenal.

Further information contact Associate Professor Anne Simmons at a.simmons@unsw.edu.au

Chemical Engineering

Industrial Chemistry
Supercritical Fluids by Thu Nguyen

A group of 16 research scientists, postgraduate and honours students, led by Professor Neil Foster is undertaking cutting-edge research into supercritical fluids to help revolutionise the delivery of pharmaceutical drugs such as insulin to treat diabetes, anti-virals and anti-bacterials in AIDS and cancer treatment.

Supercritical fluid technology takes a gas, alters the pressure and density to make it believe it’s a liquid and gives it greater dissolving properties. The pressure is then decreased again, so the
gas dissipates and precipitates out the materials extracted.

“We use our technology to take say, insulin, and to micronise it down to produce such a small particle that you can put it in an inhaler. The patient no longer has to worry about injecting. It's very convenient, just like using a ventolin puffer for asthma,” said Neil.

“The technology hasn’t really reached its commercial potential yet, but there is a definite market there which is not satisfied. So we are now looking at a suite of pharmaceuticals which satisfy certain criteria, as in billion dollar sales, a certain amount of patent life and would also be amenable to be delivered by an inhalant or some other control release formulation which can be commercialised.”

According to Neil, one of the greatest benefits from the project for UNSW is research quantum*, with corporate investment into the University. Biomedical company Eiffel Technology has licensed the research, with funding of $500,000 to renovate the biotechnology laboratory, and a minimum of $1,000,000 a year for five years committed to the project.

“International reputation is also of significant benefit because we are regarded as one of the best research groups in the world in what we do, and we attract overseas people here academically. Through the project we are also training good people, which goes back into the undergraduate programs, with our members lecturing students in cutting-edge science with real world applications,” said Neil.

For more information contact Professor Neil Foster on +61 2 9385 4341 or visit www.ceic.unsw.edu.au/centers/scf/

* Research quantum is part of the competitive operating grant received from the Federal Government.
will give them ownership of the project and training in management skills,” said Andrea.

“They will interact with remote communities to fully understand their needs and customs. The value of water may be very different in remote communities and they need to develop a solution that the community will use and be proud of, creating a sense of ownership.”

The Faculty of Engineering and the School of Civil and Environmental Engineering provided $40,000 to build the prototype solar desalination unit. Further funding is required to take the unit to remote Australian communities and developing countries. Companies interested in commercialisation are also sought.

For information contact Dr Andrea Schäfer at a.schaefer@unsw.edu.au or visit www.civeng.unsw.edu.au/research/solar/

Computer Science

AND ENGINEERING

Another triumph for RoboCup Champions by Claude Sammut

The UNSW team in the RoboCup Sony legged robot league successfully defended its World Championship title in the RoboCup 2001 tournament, held in Seattle, 3-10 August. This year’s team of four undergraduate students, Spencer Chen, Martin Siu, Tom Vogelgesang and Tak Fai Yik, were supervised by Professor Claude Sammut and assisted by members of the RoboCup 2000 championship team, Bernhard Hengst and Son Bao Pham.

RoboCup aims to advance robotics by harnessing the competitive spirit of researchers to create new and innovative hardware and software. In the legged league of the RoboCup tournament teams use the same Sony ERS–210 quadruped robots, so the competition is in the programming. The Sony ‘lions’ have 20 degrees of freedom, an on-board CMOS colour camera, accelerometer, infrared and foot contact sensors. The whole system is controlled by an on board MIPS R4000 processor with 32Mb of main memory. Special purpose processors handle frame grabbing and other low-level tasks. Programs for the robots are written in C/C++ and compiled on a host computer. Executable code is copied to a Sony memory stick which is inserted into the robot. Once booted, the robot operates autonomously.

The robots play on a field with three per side. Each team must write programs to handle vision, localisation (determining the robot’s position and the location of other objects), locomotion and game play. For RoboCup 2000, the UNSW team introduced a revolutionary style of locomotion and devised very fast routines for object recognition and localisation, scoring impressively over their opponents.

All RoboCup teams publish the methods they used in the previous year and since the UNSW code was available to other teams in 2001, we knew we were in for much tougher competition. Indeed, many teams improved significantly, in particular Carnegie-Mellon, our opponents in the final. However, the close competition we had expected never eventuated, UNSW taking the match 9-2. This year, the difference was not in high speed, but better tactics.

For further information contact Professor Claude Sammut on +61 2 9385 3933 or at c.sammut@unsw.edu.au

Electrical ENGINEERING AND Telecommunications

Telecommunications Research by Tim Hesketh

The School of Electrical Engineering and Telecommunications has always had particular strengths in communications, leading to the creation of the BE in Telecommunications degree program, in 1997. This allowed students to specialise from an early stage and the first cohorts of students from this program are now graduating.

At the same time, the School has undergone significant staff changes in the Telecommunications area, most significantly in the appointment of Aruna Seneviratne as Mahanakorn Professor of Telecommunications. Associated appointments have been
steadily building research strengths in important areas of telecommunications.

Research capabilities have now built to the point where the School will formalise its commitment to this area with the establishment of a Telecommunications Research Laboratory. The Laboratory has already been successful in attracting research funding from two major research awards.

The first award is to a consortium in which UNSW is one of the primary partners. The consortium will receive $14 million in seed funding to establish AMCOM Telecommunications.

The UNSW contribution to this research will concentrate in two main areas — networking and tele-collaboration. Networking technologies will be developed which will enable the provision of quality-of-service controlled IP based network services on demand and the use of these services for tele-collaboration will also be investigated.

The second award is from a long-time supporter of UNSW research in telecommunications. Ericsson Australia has agreed to become a foundation member of the Telecommunications Research Laboratory, and will engage in collaborative research into wireless internet technologies, a particular strength of both the company and UNSW.

For further information please contact Aruna Seneviratne on +61 2 9385 5389, at a.seneviratne@unsw.edu.au or visit www.eet.unsw.edu.au

Mechanical AND MANUFACTURING ENGINEERING

The Story behind the SuperCats
by Lawrence Doctors

Sydney Ferries provides marine transport on one of the world’s most beautiful and famous harbours and has been using catamarans since 1984, with nine First Fleet catamarans. Since then Sydney Ferries has operated JetCats (1990-91), RiverCats (1992-95), HarbourCats (1998), and most recently added four high-speed SuperCats for the Sydney-to-Manly route.

All recent ferries (1990 onwards) have been catamarans constructed of modern aluminium alloys and composite materials. These offer considerably higher performance than the older steel and wood monohulls, despite their much smaller size.

The older monohulls have displacements (all-up weights) of between 287 and 1140 tonnes and speeds of between 11 and 18 knots. Catamarans (excluding First Fleet vessels) on the other hand, possess displacements between 58 and 91 tonnes and travel at speeds between 22 and 30 knots.

That the SuperCats can maintain such a high level of serviceability, considering their small size and high speed, is a testament to their design. Vessel design, as with other engineering design, must contend with contradicting constraints such as payload, speed, height of waves, fuel consumption, environmental considerations (including wave generation and pollution), maintainability and, of course, safety — a
 Paramount concern to Sydney Ferries. A Review of Operations of Sydney Ferries by the New South Wales Department of Transport in August 2001 nevertheless, recommended improvements. The principal recommendation regarding the SuperCat is to fully enclose the open foredeck to protect passengers from very large waves, though this area of the deck is extremely popular with passengers. Another vital recommendation is that the sea state should be more closely monitored and that there be better communication between the Bureau of Meteorology and the skippers of the SuperCats to ensure that the significant-wave-height limitation of these vessels, 2.1 metres, is not exceeded.

All of the ferries servicing Sydney Harbour since 1990 have been designed by graduates of UNSW’s Naval Architecture Program, with some of the more sophisticated hydrodynamic calculations also being conducted at the University.

See the full Review on www.Transport.NSW.gov.au or contact Associate Professor Lawrence Doctors at l.doctors@unsw.edu.au

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**Mining ENGINEERING**

**Anglo coal graduate offer**

by Bruce Hebblewhite

In June, an open forum at Third International Underground Coal Conference highlighted the need for new graduate engineers to possess some sound, practical, hands-on mine experience. While mining engineering students have a minimum of 80 days industry experience and a number of subjects are also taught in an underground mine environment, it is becoming increasingly difficult for all students to gain sufficient practical experience before they graduate.

One of the forum participants, Mitch Jakeman, General Manager of Capricorn Coal in Queensland, then suggested that their managing partner, Anglo Coal, would take on any UNSW mining engineering student who had satisfactorily completed their course at the end of 2001, in order to give them this type of experience. Subject to conditions, any interested students are now being offered employment as an underground miner at one of Anglo Coal’s mining operations in Queensland and New South Wales.

“This allows new graduates to get critical exposure and experience to the industry, essential at the beginning of their careers,” said Mitch Jakeman. “Some will like operational areas and others will like the planning and project side of the industry. It puts the years of classroom learning into perspective and the reality of their profession into a hands-on approach.”

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Associate Professor Lawrence Doctors with one of Sydney’s SuperCats.

Mining Engineering students get vital hands-on experience.
While there is no commitment beyond this initial opportunity, if a miner's position is obtained, and the student goes on to perform well, they may progress to a mining engineering position with Anglo Coal at some future time. Some 16 students have applied and each must complete an industry medical test and submit a CV outlining their industrial experience.

"Anglo Coal is a great supporter of UNSW and this is a tremendously generous offer," said Professor Jim Galvin, Head of School. When mining engineering graduates join a company, they are often put through a graduate training program that includes one to two years in and about mining operations, and the Anglo Coal offer equates in many aspects to a graduate training program. It should also give Anglo Coal a great opportunity to look first hand at our new graduates, and make a far more indepth judgement about their capabilities for future employment within the company.

Courses offered lead to the degrees of the Master of Engineering Science (MEngSc), Graduate Diploma (GradDip) and Graduate Certificate (GradCert).

The School offers a total of 20 specialised courses, some of which are drawn from the Schools of Civil and Environmental Engineering and Geology, allowing us to offer a more comprehensive range of courses which include environmental management, reservoir geology and geophysics, and others.

All courses in the programs are designed to be undertaken externally by professionals currently working in the areas of petroleum engineering, geology and geophysics on a part-time, self-paced learning basis. All the programs are supported by state-of-the-art commercial software in reservoir simulation, well test analysis, reservoir characterisation, drilling and well design, and economics and risk analysis. Students receive fully functional copies of all the software required to complete their program of study.

The program started in second session 1999, with three students, and has increased to around 50 students with about one third from overseas. The current intake includes students from Australia, New Zealand, Indonesia, Malaysia, Singapore, Brunei, Vietnam, China, India, South Africa and Canada. The program is well regarded by industry and is increasingly being used by larger multinational oil companies to supplement in-house training and career development.

For more information contact Associate Professor Sheik Rahman at sheik.rahman@unsw.edu.au or visit www.petrol.unsw.edu.au/online/oplearn.html

Photovoltaic ENGINEERING
Industry takes up new photovoltaic technologies by Stuart Wenham

One of the world’s largest photovoltaic manufacturers, BP Solar, recently announced a five-fold expansion in their production of UNSW buried contact solar cell technology in Spain. Conventional screen-printed technology, in use since the early 1990s, will be
gradually phased out and the new facility will begin producing 60 MW per year, with potential for a further doubling in capacity. The new plant, which represents an investment of over $100 million, will begin production by the end of 2002.

Buried contact solar cells are the most successfully commercialised new photovoltaic technology worldwide, but the potential of UNSW’s new thin-film polycrystalline silicon technology, currently being commercialised by Pacific Solar Pty Ltd, is even greater, with the possibility of reducing material costs by a factor of five.

According to Professor Stuart Wenham, Head of the Centre for Photovoltaic Engineering, “Our team is particularly excited at the prospect of seeing how our two technologies compete against each other in the market place. On the one hand, buried contact solar cell technology is well established as a high performance product with good market share. In comparison, the thin-film technology has the potential to significantly reduce costs and capture a substantial share of this rapidly growing market.”

Optimism for the new thin-film technology is shared by Pacific Solar’s Managing Director, David Hogg. “We estimate that it will halve the cost of solar panels,” he said, “and begin to make solar electricity competitive with coal-fired electricity. Roof top solar panels that produce electricity at a cost approaching that of coal could be available in as little as four years.”

Professors Martin Green and Stuart Wenham have accepted positions as Research Director and Co-Director for Pacific Solar, to help ensure commercial success of the technology.

With the photovoltaic industry growing at 30–40 per cent per annum and several million photovoltaic powered houses planned for construction internationally over the coming decade, both UNSW technologies appear well-placed to capture significant market share. The commercial success of these technologies is also creating high demand for students completing PhDs in Photovoltaics and for graduates from the new BE in Photovoltaics and Solar Energy.

For more information, please contact Lisa Cahill on +61 2 9385 6155 or visit www.pv.unsw.edu.au

Surveying AND Spatial INFORMATION SYSTEMS
Antarctica — Monitoring the ice sheet by Mike Moore

Last summer, over 2,500nm south-south-west of Perth and over 400km from the nearest Australian National Antarctic Research Expeditions (ANARE) base, a diesel mechanic Graeme Wilsey, and two members of the School, Volker Janssen and Mike Moore, set up camp for a month on the Amery Ice Shelf as part of a program to monitor the ice sheet mass balance of Antarctica.

The Amery Ice Shelf, the third largest in Antarctica, is an important location for glaciologists trying to understand how the growth or shrinkage in an ice shelf is related to climate and sea level change. To aid the modeling and monitoring of the Amery Ice Shelf, numerous satellite measurement techniques were put into action. The rate of movement of the ice sheet was determined through a series of repeat GPS measurements of markers (a mixture of aluminum poles and used Holden axles!) placed in the snow surface. This project also involved a 150km kinematic GPS traverse by skidoo to measure any changes in elevation in the three decades since Australian

One of 650 photovoltaic-powered house at the Olympic Village at Homebush using high performance buried contact solar cells manufactured by BP under license to UNSW.
glaciologists carried out an optical levelling survey of the region.

For long-term monitoring, earlier in the summer we deployed six semi-permanent GPS stations around the perimeter of the ice shelf. It is hoped that data obtained will provide further information on ice shelf dynamics and its tidal motion, as well as defining the grounding zone of the Amery Ice Shelf.

The working routine on the ice shelf was completely dictated by weather conditions, but typically the winds would die down by midday, allowing a quick lunch of cheese, salami and chocolate. Around 2:00am the temperature would drop to around −30°C, and the winds would pick up again. Faced with long periods of inactivity between blizzards, the team made the most of things by trying to come up with the best possible out-dated dehydrated food mixes for dinner (I’ll swear by the fettuccini of ’88), playing chess and re-reading books.

In the last issue, we asked if anyone recalled the names of the young men in the photograph taken at the surveying camp in 1949/50 or 51. Both Frank Gardner (BE (Mining) ’52) and Ken Findlay (BE (Mining) ’52) have provided information leading to the following captions which we can now put to this picture. The highly sought-after Faculty of Engineering Parker pens have been forwarded to Frank and Ken in our appreciation of their excellent memories!

1. Ken Findlay identified the picture as a survey camp at Castlereagh in 1949 or 1950: Left to right — Len Wright, Frank Gardner (Frank thinks it’s him too!), Tim (Jim?) Muir and Matt Rundle

2. Frank Gardner described the photo as being of some of the first Mining Engineering students at a survey camp at Castlereagh 1950/51: Left to right — Len Wright, Frank Gardner, James Muir and perhaps Kenneth Findlay, though this person is smoking a pipe and Kenneth didn’t smoke.

If anyone can shed any further light on this, please let us know and we will have solved a major mystery of the UNSW Archives.
GRADUATE PROFILE
Mah Bow Tan

Mah Bow Tan (BE ’71, ME ’73, Hon DSc ’01), Singapore’s high profile Minister for National Development, is one of the Faculty of Engineering’s most eminent graduates, whose achievements are recognised internationally.

Engineering however, wasn’t Mah Bow Tan’s first choice when it came to tertiary study. “I was actually more interested in science,” he said, “but unfortunately at that time, there were no scholarships available, so I chose engineering.”

“While my teachers certainly nurtured my interest in science, we were also living through a period where there seemed to be new discoveries all the time and scientific developments were progressing very quickly. Man had landed on the moon and the frequent celebration of scientific successes was exciting.”

Mah Bow Tan was already studying chemical engineering in Tasmania on a Colombo Plan Scholarship in mid-1960s when he received news that he had also been awarded the prestigious President’s Scholarship from the Singapore Government.

After initially studying chemical engineering, Mah Bow Tan switched to industrial engineering and operations research. “I was more interested in computer work and the theoretical aspects of engineering. As Tasmania didn’t offer industrial engineering, I ended up at UNSW, which was a major change.”

When Mah Bow Tan arrived at UNSW in 1967/68, the computer revolution was still in its infancy. “The first IBM mainframes were in the electrical engineering building and we could only work on them in the evening or at night when everybody else was asleep. It was still at the punch card stage and we had to wait for 24 hours to get our programs back. Now, 30 years later, the power of what used to be a room full of computers resides in a hand held palmtop!”

After graduating with his Master of Engineering in Operations Research in 1973, Mah Bow Tan returned to Singapore. “My first real job was with the bus company, which was exciting because we were in the midst of a major reorganisation. I did planning and engineering work, eventually becoming the general manager.”

Mah Bow Tan also worked in newspaper publishing as the CEO of a new tabloid called The Singapore Monitor, and was Chair of the largest taxi cooperative before going into politics in 1984.

He was elected to the Singapore Parliament in 1988, and was appointed as a minister with his first portfolios in communications and transport, followed by a short stint as Minister for the Environment. He became a member of the cabinet in 1991 and is now Minister for National Development where his portfolio involves public housing, housing in general, the construction industry, land use planning and planning for the future of Singapore.

“Our vision for Singapore is to be a thriving world-class city — one that is not only very attractive for people coming here to work or for business, but which also has its own uniqueness and identity, and probably most importantly, a place we can be proud to call ‘home’. A city is not just buildings, but the life that goes on within it.

“I would say to younger engineers, try to be conscious of how your work impacts on the world, especially on other people. I would like to see our engineering students taking the time to understand the world in non-engineering ways — to learn about other aspects of life, about arts, philosophy and religion. It’s not just machines and formulas — ultimately it’s all for aid of human society in the real world.”

Mah Bow Tan met his wife Dr Sheryn Kaye von Senden when they were at International House together, and today the couple have four children.

“Your university experience is one of the most significant parts of a person’s life. For me it was not just the educational experience, but also that of being in an overseas environment which is so different from what you are used to. You had to learn to be independent and to mix with people from all different cultures and races. Those experiences form an education which is just as important as the formal education I received and which made a very major impression on my life.”
A winning memory! History survey turns up trumps.

In the last issue, we ran a survey of our graduates and current and retired staff, to provide material for the history of the Faculty that is being prepared. We would like to say a huge thank-you to the more than 200 readers who completed surveys and offered their details and memories. They make for fascinating reading and will be extremely valuable in the piecing together of the Faculty history.

As announced in the last issue, the names of those completing the survey were entered into a draw for a case of the Faculty of Engineering's 50th Anniversary 1998 Petersons Shiraz (Hunter Valley). The winner was Warwick Davies (BE (Civil) ’67, MAppSc ’81), who came out to the University in October to collect his prize and meet with the Acting Dean, Associate Professor Tim Hesketh. “We're really pleased that this desirable vintage will be going to someone who will appreciate it,” said Tim, as he handed Warwick the ribbon-wrapped box.

Warwick studied civil engineering at UNSW from 1963 through to 1966, following up with a Master of Applied Science in engineering geology from 1976 to 1980. “When I first came here, civil engineering was still being conducted at the Sydney Technical College in Ultimo and was only just starting to take occupancy here,” said Warwick. “Finally, after two years, the Civil Engineering building was ready and we had a real home.”

Warwick recalls his first year at university as being a very wet one. “When I came out here in the first six months of 1963, the place was frequently flooded. There was a lake (known as Lake Bourke) where the Village Green is today and waterskiing was popular. You couldn’t fit a boat and water skier on it at the same time though, and the only way to ski was by towing the skier using a car driving up the main drag, in front of the old Admin Building. Life on campus was certainly interesting at that time.”

Keen to follow in his father’s footsteps as a civil engineer, Warwick was awarded a Department of Railways traineeship and went through his course as one of 10 students in similar circumstances. “The mateship was important. Getting through a four-year, pretty intensive engineering course develops bonds in various ways, whether it was survey camps, playing footy together, or enjoying an afternoon off at the beach or at the Doncaster with a pie and peas and a few schooners. The crush at Eddy Avenue was a challenge we faced together, along with all the antics you had to perform to get on a bus. It’s good to look back on what you achieved together and were then able to use as a basis for the rest of your life, both socially and professionally.”

Early in his career with the railways, Warwick pursued his interest in geotechnical engineering and then branched out. After some 20 years in two consulting firms, he is now in his own practice as a geotechnical engineering specialist. “Things have changed, and it’s important to be able to change and go with it in life. Doing your job well and being respected by your peers is important. The profession has been its own reward, and I’ve been very happy with the choice.”

We have been so delighted with the response from the survey in the last issue that we have decided to run the survey again. So, if you missed out last time, please take a moment to complete the survey included in this issue. If you have time to complete a more in-depth questionnaire or are willing to be interviewed about your memories, please complete the details at the bottom of the survey.
ENGINEERING AT UNSW – THE FIRST 50 YEARS

Did you study or work with the Faculty of Engineering (including Chemical Engineering, Industrial Chemistry, Mining Engineering or Petroleum Engineering)? If so, please tell us what you remember about your time here by filling in the questionnaire below and return to us using the enclosed reply-paid envelope. If you are interested in providing more detailed information, please indicate overleaf.

Questionnaire — Please attach your CV if you have one. If answers to some of these questions are in your CV, please write ‘CV’.

a) Name (include title):
   Please tick: □ Graduate □ Academic staff □ General staff
   Please tick: □ Male □ Female

b) What year/s did you commence study or employment at UNSW?
   Study at UNSW: 19 How old were you?
   Engineering specialisation:
   Employment at UNSW: 19 How old were you?
   School:

c) What tertiary study have you completed at UNSW and/or elsewhere? (Include the name of each degree/diploma, year of award and the name of the institution)


d) If you were a student, did you receive a scholarship? (Please provide details)


e) Why did you choose engineering as a profession and why did you come to UNSW?


f) What aspects of the University do you especially associate with your time there? (like the Engineering Fountain, the Wizard, the Naked Lady Lawn, Foundation Day, the Roundhouse, field trips)


g) What were some of your social or sporting activities?


h) Did you socialise with people from other faculties? How would you describe the relationship between the Faculty of Engineering and the rest of the University?


i) Do you particularly remember any teaching or other Faculty staff? Please give details.


j) At the time, what were your attitudes to general education subjects (also known as humanities or general studies)? Have your views changed?


k) What was your first job and how did you get this position?


l) What is your current position or, if retired, what was your most senior position?


m) What have been some of your career highlights?
Engineering at UNSW …

… the first 50 years

Access and use — Please tick one of the boxes below:

☐ I understand the questionnaire will be stored in the University Archives, and may be consulted by researchers in the Archives. I do not wish to place restrictions on access to or use of my questionnaire responses.

☐ I wish to impose the following restrictions on access to or use of the whole or part of questionnaire responses:

__________________________________________________________

__________________________________________________________

__________________________________________________________

Your signature: ___________________________ Date: __________

Do you have anything more to tell us? — Please tick one of the boxes below:

☐ I am interested in completing an in-depth questionnaire on my time at UNSW. Please post a copy to me. The questionnaire is also available via email <j.horne@unsw.edu.au>.

☐ I have photographs from my time at UNSW (eg yourself as a student or staff member, other students or staff, field trips, graduation). I am willing to let the Archives copy them and return the originals to me.

☐ I am willing to be interviewed about my time at UNSW. (If you are willing, but live outside Australia, please still tick the box)

☐ I have UNSW-related material that may be of interest to the Archives.

Contact Details:

Name (include title):
Postal Address:

E-mail:
Phone (home or work):

Student: ☐ Yes ☐ No Year of Graduation: ___________________________
Engineering specialisation:

UNSW Staff: ☐ Yes ☐ No School:

Thank you for your assistance.
Faculty of Engineering, UNSW.