FROM THE PRESIDENT...

Steady goes the ship - that has been the scenario during our first nine months. I mentioned in my last column that my aim was to see us concentrate initially on building up the Association membership. This we have been doing successfully, but for those of you who have not yet joined as Financial Members, a form is located inside this magazine.

Faculty Groups

An Engineering Chapter is up and running, with an energetic committee which has already organised a couple of functions for its members. A Commerce Chapter has also been formed with its committee now looking at functions.

Before Christmas I attended an evening for graduates of the Faculty of Education, with the aim of setting up an Education Chapter of the Association. A steering committee has now been formed. This Chapter has the potential to be one of the largest within the Association as there are large numbers of Education graduates going back to the days of the Wollongong Teachers' College. So why don't you engineers, educators, economists and accountants get behind your Chapters? Join them, attend some of their social functions and through them keep in touch with your old alma mater.

Now, I have this vision of a major reunion in 1993 and then every year... Down the track I would dearly like to see a 10-year reunion held each year. By 1997 we could look at having an '87 class reunion, as with over 1,400 graduates from that year we would have sufficient numbers for a successful function.

For 1993, however, we are planning a reunion of all graduates from 1962 (there were only 12 or so then) up to 1978 (430 in that year). During this 17-year period about 2,400 students graduated from the University and its antecedent institutions. We would love to see as many of these early graduates as possible come back to the campus.

Making Contact

I am thus putting you fellow graduates from '62 to '78 on notice. We will be contacting you later if we have your current address. The reunion will be held on the University's Open Day on Sunday 29 August 1993. There will be tours of the campus, a BBQ lunch and a brief summary, possibly by the Vice-Chancellor, of what the University is doing these days. And being Open Day the whole campus will be busy with all sorts of activities.

You would not believe the physical changes to campus in recent years - you must come and have a look. So put Sunday 29 August into your diary now and, of course, you are still welcome to come along even if you graduated later than 1978! This will be a family day and you are urged to bring along your spouse, children and friends and make a day of it.

Well, that's the current situation in the Alumni Association. Our success, however, depends upon you - we need your support.

So, until next time, goodbye and good health. I look forward to meeting many more of you soon.

Keith Phipps

FROM THE EDITOR...

The University's continuing growth is reflected in a variety of articles in this issue. Innovative teaching and research programs, alumni profiles, including a government minister, and an outline of the new campus in the Shoalhaven are just some of the features. May I also recommend 'The Fallible Engineer' (page 18) which analyses the complex problems faced today by the engineering profession.

With this issue you will notice some changes in the design of The Outlook. These are intended to keep the magazine interesting and readable. So I hope you enjoy reading it and would welcome any comments as 'letters to the editor'.

Juliet Richardson
The Outlook
Autumn/Winter 1993

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Newspaper editors are invited to make use of any material in this journal. Acknowledgment of the source would be appreciated.

The front cover shows one of the participants in the ‘Girls in Engineering Summer School’ using an EDM mounted on a theodolite (see page 4)
Summer School for Engineers

In January the Faculty of Engineering played host to 76 high school girls who attended the 1993 'Girls in Engineering Summer School'.

The purpose of this Summer School is two fold. First, it broadens the careers options of female high school students to include engineering careers and fosters an interest in non-traditional subjects such as maths and science. Second, the Summer School enables the Faculty of Engineering to gain information directly from high school students which will be valuable in an ongoing program of developing a gender-inclusive engineering curriculum.

This was the second Girls in Engineering Summer School, the inaugural one having been held in January 1992. This year's School was equally successful in attracting girls from schools all over New South Wales including Bourke, Broken Hill, Walgett, the Riverina, the South Coast, the Illawarra, the Blue Mountains and southern and western Sydney.

Generous Sponsors

Approximately half the girls were Year 10 students with the rest entering Years 11 and 12 this year. As the Summer School is residential the girls stayed at International House. Their attendance fees and accommodation expenses were provided through the generous sponsorship of the Summer School's corporate and government sponsors (listed on the page opposite).

During their week at the University the girls were involved in four engineering workshops on campus: Civil, mining and environmental, electrical, materials and mechanical. Among the many activities in the workshops, the girls tried their hand at surveying, built multimeters, disassembled, assembled and started an internal combustion engine and explored various materials including plastics.
Another important activity included a presentation by the Women in Engineering Network and the Institution of Engineers, Australia, and the opportunity to talk with female engineering students about university life, the academic demands of engineering courses, prospects for the future and how to obtain traineeships. An industrial visit was made to the Water Board's water treatment plant in Wollongong.

The girls also had an opportunity to relax at the beach and to explore Wollongong. An important aspect of the Summer School is to provide those attending with a supportive network of other girls interested in pursuing non-traditional education and employment.

Career Choices

At the end of the Summer School no fewer than 27 of the girls nominated some aspect of engineering as a probable career choice. For many others, especially those in rural and remote areas with little access to careers events, they felt their career horizons had been broadened. 'There is a lot more to it than I thought and some aspects are very interesting and made me consider the possibility of becoming an engineer,' said one of the girls.

Networking

Perhaps one of the most important aspects of the Summer School is its ability to raise the self esteem and to establish networks among girls studying maths and science at high levels. This is particularly relevant where girls live in geographically remote areas of the state and are not easily able to access such networks. Many of the girls nominated the friendships formed and the confidence gained as important to them.

Clear Message

A detailed evaluation of the Summer School is currently being prepared. Early indications are, however, that the girls are listening to the message. As one girl summed it up: 'I have been reassured that women are capable of anything.'

BHP has had a long association with the University of Wollongong going back to when it first commenced in 1962, especially in the areas of Metallurgy and Engineering. We need highly trained students to meet our technological and human resource needs. BHP and the University of Wollongong have been working together in education and technology for a better Australia.
Rural Australia has suffered population decline and cyclic economic problems since World War II. The present crisis in rural towns and industries is the most recent and probably the most severe downturn to be experienced. Individuals, families and communities have been traumatised by loss of livelihood, loss of family supports as people move from farms and towns, and loss of self-esteem through debt, unemployment or forced sale.

As a result stress has become a greater problem for some rural dwellers, with an inevitable increase in demand for health services. Rural-based health workers - doctors, nurses and allied health workers - are experiencing an increased workload, putting them at risk of moving to a more anonymous and perhaps easier urban practice.

The program in mental health at the University of Wollongong, developed by the Department of Public Health and Nutrition, is unique in that it is industry specific, postgraduate and multidisciplinary. It places emphasis on the development of clinically effective and culturally sensitive strategies for health workers in comprehensive systems of care for persons with mental illness.

The program commenced in 1990 with funding from the NSW Department of Health. It was expanded in 1992, following further significant funding from the NSW Education and Training Foundation, to include an external offering to rural areas using an innovative multimedia system of delivery.

This multimedia format is used to deliver a full postgraduate program in mental health to rural and remote regions of NSW, including a Graduate Diploma of Science and a Master of Science degree. The format involves the use of interactive television (video conferencing), on-site skills development workshops (lecturers fly out to selected regional sites), applied workplace projects (self-directed learning tasks) and an annual residential school (on campus).

Key personnel in the development of the program are Paul O'Halloran (Coordinator), Brian O'Neill, Associate Professor Ross Harris, Colum Hearn and Betsy Lilley from the Department of Public Health and Nutrition. The teaching network for the rural strand involves four external teaching sites at Albury, Goulburn, Orange and...
Lismore. Students attend these sites from their rural or remote workplace across the state and come from as far afield as Brisbane (who go to Lismore), Broken Hill (to Orange), the ACT (to Goulburn) and Victoria (to Albury).

As well as those students enrolled on campus there are 55 enrolled in the rural strand of the program. Mental health workers in rural and remote areas are frequently deprived of access to such continuing education programs and have limited access to relevant inservice courses. The technology of video conferencing offers an opportunity to overcome the 'tyranny of distance' experienced by many practitioners.

Student evaluation of the program at the end of the first year has been very positive, with 70% believing after the third video conference that this is a workable technology for use in education.

The Manager of the Far West Mental Health Service at Broken Hill, Mark Hemming, says that the educational needs of rural mental health workers are being met by the Wollongong course through the innovative use of video conferencing technology and the excellent course structure. 'This has enabled participants to not only develop new skills, but to network with colleagues from all over NSW,' he says. 'This reduces the isolation felt by those, like myself, who live and work many miles from major urban centres.'

Industry collaboration has been a hallmark of this project. The Illawarra Area Health Service's Psychiatric Services has worked closely with the University in the early development stage. Other industry partners include the mental health services in four rural health regions: North Coast Region (Lismore), Central Western Region (Orange), South Eastern Region (Goulburn) and South Western Region (Albury).

The costs of bringing this program to the rural sector are carried by these regional partners, who will contribute in the vicinity of $300,000 over the next five years. The Orana and Far West Region (Broken Hill and Dubbo) and the New England Region (Tamworth and Armidale) have expressed keen interest in joining the program in 1993.

If this goes ahead, all rural mental health services in each region of NSW will be looking to the University of Wollongong and the Illawarra Area Health Service as the pre-eminent providers of multidisciplinary education in this field. Such innovative training, where academics and clinical practitioners are working together, is making a significant contribution towards the overall goal of more effective patient care and might help to counteract some of the problems faced by the rural sector.

Video conference link-up with The University Centre in Sydney during December's residential school for students of the rural mental health program. Seated at the table are (from left): Brian O'Neill, Vice-Chancellor Professor Ken McKinnon and Coordinator Paul O'Halloran from the Department of Public Health and Nutrition.
Eleven years ago Glen Moore, a lecturer in physics at the University, began working on the idea of a centre that could introduce both children and adults to the science and technology we use everyday. He soon found eager support from the University, businesses and community groups in the Illawarra, and in 1989 the University's Science Centre was established at Campus East in Fairy Meadow.

Now Director of the Centre, Glen Moore describes the aim behind its development as: to 'teach about the science of everyday lives, to make technologies understandable.' To achieve this the Centre is based upon the idea that children can learn through playing. Unlike a traditional museum, the Centre emphasises what Glen describes as an 'interactive, hands-on approach - a feature of the Centre which is not available in many museums.'

**Interactive Exhibits**

To allow its patrons to become involved in science, the Centre features over 100 interactive exhibits that encourage participation by testing perceptions and skills. Every few months the collection is updated with the addition of new exhibits which reflect the current trends and developments in science and technology. The Centre also ensures that all ages are catered for by making exhibits easy to use, practical and hard-working - and with hundreds of schoolchildren using the exhibits each week, exhibit toughness is a necessity.

Glen Moore also hopes that, by demystifying the concepts behind modern technologies, science and technology can be fun. 'I want people to be excited by science. Not only to learn about science, and develop an understanding of what science is, but also to enjoy science,' he says.

The Centre is self-supporting and receives sponsorship through local community groups and donations. All exhibits are funded or provided by companies and interested community organisations.

In 1992 the Science Centre

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*Glen Moore at the Science Centre with an exhibit from 'Life of the Past' (left) and the planetarium star projector*
was visited by over 300 school classes as well as many other visitors interested in learning about and experiencing science. It accommodates functions, such as providing for teachers a training environment for developing a new approach to science education. The Centre has also hosted events such as the Beyond 2000 Science School Awards and science conferences and seminars, and it boasts a Science Shop specialising in science related books, educational material and gifts.

In addition the Centre provides a home for travelling science exhibitions, a recent guest being 'Life of the Past'. This exhibition of Australian fossils from the South Australian Museum was opened at the Centre in January by science commentator Robyn Williams, who praised the Centre for its interactive approach. 'It is one of the most exciting science centres I've ever been in,' he said.

**Planetarium**

Glen Moore's future plans for the Centre are focused on the building of a planetarium as a permanent exhibit, which would give Wollongong the first planetarium in NSW. The plan has received local support with the Planetarium Society having donated funds to allow purchase of a star projector to show displays of the night sky. Designs are ready for the building of a 60-seat theatre which would increase the Centre's capacity by 50 per cent, and even further into the future an entire new Science Centre in permanent premises.

However, in spite of local support, sufficient funding has not yet been received for the planetarium which was wholeheartedly supported by Robyn Williams during his visit. He said that the initial outlay would be far outweighed by benefits to science and the region.

Glen believes the planetarium will be a major tourist attraction and put the University at the forefront of astronomy education in the State.

The exhibition 'Life of the Past' is at the Science Centre until the end of April. Future exhibitions this year will include an astronomical and an electrical one. The Science Centre is open to the public on weekends and public holidays from 1-5pm, and bookings can be made for school groups to visit the Centre during the week (telephone (042) 83 6665). Entry costs $3.00 for children, students and concession card holders, and $5.00 for adults.

### SPECIAL PROFILES

These graduates have been elected to the Alumni Association Board of Management or nominated as Chapter representatives. They have volunteered to give their time and service to the Association and their commitment and support are invaluable.

**Ted Bosman**

Born in South Africa, Ted Bosman completed his apprenticeship in structural engineering in the fifties and then began a working 'grand tour' overseas. Planning to spend six months away he left South Africa in 1956; and subsequently decided not to go back.

Beginning his tour in London, Ted travelled through Europe, Canada and America working with Canadian and English engineering firms. In 1961 he emigrated to Australia - 'a ten-pound tourist' - and settled in Sydney where he worked as a structural designer for Transfield in North Sydney.

Ted was eager to move to somewhere smaller, however, and so in 1964 he took up a position as design draftsman and section leader at Australian Iron & Steel (AIS), Port Kembla; and decided to stay.
In 1972 Ted began working as a design engineer with AIS, specifying and supervising plant design. After a total of eighteen years with the company he accepted a voluntary retirement package in order to study full-time.

His decision to begin a Bachelor of Mechanical Engineering at the University was prompted by the changes he saw in the workplace with the introduction of computers.

Not wanting to be left behind by technology it was a chance for Ted to devote himself entirely to full-time study, something he had not previously had an opportunity to do.

Ted completed his degree in 1989 and since then has been working as an engineering contractor, his most recent assignment being construction supervisor at a water pump installation for Johor State Economic Development Corporation in Malaysia.

Ted became involved in the Alumni Association in 1991 when he learnt that an Engineering Chapter was being formed. As the representative of that chapter to the Board, he sees his role as a way of bringing engineering alumni into contact with the University and with each other.

Ted believes that many engineering students are isolated by the workload demands of their degrees and the Alumni Association, particularly the Engineering Chapter, provides a way of establishing or improving contact between ex-students whilst also increasing the profile of the University in the workplace.

Rosemary Cooper graduated from the University in 1990 with a Bachelor of Commerce with Merit majoring in accountancy. While studying towards this degree she was also employed in the University's Financial Services Branch, working on accounts and budgets. After graduating she was appointed to the Faculty of Commerce, principally providing the Dean's office with financial and statistical expertise.

In 1992 Rosemary received the Vice Chancellor's Award for Outstanding Service for developing her role as professional officer and in particular for her establishment of computer-based statistical systems that provide information for the Faculty.

While appreciative of this acknowledgment of her work, Rosemary believes that credit for the system development should also be shared with the Faculty Office team.

As well as being Board Treasurer Rosemary has also been active in the organisation of the Commerce Chapter of the Alumni Association. She feels that the Chapter's role is both to give graduates an opportunity to provide input into courses and to establish and maintain professional contacts. In this way she believes that the Faculty can learn from its graduates - such as ensuring that courses meet the needs of industry - and graduates can continue to learn through association with the Faculty and with other alumni.

Rosemary is pleased to be associated with the Alumni Association in addition to her work on campus. She is enjoying watching the growing impetus of the alumni movement.

Damien O'Connor is the Commerce Chapter representative on the Board of Management, he comes from an engineering background. Also a graduate of the University of Newcastle, where he completed a Graduate Diploma in Management, Damien was transferred to Wollongong with consulting engineers CMPS&F Pty Ltd.

He found, however, that his work demanded further knowledge of management practices and so he began a Master of Business Administration degree at the University of Wollongong. Damien graduated in 1990 and is currently employed with Thomas and Coffey.
Australia where he is the Illawarra Regional Manager.

Damien first became involved with the Alumni Association after reading in The Outlook that an Alumni Board was to be formed. For Damien the Association provides a way of filling what he sees as the void between academic and working life. 'When many people finish their courses at University, they think that’s it,’ he says. ‘But no, that’s not it, it’s important to retain links with the Uni.’ He believes the Association allows graduates a chance to network with other professionals, for both personal and professional reasons.

To further his contact with education and keep up-to-date with management theory, Damien lectures part-time in management at the Shellharbour College of Technical and Further Education.

Wendy Raikes has been involved with the University, both as a student and a staff member, since the 1982 amalgamation with the Wollongong Institute of Education. She began working for the Institute when she was completing her HSC at Wollongong TAFE College. After this she studied part-time towards a Bachelor of Arts, majoring in psychology, while working firstly for Student Administration and then Personnel Services.

Wendy graduated in 1983 and shortly afterwards took up the newly-established position of Staff Training and Development Coordinator at the University. At the same time she began a Master of Management. She returned to Student Administration in 1988 as Examination Officer in charge of the Student Records and Examination Office. Wendy completed her masters degree in 1989.

In 1992 Wendy moved on to the Faculty of Law as Executive Officer where she is responsible for liaison with the legal profession, development and organisation of continuing education and the clinical placement program, and administration of the Faculty including financial and human resources, and student matters.

Wendy sees her role in the Alumni Association as a chance to ‘contribute back to the University, as the University has contributed to my development’. She believes that for graduates the Association is a means of maintaining and developing contacts and keeping open the links with the University. She is also interested in the development of a Law Chapter within the Alumni Association, as in mid-1993 the first Bachelor of Laws students are to graduate from the new Faculty.

Involvement with the Association also assists Wendy in maintaining contact with professionals and the workplace, and she enjoys the challenge of establishing new directions for the University. Wendy also works part-time at West Wollongong TAFE and the WEA, teaching training and other business subjects, and is involved with the organisation of the state conference of the Australasian institute of Tertiary Education Administrators to be held in Wollongong in May.

Wendy Raikes was one of six new poets, and the only one from the Illawarra, recently selected to have their first book of poetry published as part of a new venture sponsored jointly by SCARP magazine and Five Islands Press. (Photo courtesy of The Advertiser)
THE MAN BEHIND
THEATRE SOUTH

For the past 12 years Theatre South has played an important role in the development of theatre arts in Wollongong. Des Davis, Artistic Director and co-founder of the company, has recently been awarded a Medal of the Order of Australia in acknowledgment of his contribution to the performing arts.

Born in Ayr in northern Queensland and raised in Sydney, Des Davis's interests initially lay with English and History and he first worked as a teacher in high schools. He was developing a love of the theatre arts, however, and began lecturing in Drama at Australian universities and colleges.

In 1970 he was invited to Canada to teach Drama at Brock University on the Niagara Peninsula. While in Canada he worked with regional theatre groups, and was instrumental in the founding of Carousel Players, a Children’s Theatre company which proved very successful and which is still active in theatre for young people today.

Des returned to Australia in 1980 and took up a position as lecturer in English and Drama at the University of Wollongong. He was also determined to establish a professional theatre company in Wollongong.

Theatre South

That same year he and actor Faye Montgomery (his wife) founded Theatre South, supported in this by the then Vice-Chancellor of the University, Michael Birt. The company was based at the University which provided a home for rehearsals. Performances were held in the Wollongong TAFE auditorium or other non-theatrical venues such as the Wollongong Town Hall and, once, in a tent.

In 1985 the company leased from the City Council a community hall adjacent to Coniston station, which was transformed into the Bridge Theatre, now a 150-seat theatre space and the permanent home of the company.

At the end of 1991 Des Davis resigned from his position at the University to work full-time for Theatre South. For Des the OAM is more than a personal award. He is reluctant to take credit for

Des Davis, OAM (Photo courtesy of the Illawarra Mercury)
the company's significant achievements, as he sees the OAM as a recognition of Theatre South and its contribution to the arts in Wollongong.

He also believes the company has an important role in supporting local artists, from actors and writers to theatre technicians. ‘I see Theatre South as Wollongong’s theatre,’ he says. The theatre has premiered the works of local playwrights such as Katherine Thomson and Wendy Richardson, plays that often reflect on their authors’ Wollongong heritage. However, he stresses that Theatre South is not a nurturing place, but rather somewhere to develop local talent away from the city. ‘The School of Creative Arts is for nurturing the actor. Theatre South is a chance for local talent to work in a professional regional theatre outside of Sydney.’

Local Talent

One of Theatre South’s recent plays ‘The Sugar Mother’ highlights the company’s commitment to local talent. The play, based on the writings of Elizabeth Jolley, was written by John Senczuk, a Wollongong theatre designer and lecturer in the School of Creative Arts. In addition it featured Wollongong actors Faye Montgomery, Clodagh Crowe and Michael Coe, as well as guest artists Tina Bursill, Julie Hamilton and Robert Alexander.

The Company has also toured extensively throughout Australia and has performed in over 100 venues in four states, from capital cities to small country town auditoriums. In 1992 the company toured four of its six major productions, as well as the children’s play ‘Hating Alison Ashley’, throughout Victoria and New South Wales. The company is supported by the Australia Council for the Arts, the NSW Ministry for the Arts, and the patronage of the theatre-going community.

Further productions this year include ‘The Glugs of Gosh’ with John Derum, ‘Twelfth Night’, a co-production with the School of Creative Arts, and another new play by Wendy Richardson called ‘The Last Voyage of the Gracie Anne’. Theatre South is also bringing into the University’s Hope Theatre in November the acclaimed production of the Aboriginal musical ‘Bran Nue Dai’. So 1993 is a particularly rewarding year for Theatre South and its industrious Artistic Director.

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Graduate profile

The name ‘Fred Finch’ has long been associated with politics in Wollongong. In the thirties Fred Finch was an Alderman and Deputy Mayor of Wollongong City Council and Chairman of the Illawarra County Council. Over 50 years later, Fred Finch, his grandson and a graduate of the University in 1969, is following in his grandfather’s footsteps as Minister for Education and Training and Minister for Public Employment in the Northern Territory.

Born in Port Kembla, Fred Finch III was encouraged by his father to study civil engineering and at sixteen he began a part-time cadetship with the Sydney Water Board. Unlike many of his classmates Fred chose to graduate from the then Wollongong University College, rather than from its parent university (UNSW). He describes the ties to Wollongong as too strong to consider ‘a graduation at Kensington’. In doing so, in 1969 Fred Finch became the first civil engineering graduate of the University.

While with the Water Board Fred became involved with the development of a course in health engineering at the University, and for a short time was a lecturer for the subject. After nine years Fred left the Water Board to work with a private engineering firm where he was involved in land development, civil construction and consulting engineering on the South Coast. In 1972 he took up the position of managing a small consulting office on the Sunshine Coast in Queensland, and in 1974 was offered a transfer to Darwin.

Planning to move in January the following year, Fred was in Wollongong visiting family over Christmas when Cyclone Tracy hit Darwin. When he arrived in Darwin some months later, he became involved in the rebuilding of the city.

The move to Darwin provided a big turning point in my life

Included in his responsibilities was the development of building codes for cyclonic structures, as there were no existing codes that could be used for the safe rebuilding of the city.

Fred Finch
BSc(Tech) 1969

In 1969 Fred Finch became the first civil engineering graduate of the University of Wollongong.
The move to Darwin provided a 'big turning point in my life,' says Fred. 'In six months I felt I belonged in Darwin.' He established his own consulting firm, a much-needed business in Darwin, which 'grew overnight, from two to twenty'.

In 1983 the former Chief Minister of the Northern Territory, Paul Everingham, suggested to Fred that he run for a Darwin suburban seat, with the Northern Territory Country Liberal Party. Although he describes his move from engineering to politics as a moment of 'temporary insanity', Fred also saw a challenge and an opportunity to contribute to society. Since then he has held the positions of Deputy Speaker, Chairman of Committees, and has been Minister for Transport and Works for the past six years.

In November last year Fred Finch was appointed Minister for Education and Training, and Minister for Public Employment. While a vast change from engineering, Fred is eager to be involved with what he describes as people-oriented concerns. 'Until December I was an engineer, responsible for a third of the Northern Territory budget. But education is another turning point in my career, a challenge and it's my chance to do something constructive for education,' he says. 'I also see it as an acknowledgment of my political skills, as education is traditionally a problem area in politics.'

Visiting the University in February as guest speaker at the Engineering Alumni Dinner, Fred remembers a very different University, a small campus of engineers. 'It was nearly all men. But although part-time study made it difficult, we were developing that University spirit.' In his talk Fred issued a challenge to his fellow engineering alumni to consider becoming involved in politics. He said he believes that engineers have an important role to play in society. 'It is my sincere belief that this country would benefit enormously if more engineers were to contribute to the decision-making process,' he said. 'I, for one, would certainly appreciate the company!' •

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An ALUMNI REUNION for 1962 to 1978 GRADUATES will be held at the University’s Open Day

Sunday 29 August 1993

- BBQ Lunch
- Talk and video to show University developments
- Campus tours
- Open Day activities across the campus

Put the date in your diary and make a day of it!

Open Day is great entertainment for all the family. Invitations to our early alumni will be sent out in July

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UNIVERSITY OF WOLLONGONG

1993 University Day Address

Monday 10 May at 6.00pm
The Hope Theatre

University Day celebrates the establishment of a University College on this site in May 1961. Each year the University marks this important anniversary by acknowledging the achievements of its staff and by inviting a distinguished speaker to deliver the University Day Address.

The 1993 University Day Address will be delivered by:
Mr Brian Johns, Chairman, Australian Broadcasting Authority

Light refreshments will be served afterwards. University alumni are warmly invited to attend this University Day celebration. If you wish to come, please telephone Barbara Carmichael on (042) 21 3933 by Friday 30 April, who will also take bookings for the traditional Friends’ Dinner to be held in the Union Function Centre at 8.00pm the same night. Cost is $20.00 per head.
Finding an environmentally friendly solution to hazardous waste is an increasing cause for concern for industrial cities throughout the world. But with the ENVIRONMENT process, a waste-processing technology developed by Professor Howard Worner and the Illawarra Technology Corporation (ITC), what was once a problem can now be turned into a useful resource.

Professor Howard Worner

Over thirty years ago the initial idea behind the ENVIRONMENT process occurred to Professor Worner while he was watching an experiment at BHP. The idea of using a molten iron bath as a means of processing heavy metal waste appeared to have no practical applications at the time. Fifteen years later, while working at CRA, he formulated a second element in the ENVIRONMENT process, namely, using 'composites' of ore fines and a paste of brown coal to form the feed to the molten bath. Both were ideas before their time - environmental concern over methods of waste treatment was then not a major focus of industry and development.

In 1986 Professor Worner was invited by the University of Wollongong to take up a position as Director of the Microwave Applications Research Centre (MARC). One project of the Centre involved the microwave sterilisation of sewage wastes: this was proved technically feasible but was too costly.

The problem of cost suggested to Professor Worner that a more attractive means of processing the sewage sludge would be to make the waste product useful - perhaps by replacing the brown coal as the binding agent in the composites for the smelting bath. In 1989 the inspiration came to him to use two waste materials readily available in the Illawarra - steelworks dust from BHP and sewage sludge from Port Kembla - to test this new approach to waste treatment.

Complete Recycling

Now known as the ENVIRONMENT process, the procedure has been developed by the ITC into a marketable technology. ENVIRONMENT works by using a bath of molten iron and slag, that, at very high temperatures, converts sewage and steelworks dust into useful products - slag, foundry iron and volatile metal oxide fume which is
readily collected.

In this way the process is not only a waste-disposal alternative, but is complete recycling, making what was once waste into usable, and saleable, products. Its heat-conserving design makes it cost-efficient, and as there are no by-products of the process it is a solution to waste disposal that, unlike many other systems, does not create further problems for the environment.

Testing and development of the ENVIRONMENT process has so far been in a small research plant at Coniston. To date it has been successful with a range of low toxicity wastes such as steelworks dusts, sewage sludge and paint line and plating works sludges.

Recent commercial interest in the process will see the ENVIRONMENT system being given practical trials in the workplace. Professor Worner and Paul Howlett, ITC Resources General Manager, are pleased that these first commercial developments of the process are to be within Australia, and by an Australian company. It is hoped that in two to three years a commercial ENVIRONMENT plant will be operating.

**Waste Disposal**

Professor Worner says he is excited by the promising usefulness of the technology. 'The ENVIRONMENT process is right for this time - every city in the world has this problem of waste disposal. And the technology also has the potential to make a range of useful products.'

Similarly, Paul Howlett stresses that the ENVIRONMENT process is timely. 'Industry nowadays can't get away without recycling,' he says.

The research has been supported by Pacific Power, the NSW authority for clean, efficient electrical energy, and the Water Board, provider of water and sewage services to the greater Sydney area which includes the Illawarra.

Other departments of the University have also provided indirect assistance with the project, and the testing of the process has been conducted both in the local TAFE College foundry and in the MARC laboratories at Coniston.

More information about the ENVIRONMENT process can be obtained from the Illawarra Technology Corporation at the University.

Pilot ENVIRONMENT furnace being tapped with iron flowing into moulds at the Coniston laboratories. On the left is metallurgist Len Reilly with assistant Dave Harris.
**THE FALLIBLE ENGINEER**

Australian engineers feel they are being blamed for accidents and failures that are beyond their control. They want the public to understand that experts are only human.

At four o'clock in the morning of 30 April 1988 a railway embankment near the coastal town of Coledale in New South Wales collapsed, sending tonnes of mud and water down a hill. The debris crushed a house, killing a woman and child who were inside. The area was prone to subsidence and evidence given at the inquest suggested that the designers of the embankment had not taken proper account of this. Four people, two of them engineers, were subsequently charged with endangering passengers on a railway. One, a principal geotechnical engineer with the State Rail Authority of New South Wales, was also charged with two counts of manslaughter.

Though none of them was convicted, the engineering profession was horrified that engineers should be charged in this way, and rallied to their support. Peter Miller, chairman of the standing committee on legal liability of the Institution of Engineers, Australia, argued that criminal prosecutions against engineers set a precedent that could change the way engineering was practised. He said it was likely to result in engineers becoming more conservative in their assessments and decisions. Although this was not in itself a bad thing, it would mean higher costs for engineering work, he added.

The issue of who should take responsibility when things go wrong is becoming a central concern for the engineering profession both nationally and worldwide. The Australian institution recently sent all its members a discussion paper entitled 'Are you at risk? Managing Expectations'. More than 3000 engineers replied, the largest response the institution has ever had on any issue. In the preface to the paper, the institution's president, Mike Sargent, said that the trend towards criminal prosecutions for negligence and the escalation of civil law claims against engineers 'constitute a significant threat to the ability of our profession to serve the community and might even threaten its continued existence.'

Miller, too, believes that the profession is at risk. 'Engineers are being put in untenable positions,' he says. 'They are being asked to make decisions over matters they cannot control and being forced to take responsibility for these decisions.' What Miller and his colleagues at the Institution of Engineers are proposing is nothing short of a radical change in the relationship between engineer and society. The engineering profession seems to be approaching a turning point.

Miller and his colleagues believe that if people were more aware of the uncertainties surrounding engineering work and the limitations of mathematical models, then they would not so readily blame engineers for failures. The institution's discussion paper points out that engineers have presented a falsely optimistic and idealistic view of their work. They are now paying the price for having raised unjustifiably high the public's expectations of what they can deliver.

The philosophy set out in the paper is that engineering is an art rather than a science, and as such depends heavily on judgment. The widespread use in engineering of heuristics, or 'rules of thumb', requires judgment to be used properly. Billy Vaughn Koen, professor of mechanical engineering at the University of Texas at Austin, defines a heuristic device as 'anything that provides a plausible aid or...'

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*Sharon Beder*
Dr Sharon Beder, lecturer in the Department of Science and Technology Studies, has won a journalism award for her article ‘The Fallible Engineer’ which appeared in the international edition of New Scientist in November 1991.

A Michael Daly award has been given to Dr Beder for the ‘best entry by communicator not deriving majority of income from journalism’.

These awards are named in memory of the late Michael Daly, inaugural Executive Director of TV Science for the ABC. They are funded by the Science and Technology Awareness Program and the Institution of Engineers, Australia. The 1992 awards attracted about 90 entries and were offered across a record nine categories.

direction in the solution of a problem but is in the final analysis unjustified, incapable of justification and fallible.’

An example of a heuristic device is a ‘factor of safety’, sometimes referred to as a ‘factor of ignorance’. Engineers have to work with materials that vary widely in strength and other characteristics, and design for a range of operating conditions and loads. To cope with these variations and uncertainties they employ factors of safety.

The concept of a factor of safety is often misunderstood by those outside the profession as implying some large safety margin on a predictable design. Barry McMahon, a Sydney-based geotechnical engineer, has found his clients believe that factors of safety and yet some still fail, and when this happens the factor of safety for similar structures built subsequently might be increased. Conversely, when a particular type of structure has been used often without failure, there is a tendency for engineers to suspect that these structures are over-designed and that the factor of safety can be reduced. Henry Petroski, an American engineer who has written extensively on engineering accidents, explains: ‘The dynamics of raising the factor of safety in the wake of accidents and lowering it in the absence of accidents can clearly lead to cyclic occurrences of structural failures.’ He points out that this cyclic behaviour occurred with suspension bridges following the failure of the Tacoma Narrows Bridge which collapsed spectacularly in 1940 in mild winds.

Cutting safety margins to reduce costs in the face of success happens in all engineering disciplines. William Starbuck and Frances Milliken, researchers at New York University, have studied the catastrophic failure of the Challenger space shuttle in January 1986 and concluded in their paper ‘Challenger: fine-tuning the odds until something breaks’ (Journal of Management Studies, Vol. 25, July 1988) that the same phenomenon was present there. They argue that, as successful launches accumulated, the engineering managers at NASA and Thiokol, the firm responsible for designing and building the rocket boosters for the shuttle, grew more confident of future success. NASA relaxed its safety procedures, treating the shuttle as an ‘operational’ technology rather than a risky experiment, and no longer tested or inspected it as thoroughly as they had the early launches.

The O-rings sealing the joints in the shuttle’s solid-fuel rocket booster, which were eventually found to have played a major role in the accident (‘Why Challenger failed’, New Scientist, 11 September 1986), had shown signs of failure in several earlier flights. But since this damage had not impeded the shuttle launch, engineering managers at NASA and Thiokol came to accept it as ‘allowable erosion’ and ‘acceptable risk’.

A factor of safety implies ‘certainty’ plus a bit more. He says they are far more concerned with the financial risk of ‘conservative’ design (design that errs on the safe side) than they are with other sources of risk. Conservative design tends to be more expensive, which means that there is always pressure to reduce factors of safety.

All engineering structures incorporate a factor of safety which implies ‘certainty’ plus a bit more. He says they are far more concerned with the financial risk of ‘conservative’ design (design that errs on the safe side) than they are with other sources of risk. Conservative design tends to be more expensive, which means that there is always pressure to reduce factors of safety.
An example of engineering failure: the collapse of the Dombarton railway embankment during a peak storm in February 1984 (Picture courtesy of the Geotechnical Section of the NSW State Rail Authority)

Brian Wynne, a researcher at the University of Lancaster, has also studied the Challenger disaster and other accidents. He says that O-ring damage and leakage had come to be accepted as 'the new normality'. Wynne argues that implementing designs and operating technological systems involve 'the continual invention and negotiation of new rules and relationships' and that if this did not happen most technological systems would come to a halt. Starbuck and Milliken agree with respect to the space shuttle. They point out that NASA had identified nearly 300 special 'hazards' associated with the launch of Challenger. 'But if NASA's managers had viewed these hazards so seriously that any one of them could readily block a launch, NASA might never have launched any shuttles.'

Wynne says there is a tendency to refer to 'human error' when accidents occur. He suggests that part of the problem may be that technological systems are designed as if organisations can operate with perfect communication and that people are not prone to distraction, illogic or complacency. Jean Cross, professor of safety science at the University of New South Wales, agrees that engineers have a tendency to neglect what she calls the 'human/technology interface' in their designs. For example, they do not take account of how long it takes people to process information and how people behave when they are under stress.

The institution's paper gives some recognition to this. It says that the notional probability of failure implicit in engineering codes does not give sufficient weight to human factors.

For Starbuck, Milliken, Wynne, Petroski and many others, all engineering design involves experimentation. According to Petroski, 'each novel structural concept - be it a sky walk over a hotel lobby, a suspension bridge over a river or a jumbo jet capable of flying across the oceans - is an hypothesis to be tested first on paper and possibly in the laboratory but ultimately to be justified by the performance of its function without failure.' Failures will occasionally occur. They are unavoidable, he argues, unless innovation is completely abandoned.

Wynne goes further, arguing that the experimental nature
of engineering extends beyond the design stage: ‘If technology involves making up rules and relationships as its practitioners go along, it is a form of social experiment on the grand scale.’ Similarly, Starbuck and Milliken say that ‘fine-tuning is real-life experimentation in the face of uncertainty’.

If engineering is based on incomplete models and on judgment and experimentation, who should be held responsible when engineering projects fail, causing loss of life and property, and damage to the environment? Engineers feel that the public is increasingly looking for someone to blame when accidents happen, rather than accepting accidents as an inevitable part of life. They are frustrated at what seems to be the public’s need for complete safety.

The dilemma for engineers today is how to tell the public of the extent of their ignorance without losing the community’s confidence.

Getting public acceptance of new or controversial technologies is greatly assisted by portraying them as perfectly predictable and controllable.

The Institution of Engineers is suggesting a shift to a different role for engineers as ‘technical advisers’ who put forward options for the community to choose from. This means forgoing some of their autonomy and status as technological decision-makers in favour of sharing the decisions, in order to share the responsibility if things go wrong.

It will not be easy for people like Miller and his like-minded colleagues in the Institution of Engineers to bring engineers around to this sharing of responsibility and decision making, and to open and frank dialogue with the community. The change will require a lot more discussion within the profession and changes in engineering education and perhaps public education. Yet Miller is heartened by the overwhelmingly positive response he has had from engineers in Australia.

Sharon Beder, a chartered professional engineer, is a member of the Institution of Engineers, Australia. This article is an abridged version of her article which appeared in New Scientist, 2 November 1991.

Alumni News

Commerce Chapter

This Chapter was formalised in November last year with elections for the six Committee positions. Office bearers elected were:

Melissa Irvine (BCom 1990)
President,
David Winton (BCom 1984) Vice-President,
Joseph Solano (BCom 1981, GDipAccy 1989) Treasurer,
Ron Perrin (MCom 1992) Secretary,
Mary Day (MCom(Hons) 1988) Membership Development Officer and Damien O’Connor (MBA 1990) Representative to Board.

University Fellows and their partners with senior University personnel preparing to process across campus to the Inaugural Fellows’ Dinner.
Professor John Steinke, Dean of the Commerce Faculty, is an ex officio member of the Committee, which meets bi-monthly.

**Engineering Chapter**

A dinner for engineering alumni was held on campus in February. About 60 people attended including one of the University's earliest graduates, who was the guest speaker. The Hon Fred Finch MLA graduated in civil engineering in 1969 and has since achieved a high public profile by becoming a Minister in the Northern Territory Government. A profile of Fred appears on page 14.

The next function planned by the Engineering Chapter will be held in August and is likely to be combined with the Annual General Meeting.

**Indonesia**

In August last year two alumni reunion dinners were held in Indonesia, in Jakarta and Bandung. The dinners were hosted by senior lecturer Mr Bill McGaw who was visiting Indonesia on behalf of the Illawarra Technology Corporation's Foundation Studies Program.

An alumni chapter was formally created early last year in Bandung where a large number of postgraduate alumni from Wollongong is based. A steering committee was formed at the Jakarta dinner to develop a similar chapter group for alumni living in that area.

**Honorary Chapter**

Under the Association's constitution all Fellows of the University, Emeritus Professors and recipients of honorary degrees are deemed to be Honorary Life Members.

A Chapter comprising these three groups of eminent people is being developed, following a successful inaugural dinner for the Fellows held at the time of the October graduations last year (photo previous page). Initially the members of this Chapter are being invited to participate in the University Day celebrations on 10 May and to attend the graduation ceremony the following day.

**Friends' Graduates Group**

The Graduates Group of the Friends of the University, which has existed for over ten years, recently resolved to become a Chapter of the Alumni Association.

This group has traditionally been involved in campus activities. Members act as ushers at graduations, as scribes and readers during examinations, as campus tour guides on Open Day and they also run the University Graduates Bookshop at Campus East.

Once an appropriate name has been agreed, the process of formalising the Chapter will be undertaken and elections held. Any alumni wishing to become involved in the Association who do not already have an affiliation with a particular group are welcome to join.

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**Co-op Scholars At Work**

This is the third year of Cooperative Education Scholarships. In this program the University, in collaboration with a number of private and public enterprise sponsors, provides $9300 per annum scholarships to selected students to complete a degree in their chosen field.

In addition to their academic course work, scholars have significant periods of professional work experience with different sponsors engaged in fields of enterprise related to their career aspirations.

To date students have had work experience in a wide range of settings including manufacturing, service industries, commercial enterprises, public sector administration, solicitors' offices, research organisations and mining.

Jennifer Atchison, in her third year of Environmental Science, has had a very
Andrew Jones, third year Materials Engineering, and Steven Floyd, third year Mechanical Engineering, have had a range of invaluable experiences at David Brown Gear Industries Ltd at Bulli.

In the process Andrew and Steven have been exposed to the realities of an industrial environment with opportunities to view many of the theories and teachings of their University courses in practice.

As Andrew observed, 'I have had the chance to see how a successful company operates at all levels, from design to finished product and all the stages in between, and to recognise the importance of teamwork in overcoming inevitable and unexpected hurdles'.

The University also believes that the benefits from the work experience program should not be one-way. Mr Ian Clulow, Branch Manager of Tandem Computers Pty Ltd reported on a scholarship student's 'preparedness to enthusiastically apply himself to any task - whether it be menial or sophisticated' and a willingness 'to apply his obvious mental and personal skills' for the benefit of the organisation.

Similar feedback has been received from a number of organisations indicating the value of work experience to students and to sponsor organisations.
Four Faculties are represented in the University's recent professorial appointments: Health & Behavioural Sciences, Law, Engineering and Informatics.

ROBERT BARRY has taken up the position of Professor of Psychology and Head, Department of Psychology. His previous appointment was at the Cognitive Neuroscience Laboratory in the School of Education Studies at the University of New South Wales.

Professor Barry has qualifications in physics, education and psychology from Sydney, NSW and Monash universities, including a doctorate in science from the University of NSW for his work in psychology.

Among his professional activities he is a Fellow of the prestigious International Organisation of Psychophysiology and President of the Australian Society of Psychophysiology. He is Associate Editor of the International Journal of Psychophysiology, an editorial consultant and reviewer for several other journals.

Although Professor Barry has undertaken significant fundamental experimental work, he has also applied that work in clinical situations.

He says he is very impressed with recent developments in the University's Faculty of Health and Behavioural Sciences and its increasing orientation towards an emphasis on the biomedical basis of its offerings.

Its integrated approach to both research and teaching is also attractive. In this context he says his existing collaborative activities with the Department of Psychiatry at Westmead Hospital in Sydney (currently funded by the NH&MRC) have the potential to be developed into a research network spanning the Illawarra and Sydney.

Professor Barry says he is very happy to be joining the Psychology Department at its present state of development. 'I believe that the Department can become recognised as a world leader in several research areas within the next decade. To this end, I will endeavour to stimulate a further increase in the level of externally-funded research carried out in the Department and with external collaborators in the local area.'

MARTIN TSAEMENYI has taken up an appointment as the fourth professor in the Faculty of Law. Before coming to Wollongong he taught at the University of Papua New Guinea and was Dean of the Law Faculty at the University of Tasmania from 1990.

After completing a law degree at the University of Ghana, Professor Tsamenyi was awarded a postgraduate scholarship to the Australian National University where he completed master's and doctoral degrees in international law.

He has been a consultant to governments on fisheries, forestry and mining law and policy. He has also recently been an AIDAB-funded consultant to the government of Namibia on diplomatic training.

Professor Tsamenyi has a special interest in the law of the sea, particularly fisheries law in the South Pacific. He will be actively
involved in the establishment of the Centre for Natural Resources Law, which will integrate teaching and research in what until now has been a segmented approach to laws which bear on the availability and use of resources.

The Centre will bring together the different approaches to natural resources and environmental law by taking as its point of departure the law relating to the conservation and development of natural resources. This will include a significant emphasis on mineral resources, a key component of the economy of the Illawarra region and the nation.

MICHAEL WEST is expected to take up his appointment as Professor of Mechanical Engineering in mid-1993.

Professor West grew up in Texas and then attended the Massachusetts Institute of Technology (MIT) for nine years.

During this time he obtained a bachelor’s and then a master’s degree in aeronautics and astronautics. In 1976 he was awarded a PhD in structures and materials engineering, also from MIT.

He did teaching and research at McGill University in Montreal, Canada, for two years, and in 1978 he moved to Copenhagen, Denmark, where he worked for over five years as a mechanical analysis specialist for the cement process industry.

For two years Professor West was an Assistant Professor in the Department of Aerospace and Mechanical Engineering at Boston University in Massachusetts. He has also taught in Denmark and at the University of Houston in Texas.

In the five years before accepting his appointment at Wollongong, Professor West has worked at Lockheed Engineering and Sciences Company in Houston, serving as Engineering Supervisor on the Space Station Freedom project for the National Aeronautics and Space Administration (NASA). He and the group he headed, earned numerous awards, including the NASA Group Achievement Award.

Professor West’s research interests include finite element methods, structural dynamics, mechanics of materials and mineral processing.

GRAHAM WINLEY is Head of the Department of Business Systems in the Faculty of Commerce.

He holds a bachelor’s degree in mathematics from Macquarie University, a master’s degree in operations research from the University of NSW and a PhD from the University of Wollongong in the field of systems modelling.

Since 1975, following twelve years as a teacher of mathematics with the NSW Department of Education, Professor Winley has held academic posts in the Wollongong Institute of Education and the University of Wollongong.

His teaching interests include quantitative methods for business and systems analysis.

During 1984 he was appointed as a Visiting Scientist in the section of Ecology and Systematics at Cornell University in the United States, where he conducted research into models of population growth.

Professor Winley is co-ordinator of the university research group in information systems in organisations. He has a research interest in the education and training needs of computing professionals with an emphasis on information systems curricula in developing nations. These presently include Malaysia, Indonesia, The Philippines and Thailand.

He also conducts research in systems modelling, including the development of techniques and tools for systems analysis and the study of the emergence of pattern in a variety of discrete systems.
GLOBAL COOPERATION
IN ADVANCED MANUFACTURING

The University of Wollongong continues to make a name for itself in the field of Advanced Manufacturing. This article is based on the involvement in international research activities of Günter Arndt, Foundation Professor of Manufacturing Engineering.

A global industry is one in which the long-term survival and competitive position of a company depend on its strategic position in the major world markets (Europe, North America, Asia) and not on its relative strength in any one market.

The trends toward global markets and global production are releasing companies from the restrictions of local market size and creating new openings for manufacturers in small countries. Competitive advantage will lie with companies which are capable of responding rapidly to demand for high quality, highly customised products. And this will require integrating flexible production technologies with a skilled workforce and with flexible management structures that stimulate cooperative initiatives within and between companies.

Global Possibilities

In response to this challenge, six leading manufacturing areas (the United States, Japan, the European Community, Canada, Australia and the European Free Trade Association (EFTA) countries) have established the global Intelligent Manufacturing Systems (IMS) Program. IMS is an industry-led collaborative research program, motivated by the challenges and possibilities of a globalised economy.

It is the brainchild of Professor Yoshikawa of Tokyo University, whose basic assumption that 'an uneven distribution of technical knowledge creates an uneven distribution of wealth' prompted him in 1988 to put forward a proposal for modifying previous, purely competitive attitudes.

He introduced a philosophy for disclosing manufacturing knowhow which has been accumulated over the years within companies, and for
cooperatively developing future technologies for the continued sound development of manufacturing industry on a global basis.

**Feasibility Study**

International joint research in manufacturing technology requires fairness in the distribution of research results, relevance to the manufacturing industry and generality of the technology. To test this the first stage of the IMS Program comprises a two-year feasibility study.

Three IMS international committees made up of high-level industrial and academic experts are advising on the management of the feasibility study. The International Steering Committee (of which Gunter Arndt is a member) has defined an experimental framework for collaboration, with the aid of the Technical Committee and the Intellectual Property Rights Committee. Six test cases have been selected, covering a range of technical domains and involving cooperation from four to five regions in each case.

The feasibility study aims to prove whether or not collaboration of this nature and on such a scale can be achieved and, more importantly, whether the benefits of such collaboration can be fairly shared. If the results from the six test cases prove positive, a full-scale research and development program over ten years is planned.

**Australian Input**

Australia is hosting a number of the meetings being held by the three IMS committees, including the first official IMS Workshop which was held in Sydney in February.

Professor Arndt was Organising Chairman of that workshop and the associated meetings and takes part in IMS meetings held regularly in other parts of the world. He says that Australian participation in the program is being very well received.

The University of Wollongong not only has Professor Arndt’s involvement in IMS, but, based on this, it has also won a $14 million (over seven years) Cooperative Research Centre (CRC) in Intelligent Manufacturing Systems and Technologies, together with three other universities and various partners.

Key players from Wollongong in addition to Gunter Arndt are Professor Chris Cook, from the Department of Electrical and Computer Engineering and Associate Professor Richard Badham, from the Department of Management.

This new CRC, which is not yet fully set up, is tailored to become the ‘flagship’ of Australian participation in the global IMS Program, with considerable commonality of research topics between the two. It will be described in the next issue.

**Companies Invited**

Australian companies interested in developing strategic alliances with leading companies in Europe, North America and Japan are invited to participate in the IMS Program by becoming a member of the Australian IMS Group.

For full details of annual membership and associated benefits, please contact Professor Gunter Arndt on (042) 21 3354 at the University of Wollongong.

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NEW CAMPUS FOR THE SHOALHAVEN

In recognition of the Shoalhaven as a rapidly growing area, the University announced late last year that a new campus would be established in the Shoalhaven in time for the 1993 academic year.

Graham Park, Berry (north of Nowra) whilst the search continues for a more suitable site closer to Nowra.

At the announcement the Vice-Chancellor, Professor Ken McKinnon, spoke of the University's special relationship with the Illawarra region, which includes the Shoalhaven and Southern Highlands regions. ‘The University takes seriously its commitment to make higher education accessible to students from this region,’ he said. ‘Courses offered at the Graham Park Campus will be subject to the same evaluation and assessment procedures as all the offerings at the main campus. Academic staff will move between the two campuses and provide the same quality of teaching.’

In his response the Mayor, Alderman Max Atkins, said: ‘This is an historic occasion for the Shoalhaven and a sign that we are finally growing up.’ He commented on the growth of the region’s education facilities and added, ‘We can certainly pledge the support of the community and I can also say that officially, Council has pledged its full support.’

Long-time Shoalhaven resident, local teacher and now University lecturer, Ray Cleary, has been appointed Campus Coordinator. From 1984, when he came to the University as a lecturer in administrative and industrial studies, Ray taught postgraduate courses for teachers in the Shoalhaven over a number of years.

Ray believes that the Graham Park site at Berry is an excellent one and he is confident that interest from local students in studying at the campus will grow quickly, although naturally the numbers will be small at first. This session students have enrolled in five first year subjects from the Bachelor of Arts and Commerce courses on offer. Limited resources mean that second and third year courses are not as yet available at the Graham Park Campus.
Music courses for primary school students (to date over 40 are enrolled) are being offered by the University’s Conservatorium of Music. Programs will be run by the Aboriginal Education Centre and professional certificate courses will also be offered.

There is ample teaching space in the auditorium (which seats up to 50) and a number of tutorial rooms. A computer laboratory with Apple Macintosh work stations has been set up and library facilities are being organised through the Shoalhaven City Library.

Graham Park students to take advantage of Wollongong campus facilities.

Ray Cleary is delighted to see that Shoalhaven residents will no longer have to leave home to pursue a tertiary education. ‘There are tremendous benefits, both financial and emotional, to families in this area’, he says. ‘No longer will family members be forced to leave home in order to study. Students will now be able to save money by living at home and travelling to Berry daily. Having a university in the Shoalhaven means that all levels of education (school, TAFE and university) are now available, which is a great advantage to everyone in the area.’

As part of the celebrations to mark the official opening of the Graham Park Campus, a reunion dinner for graduates in the Shoalhaven area is planned for Friday 2 April 1993. Invitations have been sent to alumni living in the Shoalhaven and surrounding areas, as well as to others interested in the development of this new campus of the University of Wollongong.
Since the University began its environmental science degree in 1983, a significant number of graduates has been employed as environmental scientists in government and industry.

In a review of the program in the late eighties, employers suggested that a greater science input would enhance the qualities of the graduates. So the University extended the degree to 4 years and added an honours component. Students entered the 4-year program for the first time in 1990 and the first stream completes the honours year in 1993.

One of the unique features of the program is the requirement that fourth year students complete a research project working in association with a non-university organisation. The aim is to enable students to gain experience working as environmental scientists in a 'real' situation. In addition potential employers have an opportunity to assess the capabilities of graduates from the program and also to identify potential employees.

Students will be involved in planning and monitoring projects and in environmental impact assessments and investigations of specific issues such as bacterial/algal blooms, hazardous waste management and ecosystem surveys. To date some 20 organisations have indicated their willingness to collaborate in this exercise. These include BHP, ANSTO, NSW Environmental Protection Authority, Associated Pulp and Paper Mills, Water Board, Wollongong and Shoalhaven City Councils, Sutherland Shire Council, Quality Environmental Management Pty Ltd and the NSW National Parks and Wildlife Service.

As each student will have a University supervisor in addition to one on-site, this arrangement also provides an ideal opportunity for closer interaction between the University's staff and the wider community.

The improvement of such collaboration is one of the goals of John Morrison, who has recently arrived to take up the BHP Professorship of Environmental Science within the University. Some 15 students will be involved in projects during 1993 but this will increase in coming years. As a result Professor Morrison and his staff would welcome expressions of interest from other organisations who may wish to host BEnvSc students for their projects. Further information can be obtained by calling (042) 21 4134 or 21 4396.

Through the environmental science program Professor Morrison hopes to develop links between the University and a wide range of organisations with interests in environmental matters. Links between groups concerned with environmental issues both on and off campus will also be expanded via the Industry and Environment Working Group which is now being developed within the University's Faculty of Science.©
Law schools compete interstate

CLIENT INTERVIEWING

COMPETITION

The inaugural Australian Client Interviewing Competition was hosted by the Faculty of Law in February. Teams from nine Law Schools representing universities in five states competed for the honour of representing Australia.

The criteria for judging emphasised the process of interviewing, including the use of effective questioning, the ability to elicit relevant information in an efficient way, the ability to ascertain the client's goals, the structure of the interview and the ability to communicate with the client in a clear and effective fashion.

The Wollongong team, represented by Zoe Nielsen and Jim Stanger, came third with Macquarie University in second place. The judging panel selected Richard Kearin and Trudy Edmondson from Monash University to represent Australia at the 1993 International Client Interviewing Competition in Calgary, Canada in April. They are competing against teams from the United States, England and Wales, Scotland and Canada.

The Inaugural Australian Client Interviewing Competition was considered a great success and good wishes are extended to the Monash team when they compete in Canada.
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