The University of Sydney School of Physics

Alumni News

March 2003

From the Head

The new Head of School, Assoc. Prof. Brian James

As I take over as Head of School I would particularly like to acknowledge the achievements of my predecessor as Head, Professor Don Melrose. Don succeeded in the unenviable task of restructuring the School to reduce the general staff numbers to be commensurate with the number of continuing academic staff. The result is that the School now consists of research groups with a central administrative structure in place of the previous internal research departments with their individual administrative structures. Although the number of continuing academic staff has fallen significantly over the last ten years or so, this has been accompanied by a large increase in research-only staff supported by external research grants, to the extent that their number is about twice that of the academic staff. This change is symptomatic of the changes in the research universities, where postgraduate students and research-only staff funded by external grants are essential for most research programs, and teaching loads for academic staff have risen.

Don's restructuring has positioned the School well to seek new opportunities, and by the end of 2002 we received very clear evidence of the success of this strategy. Federation Fellow Professor Ben Eggleton, who took up his position at the beginning of 2003, together with the School's Professors Martijn de Sterke and Ross McPhedran were awarded one of eight successful Australian Research Council Centres of Excellence funded to commence in 2003. Their centre, the Centre for Ultrahigh-bandwidth Devices for Optical Systems (CUDOS) will be based in the School of Physics. This is a major success for the School, which will bring many new people to the School, and confirms the School as one of the major Australian centres for photonics research.

One of the consequences of this success is a major rearrangement within the School to provide office and laboratory space for the Centre. At the time of writing we are finalising relocations within the School and beginning refurbishments needed to achieve these changes.

Due to continuing retirements the School is in the processes of filling two positions for continuing academic staff. One, in the area of biological physics, will allow the School to expand present research efforts in this area. The other position is in the area of computational physics, where the School already has considerable expertise. In 2002 the School offered for the first time, with great success, Junior undergraduate units of study in computational science. Both these initiatives are indicative of the ways in which physics departments can make significant contributions in research and teaching to areas somewhat outside the traditional physics discipline.

Another new development is the School's contribution to high school physics teaching. As part of the Faculty's Kickstart Science program, the School provides opportunities for high school students to perform experiments from the new Higher School Certificate (HSC) physics syllabus. Unfortunately, many schools are not able to provide this essential component of the syllabus.

In another connection to high schools, Matt Ryan, a science teacher at Brigidine College Randwick, has been awarded the inaugural Science Teachers Fellowship at the University of Sydney. This fellowship will provide Matt with his salary for 12 months to allow him to pursue full-time his proposal to build a radio observatory and satellite communications centre for high school students.

Brian James
Head of School

See a profile of Brian on page 4

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Honours to School Members

The members of the School of Physics have recently logged a pretty impressive record in terms of awards and accomplishments, by anyone's judgment.

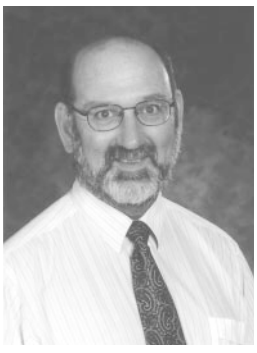
As the last issue of Alumni News was going to press, it was announced that Prof Marcela Bilek was awarded the $35,000 Malcolm McIntosh Prize for Physical Scientist of the Year for her work in creating invaluable designer materials for industry. This award is presented annually by the Federal Government "for outstanding achievement and potential in the physical sciences that advances, or has the potential to advance, human welfare or benefits society. This prize is awarded to individuals who are no more than 35 years of age at the time of the award." For more information on the work Marcela does, her career highlights and a brief biography visit www.physics.usyd.edu.au/~mmmb/

The 2002 recipient of the Boas Medal from the Australian Institute of Physics (AIP) was Prof Peter Robinson. The Walter Boas Medal is "to promote excellence in research in Physics and is awarded on the basis of Physics research carried out in the five years prior to the date of the award." Peter's work includes the neurophysical modelling of brain dynamics as outlined in the research article in the last Alumni News. Other areas of his extensive research are outlined at www.physics.usyd.edu.au/theory/peter_new.html

Prof Marcela Bilek, Malcolm McIntosh Physical Scientist of the Year, 2002

Long service medals were awarded to three staff of the School during November. Duncan Campbell-Wilson, has been with the School's Molonglo Observatory near Canberra for 15 years and has been the Officer-in-Charge for many of them. Terry Pfeiffer has been a technical officer with the School for 20 years, with much of that time spent in Applied Physics. Bill Tango joined the School in 1976 and first worked on the prototype Michelson stellar interferometer that was constructed at Lindfield. This work led to the development of the Sydney University Stellar Interferometer (SUSI) and he continues to play a major role in this project (see the October 2001 issue).

Martijn de Sterke and Dick Hunstead have been both been promoted to Professor and Tim Bedding to Associate Professor, as of 1 January 2003. Martijn is a theoretical physicist working in the field of optics, with close links to people in the Optical Fibre Technology Centre amongst others places. His work is outlined on www.physics.usyd.edu.au/theory/martijn_new.html, and elsewhere in this newsletter. Dick Hunstead leads the Astrophysics group that runs the Molonglo Observatory. His wide-ranging interests are covered on www.physics.usyd.edu.au/astrop/people/rwh.html. Tim is also an astronomer with his major research topic being asteroseismology – studying the way stars vibrate to gain information about their interiors that are otherwise hidden. He's involved with a Danish group that will launch Australia's first space telescope into orbit to discover more of the secrets of stars – see www.physics.usyd.edu.au/~bedding/



Long service medal winners: Bill Tango, Duncan Campbell-Wilson and Terry Pfeiffer

Dr Karl receiving his Ig Nobel Prize from the 1976 Chemistry Nobel Laureate William Lipscomb

Harry Messel's motto is "The pursuit of excellence". When he retired in 1987, the Messel Award for Excellence was set up to recognise excellence in staff and students. The Award is given about every three years and Joe Khachan was the recipient in 2002. Joe works in the Plasma group and his work on a portable neutron device was reported in the August 1999 issue of the Alumni News. More information on his work is available on www.physics.usyd.edu.au/app/people/j.khachan/

Last but surely not least, Dr Karl Kruszelnicki was honoured with an Ig Nobel Prize in inter-disciplinary research for his comprehensive survey of belly button lint – who gets it, when, what colour and how much. The "Igs are inflicted on you by the science humour magazine the Journal of Improbable Research" whose website (www.improb.com/ig/ig-top.html) explains that "the Igs honour people whose achievements 'cannot or should not be reproduced'." For more information on Karl's prize-winning research see www.abc.net.au/science/k2/lint/default.htm

School News

Research Funding Success

The School of Physics has enjoyed astounding success recently in funding competitions, with a long list of large-scale research projects getting the nod from the government. The School's funding allocation from the Australian Research Council (ARC) grants for 2003 alone was $1.4 million spread across ten different projects. In addition to this, the University's largest grant was awarded to Professors Ben Eggleton and Martijn de Sterke for research into new devices for nonlinear optical signal processing through the new Centre for Ultra-high band-width Devices for Optical Systems (CUDOS). The School of Physics will act as the lead institution for CUDOS, in collaboration with researchers at four other universities. See page 6 for more info.

New Staff

The School community has grown over the last few months. Among the new faces wandering the halls are Professor Ben Eggleton (Federation Fellow and Director of CUDOS), Dr Geraint Lewis (astrophysics), Dr Lucyna Kedziora-Chudczer (Theory), Dr Chris Walsh (CUDOS), Dr Peter Barnes (lecturer), Dr Matthew Hole (theory), Owen Shepherd (outreach), Martina Wardell, Lynda Fox, and Hannah Jurd (all in administration).

School Review

The School of Physics underwent an external review in November 2002. The committee, consisting of physicists and other academics from within and outside the University of Sydney, spoke with many of the academic staff, general staff and students in the School over several days. Their recommendations covered a wide range of operations in the School, including the structure of committees, directions for future appointments, the supervision of students – even the refurbishment of the tea-room. Members of the School community were asked to join the discussion to address these recommendations.

Cadbury-Schweppes Quotes Competition

The School ran the Quotes Competition again in second semester, with 10kg of Dairy Milk chocolate (generously provided by sponsors Cadbury Schweppes) handed out for the best lecturer quotes in semester two. The winner, judged by an expert panel of physics postgraduate students and administration staff, was Tom Allen, a first year Computational Science student. Tom submitted the following, uttered by Dr Mike Wheatland whilst he was eating an apple and after a student pointed out a sign stating "NO FOOD IN LAB":

"Oh no, that just means there's no food AVAILABLE in the lab..."

Science Teachers Workshop 2002: Coffs Harbour Edition

In October the Science Foundation ran the third Science Teachers Workshop for 2002 in Coffs Harbour. The School's Outreach Officer, Owen Shepherd, Kaye Placing from UniServe Science, School of Physics alumnus Dr Chris Stewart from the Unit for the History and Philosophy of Science and Dr Kate Wilson from UNSW, talked about the new NSW HSC syllabus with a group of 30 teachers from the Coffs Harbour region, including several who drove more than five hours to attend the two-day workshop.

KickStart Physics

In April last year, the School of Physics started its KickStart program for Year 12 high school physics classes. Many high school teachers lack access to the experimental equipment required by the new HSC syllabus, and are still adjusting to the new topics. High school students are now studying super-conductivity and special relativity! The KickStart program provides hand-on experiments and in-depth knowledge of physics to high school teachers and their students.

Over 800 students came through the School in 2002, from schools throughout Sydney, and even as distant as Cowra and Orange. KickStart Physics has also been an excellent opportunity to promote the School of Physics to many potential science undergraduates. Thanks must go to Dr Chris Stewart and Dr Joe Khachan for setting up KickStart and running it in 2002.

KickStart programs are also running in Biology and Chemistry. The program restarts in February this year, and we are expecting even larger numbers, going on the bookings so far. Spread the word to any physics teachers you know!

Stephen Bosi demonstrating an experiment in the KickStart program to Year 12 students

Dr George Hawke

Dr George Hawke

It is little surprise that Dr George Hawke goes to work by bus. As Senior Environmental Consultant at Pacific Power he has a keen interest in reducing pollution.

George's interest in the environment began early. "I was brought up on a wheat and sheep farm in central NSW. My father planted thousands of trees on the property and one of my earliest memories is of using a hand pump to water them."

At eleven he attended Forbes High School where he was in the first year of the HSC examination. "The Wyndham scheme, as it was known, introduced radical changes to the syllabus and the teachers had to follow a completely new curriculum. I remember learning science from Butler and Messel's great blue book, and being largely self taught. We became known as the 'Wyndham guinea pigs'."

In 1966, George attended the Summer Science School at the University of Sydney, a period to which he attributes his increased interest in science. He subsequently applied to Sydney University where he enrolled in a B.Sc.

"Looking back I have a vivid memory of the computer in the Physics building occupying the whole room. I also recall using mechanical calculators in mathematical statistics tutorials."

"There were many stimulating projects and lecturers at this time. I particularly remember Dr Robert May's excitement and animation. One of my assignments was 'Power without Pollution' which really developed my interest in environmental science. However, this wasn't the only factor. While conducting experiments with lasers in the Plasma Physics Department I became concerned about their military applications which also led me more towards the environmental field."

George remembers living at University Hall, a hostel on the corner of Parramatta Road and Glebe Point Road and the overnight journeys home on the mail train at the end of term. When not studying, George enjoyed playing cricket and has fond memories of participating in the annual staff vs student match during his fourth year. He graduated in 1971 with a first class honours in Physics.

The following year George gained a Shell Postgraduate Research Fellowship to study air pollution meteorology at Macquarie University. This involved investigations into the structure and dissipation of morning drainage flows above Sydney in order to gain a better understanding of the dispersion of air pollutants. In turn, this helped to explain the brown haze above Sydney. He gained his Ph.D. in Environmental Science in 1980.

George worked as a Senior Research Assistant in the School of Earth Sciences at Macquarie University from 1975-1978. His area of research was the meteorological aspect of the Sydney Oxidant Study.

Following this, George spent the next decade as Officer in Charge of Air Investigations at the NSW State Pollution Control Commission (now the NSW Environment Protection Authority). Continuing with his interest in air pollution, his major project was a study of photochemical smog in the Sydney region. As part of this, George embarked on a study tour of USA in 1981. The project resulted in the introduction of unleaded petrol in NSW in 1986.

George moved to his present post with Pacific Power – then known as the Electricity Commission of NSW – in 1989. He has been certified by the Quality Society of Australasia as Lead Environmental Auditor and has audited a number of construction projects such as the Penrith Whitewater Stadium, the Blayney Wind Farm and the interstate electricity transmission line connecting NSW with Queensland. Other audits have resulted in improvements in environmental protection in the electricity generating industry.

George is highly experienced in a number of areas including: environmental management systems, environmental legislation and environmental impact assessment.

Although air pollution was one of the earliest environmental issues in Sydney, according to George, this is now just one of many environmental concerns.

"Water pollution, land contamination, noise, waste management are all areas that need addressing. However, in my view the major environmental concern in Australia is land degradation caused by excessive clearing of vegetation and salinity. For example, a significant amount of topsoil has been lost in dust storms during the recent drought. Another concern for a dry continent such as ours is water conservation."

When he is not working George enjoys his eco-friendly hobbies of bush walking and photography.

Associate Professor Brian James

Trying to catch up with Associate Professor Brian James is not easy. If he isn't running a research program or collaborating on an important project he might be attending an international conference. As a physicist and academic, Brian enjoys being part of an international community, an area in which there will be even more opportunities following his recent appointment as Head of the School of Physics at Sydney University. So where did it all begin?

Born in 1946, Brian has always been encouraged to realise his potential. His parents, both primary school teachers, had a strong influence on Brian's academic aims and aspirations. "I grew up in an environment where I was expected to do well academically. My father had hoped to go to university himself, but was thwarted first by family circumstances and then by war. I was always encouraged to strive for the best educationally and to seize the opportunities offered to me."

Brian went to Parramatta High and it was here that his interest in the sciences was given a major boost. "In my first year there we had a science teacher who was on an exchange program from England. He ran after-school classes in a number of areas. I remember in particular a project where we built electric motors. This undoubtedly encouraged my interest in scientific and technical matters."

Brian's longstanding association with the School of Physics began in 1963 when he embarked on his first degree at Sydney University. He graduated three years later with first class honours in Physics and the University Medal.

Why did Brian ultimately chose physics? "Physics has a strong appeal as it deals with fundamental principles that are applicable to all areas of science. I majored in Physics and Pure Maths, but decided to pursue a career in Physics because I preferred the link that it offers with the real world. For example, my research area - plasma physics - is fundamental to an understanding of most of the universe. Everyday applications of plasmas include fluorescent lights and plasma television screens."

Brian remained at Sydney University to study for his PhD on ionising shock waves. Upon its conclusion in 1971, he was appointed as a lecturer in the School of Physics.

Brian enjoys working collaboratively with colleagues both at home and overseas. In 1974 he was a research associate at the Culham Laboratory in the UK, where he worked on the development of submillimetre lasers for plasma diagnostics. This interest continued during the 1980s when Brian worked on a joint program with CSIRO. Further study leave included stints in California, Fukuoka, Japan and Dublin.

Brian is currently collaborating with Hiroshima University on laser measurements of electric fields in plasmas and closer to home with the Australian National University on electric field diagnostics on the H-1 heliac, an apparatus in which plasmas are manufactured.

"Prudently applied, scientific discoveries can offer the world so much. I believe the understanding of matter that came with quantum mechanics was the most important discovery of the last century. Its consequences are far reaching and include the development of lasers in the 1960s and the current exciting developments in atom optics which I anticipate will lead to major technologies in the future."

However, Brian acknowledges that all forms of information can be misused, often in ways that cannot be foreseen. "The use we make of knowledge is a matter for society to decide by processes involving the whole community."

During his many years at Sydney University Brian has undertaken a range of responsibilities and has just completed six years as associate dean in the Faculty of Science.

As well as his many international links, Brian is looking forward to forming links of a different kind by visiting Sydney schools to talk about physics in the hope of inspiring the physicists of tomorrow.

When not working, Brian enjoys leisure activities with his wife Helen and their three teenage sons. His long held enthusiasm for bushwalking has expanded to include an interest in flora and fauna, local history and land use. Let's just hope he can find the time!

The new Head of School, Assoc. Prof. Brian James

CUDOS to School of Physics Researchers

The School of Physics has just become the home to one of only eight Centres of Excellence in Australia. The new Centre for Ultra-high bandwidth Devices for Optical Systems (CUDOS) will strengthen even further the School's research in optical devices and its standing in the academic community.

Professors Ben Eggleton, Martijn de Sterke and Ross McPhedran are three of the twelve Chief Investigators named on the proposal for CUDOS. The request for $11.5 million in federal funding over the Centre's five year lifespan was finally approved late last year. As of 1 January 2003, CUDOS is on-line and the group has already begun constructing laboratories and fitting out office space within the School. Over a dozen new research staff are expected to join the Centre over the next five years.

Australia's economic future depends on its scientists' ability to carry out world-class research. A vital area for the future of Australian science and technology is the field of optical communications, and Sydney is rapidly gaining strength in this sphere – it is already home to the Australian Photonics Cooperative Research Centre and the Optical Fibre Technology Centre. With the arrival of CUDOS, Sydney is truly set to become the "photonics" city.

The Centre is a collaborative project combining the established expertise of researchers at the University of Sydney, ANU, Macquarie University, Swinburne University, the University of Technology, Sydney and the CSIRO. It also builds on established research links with photonics research groups at other Australian universities and CRCs, the DSTO, and international partners such as Professor Eggleton's previous employer, the prestigious Bell Labs in the USA.

"The main purpose of CUDOS is to develop the theoretical and technical expertise to create photonic chips – the building blocks for the next generation of optical systems," says Professor Eggleton. This means researching ways to miniaturise the required optics – an optical equivalent to the great leap forward that occurred in electronics when bulky, inefficient thermionic valves and tubes were replaced by small, cheap, mass-produced integrated circuits and computer chips.

The manipulation of light through the use of lenses and mirrors, and more recently through the development of lasers, optical fibres and photonic crystals and non-linear optics, has greatly advanced the global communications industry. Many countries, including Australia, are rolling out optical fibre networks for broadband communications. These optical networks, while a vast improvement over the slow, low bandwidth electronic networks they replace, are already being saturated by the sheer volume of traffic created by modern telephone and computer communication. There is a pressing need for ultra-high bandwidth communications to cope with this ever-increasing data load.

The key to the successful production of ultra-high bandwidth optical systems envisioned by CUDOS is the use of non-linear optical systems. Linear optical systems, such as basic optical fibres, are useful for simply propagating a signal from one place to another. Sorting that signal, routing it, amplifying it and decoding it currently require the light wave to be converted into an electrical signal. That signal can then be passed through conventional circuitry, built from elementary electric components such as switches and gates. These electrical circuits constitute the main bottleneck to the efficient flow of information in current communications equipment.

Five years ago, a typical optical fibre carried 16 channels of data at a rate of about 2.5 Gigabits per second (Gbps) per channel. Since then, bandwidth has increased to 40 channels carrying 10 Gbps each, and cutting-edge optical systems aim as high as 40 Gbps per channel. At these bandwidths, the frequencies present in the signal are so high that electric circuits cannot reliably manipulate the data, and so the conversion of optical to electric signal breaks down. There is a limit to the rate at which data can be pushed through an electrical circuit. Beyond this, information is irretrievably lost.

To get over this hurdle, future ultra-high bandwidth devices will need to avoid the optical-to-electrical conversion step – which means they will require optical versions of the switches, gates, amplifiers and all the other building blocks of elementary circuits. These are all non-linear devices, since they depend on one signal being altered by the presence of another.

In a medium with linear optical properties, different light beams can superimpose without disturbing each other. By contrast, a material that is optically non-linear allows one beam of light to affect another, for example by changing its amplitude or frequency. This behaviour can be exploited to create the non-linear components that comprise optical circuits.

Applications of non-linear optics to such basic photonic devices have been studied and refined for many years, but the resulting apparatus is typically large and unwieldy. The CUDOS researchers propose to miniaturise these systems – if their research produces the means to shrink photonic devices down to more manageable sizes, then complex optical systems could be manufactured on a single 'photonic chip' and mass-produced, just as computer chips are today.

Professors Eggleton, McPhedran and de Sterke emphasise that CUDOS will not be geared towards producing marketable intellectual property or spawning spin-off companies – at least, this isn't a stated goal of the Centre. Rather the group will concentrate on excellence in research, on pursuing novel ideas and applications without the pressure to find ways to make them turn an immediate profit.

"In this regard the Centre is a riskier venture than research groups more oriented to intellectual property (IP), such as the Co-operative Research Centres (CRCs)," says Professor Eggleton. However, he is betting that over the five year life of the Centre, their research output will be so rich that the spin-offs, the IP and the commercial applications will emerge anyway.

Ultimately, CUDOS aims to put Sydney on the map as a global leader in the photonics industry. Professor Eggleton hopes to turn CUDOS into one of the top three photonics research centres in the world.

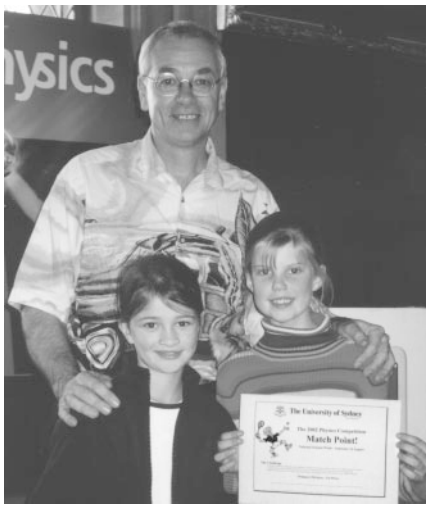
"We're using really exciting areas of photonics for some really important applications," said Professor Eggleton. "We want people to know who we are and what we're about. We want people to think of us when they think about photonics."

National Science Week activities and the 2003 Physics Competition

In 2002 someone moved National Science Week! The 'traditional' May date moved to August, where it now seems set to stay.

Physics staff and students again played a significant role in 'Science in the City' with the 'Giant Science' show, run this year by Joe Khachan and Chris Stewart. Karl Kruszelnicki, the School's Julius Sumner Miller Fellow, Caroline Pegram, and ABC radio presenter Adam Spencer once again took their 'Sleek Geek Week' Tour around Australia, visiting Byron Bay, Launceston, Melbourne, Adelaide, Perth, Broome, Alice Springs, Cairns, Townsville, Canberra and Sydney. The tour was an enormous success – it would have been possible to fill the venues twice over. A few weeks later they took their unique slant on science to the UK for a very successful nine day tour.

The Physics Competition for 2002 was 'Match Point!'. It was held on 24 August in the University's MacLaurin Hall which, with its grand appearance and ornate wooden ceiling, proved to be an added bonus for many contestants on the day.



Karl Kruszelnicki with 2002 competition winners Georgia Pearce and Gabrielle Stove

Contestants were asked to design, build and demonstrate a mechanical device using a tennis racquet (or other stringed racquet) to hit a tennis ball a distance specified on the day of the competition. The objective was to land the ball in target pipe imagined to be the corner of a tennis court. The winning entry was the one most consistent in landing the ball in the pipe. Entrants were free to decide if the 'device' caused the racquet to hit the ball or vice versa (its all a question of "frames of reference" of course). One entry exploited the fact that we didn't specify that the ball had to hit the strings!

The winner was an entry from a primary school, which used a racquet and a small backyard swing. They also took out the extra prize of an eMac computer, donated by Apple Australia for the most innovative entry.

The 2003 Physics Competition is entitled 'Gravity Drive'. This challenge will return to a previous idea using a vehicle, this time powered only by gravity, that must travel a set distance (to be physically correct – a 'displacement') to be revealed on the day.

Do you know how to do it? Entries in primary school, secondary school and open divisions are welcome!

See what silly things the lecturers say!
Entries in the latest Physics Quotes Competition can be found at **www.physics.usyd.edu.au/quotes.html**

Visit the Physics Competition web site for results and photos from the 2002 Competition and details of the next competition.
www.physics.usyd.edu.au/competition/comp2003/

Nobel and Ig Nobel Prizewinners at ISS2003

There can be few events where both a Nobel and an Ig Nobel Prize winner will speak, but the 32nd Professor Harry Messel International Science School will be one of them. Prof Jerome Friedman shared the Nobel Prize for Physics in 1990 for work in particle physics. Dr Karl Kruszelnicki won the 2002 Ig Nobel Prize in interdisciplinary research for his comprehensive survey of belly button lint – who gets it, when, what colour and how much. Both will be speaking at the two-week, fully residential International Science School held at The University of Sydney from 6-19 July 2003.

They will be joined by scientists whose research spans the range of scales "From Zero to Infinity", the theme of ISS2003. The topics will range from the apparently familiar, such as Australian native animals and the Great Barrier Reef to the definitely strange, like the extremophiles, organisms that thrive in extreme temperature or pH conditions; from blue sky stuff such as galactic cannibalism and the early universe to immediately applicable studies such as the effect of radiation on biological and electronic systems, and high resolution meteorology.

As well as the lectures, the formal program is rounded out by experiments, role playing, create-then-test-to-destruction competitions and tours of research labs. All 140 Year 11 and 12 students from nine countries stay at St John's College on campus, with an active social program for the weekends and evenings run by the Young Scientists of Australia, Sydney Chapter (www.ysa.org.au). Then there's the harbour cruise and the farewell dinner, as well as the chance to interact directly with all those top scientists.

For more on the 2003 International Science School, including the complete list of topics and lecturers, see: www.scienceschool.usyd.edu.au

Where are you now?

Alumni report on themselves

School of Physics Alumni

(A year after the degree indicates a Sydney University degree.)

Dr Neville de Mestre (BSc (Hons) 1959, DipEd 1960) I am the chair of the Mathsport group of ANZIAM (Australia and New Zealand Industrial and Applied Mathematics). I have been Director of five of the six Mathematics and Computers in Sport Conferences held in Australia. My research is investigating the dynamics of many sports including cricket, rowing, shot put, triathlon, golf, baseball, tennis and lawn bowls.

Another research interest is mathematical education where I emphasise a hands-on approach using experiments with counters, card, rods and other tactile objects. This work led to the establishment of the ACT Mathematics Centre which evolved into the Questacon Travelling Maths Centre under the auspices of the National Science and Technology Centre.

For recreation I play bridge, go orienteering (several national and State titles) and compete in surf lifesaving (16 national titles and 4 world titles).

I currently teach business Mathematics, Business Statistics and Problem Solving at Bond University. I am Deputy Chair of Senate, Chair of ANZIAM, and enjoying my part as one of the few mathematicians in an Information Technology School.

Greg Palmer (BSc 1993) Greg completed a BSc in 1992. Since graduating he has worked in the telecommunications sector – for one vendor (Alcatel) and two operators (Vodafone and Hutchison). He is presently working on standards and strategy associated with the Hutchison 3G network. In 2000 he completed an LLB and expects to complete a graduate diploma in legal practice and attain a NSW practicing certificate this year. He has been married for 8 years and has two daughters.

Richard Lindsay Dowden (BSc (Hons) 1955) After graduation and a few months with the Radiophysics Division of CSIRO, then on the Sydney campus, he spent a year at Macquarie and then eight years in Tasmania. Whilst there he acquired an MSc, PhD and DSc at the University of Tasmania. In 1966 he was appointed a Professor at Otago University, retiring in 1988.

International Science School Alumni

(The State/Country the person represented at the International Science School, and the year of the School are given in brackets after each person's name.)

Tamyka Bell (ISS 1997) Despite my best efforts to become a biochemist, I graduated with first class honours in physics at the University of Queensland in 2002 and got awarded a University Medal. I think that the ISS really sparked my interest in physics and that's why I ended up here today. I am now doing a PhD in linear optics quantum computation at UQ, as part of the ARC Special Research Centre for Quantum Computer Technology.

Emma Kemp (ISS 1995) After finishing school in 1996, I spent six months travelling the world and doing volunteer jobs such as teaching English in Thailand, working on a steam train line near Melbourne, and learning to be a pine tree farmer in Fiji. The following six months were spent in various jobs paying back my travel costs. I then spent four years at the University of Edinburgh, where I completed a BSc in chemistry in 2001. Since then, I have been living in a small town in southern Germany, learning the language and working for the publishing company Wiley-VCH as an assistant editor, first for Angewandte Chemie and now for the sister journals ChemPhysChem and ChemBioChem. I am still an incurable travel addict and hope to find some time for another big trip in the future.

We welcome contributions to this column, which should be sent to the contacts listed on the front of the Newsletter.

HARRY

Professor Harry Messel

It is now almost fifteen years since Harry Messel retired as Head of the School of Physics at the University of Sydney. Now 80 years old, Harry continues on as strongly as ever. Equally importantly, his memory remains undiminished.

There are literally hundreds of stories about Harry, many of them amusing, some poignant, but they all tell us something about the man. In an effort to ensure that the contributions of Harry Messel are remembered well into the future, the recently retired Head of the School, Dick Collins, would like to collate these stories and to put them together into a book. The working title of the book is simply "Harry". All proceeds from the book will go into the Messel Endowment.

Many alumni of the School, or of the International Science Schools, will have memories of Harry, perhaps in the lecture room, maybe as you passed him and his ever-present cloud of cigar smoke in the corridor, or from a one-on-one interaction. Please write your story down, and send it to Dick for inclusion in this memorial.

The most convenient way of sending your story is electronically, as a Word attachment to an email. Please send this to:-
Dick: r.collins@physics.usyd.edu.au with a copy to Jenny Nicholls: j.nicholls@physics.usyd.edu.au

Alternatively, you could send the story in hard copy to Dick Collins at the School of Physics, University of Sydney NSW 2006 Australia.