



Professor Trevor Hambley  
Head of School

## From the Head of School

The decrease in staffing levels in Chemistry departments around the country has been the subject of much discussion at meetings, conferences and in the press over the past few years. While we have fared better than most, it is unarguable that there has also been a decrease here at Sydney. In 1985 (the oldest School Yearbook I have) there were 41 academic staff on the books. Seven of these were what we now know as Level A (tutors and senior tutors), a level we no longer use in the School for teaching staff, and 34 were Level B and above. We currently have 25-26 staff at Level B and above so the decrease is either 8-9 or 15-16 depending on how you count. This decrease has inevitably led to increased teaching and administrative loads, but it certainly has not led to the demise of Chemistry at the University of Sydney. Looking at the 1985 Yearbook, I count 27 active research groups – whereas now, looking at our current noticeboard in the foyer, I count 34 active research groups. Counting publications in 1985, I get 83 where our counts for 2000, 2001 and 2002 have been 155, 180 and 154. Also, research funding in the School has grown extraordinarily, now being in excess of \$6 million per year. How can this be? The obvious answer is the quality of our postgraduate students and our staff! This is true but is only part of the story. The other change is the dramatic increase in the numbers of research-only academic staff. In 1985 there were none, now there are 12! As you will see in the newsletter, we have welcomed some very highly credentialed research-only staff this year including Professor Leo Radom from ANU and A/Professor Phil Attard from the University of South Australia. Most of our research-only staff are funded by ARC Fel-

lowships (APD, QEII and Professorial). In addition to the obvious contributions to our research profile, most of the research-only staff also contribute to teaching, reducing the load of our permanent staff. We also have ten Honorary staff, most of whom also contribute to teaching and research. Thus, all up, the School has at least 38 academic staff, not very different to the number in 1985. However, back then all were of “one flavour” whereas now we have an enormous variety of appointments, all of whom contribute to the vibrancy and success of the School.

Another major development in recent years has been the establishment of research centres. With the recent approval of the Centre of Structural Biology and Structural Chemistry and the Organic Synthesis Centre there are now four in the School (see insert). Most of these centres have as a goal the increase of interactions with industry, and this has already had a dramatic effect on the level of industry-linked research. We will report more on the Centres and the opportunities they may offer you in the next newsletter.

The School also has two foundations, the long standing Foundation for Inorganic Chemistry and the newly minted Cornforth Foundation for Organic Chemistry. The primary function of the foundations is to bring top scientists to Australia each year. The reverse side of the insert provides the opportunity for alumni to make a contribution to one of these Foundations, or to the new Chemistry Alumni Fund. The function of the Alumni Fund will be to provide scholarship support for the group of top quality postgraduate students (those with First Class Honours) who are unsuccessful in winning other scholarships.

**Professor Trevor Hambley**

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The University of Sydney  
AUSTRALIA



## Phil Attard

Phil joined the School at the beginning of the year as an ARC Australian Professorial Fellow from the University of South Australia, where he was an ARC Senior Research Fellow.

Phil graduated with a First Class Honours degree from the University of NSW in 1984 and then went on to a PhD at the ANU in 1988 working on Electrostatic Fluctuation and Double Layer Interactions between Surfaces.

His various appointments have taken him to such places as the Centre Recherche Paul Pascal at the Universitaire Bordeaux, the Department of Chemistry University of British Columbia, both the Department of Applied Mathematics and the Department of Physics at the ANU, the Courant Institute of Mathematical Sciences at New York University, the University of South Australia as well as the School of Chemistry at the University of Sydney.

His areas of research interest are equilibrium and non-equilibrium statistical mechanics; measurement and theory of colloid and surface forces; computer simulation of molecular interactions in fluids; and soft matter, as described by continuum mechanics and applied mathematics.

## Leo Radom

Leo graduated with First Class Honours and the University Medal from the University of Sydney and then went on to complete an MSc and PhD in the School. He was awarded a DSc in 1982 from the ANU. He comes to the School as a Research Professor from the Research School of Chemistry at the ANU. He started there in 1972 as a QEII Research Fellow following postdoctoral work at Carnegie-Mellon University, USA, and was appointed Professor in 1991. Leo has held visiting appointments in various universities across the world including the University of California, Berkeley and Irvine, Ben Gurion University, the National University of Singapore and the University of Newcastle upon Tyne. He has been on the editorial boards of many journals and has received countless awards, including a Centenary Medal, the Schrodinger Medal and the Archibald Olle Prize.

Leo's areas of interest cover computational quantum chemistry; enzyme-catalysed reactions; free radical chemistry; peptide radicals; free radical polymerization; theoretical thermochemistry; development of improved theoretical procedures; chemistry of alkali and alkaline earth metals; hydrogenation; hydrogen bonding; gas-phase ion chemistry and phosphorus chemistry.

We welcome both Phil and Leo to the School.

## Federation Fellowship!

Professor Thomas Maschmeyer (BSc 1991, PhD 1995), has accepted the offer of a Federation Fellowship and will join the School late this year or early next year. Thomas is currently Professor and Head of the Department of Applied Organic Chemistry and Catalysis at Delft Institute of Chemical Technology in the Netherlands. There he heads a research group in excess of 50 people. He has also been a co-leader in the establishment of Europe's largest spin-off company set up in 2000. This company now has over 100 employees. Thus, getting Thomas to move to our School is a great coup. Thanks to Prof. Peter Lay, A/Prof. Tony Masters, A/Prof. James Beattie and the others in the School who have played a role in encouraging Thomas to join us.

## Congratulations!

Congratulations to **Dr Bob Hunter** who has been made a Member of the Order of Australia. This is a thoroughly deserved recognition of Bob's many contributions to research, teaching and administration.

Bob has been associated with the School since 1950 when he was an undergraduate and has held many senior positions in the University, including being a Fellow of University Senate for five years. He has also been and continues to be very active in promoting science and scientists in the community, perhaps most notably as National President of Scientists Against Nuclear Arms (SANA), now Scientists for Global Responsibility (SGR).

I'm also very pleased to report that **Dr Mal McLeod**, Lecturer in Organic Chemistry, has been awarded the *2003 RACI Organic Division, Lectureship for Recently Appointed Staff*. This award provides appropriate recognition of Mal's many successes and contributions to chemistry.



Professor Len Lindoy  
Director

## Inorganic Chemistry

The annual dinner of the Foundation for Inorganic Chemistry on the 21 May was once again a great success with nearly fifty guests socializing and dining in the elegant Withdrawing Room of the Holme building. A highlight of the night was an address by Vice-Chancellor Professor Gavin Brown on developments within the University, a topic which ensured much interest and

discussion. Professor Andy Hor of the National University of Singapore, the Foundation's first semester guest for 2003, expressed his pleasure at being able to visit the University of Sydney and the desire to foster inter-university interactions between Sydney and Singapore. The AGM and Council meetings were quickly and painlessly dispatched between courses.

The Foundation is concerned with promoting industry-university interactions, bringing to Sydney eminent chemists from other universities and institutes for lectures and research consultations, forming a global net-

work of research chemists with an inorganic orientation, and providing a means for Sydney graduates to stay in contact.

Anyone wishing to become a member of the Foundation would be greatly welcomed.

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## Prize/Scholarship Winners for 2002

The School of Chemistry awards over \$85 000 in Prizes and Scholarships each year to the best of its students. The following students (pictured below) were awarded prizes or scholarships in 2003 based on their academic achievements in 2002. Scholarships are awarded subject to the students satisfying conditions required for each of the individual scholarships.

### 2002 Recipients



Jim Eckert writes about

## Chemistry Lectures 100 Years Ago



The photo above shows a chemistry class in 1903, waiting for the start of a lecture. Notice the numbers on the seats. Seat numbers were allocated and absent students could be identified by having the lecture attendant record numbers visible from the front. At least that was the student folk-lore.

Some in the photo wear academic gowns and the women in the class are seated together in the front row, placed there, we are told, "out of courtesy". Having them in lectures at all, let alone in mixed classes, had been strongly opposed when the University Senate debated the matter in the early 1880s. But the girls won out, thanks to their own determination and the support of the Chancellor William Manning and others, including John Smith and Archibald Liversidge in Chemistry. Manning, in the Chancellor's Address of 1881, assured critics that "there would be no difficulty (with "conjoint instruction", as it was called) providing that the lectures ... contain nothing of a nature to shock female delicacy".

We also know what the front of the theatre looked like for chemistry lectures a hundred years ago



were printed on large calico sheets in a prep room off the theatre (photo above). 60 lectures, 60 different displays.

Liversidge had established close links with the mining industry and this connection was reflected in the syllabus. Many of the panels displayed in his lectures illustrate industrial processes. The panels for a lecture on Iron, for example, show the compositions of various iron ores, the design of a blast furnace, how cast-iron is turned into wrought-iron by "puddling" and the use of a Bessemer "converter" in steel making.

The lectures themselves, it was said, were notable for their clarity and the skilful use he made of demonstrations, which were, according to his contemporary, geologist Edgeworth David, "always remarkably successful and impressive". I would like to have been in the audience for his lecture on liquid air. It rated a mention in a



or anyway, for Liversidge's lectures. This is because, in the University Archives, there is a set of photographs taken before his lectures in the large Chemistry (now Pharmacy) theatre. They, and the class photos, were the work of Edward Hufton, lecture attendant in Chemistry for 36 years. The photo below, from a lecture on Gold, is typical. The front bench is covered by mineral samples, reagent bottles and glassware; and "overheads" are displayed on the wall behind the bench. The display panels

newspaper of the day. "The lecturer's explanations were so lucid" the *Daily Telegraph* of 17 August 1889 reported "that his hearers were able to follow him easily and showed their appreciation of this by frequent applause. Professor Anderson Stuart moved a vote of thanks which was carried amid loud cheers."

Liversidge did lecture experiments for 35 years and, as far as I know, had no serious accidents. That's more of a feat than you might imagine. Some of the demonstrations performed in those days were "really cool". Make that reckless. The literature is littered with accounts of what happened when they went wrong. One of my favourites tells how Justus Liebig, of Liebig condenser fame, was lucky to escape with minor injuries during a lecture in front of a distinguished audience in Munich in the 1850s. Liebig had successfully demonstrated "the strikingly beautiful combustion of carbon bisulfide in nitric oxide" and then made the mistake of going for an encore.

The tradition of doing demonstrations in chemistry lectures continues, although these days safety is paramount. Gone are the "extreme" demonstrations of earlier years and safety rules are stringent. Eventually, lecture experiments may disappear altogether and if that happens it will be a loss. There are always videos, of course, and they have a place. But nothing beats live demonstrations. They intrigue, delight and occasionally surprise. The lecturer, that is. Sometimes the students feel the same way.

My thanks to Tim Robinson, Manager of the University's Archives and Record Management Services, Reference Archivist Nyree Morrison and Geoff Barker, Curator of the Macleay Museum's Historic Photographic Collection.

T.W. Edgeworth David, *Archibald Liversidge*, J. Chem. Soc., (1931), 1039.

R. Winderlich, *Prevention of Accidents When Handling Chemicals*, J. Chem.

## Archibald Liversidge



Liversidge was 25 years of age when he joined the staff of the University of Sydney as a Reader in 1872. London-born and a graduate of the Royal School of Mines and College of Chemistry, he had won an open scholarship to study Natural Science at Cambridge University. There, in 1870, he was appointed Demonstrator in Chemistry, the position he left to come to Sydney.

His appointment here must have been something of a gamble but, if so, it was a gamble that paid off handsomely. He was a man of prodigious energy. Two years after his arrival, he was promoted to the Chair of Geology and Mineralogy and was soon involved, with his colleague John Smith, in the battle for increased funding to expand and update the teaching of Science.

Charles Badham, Principal and Classics Professor, understandably resisted any shift in the existing balance of power, in language that remains marvellously quotable. Writing in 1875, he argued that "a knowledge of the merest elements of these sciences (chemistry, physics and geology) will, in my judgement, be quite enough to satisfy public opinion, and it is only in deference to public opinion that the subjects form any part of University training. They are ornaments of the memory which may be acquired at any time of life".

Liversidge, however, was relentless. In a report submitted to

Educ., 27 (1950), 670.

R.J.W. Le Fèvre, *The Establishment of Chemistry Within Australian Science - Contributions from NSW*, Ch.12 in *A Century of Scientific Progress - The Centenary Volume of the Royal Society of NSW* (1968).  
*Ever Reaping Something New. A*

the Government and the University Senate in 1880, he wrote that the University might extend its curriculum, "with great advantage to itself and to this Colony at large", to "afford instruction and laboratory practice in the scientific courses necessary for professional training in engineering, mining, agriculture, forestry, surveying and architecture". The following year, the Government increased the University's endowment and in 1882 the Senate voted to establish three new Faculties (Medicine, Law and Science). At this time, Liversidge's Chair was renamed the Chair of Chemistry and Mineralogy and, when the Faculty of Science was officially recognised, he became its first Dean.

Make a point some time to track down John Collier's portrait of Liversidge (photo above) which hangs in the Great Hall. The subject is seen, appropriately, in a lecturing pose, with pointer in one hand and mineral sample in the other. The signs of lecture experiments are all around him. ♦

*Science Centenary*, Eds. D. Branagan and G. Holland, University of Sydney (1985).

*Australia's First. A History of the University of Sydney*, Vol. 1, 1850-1939, C. Turney, U. Bygott and P. Chippendale, Hale and Iremonger (1991). ♦

# Forensic Science

by  
Tony Masters

Australians have always been a competitive people. Be it cricket, football, the Yartz, we've always ranked ourselves with the world's notables. Why, our own Chemistry School has been home to two chemistry Nobel Laureates. With the current worldwide interest in, and film and television exposure of, forensic science, and the chemistry underpinning it, it is of some surprise that Australia's poisoners, practitioners of that most chemical of crimes, have gone unnoticed.

The earliest example of poisoning I have found in Australia is that of Mary Ann Bradney, who, on 12 August 1824 at Port Macquarie, was found not guilty of "feloniously, maliciously, and traitorously" poisoning her husband, John, a forger, tinman, brazier and gaoler.

Another Sydneysider to make the nineteenth century tabloids for her poisoning exploits was Louisa Collins, the so-called Borgia of Botany. The mother of seven children, Louisa was reputed to be the sister of the bushranger, Ben Hall. At her home in Frog's Hollow in Botany, she took in boarders she met at the nearby Amos' Pier Hotel. Much to the consternation of her husband, she began affairs with several of the boarders. In deference to her husband's objections to these extramarital affairs, she poisoned him with arsenic, collected the insurance, and married the "star" boarder, who, when he ceased living up to expectations, was similarly dispatched. In December 1888, she was found guilty of murder, and on January 8, 1889, at the Darlinghurst Jail, she became the last woman hanged in New South

Wales.

A particularly unsavoury example of the malicious administration of chemicals, although not strictly a poisoning, is the case of Martha Rendall, of East Perth, who, between 1907 and 1909, killed the two daughters and one of the sons of her de facto husband by swabbing their throats with hydrochloric acid she had added to a medicine to treat sore throats. Her attempt on the life of another son led to a police investigation and trial and on October 6, 1909, she became the last woman hanged in Western Australia

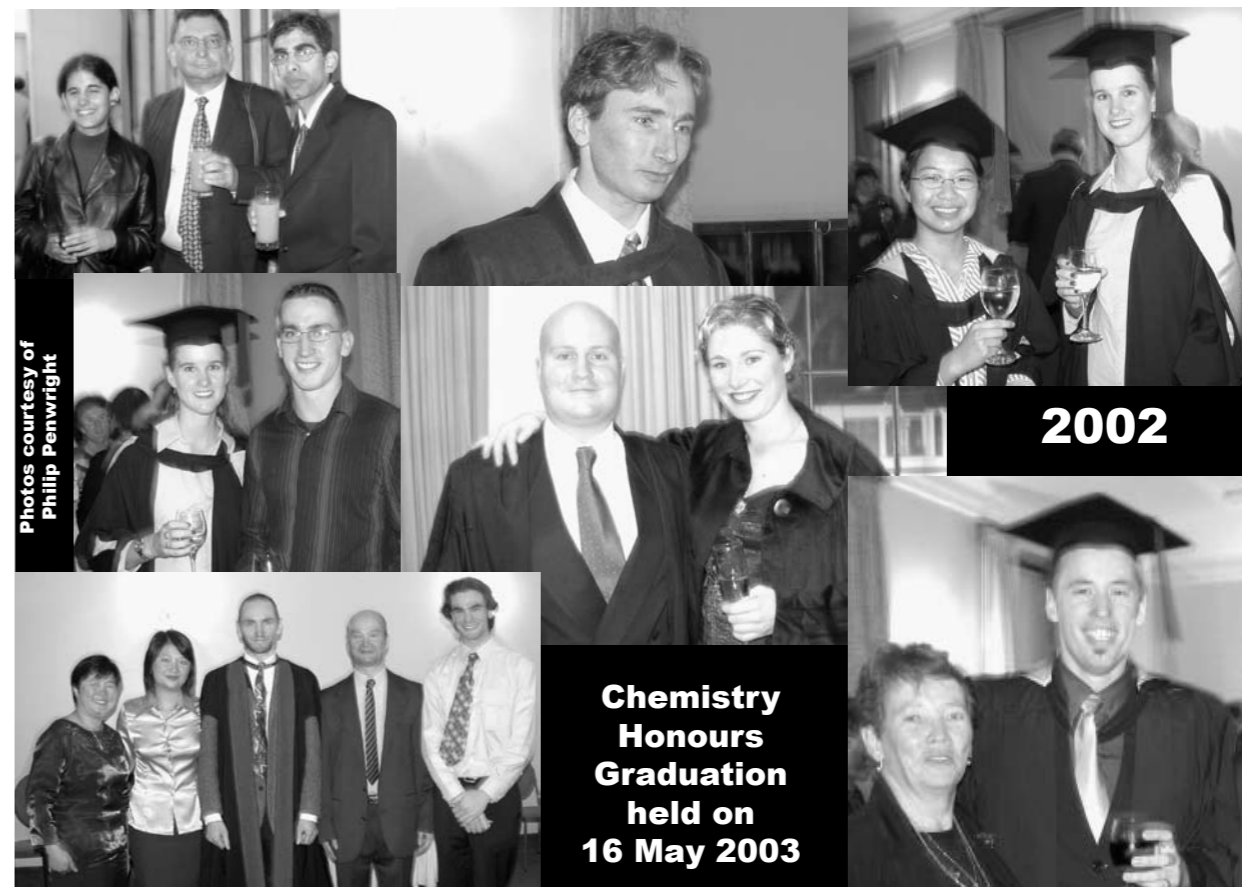
The jewel of the south, Melbourne, has been home to some few poisoners, the most infamous of whom was perhaps, the Black Widow, Martha Needle of Richmond, whose "cup of tea" was arsenic, and her undoing. Martha's first victim was her three-year-old daughter, Mabel, who died in 1885, poisoned with the arsenic-based rodenticide, *Rough On Rats*. Encouraged by her insurance payout, Martha disposed of four more children and her husband. When her finances ran low, she set her cap for Otto Juncken, one of two brothers boarding with her. However, Otto's brother, Louis, opposed their engagement and threatened to send for the brothers' mother in South Australia, to come and stop the marriage. Martha removed the threat of Louis with another application of *Rough On Rats*. Another brother, Hermann, opposed the marriage and, after drinking a cup of arsenic-laced tea, was revived only by the fortunate emergency intervention of his physician, Dr Boyd, who was visiting a patient

in the vicinity. This was the second time Dr Boyd had treated Hermann for these symptoms and the good doctor's suspicions were confirmed when traces of arsenic were found in Hermann's vomit. After consultation with the local constabulary, a trap was set. Hermann visited Martha again, but after being served a cup of tea, literally "blew the whistle", summoning the police, who arrived as Martha was struggling with Hermann to upset the incriminating brew, which was found to contain enough arsenic to kill five people. Martha was found guilty of murder and hanged on October 22 1894.

Nothing if not ingenious, Australians have employed a variety of poisons, Sydney witnessing an outbreak of thallium poisoning in the mid-twentieth century. Thallium is a somewhat unusual poison, but for many years was the active constituent of rat-killers, including Thall-rat. The use of thallium as a poison is famously described in Agatha Christie's novel, *The Pale Horse*, in which the contract killer, Thyra Grey, murders her victims with thallium-laced toothpaste, whilst providing herself with an alibi, by conducting a public séance, ostensibly to punish the victim, miles from the crime scene. The novel (which is poorly represented in the film) is also famous for an incident in which a nurse in a London hospital, tending a seriously ill child with a mysterious ailment, recognised the symptoms as those of thallium poisoning, because of the correspondence with the symptoms described in Christie's novel, the nurse's reading during the long hours at the patient's bed-side. Once the physicians were alerted and convinced, the child was successfully treated.

Yvonne Gladys Fletcher disposed of her first husband, Desmond Butler, in June 1948, then married Bert Fletcher of Newtown, a rat catcher for an Alexandria firm

(Continued from page 6)  
of exterminators. Bert is reputed to



have often severely beaten Yvonne, and he followed Desmond to an early grave in 1952. When thallium was found in both his and Desmond's (exhumed) body, Yvonne was given a life sentence for both murders.

Possibly our most famous poisoner was Caroline Grills. She was known in prison as "Aunt Thally", because her preferred poison was thallium, to which she was introduced by the Sydney City Council Health Officer, when her Goulbourn Street home was plagued by rats. Caroline, the 'demon poisoner', managed to murder four people and attempted to poison at least three more with thallium-loaded cakes. Her first two murders enabled Caroline or her husband to inherit two houses, but no motive was ascribed to the other poisonings. Caroline was sentenced to life imprisonment in 1953 and died in Long Bay Jail in 1960.

The School of Chemistry has had its own connections with

Australia's famous poisoners. The former Balmain and Australian rugby league winger, Bobby Lulham, was beginning to make a name for himself in the sporting media, when he and his new bride, Judy, moved into the Marrickville home of his mother-in-law, Mrs Veronica Monty. One thing led to another and Bobby and Mrs M apparently began an affair whilst Judy was at Sunday mass. When Bobby saw the error of his ways and called a halt, the enraged Mrs M began feeding him rat poison (Bobby's slow realisation of this speaks volumes for the quality of her cooking). Eventually, the boys in blue approached Drug Houses of Australia, who asked a young Ray Pierens (then an undergraduate working as a laboratory assistant, and later to be the School's Director of First Year Studies) to conduct an analysis on Bobby's nail parings (in a paper bag) to see if a prima facie case existed. Ray reached for his trusty Pharmacopeia, and conducted a flame test, which yielded the character-

istic green colour of thallium.

Thallium was later to be the poison of choice for the British serial poisoner, Graham Young, a case which is immortalised in a late night movie shown regularly on ABC, and which is noteworthy as the first case in which AAS was used to analyse cremated remains. An interesting postscript to the Yvonne Fletcher, Aunt Thally and Mrs Monty cases was that, because of the use of thallium as a poison, it was banned for use in rodenticides and replaced by organic poisons, which, of course, are undetectable following cremation.

Sadly then, Australia, as it has in most endeavours, has proven more than competitive, this time in the international poisoning stakes. ♦

## Great Achievement!

Our sincere congratulations to Emeritus Professor Hans Freeman, FAA, FRSC; Emeritus Professor Noel Hush, AO, FRS, FAA; Emeritus Professor Sev Sternhell, FAA; Professor Robert Hunter, AM, FAA, FRACI; Professor Don Napper, FAA; Professor Les Field, FAA, Professor Max Crossley, FAA; Professor Robert Gilbert, FAA; Professor Len Lindoy, FAA, who have all been awarded a Centenary Medal this year. The Centenary Medal is awarded by the Australian Government to past and present members of the School who are elected Fellows of the Australian Academy of Science for significant contributions to Science and Australian Society in the first century of Federation.

# Snapshots!

## Where are you now?

**Gregory Organ** (BSc Hons 1979, PhD 1985). I am the Flavour Scientist for Lion Nathan, owners of breweries in Australia, New Zealand and China. I am responsible for our expert taste panels which we use to monitor the quality and flavour characteristics of our beers. I look after panel training, alignment of the panels, procedures used (including development of our sensory software system) and the more complex data analyses. I also spend time (not as much as I would like) on the flavour chemistry of our beers (i.e. sulfur containing compounds, polyphenols and hop aroma compounds). I have recently begun using a Bruker EPR instrument to monitor the flavour stability of our beers.

**Jennifer Woodhead** (nee Watkins, BSc 1991). Since graduating with a BSc in 1991, I undertook an Honours degree in Biology at Newcastle University (graduating 1992) and a Diploma of Education a few years later.

I worked as a Research Assistant in the Biological Sciences Department at the University of Newcastle for 4 years. I am currently working as the Senior Data Manager for BreastScreen in the NSW Hunter Region & Wyong Shire (Hunter Breast Screen) where I have been employed for over 7 years.

**Timothy Payne** (BSc Hons 1984). I completed my BSc Hons in Physical Chemistry with A/Prof. John Mackie in 1984. I am currently a Research Scientist at ANSTO working in the area of environmental chemistry. Along the way I picked up a Master of Environmental Studies from Macquarie University and a PhD in Environmental Engineering from the University of NSW.

**Grace Soh** (nee Teng, BSc Hons 1981). After finishing my BSc Hons in Inorganic Chemistry, I went on to do a Diploma of Education and an MSc (Organic Chemistry) at the University of NSW. In 1986, I moved back to

Singapore to teach at the National Junior College where I met and married my husband.

NEW!  
NEW!

Let us know what you are doing and we will endeavour to include it in the next issue. Send your contribution to the contact details listed at the front of ChemNEWS.