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Head’s Report

Ken Ghiggino
Masson Professor of Chemistry
Head, School of Chemistry

During 2006 the pace of change increased across the University with the implementation of the new Growing Esteem initiative. A key component of this strategy is the introduction of the Melbourne Model. Under this far-reaching curriculum change the number of undergraduate degrees offered by the University will be reduced to six while several professional courses will now be taken at the postgraduate level. Chemistry will continue to be offered as a major in the new BSc degree and will also deliver subjects to other ‘new generation’ degrees.

Associated with the introduction of the new BSc degree in 2008, the School of Chemistry has undertaken a major review of its course structure and will offer a new program of subjects over the three years of the undergraduate degree. A feature of the modified chemistry major will be introduction of integrated core lecture and laboratory subjects at first, second and third year levels covering the key aspects of modern chemistry practice and theory. In addition to these core subjects, students will also be able to select specialist chemistry subjects and subjects outside the degree to provide both depth and breadth to their undergraduate studies. The School has received very positive feedback on these changes from industry and the profession and we believe the new degree structure will equip our graduates with the skills needed to continue to succeed as chemists in the international arena. Associated with the new undergraduate degrees, new Masters programs will also be developed over the next two years. The Undergraduate Programs Committee of the School under the leadership of Professor O’Hair has been working to a tight schedule to implement these curriculum changes.

The School received the welcome news that the University had allocated some building funds to renew the Chemistry buildings. A Buildings Working Group has been established to liaise with the architects and Property and Campus Services to ensure that the design of the new teaching and research areas will meet the teaching requirements of the new chemistry major and research needs for the foreseeable future. The program of renovations will likely occur in a staged manner over several years with the first year laboratories and ground floor of chemistry first scheduled for completion for the start of 2008. During 2006 the West Theatre in Chemistry has been converted to one of the most modern flexible teaching spaces in the University with a formal opening in February 2007.

Members of the School continued to receive acknowledgement for their achievements. Among many highlights, Professor Andrew Holmes was elected a member of the Australian Academy of Science and postgraduate student Hadi Lioe was awarded a prestigious Victorian Fellowship. Richard O’Hair was promoted to Professor, Trevor Smith, Muthupandian Ashokkumar and Spas Kolev were promoted to Reader/Associate Professor while both Dr Spencer Williams and Dr Uta Wille were promoted to Senior Lecturer. Dr Stephen Best received a Dean’s Award for Excellence in Teaching while Dr Rachel Caruso was awarded a Victorian Young Tall Poppy Award.

The School farewelled Associate Professor David McFadyen who retired after a long association with the School and the former Melbourne College of Advanced Education. David has been Director of First Year Studies and Chair of the Undergraduate Programs Committee of the School since 1998 and was a recipient of the Dean’s Excellence Award for Teaching in 2000. David has been instrumental in implementing many of the initiatives that provide our first year students with access to such a high quality learning experience.
Head’s Report

Once again the efforts of our academic and professional staff have ensured that, during a period of considerable change for both the University and the School, our teaching and research activities have been maintained at an exceptionally high level. During 2007 our detailed curriculum changes will need to be finalised for introduction in 2008 and the Research Quality Framework will introduce new challenges for Universities. The School is well placed to continue to expand its activities and contribute to the new strategic directions of the University.

Ken Ghiggino
Masson Professor of Chemistry
Head, School of Chemistry

During 2006 the pace of change increased across the University with the implementation of the new Growing Esteem initiative.

A key component of this strategy is the introduction of the Melbourne Model
STAFF

ACADEMIC STAFF

Head of School
Professor Kenneth Philip Ghiggino, BSc NSW PhD NSW DipEd Melb. FRACI

Professors of Chemistry
Franz Grieser, BSc PhD Melb. FRACI FAFA
Francis Patrick Larkins, AM BEd MSc DSc Melb. DPhil Oxst. DipAdvMath Oxst. FAA FTSE FRACI FAIE FAIP (Deputy Vice-Chancellor [International])
Richard Alfred O’Hair, BSc PhD DSc Adel. FRACI
Carl Herbert Schiesser, BSc PhD ANU DSc Adel. FRACI
Frances Separovic, BA Macq. PhD NSW MRACI
Anthony Gordon Wedd, BSc PhD Dsc Tas. FRACI

Associate Professors and Readers
Evan Bleske, BSc Qld. PhD Griff.
Michele Louise Gee, BSc Melb. PhD N.YA MRACI
Mark Antony Rizzacasa, BSc PhD W.Aust. MRACI
Jonathan Michael White, BSc PhD Cant. FRACI
Charles Graham Young, BSc ANU PhD ANU FRACI

Associate Professors
William David McFadyen, BSc PhD Dip Ed Melb
Peter Allan Tregloan, BSc PhD Adel. MRACI

Senior Lecturers
Brendan Francis Abrahams, BSc PhD DipEd Melb. SCA MRACI
Muthupandan Ashokkumar, BSc MSc Madras MRACI
Stephen Peter Best, BSc Syd. PhD Syd.
Craig Hutton, BSc Adel. PhD Adel. MRACI
Spas Dimitrov Kolev, BSc Sofia PhD TU Budapest
Trevor Alexander Smith, BSc PhD Melb. MRACI
Uta Wilke, Habilitation Kiel. PhD C.Threbach.
DipChem C.Albrechts MRACI
Spencer John Williams, BSc W.Aust. PhD W.Aust. MRACI

Lecturer
Colette Boskovic, BSc PhD Melb. MRACI

ARC Australian Federation Fellows and Professors
Andrew Bruce Holmes, BSc MSc Melb. MA DSc Camb. PhD Lond. FRS
Paul Mulvanye, BSc PhD Melb. MRACI

Australian Research Fellow
Rachel Anne Caruso, BSc PhD Melb.

Centenary Research Fellow
Toby Bell, BSc PhD Melb.

ARC Postdoctoral Fellow
Paul Donnelly, BSc PhD W.Aust

Transition Teaching Fellows
Robert Edward Charlesworth, BSc Melb. DipEd Melb.
Peneloe Commons, BSc DipEd Melb.

Chemistry Outreach Fellow
Michael Moilan, BSc MSc Melb. MRACI

Tutor
Sonia Horvat, BSc Melb. PhD Melb.

Research Fellows
Damian K. Bird, BSc VUT PhD Swinburne
Martin Boland, BSc MMU PhD UlmST
Jens O. Bunte, MSc Bielefeld PhD Bielefeld
Christopher Dean Donner, BSc PhD Melb.
David Evans, BSc Qld. PhD Melb.
Alison Funston, BSc PhD Melb. AM MRACI
John D. Gehman, BSc MPhI PhD N. Haven
Martin Grannas, BSc PhD Melb.
Andrew C. Grimsdale, BSc MSc PhD Auck.
Xiaotao Hao, BSc PhD Shandong
Stephan D. Hoffman, BSc PhD Garm
David Jones, BSc PhD Tas.
Parag M. Kanthale, BTeach Nagpur MTech Nagpur
PhD Mumbai
George Khairallah, BSc Lebanon PhD Melb.
Jian Chang Li, BA MSc China PhD Peking
Craig Lincoln, BSc PhD Melb.
Arindam Mukherjee, MSc Danijelung PhD Bangalore
Long D. Nghiem, BEng NSW PhD Wolf.
Stuart Prescott, BSc PhD Syd.
Colin Skene, BSc RMIT PhD Monash
Michelle Taylor, MSc PhD Glas.
Heuger Vakarelski,
Hung Si Vo, BSc Hanoi MSc Vietnam PhD Poland
Zhiqung Xiao, BSc MSc Fujian TU PRC PhD Melb.
Jingli Xie, BSc MSc Jin PhD Nanjing Riverside
Meifang Zhou, BSc East China PhD NSW

Research Assistants
Jillian Andreopoulos, BSc FCDip Melb
Stacey Borg, BSc PhD Melb.
Detong Chen, BSc, MSc PR China, PhD Fudan
Lucy Claschom, BSc Tianjin PhD SA
Zoran Dinev, BSc Melb.
Carle Gannon, BSc Melb. MRACI
Tim Hudson, BSc PhD Melb.
Firasat Hussain, MSc MPhil India PhD IUB Germany
Judy Lee, BE BSc PhD Melb.
Michelle Ma, BSc, Qld
Tich Lam Nguyen, BSc PhD RMIT
Jessica Pacifico, MSc PhD Neuchatel
Natalie Pereira, BSc Melb.
David Price, BSc PhD Mon.
Mitch Shirai, PhD, Chicago
Marisa Spiniello, BSc PhD Melb.
Christopher Thompson, BSc ANU PhD Mon.
Tom Waters, BSc PhD Melb.
HONORARY APPOINTMENTS

Professors Emeritus
Donald William Cameron, MSc Qld. MA Camb. PhD Manc. ScD Camb. FRACI
Thomas Aloysius O’Donnell, PhD DSc Melb. FRACI

Professorial Fellows
Calum John Drummond, BSc PhD Melb.
Roy Jackson, BSc Manc. PhD Lond. DSc Lond. FRACI
Richard Robson, BA Oxon. PhD Oxon.
Robert Oliver Watts, BSc Lond. PhD ANU FRACI FAA

Principal Fellows
Ronald Cooper, BSc PhD Leeds FRACI
Peter McTigue, BSc MSc Melb. DPhil Oxf.
Roger Francis Martin, BSc PhD Melb.
Peter James Thistlethwaite, BSc Melb. PhD Melb. Dip Ed Melb.

Senior Fellows
Robert Craig, BSc Melb. MSc Melb. DPhil Oxf.
Donald Neil Furlong, BSc Melb. PhD Brun. FRACI
Valda May McRae, BSc Melb. BEd Melb. PhD Melb.

Fellows
Richard David Harcourt, BSc Melb. PhD Monash DipEd Melb.
Jan Ramuaid Zdysewicz, BSc Adel. PhD Adel. FRACI

Visitors
Sung Il Cho, BA MA PhD Seoul
Fabien Gaboriaud, BSc MSc PhD Dijon
Mohammad Gholivand, BSc MSc PhD Iran
Gregory Victor Hartland, BSc Melb. PhD Los Angeles
Scott Watkins, BSc PhD NSW
Gary H Weddle, PhD Delaware

PROFESSIONAL STAFF

Marino Artuso
Vicki Burley
Sara Brimfield
Christine Callahan, BComm Melb. PgDip BusSys Mon.
Monalisa D’Souza, BSc Nagpur
Fran Dynan, AdvDipAcctg. VU
Jim Dynan
Robert Gable, BSc Melb. PhD Melb.
Les Gamel
Francoise Gelb
Sue Hickey
Felicity Jansz, BA MA Melb.
Caithleen Jones, BA Melb.
Ben Kirk. BComp Ballarat
Peter Lehman, Appl. Chem RMIT MSc PhD E. Anglia
Tang-Kuan Lim, BSc Malaysia PhD Brit.Col.
Ross Lineham
Brendan Mangan
Richard Mathys
Alf Meilak
Peter Mills, DipAppChem RMIT GradDip(Met) RMIT
John Nuske
Des Odgers
George Papadopetlos, BEng VUT DipAppSc-OH&S RMIT
Marian Petrescu
Jennifer Scott
Doug Taylor, BAAppSci(Chem) RMIT GradDip(ClinSc)
Riverina CAE
Joe Tyler
Joanne Tymms
Sioe See Volaric, BSc Syd. MSc Syd.
Jennifer Joy York, BSc MA Deakin MSc PhD Melb.
(Executive Manager)
Postgraduate Students

PhD STUDENTS
COMPLETED

Dinev, Zoran. Covalent capture of supramolecular assemblies.
Kathryn Hassall: Synthesis and structural characterisation beta-silylated carbenium ions
Ferdows Hilli: Formal total synthesis of (-) – Applularan A
James Hutchison: Photoinduced electron transfer in porphyrin-based supramolecular systems
Melissa Koay: Molecular characterization of the copper transport protein CopC
Tong Lay Lau: NMR studies of amyloid-beta peptide in membranes
David McAllister: Analogues of the anti-angiogenic compound, 2-methoxyestradiol: a synthetic and pharmacological study
Thomas Munro: The chemistry of salvia divinorum
Helen Ryan: Performance chemistry of novel urethane coatings
Timothy Wade: High power carbon – based supercapacitors
Rosemary Wilson: Infrared spectroscopic studies of charge complexes in the gas phase

Masters Research – completed

Envi Ciawi: Cavitation bubble temperatures in aqueous solutions containing surface active solutes
Learning Lab
The new Learning Laboratory was completed in late 2006 after extensive refurbishment of the former West Theatre. The Learning laboratory features modern facilities for group learning and new style tutorials.

“The Chemistry Bytes”
Congratulations to Professor Richard O’Hair, Associate Professor Peter Tregloan and Dr Brendan Abrahams who were awarded funding of $40,000 for their innovative project “The Chemistry Bytes”. The aim of this project is to develop a library of “micro-resources” – short animation and video clips – that will be used widely and flexibly by staff and students in large lecture, laboratory and other classes. Three libraries of Chemistry Bytes will be developed: Animation Bytes, Laboratory Bytes and Safety Bytes. Since many of the laboratory procedures and safety practices are common to all year levels the development of the laboratory and safety libraries will benefit the laboratory curriculum for the entire BSc Chemistry Major.

Dean’s Award for Excellence in Teaching
Dr Stephen Best was awarded the Dean’s Award for Excellence in Teaching. The award is presented in recognition of ongoing, outstanding performance in educational activities within the Faculty of Science and the wider community.

Stephen has contributed to the School in many areas, in particular to the development of the Inorganic Chemistry laboratory programs.

Dr Spencer Williams reports to Prime Minister’s Science Engineering and Innovation Council
Dr Spencer Williams recently reported to the Prime Minister’s Science Engineering and Innovation Council. The Council is the Australian Government’s principal source of independent advice and issues in science, engineering and innovation and relevant aspects of education and training. Dr Williams joined two other early career researchers to present to the Council their thoughts on the opportunities and challenges encountered when establishing a career in science research.

Another Tall Poppy from The School of Chemistry
Congratulations to Dr Rachel Caruso, Australian Research Fellow in the School of Chemistry, for winning the prestigious Victorian Young Tall Poppy Science Award. The Young Tall Poppy Campaign was created by the Australian Institute of Policy
and Science in 1998 to recognise and celebrate Australian scientific and intellectual excellence. The Young Tall Poppy award identifies and acknowledges outstanding young Australian Researchers. Rachel is the second recipient from the School to receive this prestigious award with PhD student Gavin Reid, who is now an Assistant Professor at Michigan State University, receiving the award in 2002.

Grimwade Prize in Industrial Chemistry
Congratulations to Dr Muthupandian Ashokkumar for being awarded the Grimwade Prize in Industrial Chemistry for his research in the field of Sonoluminescence and Sonochemistry, which was presented at the Deans Awards held in May 2006. The prize was established in 1905 by the Honourable Frederick Sheppard Grimwade, a drug wholesaler and part owner of Felton Grimwade & Co., later to become Felton, Grimwade and Bickfords Pty Ltd, the largest drug wholesaler in Victoria. The prize is in recognition of a high degree of originality, chemical knowledge and scientific ability, displayed in a branch of industrial chemistry and is valued at $7,000.

2006 Eric Kneen Award
Ken Ghiggino, Mark Goldsmith, Peter Rogers, Nuno Cabral and Felicity Roddick were awarded the 2006 Eric Kneen Memorial Award for the article entitled "Riboflavin Triplet Quenchers Inhibit Lightstruck Flavour Formation in Beer". This award is presented to the author or authors of the best paper in the Journal of the American Society of Brewing Chemists in the previous calendar year. The award is presented at the annual meeting in La Quinta, California.

Journal of Materials Chemistry cover for Caruso Research
Research from the Caruso Group, headed by Dr Rachel Caruso, has been highlighted on the cover of the May issue of Journal of Materials Chemistry. The article shows porous structures of two metal oxides formed using a templating technique.

Assoc. Prof. Charles Young's research featured in "Highlights of Australasian Chemistry"
Research carried out in the laboratory of Charles Young has been featured in the "Highlights of Australasian Chemistry" feature of Chemistry in Australia, the magazine of the Royal Australian Chemical Society. Charles's research involved early transition metal co-ordination and organometallic chemistry relevant to artificial and biological catalysis. A principal focus of current work is the synthetic modelling of molybdenum and tungsten enzymes. These enzymes are crucial to all life on earth and over the years Young’s group has developed some of the best available synthetic models.

Front Cover for Best Group
Congratulations to Dr Stephen Best and his research group who feature on the front cover of Volume 46 of Inorganic Chemistry published. Thanks also to past School of Chemistry staff member, Jo Dalvean who assisted with the fine-tuning of the artwork. The article entitled "Assignment of Molecular Structures of the Electrochemical Reduction Products of Diron Compounds Related to (Fe-Fe) Hydrogenase: A Combined Experimental and Density Function Theory Study" by Stacey Borg, Jesse Tye, Michael Hall and Stephen Best.

Assoc. Prof. Richard O'Hair has "Feature Review" in Chemical Communications
Associate Professor Richard O’Hair had a recent ‘Feature Review’ published in Chemical Communications, which highlighted recent research from his group.

Wedd group article in Journal of American Chemical Society
Research from the Wedd group involving fundamental studies into copper chaperone proteins was published in the prestigious Journal of the American Chemical Society.

Opinion Piece
Carl Schiesser has had an opinion piece on the value of science education published in the Education Section of The Age.

Frances Separovic was interviewed by the Croatian Herald (English Supplement) about her career.

Elected / Appointed...
Assoc. Prof. Michelle Gee has been elected to the Council of the International Association of Colloid and Interface Scientists, which is the pre-eminent...
Major Achievements 2006 News

organization for scientists working in the areas of surface science and nanoscience.

Michelle Gee has been appointed to the Editorial Board of the international journal *Soft Materials*.

Frances Separovic was recently elected to a three year term to the Council of the Biophysical Society (USA).

Invitation

Congratulations to Richard O’Hair for being invited to present the Morrison Plenary Lecture at the 21st Australian and New Zealand for Mass Spectrometry Conference held in Christchurch.

Congratulations

The School of Chemistry congratulates Drs Trevor Smith, Spas Kolev and Muthupandian Ashokkumar, on their promotion to Associate Professor and Reader (Level D) and Dr Uta Wille and Dr Spencer Williams on their promotion to Senior Lecturer.

Former Head of School Awarded Victoria Prize

The former Head of Chemistry and now Professorial Fellow in Chemical and Biomolecular Engineering, Professor David Solomon, was the recipient of the 2006 Victoria Prize for his work in polymer chemistry.

School of Chemistry welcomes:

Dr Xiaotao Hao

Welcome Dr Xiaotao Hao from Shandong University, China, who joined us as a Research Fellow in Spectroscopy of Aligned Polymers until March 2008.

Dr Tom Waters

Welcome Dr Tom Waters to his new position as ARC Australian Postdoctoral Fellow.

Farewell

The School farewelled Assoc. Prof. David McFadyen, Director of First Year Studies, School of Chemistry; we wish him good-luck in his retirement.
PhD student Hadi Lioe awarded Victoria Fellowship & AFAS/FEAST – France Fellowship at Government House.

As winner of the Victoria Fellowship Hadi will receive up to $18,000 funding to assist him to investigate the working fundamentals of different types of ion mobility mass spectrometers. In addition, Hadi was also awarded a $5,000 AFAS FEAST France Fellowship as a supplement to the Victoria Fellowship. This award, from the Australian French Association for Science and Technology (AFAS) and the Embassy of France, aims to facilitate science and technology to mutually benefit Victoria and France. This additional award will see Hadi visit France as part of his study mission.

Congratulations to PhD students Hadi Lioe and Jack Jasieniak

Congratulations to PhD students Hadi Lioe and Jack Jasieniak who were chosen to attend the meeting of Nobel Laureates in Lindau (Germany). Both students went to Germany for the meeting, which this year focused on Nobel Laureates in chemistry.

Poster Prize

Ann Gooding was awarded a student poster prize for her poster entitled “Charge Injection into 2D Nanocrystal Arrays” at the International conference on Nanoscience and Nanotechnology held in Brisbane. Ann’s poster outlined her research into the electrochemical charging of self-assembled monolayers of CdSe nanoparticles on a gold surface. The prize was awarded at the conference dinner. Ann is currently undertaking her PhD in Chemistry in the group of Paul Mulvaney.

The J.S. Anderson Prize

Spas Kolev’s Honours student, Alexander Michael St John, was awarded The J.S. Anderson Prize. The prize is awarded annually on the recommendation of a committee appointed by the Council to the student enrolled in the Honours Year of a Science degree who is majoring in chemistry and who displays the greatest aptitude and potential for research. The prize was awarded at the Dean’s Award night.

2006 TW Healy Awards

Carolina Novo and Joannelle Bacus were the successful recipients of the 2006 TW Healy Awards. The awards will enable the students to present their PhD work at an international conference.

Congratulations from the School of Chemistry
The lecture theatre was packed full once again for the Magic of Chemistry Show that was delivered by Brendan Abrahams. This is a demonstrative lecture highlighting the effects of chemical reactions that is well received yearly.

"What's in That" starred for the first time on Open Day, and had many people involved in the three-dimensional, virtual reality presentation (developed with support from VICS) that allowed users to find out what was in pizza, sugar, nicotine, etc. on a molecular level.

The short yet informative sessions in our historic Masson Theatre were well attended by inquisitive potential students and their parents. They were given a brief look at: Chemistry then, now and in the future. The importance of Chemistry, as well as what is Chemistry?, why study Chemistry?, where do Chemists work?, how do I become a Chemist? Questions were addressed followed by a presentation of our course structure, and answers to commonly asked questions. The prospective students and their parents then had time to ask their questions following these sessions.

Enthusiastic staff were available all day in the Wilson Hall giving personalised course planning and advice to potential students. The staff also gave overviews of the chemistry courses. Our colourful posters on display and the brilliant handouts highlighted the benefits of a Science Degree majoring in Chemistry, including brief summaries from past graduate students.

A highlight for next year is that we will be featuring our Learning Lab for the first time. People passing through this lab will get to experience our newest teaching space and see for themselves how high quality teaching takes place in the School of Chemistry.
2006 Melbourne University Chemical Society (MUCS)

President: Uta Wille
Secretary: Colette Boskovic
Treasurer: Alison Funston
Student representatives: Chris Barlow, Damien Callahan, Nathan Fifer, Tim Quach, Alison Radford, Shinn Dee Yeoh

For 2006 MUCS Lecture program see the following website:

It was another successful year for MUCS in terms of both finances and the lecture series. MUCS received an unprecedented amount of funding from sponsors. We thank the Australian Journal of Chemistry, Blake Dawson Waldron Patent Services, the Royal Australian Chemical Institute and the Victorian Institute of Chemical Sciences for their sponsorship of MUCS. Their funding allowed us to bring in high profile guest lecturers from around Australia to take part in our seminar series. The range of speakers was multi-disciplinary, well reflecting the broad scope of Chemistry in modern science.

Chemistry Postgraduates Society (CPS)

The Chemistry Postgraduate Society representatives for 2006 are:

President – Phil Weame
Secretary – Jack Jasieniak
Treasurer: Patrick Momane
Staff Representative: Vicki Burley

General Committee
Quentin Churches
Nick FitzGerald
Nathan McGill
Duanne Sigmund
Maree Staples
Undergraduate student numbers have increased markedly since 2001, with a peak in 2005. In 2006 there were 600 EFTSU enrolled in Chemistry subjects. This figure includes 40.5 EFTSU for the BSc Honours program in Chemistry.

Student appraisal of teaching is measured on a 1-5 scale with 5 being the best score. These data are for the question 'This course was well taught'.
Research Funding

Beautiful some might say...

The School is one of the largest budgeting departments in the University with an annual operating budget of $8.6M and research income of ~$10.3M.

In 2006 over $9.4M was spent on equipment in the School. Large items purchased included an ultrafast laser facility and a spectroscopic ellipsometer. In addition, ARC funding for a 600 MHz solid-state NMR, which is pictured, was also obtained.

ARC Grants

ARC, NHMRC, Government and Industry grants awarded to the School in 2006 totalled $9.4m in value.

NEW GRANTS AWARDED TO:

Dr Damian Bird
Dr Rachel Caruso
Dr Paul Donnelly
A/Prof Michelle Gee
Prof. Ken Ghiggino
A/Prof Spas Kolev
Prof Paul Mulvaney
A/Prof Mark Rizzacasa
Prof. Richard Robson
A/Prof Trevor Smith
Prof. Frances Separovic
Dr Spencer Williams
A/Prof Charles Young

New addition for 2006
School of Chemistry
New Research Funding

Cara Doherty has been successful in obtaining PORES (Postgraduate Overseas Research Experience Scholarship) funding, which will allow her to travel to Germany and conduct research at the Max Planck Institute of Colloids and Interfaces for three months. Cara will be continuing her research into porous inorganic materials for lithium ion battery applications. Her visit to Germany will allow her to gain extensive experience in an overseas laboratory in the synthesis and use of soft templates. Cara is currently conducting research towards her PhD between CSIRO and The University of Melbourne with co-supervision from Rachel Caruso, Calum Drummond and Thomas Healy.

Congratulations to Charles Young and Stephen Best whose Minor/Medium Equipment application was awarded $23,500 by the Faculty for infra red instrumentation. Matching funds were provided by RAPS and School to buy two base model T27 Bruker FTIR units. The units are located in the Junior Organic Lab (JOL) and the Inorganic Instrument Room.

Andrew Holmes and colleagues were awarded SRIF funding for the “Victorian Solar Cell Consortium”.

Some of our Research Groups
Biscuit chemistry

19,500 students made slime, solved crimes, analysed shortbread biscuits, or participated in other events run or supported by the VICS outreach program in 2006. These students came from schools throughout Victoria, from year 12 down to prep grade. The VICS outreach fellow saw about 1/5 of these students, and the remainder participated in activities at the program’s collaborators: Monash, RMIT and the CSIRO.

Victorian Institute for Chemical Sciences was formed in 2003 to promote the chemical sciences in Victoria. The founding members were the University of Melbourne, the Royal Melbourne Institute of Technology and Monash University. The Mission of the Institute is to build synergy between its participants in order to demonstrate excellence in:

- the education of new generations of chemical scientists, and
- the promotion of fundamental and applied science research, primarily in the chemical sciences.

In 2006, the VICS Program included projects in four Theme areas: Drug Discovery and Chemical Synthesis, Chemistry Education and Outreach, Environmental Solutions and Molecular Analysis and Dynamics.

Highlights from the VICS program included: discovery and identification of biologically active molecules in extracts of marine organisms and plants, a very successful outreach program to schools, now presented in conjunction with CSIRO Education, generation of two multimedia teaching aids, one dealing with laboratory safety and the other teaching chemical principles associated with everyday activities, development of instruments for determining water quality and application of Accelerated Solvent Extraction (ASE) and Microwave Extraction (ME) techniques for preparation of samples for chemical analysis. The VICS Centre for Scientific Instrumentation (VICS-CSI) has developed a number of scientific instruments for teaching and research. The VICS-CSI Polarimeter, for measuring optical rotation and applications in chemical kinetic studies, has been licensed to an Australian company for manufacture and distribution worldwide.

VICS has again contributed to the purchase of scientific instruments for research in the Member Universities and has sponsored seminars in the chemical sciences, attended by University and external participants.

Information about VICS and its programs can be obtained by telephone (03) 8344 3949 or email vics-enquiries@unimelb.edu.au

Alternatively, visit the website www.vicsco.com.au
The Bio21 Institute is the core of the Bio21 Cluster, which includes 16 prestigious member institutions recognised for research excellence and translational outcomes in the medical and biomedical science and biotechnology. The School of Chemistry is the largest participant within the Institute, which was opened by the Premier of Victoria, Mr Steve Bracks in June 2005, and during 2006 120 staff and students from the School were located within the building. Research programs that cover new drugs to fight disease, bioactive compounds, low cost plastic solar panels, advanced materials, and collaborations with industry support the Bio21 Institute’s vision of ‘improving health through biotechnology’. The Institute provides key infrastructure including modern mass spectrometry, NMR and electron microscopy facilities. The following research groups from the School are based at Bio21: Dr Paul Donnelly, Dr Craig Hutton, Prof. Andrew Holmes, Prof. Richard O’Hair, Assoc. Prof. Mark Rizzacasa, Prof. Carl Schiesser, Prof. Frances Separovic, Prof. Anthony Wedd, Dr Uta Wille, Dr Spencer Williams and Assoc. Prof. Jonathon White. Staff and students from both the Masson and Bio21 precincts regularly make the journey across Royal Parade and the School maintains teaching, research and services across both locations.

For more information: [www.bio21.org](http://www.bio21.org)
Achievements. The ARC Centre of Excellence (CoE) for Free Radical Chemistry and Biotechnology completed its first full year of operation with a number of notable achievements. Centre members contributed to 61 publications in peer-review journals, 128 conference presentations and four patents. The excellence of Centre research was recognized through significant national and international awards made to Centre members during 2006. I congratulate the CoE on these achievements.

Research Projects. Because of the breadth and geographic nature of the Centre, it is important to provide opportunities for Centre members to gather and share their experiences with one another. To that end the Centre held a very successful Free Radical Winter Carnival in Canberra in June, and sponsored the Society for Free Radical Research (Australasia) meeting in Perth in December. In addition, opportunities were provided for members to attend the Second Pacific Symposium on Radical Chemistry, held in Korea in November, and several other significant international meetings.

Staff. During 2006, the Centre was home to 34 staff and 50 PhD, MSc and Honours student researchers. We hosted seven international visitors and, in return, visited seven overseas laboratories. Ten new Centre Associate members were welcomed and a Memorandum of Understanding was signed with the Centre for Cultural Materials Conservation. Centre researchers also received funding from the Department of Defence to develop a project as part of the international Joint Strike Fighter initiative. These activities highlight how, in a relatively short time, the Centre has grown and embraced new and exciting opportunities. Several other developments will evolve during 2007 and I look forward to reporting on these in due course.

Eclectic conversation. The Centre Management Committee met on eight occasions to discuss Centre operational and policy issues, while a sub-committee of the Scientific Advisory Board (Professor Chris Abell, University of Cambridge; Professor John Carver, University of Adelaide; Professor Chris Easton and myself) met informally in September. Described as an eclectic conversation by Professor Carver, this meeting provided important feedback in areas such as intellectual property, student recruitment and governance.

Centre Public Awareness Program. The CoE welcomed Felicity Jensz who joined us in July as Centre Public Awareness Program Manager with immediate impact. Numerous articles for public consumption have been published to reach audiences as diverse as school children, to business, government and the ARC community. These articles feature Centre research, profile Centre researchers or are fun stories for the younger members of the public and are important conduits between us and the community. Felicity and Michael Moylan, who is the Outreach Officer for the Victorian Institute for Chemical Sciences (VICS), have worked together to provide curriculum specific material for senior secondary school teachers that also highlights the research conducted in the Centre. They are also involved in bringing Centre research to the community through organising public lectures. With the research output continuing to increase there will be no shortage of opportunities for public communication of Centre research.

Finally. During 2006 we met or exceeded our key performance indicators in many areas. The synergies provided through the CoE has allowed free radical researchers in different parts of the country to work together, and, through the international networks that we all have, to forge new collaborations. Our first full year of operation has been a great one, but there is more to be done, more science to discover, more innovations to exploit and more solutions to provide.
It is a fact of life that we all age. It is an inevitable consequence of our need of oxygen to survive. Within our bodies, oxygen molecules can be transformed into free radicals, which are molecules with unpaired electrons. Free radicals are unstable and therefore very reactive. They are known to cause diseases and damage to DNA and proteins as they try to extract an electron from other molecules in order to reach a stable state with paired electrons.

In the environment one very reactive oxygen centred free radical is the nitrate radical, which is formed by pollutants from car exhausts being released into the atmosphere. During the daylight hours, the UV radiation from the sun causes rapid destruction of this radical. Yet, when the sun goes down, the concentration of nitrate radicals goes up.

For Dr Uta Wille, a chemist in the School and member of the ARC Centre of Excellence for Free Radical Chemistry and Biotechnology located at the Bio21 Institute, these night-time radicals present a particularly intriguing question.

“We are interested”, she says, “in knowing what these nitrate radicals do to the human body. Although the nitrate radical is the most important night-time radical, being more reactive than ozone, there has not been much work done on the impact of this radical on biological systems.”

Uta and her team are particularly interested in the chemical reactions that nitrate radicals take part in within the respiratory tract in humans. The respiratory tract itself has a membrane walls that that consists of lipids, which in turn are lined with proteins and a carbohydrates. All three of these biological molecules could potentially be damaged through a free radical reaction. The team has focused on investigating the reactions between nitrate radicals and amino acids, which in turn are the building blocks of proteins. By studying the products of these reactions, as well as the rates by which they are formed, they hope to gain insights into the damaging effect that nitrate radicals may have on us and other surface dwelling organisms.

“We know lots about nitrate radicals and their reactions in the gas phase”, says Uta, “that they might possibly also damage molecules at the inter phase between the atmosphere and the cell membrane is something that may be expected- simply on the basis of the extraordinary high reactivity of nitrate radicals- but it has never been investigated.”

Uta and her team are working towards further investigations into the nitrate radical induced damage in a system that more closely mimics the physiological condition, ideally they wish to studying real cells. This will bring a closer understanding of the damaging effects of the important nitrate radical within biological systems.
Professor Carl Schiesser's keynote lecture

Professor Carl Schiesser, School of Chemistry and Director of the ARC Centre of Excellence for Free Radical Chemistry and Biotechnology, gave a keynote at the annual Science Teachers Association of Victoria Conference (STAVCON) in November, 2006. STAVCON brings together science teachers from all disciplines all over the state to update them on cutting edge research as well as new teaching techniques.

His talk entitled 'From DNA to jumbo jets: radical chemistry and future technology' provided teachers with an overview of the work conducted in the Centre, as well as an introduction to free radical chemistry. It also presented teachers with an understanding of the work of a chemistry professor within a university setting.

Professor Schiesser's keynote is just one of a number of outreach activities undertaken by academics in the school.
Assoc. Prof. Weilin Guo from Jinan University, Jinan, China spent his sabbatical here from Sep 2006 until Feb 2007 to initiate collaboration with our sonochemistry research group. Weilin Guo is an expert in the area of sonochemical synthesis of nanomaterials. Weilin’s project involves the sonochemical synthesis of Ru/Pt alloy, which could be used as catalysts in fuel cells.

Prof Jean Pierre Pascault, one of France’s internationally pre-eminent scientists visited Melbourne. He gave a seminar and led a round table discussion.

The School welcomed Prof Ron Steer from the University of Saskatchewan, Canada, who was a visitor to the School in February.

Photo taken of the Emperor and Empress of China (Matthias Zimmermann, Karrera Djoko) at Third Asian Conference of Biological Inorganic Chemistry, Nanjing, China

### Seminars – Inorganic and Analytical Chemistry Seminars:

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<td>Nazanin Amini (The University of Melbourne). Online determination of mercury by membrane separation flow injection analysis.</td>
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<td>March 13</td>
<td>Mr Michael Moylan (University of Melbourne). Metal derivatives of aldarc acids.</td>
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<td>March 20</td>
<td>Dr Suzanne Neville (Monash University). Spin crossover in dinuclear and polynuclear materials.</td>
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<td>March 27</td>
<td>Dr Michelle Taylor (University of Melbourne). Copper schiff’s base complexes as potential oxidant sensors</td>
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<td>April 3</td>
<td>Assoc. Prof. David McFadgen (University of Melbourne). Some approaches to metal-based drugs.</td>
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<td>April 10</td>
<td>Dr Ian Potter (La Trobe University)</td>
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<td>April 24</td>
<td>Patrick Mornane &amp; Robert Piccinin (University of Melbourne).</td>
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<tr>
<td>May 1</td>
<td>Dr Paul White (CSIRO, Clayton). An electronic lab book for the rest of us.</td>
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<td>May 8</td>
<td>Dr Patricia Hunt (Imperial College, London). Ab-initio molecular dynamics: understanding ultrafast photochemical reactions</td>
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<tr>
<td>May 22</td>
<td>Prof Thomas Klapoetke (University of Melbourne). Nitro compounds, tetrazoles and azides: The last five months at LMU Munich</td>
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<tr>
<td>July 24</td>
<td>Prof. Richard Keene (James Cook University). The Shape of Electron Transfer</td>
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<td>July 31</td>
<td>Dr Chris Glover (Australian Synchrotron). X-ray Absorption Spectroscopy at the Australian Synchrotron</td>
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<td>August 7</td>
<td>Dr Jose Santos (University of Brunei). Mercury-Free Anodic Stripping Voltammetry of Heavy Metal Species using Chemically modified carbon Electrodes</td>
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<td>August 14</td>
<td>Dr Stuart Batten (Monash University) Adventures in Crystal Engineering</td>
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<td>August 21</td>
<td>Dr Tom Waters (University of Melbourne). Gas Phase Reactivity of Monocline Vanadate Anions: Activation of Alcohols by Hydrogen, Hydride and Proton Transfer</td>
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<tr>
<td>August 28</td>
<td>Prof Rhett Kempe (University of Bayreuth). Bimetallic catalysis: $1 + 1 &gt; 2$</td>
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<td>September 4</td>
<td>Prof Tony Wedd (University of Melbourne). Copper is toxic but essential. How does biology cope with that?</td>
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<td>September 11</td>
<td>Mr Matthias Zimmeremann, Ms Karrera Djoko (University of Melbourne), Applications of Polyoxometalates. The Precious Gold.</td>
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<td>September 25</td>
<td>Dr Christian Doonan (University of Saskatchewan). Shedding light on Biological Systems</td>
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<td>October 2</td>
<td>Mr Stephen Sproules (University of Melbourne). Tungsten: For life in extreme environments</td>
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<td>October 9</td>
<td>Ms Marissa Haywood (University of Melbourne). Networks from simple oxyanions</td>
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## School Seminars

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<td>October 16</td>
<td>Mr Lianyi Zhang (Uni. Mel.)</td>
<td>The Copper transfer Proteins CopC: All things are possible!</td>
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<td>October 26</td>
<td>Dr Mike Grace (Monash Uni.)</td>
<td>La Tour de Sediment. Biogeochemical cycling</td>
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### Organic Chemistry Seminar Program

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<td>Feb 24</td>
<td>Dr Michelle Colgrave (IMB, Univ. Queensland)</td>
<td>Discovery, stability, sequencing and mode of action studies of circular proteins</td>
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<td>March 3</td>
<td>Dr Chris Ellvin (CSSIRO Livestock Industries)</td>
<td>A facile photochemical method for the production of a near-perfect rubber biomaterial - resin</td>
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<td>March 17</td>
<td>Dr Matthew Todd, (University of Sydney)</td>
<td>Non-linear effects in asymmetric catalysis</td>
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<tr>
<td>March 21</td>
<td>Khai Leok Chan (School of Chemistry PhD swansong)</td>
<td>Lighting up polymers</td>
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<td>March 24</td>
<td>Prof Nigel Simpkins, (University of Nottingham)</td>
<td>Synthetic fun with bases and bridges</td>
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<td>March 31</td>
<td>Melanie Tsang (School of Chemistry, PhD swansong)</td>
<td>Palladium catalysed amination reactions and urea synthesis in supercritical carbon dioxide</td>
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<td>April 7</td>
<td>Helen Ryan (School of Chemistry, PhD swansong)</td>
<td>Performance chemistry of novel urethane coatings</td>
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<td>April 21</td>
<td>Assoc Prof Ram Mohan, (Illinois Wesleyan Univerity)</td>
<td>Environment-friendly organic synthesis using bismuth compounds</td>
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<td>April 28</td>
<td>Crystal Lau (School of Chemistry, PhD swansong)</td>
<td>The effect of Aβ peptides from Alzheimer’s disease on membranes: a study of aging during a PhD</td>
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<td>May 5</td>
<td>Alison Drechsler, (School of Chemistry, PhD swansong)</td>
<td>Structural changes and membrane interaction of the pore-forming protein, equinatoxin II</td>
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<td>May 12</td>
<td>Dr Mark Coster (University of Sydney)</td>
<td>Anti-cancer and anti-HIV natural products: synthesis and variation</td>
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<td>May 19</td>
<td>Tim Quach, (School of Chemistry, PhD swansong)</td>
<td>Studies toward the synthesis of the ajudazols</td>
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<td>May 26</td>
<td>Rachael Goh, (School of Chemistry, PhD swansong)</td>
<td>Application of the structural correlation principle to the retro-dieis alder nd retro-chelotropic reactions</td>
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<td>June 2</td>
<td>Kylee Aumann, (School of Chemistry, PhD swansong)</td>
<td>Adenosine receptors as potential therapeutic targets</td>
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<td>July 21</td>
<td>Dr Klaus Gawrisch (Lab. Of Membrane Biochem.and Biophys., NIH)</td>
<td>Structure and dynamics of polyunsaturated phospholipids: significance for GPC receptor function</td>
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<td>July 26</td>
<td>Assoc Prof Paul Carter (Virginia Tech)</td>
<td>Transiently non-racemic enolates asymmetric synthesis of quaternary benzodiazepines</td>
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<td>August 11</td>
<td>Dr Michelle Coote (Researchh School of Chemistry, NU)</td>
<td>Computational radical polymerisation</td>
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<td>August 18</td>
<td>Alison Radford (PhD swansong)</td>
<td>Synthesis towards selenium-containing anti-inflammatory compounds</td>
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<td>August 23</td>
<td>Prof Jeo Konopelski (UC Santa Cruz)</td>
<td>Amino acids in synthesis: derivatives, coupling and novel transformations</td>
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<td>August 25</td>
<td>Sam Coglan (Cambridge University, PhD swan song)</td>
<td>Synthesis of caged inositol phospholipids</td>
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<td>September 8</td>
<td>Phoebe Macdougall (PhD swansong)</td>
<td>Improved anti-inflammatory steroids: synthesis and analysis of selenium-containing glucocorticoid prodrugs</td>
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<tr>
<td>Date</td>
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<td>September 15</td>
<td>Hadi Lioe (PhD swansong)</td>
<td>Chemistry and applications of novel reagents for proteomics</td>
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<td>September 22</td>
<td>Prof Rick Dnheiser (MIT)</td>
<td>New cycloaddition and annulation strategies for the synthesis of heterocyclic compounds.</td>
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<td>October 6</td>
<td>Ben Cebon (PhD swansong)</td>
<td>“You want to epoxidise what?” – studies toward the synthesis of dihydrooxepin-containing natural products</td>
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<td>October 13</td>
<td>Alica Daly (PhD swansong)</td>
<td>Formal total synthesis of zaragozic acid C</td>
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<td>October 20</td>
<td>Prof Tony Barrett (Imperial College)</td>
<td>Recent advances in the total synthesis of antibiotic natural products</td>
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<tr>
<td>October 27</td>
<td>Rebecca Grange (PhD swansong)</td>
<td>Towards selenium-containing antihypertensives.</td>
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### Physical Chemistry Seminars

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<td>August 4</td>
<td>Anna Kohler, University of Potsdam.</td>
<td>“Triplet Exciton in Organic and Organometallic Semiconducting Compounds&quot;</td>
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<tr>
<td>August 17</td>
<td>Mr Sean Mathai, University of Melbourne</td>
<td>“Photochemistry of Porphyrin Photosensitizers&quot;</td>
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<td>August 24</td>
<td>Professor Tossy Nagamura, Kyushu University</td>
<td>&quot;Novel photoelectrochromic polymers showing responses in extremely broad time and wavelength ranges&quot;</td>
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<td>August 31</td>
<td>Professor Tossy Nagamura, Kyushu University</td>
<td>&quot;Composite polymer waveguide geometry for all-optical molecular photonics&quot;</td>
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<td>September 7</td>
<td>Dr Alison Funston, University of Melbourne</td>
<td>“Polaron Delocalisation and Transport in p-Conjugated Polymers.”</td>
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<td>September 14</td>
<td>Dr John Gehman, Bio21 Institute, University of Melbourne.</td>
<td>“Islands in the Stream – Solid State NMR approaches to Structure”</td>
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<td>October 5</td>
<td>Professor Peter Hannford, Swinburne University</td>
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<td>October 12</td>
<td>Dr David Snoswell, Bristol University</td>
<td>“Photonic Crystals”</td>
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<td>October 19</td>
<td>Dr Craig Lincoln, University of Melbourne</td>
<td>“Femtosecond Nonlinear Spectroscopy of Complex Molecular Systems”</td>
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<td>October 26</td>
<td>Dr Mike Grace Director, Water Studies Centre, Monash University</td>
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<td>November 2</td>
<td>Mr Daniel Gomez, University of Melbourne</td>
<td>“Spectroscopy of Individual Semiconductor Nanocrystals&quot;</td>
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<td>November 9</td>
<td>Professor Paul Mulvaney, University of Melbourne.</td>
<td>“Single Metal nanocrystals”</td>
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Books and Book Chapters


Journals


Baba, Ohe, Kawasaki, Kolev’s, S. Absorption of mercury(II) from hydrochloric acid solutions on glycidylmethacylate-divinylbenzene microspheres containing amino groups. Reaction and Functional Polymers, 2006, 66:10, 1158-1164

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Grinev TA, Buchachenko AA, Klos J, Bieskie E. Ab initio potential energy surface, infrared spectra, and dynamics of the ion-molecule complexes between Br- and H3, D3, and HD. Journal of Chemical Physics, 2006, 125, 114313 (Abstract)


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Yuen KL, Hutton C. Preparation of the Central Peptides Alkaloids containing functionalised tryptophan residues. Natural Product Communications, 2006, 1:10, 907-919


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