

Joint Research Projects Undertaken with Universities, CSIRO and Other Institutions

Biochemical Reactions and Molecular Recognition

Activators and inhibitors of ryanodine receptor calcium ion channels by PROF. C.J. EASTON and DR J.K. ROBINSON with Prof. A. Dulhunty and Dr M. Casarotto, John Curtin School of Medical Research, ANU; and Dr M. Miller, Biotron, Canberra.

Chemistry of scymnol by PROF. C.J. EASTON and MS M. GEBARA-COGLAN with Mr J. Broadbent, McFarlane Laboratories Pty Ltd, Melbourne; and Dr G.W. Simpson, CSIRO Molecular Science, Melbourne.

Chlorine chemistry by PROF. C.J. EASTON and MR P.G. DUMANSKI with Mr R. Faulkner, Australian Vinyls Pty Ltd, Melbourne; and Dr G.W. Simpson, CSIRO Molecular Science, Melbourne.

Cycloaddition reactions of nitrile oxides by PROF. C.J. EASTON with Drs G.P. Savage and G.W. Simpson, Dunlena Pty Ltd and CSIRO Molecular Science, Melbourne.

Free radical reactions of peptides and proteins by PROF. C.J. EASTON, MR B.J.W. BARRATT, MS L.Y.F. CHOW, MR A.J. HERLT, MS I. LI, MS N. LORIMER, MR S.B. McNABB, MR A.J. MORTIMER, DR J.S. SIMPSON, MS Y.-C. TSAI, MR Z. WATTS and DR A. WRIGHT with Mr. M. Taylor, ANUTECH Pty Ltd; Business ACT; Dr M.J. Davies, Heart Research Institute, Sydney; Dr R. O'Hair, University of Melbourne; and Prof. A. Rauk, University of Calgary, Canada.

Lipid chemistry by PROF. C.J. EASTON with Profs. A. Ferrante and A. Poulos, Adelaide Medical Centre for Women and Children.

Lipid modified coordinating ligands by PROF. C.J. EASTON, DRS P.A. COGLAN and DR M.R. NAIRN with Dr J. Altin, Division of Biochemistry and Molecular Biology, ANU; and Lipotek Pty Ltd, Canberra.

Supramolecular chemistry of cyclodextrins by PROF. C.J. EASTON, MS L. BARR, MS M.M. CIESLINSKI, MR. R. DAWSON, MR A.J. HERLT, MS N. LORIMER, MR H. ONAGI and DR J.S. SIMPSON with Prof. S.F. Lincoln, Ms J.S. Lock and Mr B.L. May, University of Adelaide.

The development of new generation anti-infective agents by PROFS. M.G. BANWELL and C.J. EASTON, DRS S.A. BENNETT, M.R. NAIRN, J.K. ROBINSON, D.J. SINCLAIR, M.K. SMITH and L. XIA with Dr P.J. O'Hanlon, GlaxoSmithKline, Harlow, UK.

Towards improved melamine-urea-formaldehyde resins by PROF. C.J. EASTON and MS A. PHILBROOK with Mr G. Ryan and Dr N. Dunlop, Orica Adhesives and Resins, Melbourne, through the UniChe program.

Computational Quantum Chemistry

Combined experimental/theoretical studies of RAFT polymerisation by DR M.L. COOTE with Prof. T.P. Davis and Dr C. Barner-Kowollik, Centre for Advanced

Macromolecular Design, University of New South Wales; and Dr P. Vana, Georg-August-Universität Göttingen, Germany.

Computational chemistry studies of radical reactions by DR M.L. COOTE with Prof. L. Radom with Dr Rodolfo Gomez, University of Sydney.

Solvation of glyceryl radicals by PROF. L. RADOM, and MR G.P.F. WOOD with Prof. M.S. Gordon, Iowa State University, USA.

Radical addition reactions by PROF. L. RADOM with Prof. H. Fischer, University of Zurich, Switzerland.

Thermochemistry of metal oxides and hydroxides by PROF. L. RADOM and DR M.B. SULLIVAN with Dr B.J. Smith, Walter and Eliza Hall Institute, Melbourne; Prof. J.M.L. Martin, Weizmann Institute, Israel; and Dr L.A. Curtiss, Argonne National Laboratories, USA.

Acidities of alkali metal hydroxides by PROF. L. RADOM, DRS M.B. SULLIVAN and A.P. SCOTT with Prof. S.R. Kass, University of Minnesota, USA.

Reactions catalysed by vitamin B₁₂ by PROF. L. RADOM with Prof. B.T. Golding, University of Newcastle upon Tyne, UK; Dr D.M. Smith, Institut für Organische Chemie, Munich, Germany; and Dr S.D. Wetmore, Mount Allison University, Canada.

Oxidative damage to proteins by PROFS. L. RADOM, C.J. EASTON, MR G.P.F. WOOD, DRS M.L. COOTE and R. JACOB with Dr M. Davies, Heart Research Institute, Sydney; Associate Prof. R.A.J. O'Hair, University of Melbourne; and Prof. A. Rauk, University of Calgary, Canada.

Cleavage of alkoxy radicals by PROF. L. RADOM and DR D.J. HENRY with Prof. A. Rauk, University of Calgary, Canada; Prof. R.J. Boyd, Dalhousie University, Halifax, Canada; and Prof. S.L. Boyd, Mount St Vincent University, Canada.

Interaction of calcium dications with molecules of biological interest by PROF. L. RADOM and MS I. CORRAL with Profs. M. Yanez and O. Mo, Autonoma University of Madrid, Spain.

Bond dissociation energies by PROF. L. RADOM and DR M.L. COOTE with Prof. A. Pross, Ben Gurion University, Israel.

Coordination Chemistry and Spectro-electro Chemistry

Characterization of unwarranted deposits in aero-engines by DRS G.A. HEATH, A.J. EDWARDS, L. NORÉN and MR P.A. GUGGER with Dr M. Sterns, Department of Chemistry, ANU; Mr G. Bailey, Australian War Memorial; Dr V. Otiengo-Alego, AFP Forensic Laboratories, Weston; and Mr A. Romeyn, Australian Transport Safety Bureau, Canberra.

Computational modelling of electrochemical responses by DR P.J. MAHON with Associate Prof. D.K. Cope, North Dakota State University, USA; and Prof. K.B. Oldham, Trent University, Ontario, Canada.

Corrosion analysis and conservation treatments by DRS G.A. HEATH, P.J. MAHON and R.D. WEBSTER with Prof. D.C. Creagh, University of Canberra; and Dr V. Otiengo-Alego, AFP Forensic Laboratories, Weston, ACT.

National and International Links

Paintings and textiles; spectroscopic means of analysis by DRS G.A. HEATH, P.J. MAHON and MS M.E. KUBIK with Dr R. Maxwell, Art History, ANU; Dr M. Sterns, Chemistry, ANU; Ms D. Ward, Australian National Gallery; Prof. D.C. Creagh, University of Canberra; Dr V. Otiengo–Alego, AFP Forensic Laboratories, Weston; and Mr D. Haines, Varian Analytical Instruments, Melbourne.

Redox-modulation of metal cluster compounds by DRS G.A. HEATH, A.J. EDWARDS, P.J. MAHON and MR S.B. LEE with Dr S.P. Best and Mr M. Bondin, University of Melbourne; and Dr G. Foran, Australian National Beamline Facility, KEK, Tsukuba, Japan.

Spectro-electrochemical and theoretical investigation of binuclear and tetranuclear arrays by DR G.A. HEATH with Dr J.E. McGrady and Ms S.Z. Knottenbelt, University of York, UK.

Spectro-electrochemical investigation of organo-metallic redox-switched nonlinear-optical materials by DR G.A. HEATH with Drs M.P. Cifuentes and M.G. Humphrey, Department of Chemistry, ANU; and Dr M.J. Samoc, RSPHysSE, ANU.

Disordered Materials

Diffuse scattering from benzil, $C_{14}H_{10}O_2$ by PROF. T.R. WELBERRY with Prof. W.I.F. David, ISIS, Rutherford Appleton Laboratory, Oxfordshire, UK.

Disorder in 1:1 adducts of hexamethylenetetramine with azelaic acid by PROF. T.R. WELBERRY with Dr K.J. Schenk, Institut de Cristallographie, Université de Lausanne, Switzerland.

Diffuse scattering in zeolites by PROF. T.R. WELBERRY with Dr B. Campbell, Department of Physics and Astronomy, Brigham Young University, Utah, USA.

High-pressure X-ray scattering of oxides with a nanoscaled local structure by PROF. T.R. WELBERRY with Dr J. Kreisel, Laboratoire Matériaux et Génie Physique, ENS de Physique de Grenoble, France; Prof. A.M. Glazer, Clarendon Laboratory, Oxford, UK; and Dr P.A. Thomas, Department of Physics, University of Warwick, UK.

Phonon softening in benzil by DR D.J. GOOSSENS with Dr M.E. Hagen, ANSTO, Sydney.

Structure and magnetism in disordered perovskite oxides, focussing on cobaltates by DR D.J. GOOSSENS and PROF. R.L. WITHERS with Dr M. James, ANSTO, Sydney; Dr X.L. Wang, Wollongong University; and Dr K.F. Wilson, University of New South Wales/ANU.

Magnetic and structural properties of $CeCu_{6-x}Au_x$ and $BaPrO_3$ by DR D.J. GOOSSENS with Dr R.A. Robinson, ANSTO, Sydney.

Crystal field levels by neutron spectroscopy in $CeCu_{6-x}Au_x$ by DR D.J. GOOSSENS with Dr T.J. Hicks and Dr S. Harker, Monash University.

Laser and Optical Spectroscopy

Multi-dimensional spectroscopy of PSII protein sub-assemblies by PROF. E. KRAUSZ with Dr R. Pace, Department of Chemistry, ANU; and Dr M. Seibert, NREL, Golden, Colorado.

EPR and optical spectroscopy of thermophilic PSII from *Synechococcus vulcanus* by PROF. E. KRAUSZ with Dr R. Pace Department of Chemistry, ANU; Dr J.R. Shen, Riken Institute, Hyogo, Japan; and Associate Prof. S. Peterson Arkshöld, University of Lund, Sweden.

Narrow band hole-burning in active photosystem II by PROF. E. KRAUSZ, MR J. HUGHES and DR B. PRINCE with Dr H. Riesen, University of New South Wales, ADFA, Canberra.

Spectroscopy of new chromium (III) hole-burning materials by PROF. E. KRAUSZ and MR J. HUGHES with Dr H. Riesen, University of New South Wales, ADFA, Canberra.

Development of the new generation MCD metallo-enzyme spectrometer by PROF. E. KRAUSZ with Dr M. Riley, University of Queensland; and Mr A. Stanco, CEO LASTEK Adelaide.

Optical spectroscopy of genetically modified PSII having reaction centres containing chlorophyll b. by PROF. E. KRAUSZ with Prof. W. Vermaas, University of Arizona, Tempe, USA.

Sharp line spectroscopy of chromium (III) cyclams by PROF. E. KRAUSZ with Prof. J.H. Choi, Andong National University, Korea.

Physical and optical properties of self-assembled Si nanocrystals by PROF. E. KRAUSZ with Prof. R. Elliman, RSPHYSSE, ANU; and Prof. S.H. Choi, Kyung Hee University, Korea.

Liquid State Chemical Physics

Chaos and nonequilibrium statistical mechanics by PROF. D.J. EVANS with Prof. L. Rondoni, Politecnico Di Torino, Italy.

Derivation of potential models for phase equilibria by DR J.P. DELHOMMELLE with Dr P. Millie, Laboratoire Francis Perrin, France.

Fluctuation theorem by PROF. D.J. EVANS, DR E. MITTAG, E.M. SEVICK and G.M. WANG with Dr D.J. Searles, Griffith University, Brisbane.

Non-equilibrium hard sphere simulations by DR J. PETRAVIC with Dr O.G. Jepps, Department of Chemical Engineering, University of Queensland.

Shear viscosity of a simple fluid over a wide range of strain rates by PROF. D.J. EVANS with Dr I. Borzsák, Hungarian Academy of Sciences, Budapest; and Prof. P.T. Cummings, University of Tennessee, USA.

Transport coefficients of polar liquids and electrolytes by PROF. D.J. EVANS and DR J. PETRAVIC with Dr B. Rousseau, Université Paris-Sud, France.

Transport properties of ionic liquids by DR J. PETRAVIC with Dr J. Delhommelle, Équipe de Chimie et Biochimie Théoriques, Université Henri Poincaré, Vandœuvre-lès-Nancy, France.

National and International Links

Nuclear Magnetic Resonance

Defining the structure of a protein involved in the onset of breast cancer by DR M.A. KENIRY with Prof. C.C. Benz and Dr G. Scott, Buck Institute for Age Research, Novato, California. Supported by a travel grant from the International Union Against Cancer.

Multidimensional NMR studies of chaperone proteins by DR M.A. KENIRY with Associate Prof. J. Carver and Dr M. Wilson, University of Wollongong, NSW.

The association of calothrixin with DNA by DR M.A. KENIRY and MS E.A. OWEN with Drs C. Chai, M. Waring and G. Smith, Department of Chemistry, ANU.

Organic Synthesis

Biosynthetic, structural and metabolic studies on gibberellins by PROF. L.N. MANDER with Dr J. Zeevaart, MSU-DOE Plant Research Laboratory, Michigan State University, USA; Dr P. Hedden and Prof. J. MacMillan, Long Ashton Research Station, Bristol, UK;

Biosynthetic, structural and metabolic studies on gibberellins by PROF. L.N. MANDER and MR B. TWITCHIN with Prof. O. Junttila, Department of Plant Physiology and Microbiology, University of Tromsø, Norway; Prof. R.P. Pharis, Department of Biology, University of Calgary, Canada; Drs M. Koshioka and M. Nakayama, Department of Genetics and Physiology, National Institute of Floricultural Science, Tsukuba, Japan.

Structural and biosynthetic studies on antheridiogens from fern gametophytes by PROF. L.N. MANDER with Dr H. Yamane, Biotechnology Research Center, University of Tokyo, Japan; Dr J. Banks, Department of Botany and Plant Pathology, University of Purdue, USA; Dr J. Nester, Department of Biological Sciences, Sam Houston State University, Texas, USA.

Structural studies on biologically active extractives from Indonesian plant species by PROF. L.N. MANDER and MR A.J. HERLT with Drs R. Rumampuk and P. Tarigan, Kimia Pascasarjana Laboratory, Padjadjaran University, Bandung, Indonesia.

Studies on fruit development by PROF. L.N. MANDER and MR B. TWITCHIN with Dr P.S. Blake, Horticulture Research International, East Malling, UK.

Studies on gibberellin receptors by PROF. L.N. MANDER, DR E.J. BECK, and MR J.R. CROW with Dr P.M. Chandler, CSIRO Division of Plant Industry, Canberra.

Studies on growth inhibition and flowering by PROF. L.N. MANDER and MR B. TWITCHIN with Drs L.T. Evans and R.W. King, CSIRO Division of Plant Industry, Canberra; and Prof. R.P. Pharis, University of Calgary, Canada.

Organic Synthesis, Methodology and Host-guest Chemistry

New horizons in Diels–Alder chemistry by DR M.S. SHERBURN and DRS R. TRIPOLI and A. PAYNE with Emeritus Scientia Prof. M.N. Paddon-Row and Dr D. Moran, School of Chemical Sciences, University of New South Wales.

Protein Crystallography and Engineering

Structural studies of the β IL5 receptor by DR D.L. OLLIS, MR J.M. MURPHY and DR P.D. CARR with Prof. I.G. Young, John Curtin School of Medical Research, ANU.

Structural studies of the P_{II} and GlnK proteins by DRS D.L. OLLIS and P.D. CARR with Drs S.G. Vasudevan and Y. Xu, James Cook University, Queensland.

Structure function studies with esterases by DRS D.L. OLLIS with Dr J. Oakshot, CSIRO, Department of Entomology, Canberra.

Protein Synthesis and Evolution

Carbohydrate binding by C-type lectins by DR N.E. DIXON with Drs J.E. Gready, M. Hulett and Mr Y.-M. Hyun, John Curtin School of Medical Research, ANU.

Cleavage of DNA by chromium(V) complexes by DR N.E. DIXON and MS P.E. LILLEY with Prof. P.A. Lay and Dr A. Levina, School of Chemistry, University of Sydney.

Crystallisation of the DnaB helicase and DnaB•DnaC complex by DRS N.E. DIXON, P.M. SCHAEFFER, MS K.V. LOSCHA and MR M. MULCAIR with Drs A. Oakley and M.C.J. Wilce, University of Western Australia.

Expression, isolation and crystallisation of the *Bacillus subtilis* DnaC helicase and DnaI proteins by DR N.E. DIXON and MS K.V. LOSCHA with Prof. R.G. Wake, and Drs D.B. Langley and J.M. Guss, School of Molecular and Microbial Biosciences, University of Sydney.

In vitro protein synthesis by DRS N.E. DIXON, M.J. HEADLAM, K. OZAWA and PROF. G. OTTING with Drs J. Liggins, S. Whitney and Prof. T.J. Andrews, Research School of Biological Sciences, ANU; Prof. R. Dean, University of Canberra; Dr K. Rogers, Heart

Research Institute, Sydney; Dr A.V. Kralicek, HortResearch, Auckland, New Zealand; and Dr M. Pavlov and Prof. M. Ehrenberg, University of Uppsala, Sweden.

Mass spectrometry of protein-protein and protein-DNA complexes by DRS N.E. DIXON, P.M. SCHAEFFER, MS K.V. LOSCHA and MS A.-Y. PARK with Dr J.L. Beck, Mr R. Gupta, Mr S.J. Watt and Prof. M.M. Sheil, Department of Chemistry, University of Wollongong.

Mechanisms of termination of DNA replication by DRS N.E. DIXON, P.M. SCHAEFFER and MR M. MULCAIR with Dr D.C. Neylon, Department of Chemistry, University of Southampton, UK; Dr A.V. Kralicek, HortResearch, Auckland, New Zealand; and Dr T.M. Hill, School of Medicine and Health Sciences, University of North Dakota, USA.

Properties of proteins circularized by intein-mediated reactions by DRS N.E. DIXON, P. PROSELKOV, N.K. WILLIAMS, MS A.-Y. PARK, MR B. BANCIA and PROF. G. OTTING with Dr J.M. Matthews, School of Molecular and Microbial Biosciences, University of Sydney; Dr J.L. Beck, Mr S.J. Watt and Prof. M.M. Sheil, Department of Chemistry, University of Wollongong; and Dr E. Liepinsh, Department of Medical Biochemistry and Biophysics, Karolinska Institute, Stockholm, Sweden.

National and International Links

QOR quinone reductase structure and mechanism by DRS N.E. DIXON, P. PROSELKOV and R.D. WEBSTER with Dr J.-I. Mano, Faculty of Agriculture, Yamaguchi University, Japan.

Spectroscopic studies of the proofreading exonuclease subunit of DNA polymerase III by DR N.E. DIXON and MS A.-Y. PARK with Drs G. Schenk, Department of Chemistry; and Prof. G.R. Hanson, Centre for Magnetic Resonance, University of Queensland.

Structural genomics of integron proteins by DRS N.E. DIXON, P.M. SCHAEFFER, MR P. WU and PROF. G. OTTING with Drs B. Mabbutt, H. Stokes and Mr A. Robinson, Department of Chemistry, Macquarie University; and Dr Zs. Dosztányi, Institute of Enzymology, Budapest, Hungary.

Structure and mechanism of action of proline aminopeptidase by DRS N.E. DIXON, P.M. SCHAEFFER and MS P.E. LILLEY with Prof. H.C. Freeman and Dr J.M. Guss, School of Molecular and Microbial Biosciences, University of Sydney.

Structure of a circularised protein by DRS N.E. DIXON and P. PROSELKOV with Drs K. Alexandrov and A. Niculae, Department of Physical Biochemistry, Max-Planck-Institute for Molecular Physiology, Dortmund, Germany.

Structure of DnaG primase by DRS N.E. DIXON, P. PROSELKOV, P.M. SCHAEFFER, MR B. BANCIA, MS K.V. LOSCHA and PROF. G. OTTING with Drs A. Oakley and M.C.J. Wilce, University of Western Australia; and Dr E. Liepinsh, Department of Medical Biochemistry and Biophysics, Karolinska Institute, Stockholm, Sweden.

Structures and functions of the *Escherichia coli* replicase by DRS N.E. DIXON, M.J. HEADLAM, K. OZAWA, P. PROSELKOV, MR S. JERGIC, MS A.-Y. PARK and PROF. G. OTTING with Drs C.M. Elvin, K. Kongsuwan and G. Wijffels, CSIRO Division of Livestock Industries, Brisbane; Drs A. Oakley and M.C.J. Wilce, University of Western Australia; and Drs R. Rothnagel and B. Hankamer, Institute for Molecular Biosciences, University of Queensland.

Structures of complexes of the proofreading exonuclease subunit of DNA polymerase III by DRS N.E. DIXON, P.D. CARR, D.L. OLLIS, M.A. KENIRY, PROF. G. OTTING and MS A.-Y. PARK with Drs G. Pintacuda and E. Liepinsh, Department of Medical Biochemistry and Biophysics, Karolinska Institute, Stockholm, Sweden.

Structures of the *Escherichia coli* DnaB helicase protein and the DnaB•DnaC complex by DRS N.E. DIXON, P.M. SCHAEFFER and MS K.V. LOSCHA with Prof. J.M. Carazo, Drs L.E. Donate, M. Barcéna and Ms Y. Robledo, Centro Nacional de Biotecnología, Universidad Autónoma, Madrid, Spain.

Solid State Inorganic Chemistry

A low temperature electron diffraction study of structural disorder and its relationship to the Kondo effect in ThAsSe by PROF. R.L. WITHERS with Dr R. Vincent, University of Bristol, UK; and Prof. J. Schoenes, Technical University, Braunschweig, Germany.

Atomic ordering in the doped, rare earth, cobaltates $Ln_{1-x}Sr_xCoO_{3-\delta}$ by PROF. R.L. WITHERS with Drs D. Goossens and M. James, Australian Nuclear Science and Technology Organisation, Menai, NSW.

Constrained refinement techniques for problem crystal structure refinements by PROF. A.D. RAE with Drs K.J. Haller and Ms W. Somphon, Suranaree University of Technology, Nakhon Ratchisima, Thailand.

Local crystal chemistry, induced strain and short range order in the cubic pyrochlore $(\text{Bi}_{1.5-\alpha}\text{Zn}_{0.5-\beta})(\text{Zn}_{0.5-\gamma}\text{Nb}_{1.5-\delta})\text{O}_{(7-1.5\alpha-\beta-\gamma-2.5\delta)}$ (BZN) by PROFS. R.L. WITHERS, T.R. WELBERRY, DRS, Y. LIU, L. NORÉN and MR F. BRINK with Dr A.K. Larsson, RSPHysSE, ANU, and Dr H. Rundlöf, Studsvik Neutron Research Laboratory, Sweden.

Refinement of crystal structures showing twinning and disorder by PROF. A.D. RAE with Dr S.W. Ng, University of Malaya, Kuala Lumpur, Malaysia.

Structural studies on the Fresnoite type compound $\text{Ba}_2\text{VSi}_2\text{O}_8$ by PROF. R.L. WITHERS with Dr T. Höche, Humboldt-Universität zu Berlin, Germany; Dr S. Esmailzadeh, Stockholm University, Sweden; and Dr H. Schirmer, Friedrich-Schiller-Universität, Germany.

The effects of local strain on the crystal chemistry of solid solutions by PROFS. R.L. WITHERS and T.R. WELBERRY with Dr A. Pring, South Australian Museum; and Dr N. Ishizawa, Tokyo Institute of Technology, Japan.

Solid State Molecular Science

The interface between complex fluids and solids by DR P.A. REYNOLDS, PROF. J.W. WHITE, DR M.J. HENDERSON, DR J. ZANK and MR K. BARANYAI with Dr S.A. Holt, Rutherford Appleton Laboratory, Oxford, UK; and Dr D. Tunaley, Orica Ltd, Australia.

Conformation of proteins at interfaces by PROF. J.W. WHITE and DR M.J. HENDERSON with Dr S.A. Holt, Rutherford Appleton Laboratory, Oxford, UK.

Kinetics of template action in silicalite synthesis by PROF. J.W. WHITE with Dr L. Iton, Argonne National Laboratory, Chicago, USA.

Millisecond X-ray reflectometer for ChemMatCARS by PROF. J.W. WHITE and DR M.J. HENDERSON with Dr R. Garrett, ANSTO, Sydney; and Dr J. Viccaro, University of Chicago, USA.

Nanostructure of milk membrane and proteins by PROF. J.W. WHITE with Dr S.A. Holt, Rutherford Appleton Laboratory, UK; and Dr B. Cox, Dairy Research Corporation, Melbourne.

Structure of high internal phase emulsions by PROF. J.W. WHITE, DRS P.A. REYNOLDS, M.J. HENDERSON, J. ZANK and MR K. BARANYAI with Drs R. Goodridge, C. Such, Orica Ltd, Australia; and Mr. A. Fontaine, FIUPSO, France.

Structure of polymer surfactant films by PROF. J.W. WHITE with Dr J. Penfold, Rutherford Appleton Laboratory, Oxford, UK.

Structure of templated silicate films by PROF. J.W. WHITE and DR P.A. REYNOLDS with Drs M. Trau and J. Ruggles, University of Queensland, Brisbane.

X-ray small angle scattering from whole blood and haemoglobin by PROF. J.W. WHITE with Dr C. Garvey, Department of Biochemistry, University of Sydney.

National and International Links

Titania and zirconia composite thin films by PROF. J.W. WHITE and DR M.J. HENDERSON with Prof. A.R. Rennie, NFL, Studsvik, Uppsala Universitet, Sweden; and Mr N. Rosier, FIUPSO, France.

Structure of inorganic catalyst films by PROF. J.W. WHITE with Dr J. Bartlett, ANSTO, Sydney.

Structure of polymer clay-composites by PROF. J.W. WHITE with Dr E. Gilbert, ANSTO, Sydney.

Structure of polymer composites by PROF. J.W. WHITE with Dr D. Martin, Department of Chemical Engineering, University of Queensland.

The following collaborators visited the group during 2003 to conduct X-ray reflectometry experiments:

Dr W. Fullagar University of Queensland; Dr V. James Hon. Visiting Fellow, RSC; Dr C. Garvey University of Sydney; Dr K. Latham RMIT University, Melbourne; Drs V. Luca and M. James, ANSTO, Sydney; Dr D. Martin, University of Queensland; Dr A. Whittaker, University of Queensland; Dr G. Warr, University of Sydney; Dr J. Ruggles, University of Queensland; Prof. R. Amal, University of NSW, and Dr Y. Chen, RSPHysSE, ANU.

Structural Biology and Biophysics by NMR

Application of an intein-based system for protein cyclization by PROF. G. OTTING, DRS N.E. DIXON, P. PROSELKOV and N.K. WILLIAMS with Dr J. Matthews, University of Sydney; Dr E. Liepinsh, Karolinska Institute, Stockholm, Sweden; and Drs A. Sharipo and I. Line, University of Latvia, Riga, Latvia.

Determination of the three-dimensional structure of complexes between the R3H domain and mononucleotides by PROF. G. OTTING with Drs E. Liepinsh and G. Pintacuda, Karolinska Institute, Stockholm, Sweden; and Drs A. Sharipo and A. Leonchiks, University of Latvia, Riga, Latvia.

Determination of the three-dimensional structure of human CLP and its interaction with 5-lipoxygenase by PROF. G. OTTING with Drs E. Liepinsh and O. Rådmark, Karolinska Institute, Stockholm, Sweden.

Determination of the three-dimensional structure of pig Cox-17 by PROF. G. OTTING with Drs E. Liepinsh and R. Sillard, Karolinska Institute, Stockholm, Sweden.

Determination of the three-dimensional structure of the complex between the N-terminal domain of the *E. coli* arginine repressor and DNA by PROF. G. OTTING with Drs G. Pintacuda and E. Liepinsh, Karolinska Institute, Stockholm.

Determination of the three-dimensional structure of WIF-1 and a Kunitz-type protease inhibitor by PROF. G. OTTING with Dr E. Liepinsh, Karolinska Institute, Stockholm, Sweden; and Prof. L. Patthy, Hungarian Academy of Sciences, Budapest, Hungary.

NMR resonance assignments from measurements of cross-correlated relaxation by PROF. G. OTTING with Prof. G. Bodenhausen, Ecole Normale, Paris, France; Prof. C. Griesinger, Max-Planck-Institute, Göttingen, Germany; Prof. I. Bertini, University of

Florence, Italy; Prof. R. Kaptein, University of Utrecht, Netherlands; and Dr J. Boyd, Oxford University, UK.

Protein-labelling with paramagnetic ions by PROF. G. OTTING and DR S.A. BENNETT with Dr G. Pintacuda, Karolinska Institute, Stockholm.

Synthesis and Mechanism

Biotransformations by PROF. M.G. BANWELL and MR D.W. LUPTON with Dr G.M. Whited, Genencor International Inc, Palo Alto, California, USA.

Studies in alkaloid synthesis by PROF. M.G. BANWELL and MR M.O. SYDNES with Dr C. Burns, Cytopia Pty Ltd, Melbourne.

The development of chemoenzymatic methods for the selective elaboration of polyfunctionalised therapeutic agents to oligomers with improved efficacy by PROF. M.G. BANWELL and MR M.P. FRIEND with Dr J. Lambert, Biota Chemistry Laboratories, Melbourne.

The development of new generation anti-infective agents by PROFS. M.G. BANWELL, C.J. EASTON, DRS S.A. BENNETT, M.R. NAIRN, J.K. ROBINSON, D.J. SINCLAIR, M.K. SMITH and L. XIA with Dr P.J. O'Hanlon, GlaxoSmithKline, Harlow, UK.

The development of novel carbohydrate-like drugs by PROF. M.G. BANWELL, DRS M. BONNET, J. RENNER and P. GUAN with Drs R.H. Don and V. Ferro, Progen Industries Ltd, Brisbane.

The synthesis of sialic acid analogues by PROF. M.G. BANWELL and MR X.H. MA with Dr J. Lambert, Biota Chemistry Laboratories, Melbourne.

The total synthesis of biologically active marine alkaloids from the Great Barrier Reef by PROF. M.G. BANWELL, DRS M.J. COSTER and N.L. HUNGERFORD with Associate Prof. M.J. Garson, Department of Chemistry, University of Queensland; and Dr C. Burns, Cytopia Pty Ltd, Melbourne.

The total synthesis of biologically active natural products by PROF. M.G. BANWELL and MR S. CHAND with Dr G.P. Savage, CSIRO Molecular Science, Melbourne; Prof. C. Parish, John Curtin School of Medical Research, ANU; and Prof. G. Dannhardt, Institute of Pharmacy, University of Mainz, Germany.

Theoretical Chemical Physics

Chemical reaction dynamics by PROF. M.A. COLLINS with Associate Prof. D.H. Zhang, National University of Singapore; Dr M. Brouard, University of Oxford, UK; and Dr J.F. Castillo, Universidad Complutense de Madrid, Spain.

Nonadiabatic dynamics and coupled potential energy surfaces by PROF. M.A. COLLINS with Prof. D. Yarkony, Johns Hopkins University, USA; and Associate Prof. D.H. Zhang, National University of Singapore.

Quantum scattering of hydrogen and methane on a nickel surface by PROF. M.A. COLLINS with Dr C. Crespos and Prof. G.-J. Kroes, University of Leiden, Netherlands.

National and International Links

Electrochemistry

Corrosion of copper in potable water systems by DR R.D. WEBSTER with Dr A.G. Christy, Department of Geology, ANU; Dr A. Lowe and Mr M. Stoll, Department of Engineering, ANU; and Dr V. Otieno-Alego, AFP Forensic Laboratories, Weston, ACT

Electrochemistry of mixed valence triruthenium complexes by DR R.D. WEBSTER with Dr L.Y. Goh, National University of Singapore.