3 National and International Links

Professor Jim Williams - Associate Director (Resources)

This section reports the activities of the School staff in service to domestic and international bodies in academia, government and industry. These tasks are in addition to normal professional duties such as external student supervision, reviewing/refereeing of research papers and proposals and external seminar presentations.

Given the diminished funding environment facing Australian universities it is essential that the School seeks additional support for its activities from various domestic public institutions (DISR, DETYA, ANSTO, AINSE etc.) in addition to industrial partners and funding through international collaborations. The School has attracted support from over 70 different, concurrent funding sources. The details are presented in this section.

The difficult funding environment has, more than ever, highlighted the importance of strong domestic and international collaborative links. In this context, an important function for the School is the support of major national facilities that would not otherwise be viable at regional universities. These centres, such as the H-1 National Plasma Fusion Research Facility in the Plasma Physics Laboratory, and the Heavy Ion Accelerator Facility in the Department of Nuclear Physics, are a focus for students and researchers from other institutions to participate in large scale physics programs, while also enabling access for Australian scientists to equivalent major international facilities.

Domestic and international collaborations continue to be a major ingredient in the success of all of the major School research programs. This year, we have over 232 collaborative projects that have either resulted in a publication in the past year, or have attracted external funding support, and report 28 national and 37 international Collaborative Agreements/MoUs. Consistent with this, the School has hosted in excess of 86 visitors who have either presented departmental seminars or who have participated in joint research projects. Results of these and other programs are, in part, disseminated through organizing conferences, colloquia and seminars. Collaborations, School visitors, conferences and colloquia are listed in this section.

Collaborations with industry allow high-tech spinoff technologies to be developed as well as bringing additional money for applied research into the School. The range of industrial funding support covered direct project funding and service contracts by industry, support of PhD students and postdoctoral fellows, funding for equipment and facilities in lieu of industry access, partners in government grants and centre funding. We selectively report the activities of the Photonics Cooperative Research Centre, the Redcentre for rapid development of cutting-edge technologies, The ANU Centre for Theoretical Physics and The Centre for the Mind.

A significant School priority is to raise public awareness of the importance of science. It is an important duty for members of the School to serve on committees and boards of universities, business and government organizations. It is noteworthy that academic staff of the School serve on the editorial boards of over 30 domestic and international journals and some 20 international advisory committees. Many academics act as reviewers and referees for the Australian Research Council, Australian Institute of Nuclear Science and Engineering and the Australian Academy of Sciences. Services to outside organizations are presented in detail in this section.

Commercialisation

A recent venture within the School is the "BlueLab Project". The School has been successful in attracting the major Taiwanese Company LEDEX, to set up laboratories in Canberra aligned to the MOCVD Growth and Devices facilities in the School's Electronic Materials Engineering Department. This venture, the so-called "BlueLab", will develop joint manufacturing ventures with ANU in the specific area of blue-green light-emitting devices. These products will address enormous markets such as flat panel displays, flat traffic lights and even super-efficient white light sources. There were other reasons why this multinational company came to Australia to set up a development lab and advanced manufacturing. Two key company executives were educated in Australia (one a PhD student in the School) and hence were aware of Australia's capacity for research innovation. In addition, there was an awareness of the world class facilities and expertise for materials problem solving and device fabrication in the School.

The installation of a new ion accelerator and a new MOCVD reactor will take place in early 2000 in the Department of Electronic Materials Engineering. These developments are possible as a result of the successful ARC Research Infrastructure Equipment and Facility bids by Dr Rob Elliman and Professor Jagadish, respectively. In the MOCVD case, the new reactor constitutes a $3.5M (national) facility. A lucrative R&D contract with the manufacturer (Aixtron) worth more than $US0.5M over two years will contribute to the development of this facility.

Innovations and Small to Medium Enterprise Involvements

The WEDGE

The School's virtual reality system has generated considerable external interest. An installation of the WEDGE virtual reality theatre was purchased by the Powerhouse Museum, Sydney. This was a collaborative commercialisation together with the ANU Supercomputer Facility and was administered by the Business Office of RSPhysSE. Professor R.W. Boswell and Mr P. Alexander participated in setting up the system at the Powerhouse Museum Universal Machine Exhibition in June (along with Mr Drew Whitehouse of ANUSF). The exhibition, and especially the WEDGE, was a great success with queues of about twenty children every day waiting to use the facility. The Intergraph Computer Company and the Millenium A.V. Company were also involved. Professor R.W. Boswell and Mr P. Alexander are also helping the CSIRO Discovery Centre to design their new exhibition using a WEDGE that will open in the year 2000.

Other demonstrations of the WEDGE virtual reality theatre featured at the Australian Science Festival, the Siemens Science and Engineering Experience, RSPhysSE Founder's Day and as part of the COMP3067 "Computational Science and Engineering" lecture course. Many informal demonstrations to industry also took place. Several hundred people experienced the WEDGE during 1999 for the first time. A portable version of the WEDGE theatre was exhibited at an international workshop at Magnetic Island, Queensland, in July and in the Main Committee Room, Parliament House, Canberra, in October. The parliament house exhibition to politicians and Vice-Chancellors of Australian universities was at the occasion of the launch of the Australian Partnership for Advanced Computing. *(Dr H.J. Gardner, TP and Professor R.W. Boswell, PRL)*

There have been several smaller industry-related projects that have received external funding in 1999. Examples involve contract R&D grants (involving DSTO and industry partners) for development of a plasma antenna (see later) and for the fabrication of infrared photodetector arrays. *(Professor J. Harris and Dr G. Borg, PRL, Professor C. Jagadish, EME)*

The Magnet System and Friction Attachment for Surface Force Apparatus of the Department of Applied Mathematics was sold to Mulhouse University, France. *(Drs A.M. Stewart, H.K. Christenson; T.J. Sawkins and A.M. Hyde, AM)*

Several DISR grants were received in 1999 for a range of activities, from international travel for collaborative research to workshop organisation. Two grants under the Technology Diffusion Program involve feasibility studies:

(a) Harnessing the Resources to Fabricate Innovative Optoelectronic (Semiconductor) Devices in Australia — $65K:

This project is to carry out a business model for the commercialisation of the School's innovative semiconductor devices activities that have generated considerable international (industry) attention. It is anticipated that the first stage of commercialisation (including establishing a business venture) is of the order of $20M. Currently, there are no Australian industries fabricating high value added semiconductor components such as lasers, detectors, etc. Thus, there is no ready pathway to commercialisation for the prototype devices fabricated by ANU and its collaborators. These cutting-edge components have the potential for creating a new industry in Australia, with the ability to both penetrate existing markets and generate new ones.

(b) Harnessing Materials R&D Resources for the Benefit of Australian Manufacturing Industry — $113K:

The School (Professor Jim Williams) is coordinating this project which is establishing the feasibility of networking Australia's considerable materials science capabilities (initially in trouble-shooting and materials characterisation) for the benefit of Australian industry. The School has much to offer (and much to gain) in this activity.

Both studies will be carried out within the School using the Policy and Public Relations Unit resources and the FileMaker database currently being constructed for the School's IP register. *(Professors J. Williams, C. Jagadish)*

The School has initiated the collation of its Intellectual Property into an IP register that will assist in negotiations with industry for contracts and joint ventures — this project is being undertaken by the Policy and Public Relations Unit. The register will document the School's know-how in three categories:

(i) generic technology arising from the School's research which is unencumbered,
(ii) strategic IP which is considered to be potentially attractive to industry or already has generated industry interest or secured industry funding,
(iii) patented and encumbered technology.

A 1998 DISR grant established the Photonics Redcentre (Rapid Engineering Development) to commercialize, market, and link the work of the Photonics CRC and its partners to industry. The Redcentre has been active in working with the School as part of a national network charged with fast track engineering development, industrial design and manufacturing. Redcentre has been successful in initiating several networks involving research from the School and external companies. The School is keen to promote links of this type with other educational institutions and Small-to-Medium-Enterprises (SMEs). The following projects are examples of the work undertaken by the Canberra node of the Redcentre during the past 12 months.

Plasma Antennas
In January 1999, the Plasma Research Laboratory won a contract offered for tender by the DSTO to investigate the feasibility of plasma antennas as low radar cross-section radiating elements. The first stage of this contract has been successfully completed and three seminars were presented at the DSTO as part of the contract. As a result of this work, a provisional patent was filed in October. The plasma antenna developed by PRL in collaboration with the Australian Defence Science and Technology Organization shows great promise, and is being developed further for possible commercialisation in collaboration with the Photonics Redcentre. The Redcentre has arranged collaboration between the ANU researchers, CEA Technologies and Cantec Australasia in Canberra, and Neolite Neon in Sydney.

Panoramic Video System
The Australian National University has developed a novel 360˚ panoramic video system that can monitor an entire room using a single fixed camera. Video surveillance systems that use multiple cameras to monitor an entire room (360 degrees) can now be replaced by one camera. Motion detecting can also be built into the system whereby it is possible to specify certain areas of the room as 'off-limits' thereby lending the system to unmanned security operations. The system could also be reversed so as to project an image recorded in this way back onto 360˚ hemispherical room so as to provide 'surround video'. The system has a very large potential market because it offers a cost-effective alternative to current systems, and application to new and exciting areas.

The current system consists of a standard video camera, a special lens attachment that has been designed in the Centre for Visual Sciences at the Australian National University, an IBM-compatible computer, a frame grabber, and the associated software. The system could be packaged in any form depending upon the application. A fully functional prototype has been manufactured by the Photonics Redcentre for use by ANUTECH and the researchers in product evaluation trials and marketing. Recent interest by a large multinational company is being investigated by Redcentre in Sydney.

High Temperature Pyrometer
Redcentre and Thermal Research Australia P/L, have continued development of a technology that allows the continuous measurement of hot metal temperature in cast iron induction furnaces. The technology was initially developed in conjunction with the Australian Photonics Co-operative Research Centre Product Incubator in Sydney, and more recently the Photonics Redcentre. The development has involved several plant trials in furnaces in Victoria and South Australia, and has resulted in a provisional patent application. Thermal Research Australia in conjunction with the Photonics Redcentre is now developing the technology into a stand-alone instrument, capable of being manufactured for sale and distribution throughout Australia, South East Asia, Europe, and the continental United States of America. The Photonics Redcentre has been involved for the

entire development to date. Redcentre is providing access to finance, engineering, design services, and marketing skills. It is also providing access to management and business planning as required. It is envisaged that Redcentre would be involved in the project management of the project and would initiate the grant application process, as well as negotiating arrangements with industry partners.

Innovations Building

The Photonics Redcentre is actively pursuing a proactive role in the management of the new ANU Innovations Building. This is an expansion of the role of the Redcentre from just a passive tenant of the building, to one of actively managing and promoting the capabilities associated with the building. This includes in the broader sense, marketing of the capabilities of the Australian National University and the Australian Capital Region.

Management of this building will be critical to the ANU if it wishes to capitalise on the building's potential capabilities, and to educate the broader community and industry. This is an ideal opportunity to focus industry on the research activities within the ANU and the Australian Capital Region, including a significant education and training role of high school students and undergraduate students. The Photonics Redcentre will occupy an office in the Innovations Building adjacent to the RSPhysSE laboratory on the ground floor. The Redcentre continues to be proactive in promoting activities within the RSPhysSE and some other areas of the ANU. In several instances has taken an active and leading role in the management of projects through the provision of technical and legal advice, and networked access to potential commercial partners outside of the ANU.

At the opening of the building on 30th November 1999, Redcentre took a leading role in promoting some of the School's more innovative developments. Both the Plasma Antenna project and the "BlueLab" project were prominently displayed for the many visitors on the day.

ANUTECH

Redcentre continues to assist ANUTECH in the management of several commercial projects and Intellectual Property portfolios. The projects range from a watching brief through to high level negotiations, and in some instances mediation, between researchers, commercialising companies and financial investors. This aspect of Redcentre activities this year has presented many challenges, and has allowed it to build on its extensive network capability.

Other Opportunities

Redcentre continues to pursue opportunities to utilise the extensive capabilities at the ANU. Several opportunities were identified during the year, and with the collaboration of appropriate ANU staff and researchers, bids for the work were submitted.

The Innovations Building under construction

Collaborative Ventures, Agreements & Memoranda of Understanding

Applied Mathematics

Dr H.K. Christenson

Project: Preparation of and Study of Interactions between Homogeneous Hydrocarbon and Fluorocarbon Surfaces
Partners: Dr V.V. Yaminsky with Professor M. Hato, Dr T. Ishida and Dr S. Ohnishi, National Institute of Materials and Chemical Research, Tsukuba, Japan

Project: Determining the Surface Tension of Microlitre Quantities of Liquid
Partners: Mr J. Kirkness, Dr T. Amis and Dr J. Wheatley, Westmead Hospital and University of Sydney

Dr V.J.S. Craig

Project: Nanorheological Measurements using a Modified Atomic Force Microscope
Partner: Dr Simon Biggs, University of Newcastle

Project: A Reflectometry Study of the Adsorption of Cationic Surfactants to Silica
Partner: Dr Simon Biggs, University of Newcastle

Professor E. Gamaly

Project: Molecular Confinement Studies
Partners: Drs S.A. Cruz and J.Soullard, Universidad Autonoma Metropolitana, Mexico City, Mexico

Project: Formation Mechanism of Single-Walled Carbon Nanotubes in a Gas Phase
Partners: Drs W. Maser, E. Mu-oz, A.M. Benito, M.T. Martinez and G.F. de la Fuente, Instituto de Carboquimica, CSIC, Spain

Project: Laser Ablation in a Reactive Gas Filled Experimental Chamber
Partners: Professor A. Perrone and Dr A. Zocco, University of Lecce, Italy

Professor S.T. Hyde

Project: Polycontinuous Mesophases in Copolymer Melts
Partners: Professor T. Hashimoto and Professor H. Hasegawa, Kyoto University, Japan

Project: Microemulsions and Cubic Phases in Hydrogenated and Perfluorinated Systems
Partner: Professor M. Monduzzi, Cagliari University, Italy

Project: Hyperbolic Forests and 3d Euclidean Thickets
Partner: Dr C. Oguey , Université Cergy-Pontoise, France

Dr M.A. Knackstedt

Project: Dynamic Fluid Flow in Ore-Forming Systems
Partner: Professor S.F. Cox, Research School of Earth Sciences

Project: Characterisation of Random Biphasic Materials
Partners: Dr K. Mecke, University of Wuppertal, Germany, Mr. C. Arns, UNSW.

Project: Correlating Microstructure to Flow and Elastic Properties of Porous Materials
Partners: Dr E. Garboczi, Mr D. Bentz, Building Materials Division, National Institute of Standards and Technology, USA; Dr A.P. Roberts, Civil Engineering, Princeton University., Mr C. Arns, UNSW

Dr M.A. Knackstedt and Dr A. Sheppard

Project: Network Modelling of Two-Phase Flow in Porous Media
Partners: Professor W.V. Pinczewski, Australian Petroleum CRC; Professor M. Sahimi, Chemical Engineering, University of Southern California, U.S.A.

Dr M.A. Knackstedt and Dr T.J. Senden

Project: Penetration into Paper Products and Coatings
Partner: Dr B. Lyne, Research Director, International Paper Pty Ltd

Dr R. Sok, Dr A. Sheppard and Dr M.A. Knackstedt

Project: Pore-scale Network Characterisation of Sedimentary Rocks
Partners: Professor W.V. Pinczewski, Australian Petroleum CRC; Professor W.B. Lindquist, SUNY Stony Brook.

Professor B.W. Ninham

Project: Restriction Enzyme Mechanisms; Specific Ion Effects in Flocculation of Hydrophobic Colloids; Denaturing of Proteins by Surfactants, Ion Binding to DNA; Laser Spectroscopy of Liquids, Effects of Dissolved Gas; Ion Binding to Colloids via NMR Diffusion; Theories of Molecular Forces, Specifically Casimir Effects; Templating of Metal Particles in Mesostructured Fluids; Phase Behaviour and Mesostructure of Microemulsions; Phase Behaviour of Brain Lipids and Microstructure in Milk
Partners: Universities of Lund; Gothenberg; Surface Chemistry Institute (YKI) Stockholm; University of Paris V1; Florence; Moscow State

Dr E. Radlinska

Project: Characterisation of Microstructures in the Surfactant/Polymer/Water Systems Using Freeze Fracture Electron Microscopy
Partner: Dr T. Gulik-Krzywicki, Centre de Génétique Moléculaire, CNRS, France

Project: Phase Transitions in the C12E5/Water/Random Heteropolymer System
Partners: Dr D. Langevin, Laboratoire de Physique des Solides, Universite Paris Sud, France; Dr F. Lafuma, Ecole Supérieure de Physique et de Chimie, France; Professor W. Urbach, Ecole Normale Supérieure, France; Dr C.E. Williams, Collège de France, France; Dr R. Ober, Collège de France, France.

Project: The Microstructure of Coals and Oil-Bearing Shales
Partner: Dr A.P.Radlinski, The Australian Geological Survey Organisation

Dr T.J. Senden

Project: Experimental Single Chain Polymer Mechanics
Partner: Prof Jean-Marc di Meglio, Institut Charles Sadron/Universite Louis Pasteur, Strasbourg, France

Project: The Development of Novel Delivery Systems for Radiotherapy
Partner: Dr Bill Burch, Radiopharmaceuticals Division, ANSTO

Dr A. Sheppard and Dr R. Sok

Project: Development of a Fast Network Simulator for 3-Phase Flow
Partner: Professor W.V. Pinczewski, Australian Petroleum CRC.

Dr D.R.M. Williams

Project: Folding Dynamics of DNA Condensates
Partners: Mr B. Schnurr and Dr F.C. MacKintosh, University of Michigan

Project: Novel DNA Condensates
Partner: Dr J. Hoh, John's Hopkins Medical School, USA

Dr V.V. Yaminsky

Project: Principles and Methods of Capillarography
Partners: Mr K. Thuresson and Dr T. Nylander, Physical Chemistry I, Lund University

Project: Ellipsometry Studies of Wetting and Adsorption
Partner: Mr K. Eskilsson, Physical Chemistry I, Lund University

Project: Dynamic Spreading of Liquids and Solutions
Partner: F. Tiberg, YKI, Stockholm

Project: Hydrophobic Bridging Forces.
Partner: Professor P. Claeeson, YKI, Stockholm

Project: Wetting and Marangoni effects in self-assembly of nanoparticles
Partners: Professor M.-P. Pileni and Dr L. Motte, Laboratoire SRSI, University Paris VI

Project: Water and Biomaterials
Partner: Dr E. Vogler, Departments of Materials Science and Engineering and Bioengineering, The Pennsylvania State University

Atomic and Molecular Physics Laboratories

Professor S.J. Buckman

Project: Low Energy Electron Molecule Scattering
Partners: Dr M.J. Brunger and Professor P.J.O. Teubner, Flinders University

Project: Electron Scattering from Molecular Radicals
Partners: Dr M.J. Brunger and Professor W. Lawrance, Flinders University

Project: Electron Scattering from CO_2
Partners: Professor M.A. Morrison and Dr S.F. Mazevet, University of Oklahoma, USA

Project: Electron Scattering from Metal Vapours
Partners: Professor P.D. Burrow, University of Nebraska; Professor K. Bartschat, Drake University, USA

Project: Electron Molecule Scattering
Partner: Professor H. Tanaka, Sophia University, Japan

Professor L.T. Chadderton

Project: Phase Changes in Transition Metal Dichalcogenides due to GeV Heavy Ion, and MeV Fullerene Ion Bombardments - Transmission Electron Microscopy and Surface Force Microscopy
Partner: Dr A. Dunlop, SESI, École Polytechnique, Paliseaux, France

Project: Radiation Effects on Polymers; Semiconductors
Partner: Dr D. Fink, Hahn-Meitner Institute, Berlin

Project: Theory and Practice of Organic Radical Formation and Motion in GeV Ion Irradiated Polymers
Partner: Professor S.A. Cruz, Autonomous Metropolitan University of Mexico, Mexico

Project: (e,2e) Primary Current Electron Spectroscopy and Other Surface Technical Investigations of the Graphite/ Fullerene Radiation Induced Phase Change
Partner: P.B. Möller, Niels Bohr Institute, Copenhagen, Denmark

Professor R.W. Crompton and Dr K. Kumar (TP)

Project: Quantum Statistics and Boltzmann's Equation
Partners: Dr R.E. Robson, James Cook University; Professor M.A. Morrison, University of Oklahoma, USA

Dr A.S. Kheifets

Project: Convergent Close-Coupling Theory of Double Ionization by Photon and Electron Impact
Partner: Dr I. Bray, Flinders University of South Australia

Project: Electron Momentum Density Studies in Metals and Metal Oxides
Partner: Dr M. Ford, Flinders University of South Australia

Project: Electron Impact Double Ionization of the Helium Atom
Partner: Professor A. Lahmam-Bennani, University of Paris - Orsay

Project: Coincident Compton Scattering from Solids
Partner: Professor F. Bell, University of Munich

Project: Circular Dichroism in Atomic Double Photoionization
Partner: Professor A. Yagishita, Photon Factory, High Energy Accelerator Research Organization

Dr B.R. Lewis and Dr S.T. Gibson

Project: Photodissociation Quantum Yields
Partners: Dr J. Lacoursiere and Dr T.G. Slanger, SRI International, Menlo Park, California, USA

Project: Multiphoton Excitation of Coupled Molecular States
Partners: Dr R.A. Copeland and Dr C.G. Bressler, SRI International, Menlo Park, California, USA

Project: Calculations of Transition Strength
Partners: Dr T.G. Slanger and Dr. D.L. Huestis, SRI International, Menlo Park, California, USA

Project: Rydberg-Valence Interactions
Partners: Professor M.L. Ginter, University of Maryland, USA; Dr J.S. Morrill, Naval Research Laboratory, Washington DC, USA

Project: High-Resolution Oscillator-Strength Measurements
Partner: Professor G. Stark, Wellesley College, Massachusetts, USA

Project: Anomalous Intensities in REMPI Spectra
Partners: Dr R.A. Copeland, Dr R. Robertson and Ms A. Tucay, SRI International, Menlo Park, California, USA

Project: Coupled-Channel Calculations for Atmospheric Photochemical Models
Partners: Dr L.W. Torop, Dr F.T. Hawes, University of Adelaide

Dr B.R. Lewis and Dr K.G.H. Baldwin (Laser Physics Centre)

Project: Development of Ultra-High Resolution VUV Laser Sources
Partner: Professor B.J. Orr, Macquarie University

Dr M. Vos

Project: Comparison of Modern Many-Body Theories with the Measured Energy-Resolved Momentum Densities of Aluminium
Partner: Dr B. Holm, Chambers University, Goteborg

Project: Electron Momentum Spectroscopy and (γ,eγ) Spectroscopy
Partner: Professor F. Bell, University of Munich, Germany

Professor E. Weigold, Dr A.S. Kheifets and Dr M. Vos

Project: Electron Momentum Spectroscopy of Solids
Partners: Professor I.E. McCarthy and Dr M. Ford, Flinders University

Professor E. Weigold and Dr J. Lower

Project: (e,2e) Processes with Polarized Electrons and Targets
Partners: Dr J. Berakdar, Max Planck Institut für Microstruktur Physik, Halle, Germany; Dr S. Mazevet, Los Alamos Laboratory, USA

Project: National Facility for Spin Polarisation Studies of Atoms and Molecules
Partner: Professor J.F. Williams, University of Western Australia

Professor E. Weigold

Project: Electron Momentum Spectroscopy of Atoms and Molecules
Partners: Dr M.J. Brunger and Professor I.E. McCarthy, Flinders University

Project: Electron Momentum Spectroscopy of Large Molecules
Partners: Professor I.E. McCarthy, Dr M.J. Brunger and Dr W. Adcock, Flinders University; Dr M.T. Michalewicz, CSIRO Division of Information Technology; Dr D. Winkler, CSIRO Division of Chemicals and Physics

Electronic Materials Engineering

Dr Y. Chen

Project: Synthesis of Carbon Nanotubes by Using High-Energy Ball Milling
Partner: Dr L. Chaffron, Section de Recherche de Metallurgie Physique, Saclay Research Center, France

Project: Mossbauer Analysis of Metal Catalysts for Nanotube Formation
Partner: Professor G. LE CARE, Ecole de mine de Nancy, Nancy, France

Project: Increased Dissolution of Ilmenite Induced by High-Energy Ball Milling
Partners: Professor S. Campbell and Dr G.M. Wang, Department of Physics, Australian Defense Force Academy

Project: Microscopy and Microanalysis of Nanotubes Produced by Mechano-Thermal Processes
Partners: Dr J. Zou and Mr S. Bulcock, Electron Microscopy Unit, College of Sciences and Technology, University of Sydney

Project: Solid State Formation of Carbon Nanotubes
Partner: Professor H.M. Cheng, Institute of Metal Research, Chinese Academy of Sciences, Shenyang, China

Dr R.G. Elliman

Project: Atomic Collision Processes Associated with High-Energy Heavy-Ions
Partners: Dr H. Whitlow and Dr Y. Zhang, Lund University, Sweden; Dr J. O'Connor, Newcastle University

Project: High-Energy Heavy-Ion Beam Analysis of Silicon Oxynitride Thin Films
Partners: Professor J. Davies, Chalk River, Canada; Dr S. Walker, Bosch

Project: Strain Relaxation Processes in Ion-Irradiated Ge-Si Alloys
Partners: Professor D.J.H. Cockayne and J. Zou, University of Sydney

Project: Nucleation and Growth of Amorphous Silicon During Ion-Irradiation
Partner: Dr R. Goldberg, Applied Materials, UK

Project: Electronic and Optical Properties of Nanocrystalline Semiconductors
Partner: Dr Suk-Ho Choi, Kyung Hee University, Korea

Project: Properties of Nanocrystalline Semiconductors and Ion-Beam Modification of Materials
Partner: Professor B. Striztker, University of Augsburg, Germany

Dr M. Petravic

Project: Electron and Photon Stimulated Desorption from Diamond Surfaces
Partners: Professor A. Hoffman, Technion, Israel; Dr G. Comtet, Dr L. Heffner and Dr G. Dujardin, Uni Paris-Sud, France

Project: Characterization of SIMS Standards
Partner: Dr D.W. Moon, KRISS, Korea

Dr M. Petravic and Mr P.N.K. Deenapanray

Project: Photoemission and Photodesorption Spectroscopy of GaAs Surfaces
Partners: Dr G. Comtet, Dr L. Hellner and Dr G. Dujardin, Uni-Paris-Sud, France

Project: Angular Dependence of Depth Resolution in SIMS Analysis
Partners: Dr D.W. Moon, KRISS, Korea; Professor Demanet, University of Transkee, South Africa

Mr P.N.K. Deenapanray and Dr M. Petravic

Project: As Diffusion in Ge
Partners: Dr J. Likonen, Technical Research Center of Finland; Dr T. Ahlgren, University of Helsinki, Finland

Project: Photoemission Study of Oxidised and Nitridated Semiconductor Surfaces
Partners: Dr B. Gong and Professor R.N. Lamb, University of New South Wales

Dr M.C. Ridgway

Project: Electrical Characterisation of Ion-Implanted Semiconductors
Partners: Professor F.D. Auret, Professor S.A. Goodman and Dr G. Myburg, University of Pretoria, South Africa

Project: Implantation-Induced Phenomena in Optoelectronic Materials
Partners: Dr P.W. Leech, CSIRO; Dr V. Gurarie, University of Melbourne

Project: Doping of SiC by Ion Implantation
Partner: Professor M. Rao, George Mason University, USA

Dr M.C. Ridgway and Mr C.J. Glover

Project: EXAFS Measurements of Implantation-Induced Disorder in Semiconductors
Partners: Dr K.M. Yu, Lawrence Berkeley National Laboratory, USA; Dr G. Foran, Photon Factory, Japan

Project: EXAFS Characterisation of Implantation-Induced Disorder in Ge and Ge_xSi_{1-x} Alloys
Partners: Dr A. Nylandsted-Larsen and Dr J. Hansen, Aarhus University, Denmark

Dr M.C. Ridgway, Mr C.J. Glover and Dr A.P. Byrne (Nuclear Physics)

Project: Perturbed Angular Correlation Measurements of Implantation-Induced Disorder in Semiconductors
Partner: Dr R. Vianden, Universitat Bonn, Germany

Dr M.C. Ridgway, Professor J.S. Williams and Mr X. Zhu

Project: Transmission Electron Microscopy of Implantation-Induced Amorphisation in Semiconductors
Partners: Dr H. Bernas, Dr F. Fortuna and Dr M-O. Ruault, Centre National de Recherche Scientifique, Orsay, France

Dr H.H. Tan, Dr Z. Chen, Ms L. Fu, Mr M.I. Cohen, Ms C. Lobo, Mr P.N.K. Deenapanray, Ms C. Carmody and Professor C. Jagadish,

Project: Optical Spectroscopy of Semiconductor Quantum Structures and Devices
Partners: Mr M.B. Johnston, Dr L.V. Dao and Professor M. Gal, University of New South Wales

Ms L. Fu, Dr H.H. Tan and Professor C. Jagadish

Project: Fabrication and Characterization of Quantum Well Infrared Photodetectors
Partners: Mr M.B. Johnston and Professor M. Gal, University of New South Wales

Dr H.H. Tan, Mr M.I. Cohen, Ms. L. Fu and Professor C. Jagadish

Project: Design, Fabrication and Testing of High Power and Multi-Wavelength Lasers
Partners: Dr Fouad Karouta, Ms. M. Buda and Mr G. Iordache, Eindhoven University of Technology, The Netherlands

Professor C. Jagadish, Dr H.H. Tan and Ms. L. Fu

Project: Optical Spectroscopy Studies on Semiconductor Quantum Wires and Dots
Partners: Professor S.C. Shen, Professor Wei Lu, Dr Xingquan Liu, Dr Li Na, Dr Z. Chen, Mr Li Ning, Dr Yong Chang and Ms. H.F. Dou, Shanghai Institute of Technical Physics, Chinese Academy of Sciences

Dr H.H. Tan and Professor C. Jagadish

Project: Implantation Induced Quantum Well Intermixing in GaAs/AlGaAs Heterostructures
Partners: Professor I.V. Mitchell and Dr R.D. Goldberg, University of Western Ontario

Project: Development of Indigenous Photodetectors for Wideband Photonic RF Links
Partners: Dr Tony Lindsay, Defence Science and Technology Organisation; Professor M.W. Austin, Royal Melbourne Institute of Technology; I. Will and A. Hart, Vision Abell

Dr H.H. Tan, Professor C. Jagadish; Dr M.J. Lederer and Professor B. Luther-Davies (LPC)

Project: Passive Mode-Locking of Solid State Lasers Using Semiconductor Saturable Absorbers
Partners: M. Haiml, Dr U. Seigner and Professor U. Keller, ETH-Zurich

Professor C. Jagadish and Dr H.H. Tan

Project: Electrical, Optical and Structural Properties of Non-Stoichiometric GaAs
Partner: Professor M. Kaminska, Warsaw University, Poland

Project: Ultrafast Optical Spectroscopy Studies of Non-Stoichiometric GaAs
Partners: Professor A. Krotkus, Semiconductor Physics Institute, Vilnius, Lithuania; Dr S. Marcinkevicius, Royal Institute of Technology, Stockholm, Sweden

Project: Reactive Ion Etching of GaN Epitaxial Layers
Partner: Dr G. Li, Ledex Corporation, Taiwan

Dr J. Wong-Leung, Dr H.H. Tan, Mrs S. Fatima, Professor C. Jagadish and Professor J.S. Williams

Project: Electron Microscopy Study of Defects in Ion Implanted Semiconductors
Partners: Professor D.J.H. Cockayne, Dr J. Zou and Dr C.T. Chou, University of Sydney, Dr J. Fitz Gerald, Research School of Earth Sciences

Mrs S. Fatima and Professor C. Jagadish

Project: Study of MeV Ion Implanted Defect Generation in Silicon
Partner: Professor B.G. Svensson, Royal Institute of Technology, Kista-Stockholm, Sweden

Ms. C. Lobo, Dr H.H. Tan, Ms. L. Fu, Ms. C. Carmody and Professor C. Jagadish

Project: Electron Microscopy of Epitaxial Semiconductor Structures
Partners: Professor D.J.H. Cockayne, Dr J. Zou, J. Liao and D.Q. Cai, University of Sydney

Mr S.O. Kucheyev, Dr H.H. Tan, Professor C. Jagadish and Professor J.S. Williams

Project: Ion Implantation in Gallium Nitride
Partners: Professor J. Baranowski and Professor M. Kaminska, Warsaw University and Dr T. Suski, High Pressure Research Institute, Warsaw, Poland

P.N.K. Deenapanray, Ms. Lan Fu, M.I. Cohen, Dr H.H. Tan and Professor C. Jagadish

Project: Defects and Diffusion in III-V Compound Semiconductors
Partner: Professor R. Cohen, University of Utah, USA

Dr H.H. Tan, Dr S. Yuan, Ms. C. Lobo, Dr S.I. Kim and Professor C. Jagadish

Project: Cathodoluminescence Imaging of Quantum Wires and Dots
Partners: Dr M.R. Phillips and M.A. Stevens Kalceff, University of Technology Sydney

Professor C. Jagadish, Dr H.H. Tan and Ms. C. Lobo

Project: Electrical and Optical Characterization of Self-Assembled Quantum Dots
Partners: Dr A. Babinski, Dr A. Wysmolek, Mr T. Tomaszewicz and Professor J. Baranowski, Warsaw University, Poland

Dr H.H. Tan, Ms. L. Fu, Ms J. Hazel, Dr A. Uddin and Professor C. Jagadish

Project: Noise Characteristics of Semiconductor Lasers
Partners: Professor P. Edwards, Assoc.Professor W. Cheung and Dr G. French, Faculty of Information Science and Engineering, University of Canberra

Mr P.N.K. Deenapanray

Project: Processing Induced Defects in Si, Si_xGe_{1-x} and GaAs Studied by DLTS
Partner: Professor F.D. Auret, University of Pretoria, South Africa

Mr M.I. Cohen, Dr H.H. Tan and Professor C. Jagadish

Project: Novel Processing of Vertical Cavity Surface Emitting Lasers
Partners: Dr A. Allerman, Dr K. Choquette, Sandia National Labs; Dr A. Clark, Honeywell, Dallas

Professor C. Jagadish, Dr H.H. Tan, Ms. L. Fu, Mr S. Kucheyev and Professor J.S. Williams

Project: Processing of GaN Based Optolectronic Devices for Blue Light Emission
Partners: Dr A.G. Li, Mr T. Wu, Mr W-J. Chung and Mr C-H. Lin, Ledex Corporation, Taiwan

Mr S. Kucheyev, Professor J.S. Williams, Dr H.H. Tan and Professor C. Jagadish

Project: Cathodoluminescence and Environmental SEM Studies of Ion Implanted GaN
Partners: Mr M. Toth and Dr M. Phillips, University of Technology, Sydney

Ms C. Carmody, Dr H.H. Tan and Professor C. Jagadish

Project: Study of Self Assembled Monolayers of Organic Molecules on Semiconductor Surfaces
Partners: Dr V. Braach-Maksvytis, Dr B. Raguse and Dr G. Griffiths, CSIRO Telecommunications and Industrial Physics; Dr L.V. Dao and Professor M. Gal, University of New South Wales

Dr H. Timmers

Project: Compositional Ion Beam Analysis of YBCO Superconducting Films
Partners: Dr L. Wielunski and Dr C. Foley, CSIRO Telecommunications, Lindfield

Professor J.S. Williams, Mr M.J. Conway, Mr P.N.K. Deenapanray and Dr M. Petravic

Project: Implantation Processes and Defects in Silicon
Partners: Dr R.A. Brown, New Jersey Institute of Technology, USA; Dr D.J. Eaglesham, Lucent Technologies, Bell Lab, NJ, USA

Professor J.S. Williams and Mr M.J. Conway

Project: Implantation into Brittle Materials for Improved Thermal Shock Resistance
Partner: Dr V. Gurarie, School of Physics, University of Melbourne

Professor J.S. Williams

Project: Ion-Induced Epitaxy in Silicon
Partner: Dr A. Kinomura, Dr N. Fujii, Osaka National Research Institute, Japan

Professor J.S. Williams and Dr R.G. Elliman

Project: Ion Implantation of Silicon
Partner: Dr R.G. Goldberg, University of Salford, UK

Professor J.S. Williams, Dr M. Petravic, Mr M.J. Conway and Dr J. Wong-Leung

Project: Gettering of Metals to Defect on Si
Partner: Dr A. Kinomura, Dept of Material Physics, Osaka National Research Institute, Japan

Professor J.S. Williams, Professor C. Jagadish, Dr H.H. Tan and Mr. S.O. Kucheyev

Project: Implantation Processing of GaN Layers
Partner: Professor S. Pearton, University of Florida, USA

Professor J.S. Williams and Mr X. Zhu

Project: Ion-Induced Phase Transformations in Silicon
Partner: Dr J.C. McCallum, University of Melbourne

Professor J.S. Williams and Mr M.J. Conway

Project: Ion Beam Induced Epitaxy Under Channeling Conditions
Partner: Dr M. Posselt, Institute for Ion Beam Physics and Materials Research, FZR, Dresden, Germany

Mr X.F. Zhu and Professor J.S. Williams

Project: Novel Physical Properties of Nanocavities in Silicon
Partner: Professor W. Liu, Shanghai Institute of Technical Physics, Chinese Academy of Sciences

Project: Novel Properties of Nanostructured Silver
Partners: Professor L.D. Zhang, Institute of Solid State Physics, Chinese Academy of Sciences; Professor X.J. Wu, Shejiang University, China

Laser Physics Centre

Dr K.G.H. Baldwin & Dr M.D. Hoogerland (Atomic and Molecular Physics Laboratories)

Project: Ultracold Atomic Collisions
Partner: Dr I. Whittingham, James Cook University

Project: Measurement of He 1s–2s Transition
Partners: Dr T. Lucatorto, NIST, Maryland, USA; Professor T.J. McIlrath, University of Maryland, USA; Professor E. Eyler, University of Conneticut, USA

Dr R. Charters

Project: Laser Written Ormosil Waveguide Components
Partners: Professor Y. Moreau and Dr P. Coudray, University of Montpellier, France

Dr W. Krolikowski

Project: Incoherent Solitons
Partner: Dr O. Bang, Technical University Denmark, Copenhagen, Denmark

Project: Dynamics of Soliton Interaction in Photorefractive Media
Partners: Professor T. Tschudi and Dr C. Denz, Technical University of Darmstadt, Darmstadt, Germany

Project: Screening Solitons in Photorefractive Waveguides
Partner: Dr A. Bledowski, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland

Dr M. Lederer

Project: Ultrafast Nonlinear Optical Absorption in Ion-implanted GaAs
Partners: Mr M. Haiml, Dr U. Siegner and Professor U. Keller, Institute of Quantumelectronics, Swiss Federal Institute of Technology, ETH Zuerich

Professor B. Luther-Davies, Dr A.V. Rode and Dr M. Samoc

Project: Light Induced Structural Phase Transitions in Confining Gallium Films Produced by Ultrafast Laser Ablation and their Optoelectronic Applications
Partner: Dr N.I. Zheludev, Department of Physics and Astronomy, University of Southampton, UK

Dr N.B. Manson

Project: Off-Centre Ions
Partners: Dr H. Reisen, Department of Chemistry, UNSW-ADFA; Mr V. Bursian, A.F. Ioffe, Physico-Technical Institute, Academy of Sciences, Russia

Dr N.B. Manson, Dr J.P.D. Martin and Dr M.J. Sellars

Project: Phase Sensitive Raman Heterodyne Detection
Partner: Professor D. Suiter and Mr R. Neuhaus, Universität Dortmund, Germany

Dr A.V. Rode

Project: Electron-Energy Loss Spectra of Carbon Nano-Foam Produced by Ultrafast Laser Ablation
Partner: Professor D.R. MacKenzie, School of Physics, University of Sydney, NSW, Australia

Dr A.V. Rode and Professor B. Luther-Davies

Project: Ultrafast Laser Ablation and Deposition of Thin Films
Partner: Professor E.G. Gamaly, Departamento de Fisica, Universidad Autonoma Metropolitana - Iztapalapa, Mexico (until August), Department of Applied Mathematics, RSPhysSE, ANU (from August).

Dr A. Samoc, Dr M. Samoc and Professor B. Luther-Davies

Project: Nonlinear Optical Properties of Substituted Poly(phenylenevinylenes)
Partner: Professor H.-H. Hoerhold, University of Jena, Germany

Dr A. Samoc, Dr M. Samoc, Professor B. Luther-Davies and Dr R. Charters

Project: Novel Ormosil Materials for Photonics
Partner: Dr G. Atkins, OFTC, University of Sydney

Dr M. Samoc, Dr A. Samoc and Professor B. Luther-Davies

Project: NLO Properties of Poly(indenofluorene)
Partner: Dr U. Scherf, Max-Planck-Institut, Mainz, Germany

Nuclear Physics

Dr A.P. Byrne

Project: Development of an Ion Implanter for Radioisotopes
Partner: Associate Professor D.H. Chaplin, University College, ADFA, UNSW

Project: Hyperfine Interaction Studies of Semiconductor Materials
Partner: Dr R. Vianden, ISKP, University of Bonn, Germany

Project: Production of Isotopes for Cancer Therapy
Partners: Professor B. Allen and Dr G. Goozee, St. George Cancer Care Centre, NSW

Dr A.P. Byrne and Professor G.D. Dracoulis

Project: Spectroscopy of Neutron Rich Nuclei Near and Above ^{208}Pb Studied using Deep Inelastic Reactions
Partners: Dr G.J. Lane, Lawrence Berkeley Laboratory, California, USA; Professor R. Broda, INP, Krakow, Poland; Dr R.V.F. Janssens, Argonne National Laboratory, Illinois, USA

Dr A.P. Byrne, Dr A.M. Baxter (The Faculties) and Professor G.D. Dracoulis

Project: Spectroscopy of Neutron Deficient Lead and Thallium Nuclei
Partner: Professor R. Julin, University of Jyvaskyla, Finland

Dr R.G. Cresswell

Project: Environmental Isotopes in Arid Zone Groundwaters
Partners: Dr G. Jacobson and Dr S. Hostetler, Bureau of Rural Sciences; Dr D. Hilton, UC San Diego; Dr A. Herczeg, CSIRO Land and Water

Dr R.G. Cresswell and Dr L.K. Fifield

Project: Measuring Groundwater Flow in Fractured Rocks in the Clare Valley, South Australia
Partners: Dr P. Cook, Dr A. Herczeg and Dr F. Leaney, CSIRO Land and Water (Adelaide)

Project: Groundwater Flow and Recharge Processes on the Western Margin of the Great Artesian Basin
Partner: Dr A. Love, South Australian Department of Primary Industry and Resources

Project: Sustainability of Groundwater Supplies in Central Australia and Nepal
Partner: Dr G. Jacobsen, AGSO

Project: Hydrochemistry of the Main Artesian Aquifer in the Great Artesian Basin
Partners: Dr B. Radke, Dr J. Ferguson, Dr M.A. Habermehl and Dr T. Ransley, Bureau of Rural Sciences

Dr M. Dasgupta, Dr D.J. Hinde, Dr C.R. Morton, R.D. Butt and A.C. Berriman

Project: Fusion of Light Ions with Heavy Nuclei Near the Fusion Barrier
Partners: Professor P.R.S. Gomes, University of Fluminense, Niterói, Brazil; Professor A. Szanto de Toledo, University of Sao Paolo, Brazil

Dr M. Dasgupta, Dr D.J. Hinde and Dr C.R. Morton

Project: Influence of Projectile Breakup on Fusion
Partner: Dr K. Hagino, University of Washington, Seattle, USA

Dr M. Dasgupta and Dr D.J. Hinde

Project: Applications of Fusion Barrier Distributions
Partner: Professor N. Rowley, Institut de Recherches Subatomiques, Strasbourg, France

Dr M. Dasgupta, Dr D.J. Hinde and Dr C.R. Morton

Project: All-order Coupled Channels Calculations
Partner: Professor I. J. Thompson, University of Surrey, Guildford, UK

Professor G.D. Dracoulis

Project: High-K Isomers
Partners: Professor P.M. Walker, University of Surrey, UK; Dr D.M. Cullen, University of Liverpool, UK

Project: High-K Isomers in Hafnium
Partners: Dr F.G. Kondev and Dr. R. Janssens, Argonne National Laboratory, USA

Project: Spectroscopy of Very Heavy Nuclei
Partners: Professor J.F. Sharpey-Schafer, National Accelerator Centre, South Africa; Professor P.A. Butler, University of Liverpool, UK

Professor G.D. Dracoulis and Dr A.P. Byrne

Project: Spectroscopy of Heavy Nuclei
Partner: Professor A.R. Poletti, University of Auckland, NZ

Dr L.K. Fifield, Dr R.G. Cresswell and Dr P.A. Hausladen

Project: Uptake and Long-Term Retention of ^{99}Tc in Humans
Partner: Dr J.P. Day, Manchester University, UK

Project: Tracing Releases of Plutonium from the Mayak Production Plant, Southern Urals, Russia
Partner: Dr D. Oughton, Agricultural University of Norway

Project: Measurements of ^{59}Ni, ^{36}Cl and ^{41}Ca in Fragments of the Canyon Diablo Meteorite
Partner: Professor G. Herzog, Rutgers University, New Brunswick, New Jersey, USA

Dr L.K. Fifield and Dr R.G. Cresswell

Project: Uptake by Humans of Plutonium
Partner: Professor N.D. Priest, Middlesex University, UK

Project: Long-Term Retention and Excretion of Plutonium by the Human Female
Partners: Dr D. Newton and Dr R.J. Talbot, AEA Technology, Harwell, UK

Project: Hydrogeological Studies of Clay Aquifers in North-West Europe using ^{36}Cl
Partner: Dr J.-L. Michelot, Universite de Paris Sud, Orsay, France

Project: Retreat Rate of the Drakensberg Escarpment, SE Africa, Using ^{36}Cl Produced *In Situ*
Partner: Professor M. Summerfield, University of Edinburgh, Scotland

Project: Dating of Ice in Temperate-Region Glaciers with ^{32}Si
Partners: Dr U. Morgenstern and Dr A. Zondevan, Geological and Nuclear Sciences, Lower Hutt, New Zealand

Project: The History of Fires in the Amazon during the Holocene
Partners: Professor P.R. Gomes and Dr G. dos Santos, Universidade Federal Fluminense, Niterói, Brazil

Professor T.R. Ophel and Dr H. Timmers

Project: Heavy Ion Detection with Thin Si-Detectors
Partners: Dr R.G. Elliman, EME; Dr H. Whitlow and Y. Zhang, Lund Institute of Technology, Lund, Sweden

Project: Evaluation of the Efficacy of NRA and ERD in the Characterization on SiON Films
Partners: Dr R.G. Elliman, EME; S. Walker, McMaster University, Ontario, Canada

Project: Hydrogen Detection with Heavy Ion ERD
Partners: Dr R.G. Elliman, EME; L. Wielunski, CSIRO Telecommunications and Industrial Physics, Lindfield, NSW

Dr A.E. Stuchbery

Project: Triaxial Rotor Model and U(6/20) Supersymmetry Descriptions of ^{191}Ir and ^{193}Ir
Partners: Dr S. Kuyucak, Department of Theoretical Physics, ANU; Dr P. Van Isacker, GANIL, France; Dr E. Bezakova, Royal Adelaide Hospital

Project: Measurement of Nuclear g-Factors and Investigation of Transient Magnetic Fields
Partner: Professor H.H. Bolotin, University of Melbourne

Project: Nuclear Moments and Structure Changes in Exotic Nuclei
Partner: Dr P.F. Mantica, Michigan State University, USA

Project: Nuclear Structure through Measurements of g-Factors in even Xe Isotopes by Projectile Excitation
Partners: Professor N. Benczer-Koller, Rutgers University, USA; Professor K.-H. Speidel, University of Bonn, Germany; Dr A. Aprahamian, Notre Dame, USA; Dr A Macchiavelli, Lawrence Berkeley Laboratory, USA

Project: In-Beam Studies of Local Magnetism using Recoil Implantation
Partners: Dr A.A. Tulapurkar and Dr S.N. Mishra, Tata Institute, India

Dr H. Timmers

Project: Compositional Ion Beam Analysis of YBCO Superconducting Films
Partners: L. Wielunski and C. Foley, CSIRO Telecommunications, Lindfield

Optical Sciences Centre

Dr N. Akhmediev

Project: Observation of Polarization-Locked Vector Solitons in an Optical Fiber
Partners: Dr S.T. Cundiff, University of Colorado, USA; Drs B.C. Collings and W.H. Knox, Lucent Technologies, USA; Dr J.M. Soto-Crespo, Instituto de Optica, Spain; Dr K. Bergman, Princeton University, USA

Project: Asymmetric Partially Coherent Solitons in Saturable Nonlinear Media
Partners: Dr W. Krolikowski, Laser Physics Centre, ANU; Dr N.M. Litchinitser and Professor G.P Agrawal, The Institute of Optics and Rochester Theory Center of Optical Science and Engineering, University of Rochester, USA

Project: Dynamics of Quadratic Soliton Excitation
Partners: Dr D. Artigas and Dr L. Torner, Polytechnic University of Catalonia, Spain

Project: Multisoliton Regime of Pulse Generation by Lasers Passively Mode-Locked with a Slow Saturable Absorber
Partners: Dr J.M. Soto-Crespo, Instituto de Optica, Spain

Project: Multi-Pulse Operation of a Ti: Sapphire Laser Mode-Locked by an Ion-Implanted Semiconductor Saturable Absorber Mirror
Partners: Professor B. Luther-Davies and Dr M.J. Lederer, Laser Physics Centre, Drs H.H. Tan and C. Jagadish, Electronics Materials Engineering, ANU; Dr J.M. Soto-Crespo, Instituto de Optica, Spain

Project: Multi-Component Pulse Generation and Propagation in Optical Fibers
Partner: Dr G. Town, University of Sydney

Project: Multilevel Soliton OTDM Dense Wavelength Division Multiplexing Ultra-High Bandwidth Transmission System
Partners: Professor P. Chu, University of New South Wales; Professor M. Ablowitz, and Dr. S. Chakravarty, University of Colorado, USA; Professor W. Song, Shanghai Jiaotong University China

Drs N. Akhmediev and A. Ankiewicz

Project: Hamiltonian versus Energy Diagrams in Soliton Theory
Partner: Professor R. Grimshaw, Monash University

Project: New Approach to Stability of 2D Beams in Nonlinear Media
Partner: Professor P. Chu, University of New South Wales

Dr A. Ankiewicz

Project: Annealing Properties of HC-PECVD Germanosilica and their Application to Device Post-Tuning
Partner: Drs M. Bazylenko and B. Wu, University of New South Wales

Drs A. Ankiewicz and N. Akhmediev

Project: Singularity Analysis, Balance Equations and Soliton Solution of Nonlocal Complex Ginzburg-Landau Equation
Partner: Professor P. Winternitz, University of Montreal, Canada

Professor Yu.S. Kivshar

Project: Parametric Wave Interactions and Parametric Solitons
Partners: Professor R. Sammut and Dr A. Buryak, Australian Defence Force Academy, University College, University of New South Wales

Project: Soliton Stability in Discrete Models
Partner: Dr M. Johansson, The Swedish National Academy of Sciences, Sweden

Project: Kink Dynamics in Discrete Lattices
Partner: Dr A. Champneys, Department of Engineering Mathematics, University of Bristol, Bristol, UK

Project: Dynamics of Magnetic Solitons in Thin Films
Partners: Professor A. Slavin, Department of Physics, Oakland University, USA; Professor H. Benner, Darmstadt Technical University, Darmstadt, Germany

Project: Parametric Solitons in QPM Superlattices
Partners: Dr Ole Bang and Professor P.L. Christiansen, Technical University of Denmark, Lyngby, Denmark

Project: Multistep Cascading and Multicolour Solitons
Partner: Professor S. Saltiel, Department of Physics, University of Sofia, Sofia, Bulgaria

Project: Stability of the Bose-Einstein Condensates with Attractive Interaction
Partner: Dr L. Berge, Commissariat a L'Energie, France

Professor Yu.S. Kivshar and Dr E.A. Ostrovskaya

Project: Bose-Einstein Condensation
Partners: Professors D. Anderson and M. Lisak, Department of Electromagnetic Theory, Chalmers Technical University, Goetheborg, Sweden

Project: Interaction of Vector Solitons
Partners: Dr Zhigang Chen, San Francisco State University, San Francisco, USA; Professor M. Segev, Department of Electrical Engineering, Princeton University, USA

Project: Multidimensional Vector Solitons
Partners: Professors D. Anderson and M. Lisak, Department of Electromagnetic Theory, Chalmers Technical University, Goetheborg, Sweden

Project: Instability of Multidimensional Vector Solitons
Partners: Professor V. Perez-Garcia and Mr Garcia-Ripoll, Departamento de Matematicas, Universidad de Castilla-La Manch, Spain

Professor J.D. Love

Project: Planar Lightwave Circuits Program
Partners: University of New South Wales; RMIT University; Melbourne; University of Sydney; Royal Institute of Technology, Stockholm; Ericsson Australia Pty Ltd

Project: Add/Drop Optical Wavelength Filters
Partner: OFT Associates, USA; Department of Communications, Canada

Project: Characterisation of Optical Fibre Couplers
Partner: AOFR Pty Ltd; University of Melbourne

Plasma Research Laboratory

Dr B.D. Blackwell and Dr J. Howard

Project: Soft X-ray Measurements on H-1NF
Partner: Associate Professor A.D. Cheetham, University of Canberra

Dr G.G. Borg, Dr I.V. Kamenski and Dr D.G. Miljak

Project: RF Plasma Wave Studies in H-1NF
Partner: Dr T. Seki, National Institute for Fusion Science, Japan

Dr G.G. Borg and Professor J.H. Harris

Project: Plasma Antenna Concept Device
Partner: Dr. N.M. Martin, Defence, Science and Technology Organisation

Professor R.W. Boswell and SP[3] Group

Project: Stereo Digital Video
Partner: Compucat

Project: HARE
Partners: Professor D. MacKenzie, Dr B. James and Dr I. Falconer, University of Sydney

Project: Etching of Si/Ge Films
Partner: Professor G. Turban, University of Nantes, France

Project: Plasma Deposition of Palladium
Partner: Dr P. Brault, University of Orleans, France

Dr J. Howard

Project: Phase Sensitivity Polarimetry for Measurement of Plasma Density and Finite Pressure Effects in Torastron CHS
Partner: Dr K. Tanaka, National Institute for Fusion Science, Japan

Project: Fibre Optic Probes for Plasma Diagnostics
Partners: Mr V. Everett and Professor G. Woolsey, University of New England

Project: Measurement of Electric Field in H-1NF Using Laser Induced Fluorescence Techniques
Partners: Dr B. Zhang and Associate Professor B.W. James, University of Sydney

Project: Current Profile Diagnostics for NSTX
Partner: Professor R. Katia, Princeton Plasma Physics Laboratory, USA

Dr M.G. Shats

Project: Electron Cyclotron Heating of Plasma in Stellarators
Partner: Dr K. Nagasaki, Kyoto University, Japan

Project: High Confinement Studies in Stellarators
Partner: Professor K. Toi, National Institute for Fusion Science, Japan

Project: Development of a Quasi-Optical Transmission Line for a High-Power Microwave Gyrotron
Partner: Professor M. Sato, National Institute for Fusion Science, Nagoya, Japan

Project: Application of Novel Signal Analysis Techniques to the Plasma Turbulence
Partner: Dr X.H. Shi, Central Queensland University

Dr T.E. Sheridan

Project: Simulations of Sheath Dynamics during Plasma-Based Ion Implantation
Partner: Professor P.K. Chu, City University of Hong Kong

Project: Modelling the Launching, Propagation and Interaction of Ion-Acoustic Solitons
Partner: Professor K.E. Lonngren, University of Iowa, USA

Theoretical Physics

Dr M.P. Das

Project: Electron Correlation and Metal-Insulator Transition
Partner: Professor D. Neilson, University of New South Wales

Project: Fluctuations in Mesoscopic Systems
Partner: Dr F. Green, CSIRO, Sydney

Project: Magnetic Properties of High-T_c Superconductors
Partner: Professor S.X. Dou, University of Wollongong

Project: Electronic Structure of Metallic Oxides
Partner: Dr K. Kokko, University of Turku, Finland

Professor R.L. Dewar

Project: Text on Fluid and Plasma Dynamics
Partner: Professor R.J. Hosking, University of Brunei

Project: Fermi Acceleration in ECR Plasmas
Partner: Dr C.I. Ciubotariu, University of Lethbridge, Canada

Project: Implementation of Quadratic-Flux Minimising Curves in the PIES Code
Partners: Dr S.R. Hudson, University of Wisconsin, USA; Dr D.A. Monticello,PPPL, Princeton, NJ, USA

Dr H.J. Gardner

Project: Resistive Magnetohydrodynamic Spectra for Tokamak and Stellarator Plasmas
Partner: Professor R.G. Storer, School of Chemistry, Physics and EarthSciences, The Flinders University of South Australia

Dr M. Gulacsi

Project: Impurity Effects in Mesoscopic Systems
Partners: Professor A. Rosengren and Mr A. Juozapavicius, Royal Institute of Technology (KTH), Stockholm, Sweden; Dr S. Caprara, University of Rome, Italy

Project: Effects of Phonons on Magnetic Impurities
Partners: Dr A.R. Bishop, Los Alamos National Laboratory, USA; Dr A. Bussmann-Holder, Max-Planck Institut, Stuttgart, German; Dr G. Honner, Ben-Gurion University, Israel

Project: Cluster Formation in Random Spin Systems
Partner: Professor Zs. Gulacsi, University of Debrecen, Hungary

Project: Metal-Insulator Transition in Strongly Correlated Electron Systems.
Partners: Professor K.S. Bedell, Boston College; Dr J. Gubernatis, Los Alamos National Laboratory, USA

Dr A.S. Kheifets

Project: Convergent Close-Coupling Theory of Double Ionisation by Photon and Electron Impact
Partner: Dr I. Bray, Flinders University of South Australia

Project: Electron Momentum Density Studies in Metals and Metal Oxides
Partner: Dr M. Ford, Flinders University of South Australia

Project: Electron Impact Double Ionisation of the Helium Atom
Partner: Professor A. Lahmam-Bennani, University of Paris – Orsay

Project: Coincident Compton Scattering from Solids
Partner: Professor F. Bell, University of Munich

Project: Circular Dichroism in Atomic Double Photoionisation
Partner: Professor A. Yagishita, Photon Factory, High Energy Accelerator Research Organization

Dr S.Y. Kun

Project: Spontaneous Coherence and Nonequilibrium Phase Transitions in Complex Microscopic and Mesoscopic Systems
Partner: Professor H.A. Weidenmüller, Max-Planck Institute for Nuclear Research, Heidelberg, Germany

Project: Macroscopic Schrödinger-Cat States in Complex Many-Body Quantum Systems
Partners: Dr A.V. Vagov, University of Western Australia; Dr O.K. Vorov, University of Sao Paulo, Brazil

Dr S.Y. Kun and Dr B.A. Robson

Project: Spontaneous Clustering and Slow Decoherence in Highly Excited Complex Quantum Systems
Partner: Dr A.V. Vagov, University of Western Australia

Dr S. Kuyucak

Project: Magnetic Dipole Properties in Collective Nuclei
Partner: Professor B.R. Barrett, University of Arizona

Mr I. McCulloch

Project: Strongly Correlated Electron Systems and Density Matrix Renormalization Group Methods
Partner: Professor A. Rosengren, Department of Physics/ Theoretical Physics, Royal Institute of Technology (KTH), Stockholm, Sweden

Dr B.A. Robson

Project: Fission and Fusion Reactions
Partner: Professor G. Do Dang, Université de Paris Sud, France

Project: Antiproton Scattering
Partner: Professor Zhang Yu-shun, Institute of High Energy Physics, Academia Sinica, Beijing, PR China

Dr S. Scott

Project: Gravitational Wave Data Analysis

Partners: Professor D. McClelland, ANU; Professor B. Whiting, University of Florida, USA (There is a Memorandum of Understanding with LIGO for this Project)

Dr W.S. Woolcock

Project: Electromagnetic Corrections to Hadronic Processes
Partners: A. Gashi , Dr E. Matsinos and Professor G. Rasche, University of Zürich, Switzerland; Professor G.C. Oades, University of Aarhus, Denmark

Collaborative Agreements and MoU

International Collaborative Agreements

The School holds 37 international collaborative/cooperative agreements and/or memorandums of understanding with the following institutions and organisations:

- Samsung Electronics Co. Ltd, Korea
- Shanghai Institute of Technical Physics (SITP), Chinese Academy of Sciences
- The Physics Department, University of Pretoria
- Institute of Advanced Energy, Kyoto, Japan
- Tsinghua University, Beijing, China
- The European Union-Australia Science & Technology Agreement, DIST
- Deutscher Akademischer Austauschdienst (DAAD) Exchange Service
- ANU-Engineering & Physical Sciences Research Council Agreement (ANU-EPSRC), UK (The ANU-EPSRC agreement in effect covers a range of UK universities)
- Beijing University, China
- National Institute for Fusion Science, Nagoya, Japan
- Lockheed Martin Energy Research Corporation, Oak Ridge National Laboratory, USA
- L'Ecole Polytechnique, Paris, France
- Royal Institute of Technology, Stockholm
- Ericsson Components AB, Stockholm
- British Telecom Laboratories, UK
- Cambridge University, UK
- Telecom Korea, Seoul
- OFT Associates, USA
- Department of Communications, Ottawa
- ATLAS Accelerator Facility, Argonne National Laboratory, USA
- Physics Division, Lawrence Berkeley Laboratory, USA
- HHRIF, Oak Ridge National Laboratory, USA
- Physics Department, University of Jyvaskyla, Finland
- National Accelerator Facility and FRD, South Africa
- GANIL IN2P3, France
- Hahn-Meitner Institute, Berlin, Germany
- RCNP, Osaka, Japan
- Institute of Nuclear Physics, Leuven, Belgium
- Ericsson Fibre Optic Research Centre, Stockholm
- British Telecom Research Laboratories, UK
- Bell Laboratories, USA
- Lucent Technologies (an offshoot of Bell Labs)
- Princeton Plasma Physics Laboratory, Princeton University, USA
- Stanford Linear Accelerator Center, Stanford Sychrotron Radiation Laboratory, USA
- Institute of Mathematics Modelling, Technical University of Denmark
- COBRA Inter-Universiy Research Institute on Communication Technology, Eindhoven UTech, The Netherlands
- National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, RPC

National Collaborative Agreements from 1994

The School holds 28 national collaborative agreements under the IAS/ Other Australian University Collaboration Scheme and has various independent agreements with Australian industries:

- Royal Melbourne Institute of Technology
- Macquarie University
- La Trobe University
- University of Newcastle
- The University of Canberra
- The University Wollongong
- University Queensland
- The University of South Australia
- Griffith University
- Curtin University of Technology, Western Australia
- University of New England
- University College, Canberra, University of New South Wales
- Monash University, Victoria
- James Cook University, Queensland
- University of Melbourne
- University of New South Wales
- The University Sydney
- Central Queensland University
- Flinders University of South Australia
- University of Western Australia
- Faculty of Business and Technology, University of Western Sydney
- AGEN Pty Ltd
- Ericsson Australia Pty Ltd, Melbourne
- AOFR Pty Ltd, Fyshwick, ACT
- Siemens Ltd, Sydney
- Photonic Technologies Pty Ltd, Sydney
- Hypatia Analytic Thought Pty Ltd, Melbourne
- The Powerhouse, Museum of Applied Arts & Sciences, Sydney

Outside Grants and Contracts

In 1999, the School's annual recurrent grant of $13.7m was supplemented by additional income from the University's Major Equipment Committee's funds ($700k), the Performance and Planning Fund ($1m), from full fee paying students ($101k) and by a significant number of outside grants from a variety of sources. These grants, which are shown below, reflect the School's income opportunities and some of its collaborative activities.

Applied Mathematics

ANSTO
Dr W. Kaczmarek
XRD and XAFS Study of Cobalt Doped Nanocrystalline
February 1999 $4180

DETYA (Australian Research Council)
Dr V.S. Craig
Australian Postdoctoral Research Fellowship
February 1999 to February 2002 $177,009

Dr T.J. Senden
Australian Postdoctoral Research Fellowship
March 1997 to March 2000 $181,302

Dr D.R.M. Williams
Queen Elizabeth II Research Fellowship
October 1994 to September 1999 (transferred to Faculties July 1998) $330,200

IREX Award
Dr M.A. Knackstedt
Travel Grant
(with W.B. Lindquist, SUNY Stony Brook USA) $5,000

KAO, Tokyo Research Centre - Training Contract
Professor S.T. Hyde
Visiting Fellow - Dr S. Watanabe: Counter-ion Specificity of Cationic Surfactants in Aqueous Solutions
November 1998 to November 1999 $41,720

Proctor and Gamble Company
Professors J.S. Williams and S.T. Hyde
Ball Milling of Oxide Pigments
January 1999 to February 1999
(Held jointly with Department of Electronic Materials Engineering) USD$7,000

University of New South Wales
Dr M.A. Knackstedt
January 1998 – onwards $20,000

Atomic and Molecular Physics Laboratories

CSIRO
Professor L. Chadderton
Swift Ions Project
August 1998 to August 2003 $150,000

DETYA (Australian Research Council)
Dr R.J. Gulley
Australian Postdoctoral Research Fellowship
March 1998 to February 2001 $164,000

Dr D.R.A. Lun
Australian Postdoctoral Research Fellowship
January 1997 to January 2000 $178,263

Professor H. Cho
International Research Fellow
June 1999 to May 2000 $97278

Dr M. Vos
Queen Elizabeth II Research Fellowship
November 1996 to June 2001 $308,216

DETYA (ARC Large Research Grants)
Dr B.R. Lewis and Dr S.T. Gibson
Development of an Innovative Quantum-mechanical Mode for the Interaction of Solar Vacuum Ultrviolet Radiation with the Earth's Atmosphere
January 1998 to December 1999 $133,000
(Held jointly with Adelaide University)

DETYA (Research Infrastructure Equipment & Facilities - RIEF)
Professor S.J. Buckman
National Facility for Collision Studies of Molecules and Radicals of Technological Interest
January 1999 to December 1999 $280,000
(Held jointly with Flinders University)

DISR
Dr B. Lewis
13th International Conference on Vacuum Ultraviolet Radiation Physics
January 1998 to August 2001 $4,955

Japan Society for the Promotion of Science
Professor S.J. Buckman
Visiting Fellowship $10,000

Science and Technology Agency of Japan (STA)
Dr. A. Kheifets
Visiting Fellowship
June 1999 to July 1999 $14,571

Electronic Materials Engineering

ANSTO
Dr M. Ridgway
EXAFS Characterisation of Implantation-Induced Disorder in Compound Semiconductors
January 1999 to June 1999 $10,130

AUSAID (IDP Education Australia)
Professor C. Jagadish
Australia – China Institutional Links Program
Spectroscopy Study of Quantum Wires and Quantum Dots Grown by Metal Organic Chemical Vapour Depositions
1996 to 1999 $198,000

Australia-Korea Foundation
Dr R. G. Elliman
Light Emission from Self-assembled Nanocrystals in Silicon Dioxide Understanding and Applications
July 1998 to October 1999 $2,000

DETYA (Australian Research Council)
Dr G. Li
Australian Postdoctoral Research Fellowship
February 1996 to January 1999 (resigned in 1999) $159,165

Dr H. Tan
Australian Postdoctoral Research Fellowship
December 1996 to January 2000 $161,568

Dr Y.J. Wong-Leung
Australian Postdoctoral Research Fellowship
January 1998 to December 2000 $164,000

Dr H. Timmers
Australian Postdoctoral Research Fellowship
June 1999 to June 2002 $174,576
(Jointly with NP)

DETYA (ARC-International Researcher Exchange Program - IREX)
Assoc. Professor S.H. Choi and Dr R. G. Elliman
Light Emission from Self-Assembled Nanaocrystals in Silicon Dioxide: Understanding and Applications
January 1999 to September 1999 $60,203

Dr Y.J. Park and Professor C. Jagadish
Fabrication of Photonic Devices using Semiconductor Nanostructures
January 2000 to December 2000 $79,478

DETYA (ARC Large Research Grants)
University of Canberra
Professor C. Jagadish
Fabrication and Testing of Low Noise Semiconductor Lasers
1998 to 2000 $228,000

University of Newcastle
Dr M. Petravic
Surface Analysis using a Free Electron Laser
1999 to 2002 $120,000

University of New South Wales
Professor C. Jagadish
Quantum Well Intermixing in InP Based Optoelectronic Materials and Devices
1999 to 2001 $223,000

University of Wollongong
Professor C. Jagadish
For Infrared Laser Generation from Optically and Electrically Pumped Semiconductor Quantum Well Systems
1998 to 2000 $150,000

DETYA (Research Infrastructure Equipment and Facilities - RIEF)
Dr R. Elliman
Ion Accelerator for Materials Characterisation $332,000

January 1999 to December 1999
Professor C. Jagadish
MOCVD Reactor for the Growth of III-V Compound Semiconductors
January 1999 to December 1999 $1,100,000

DETYA (Strategic Partnerships with Industry, Research and Training - SPIRT)
Professor J.S. Williams
Indentation Studies of Semiconductor Thin Films
January 1999 to January 2002 $62,268

Australian Scientific Instruments
Professor J.S. Williams
*Contribution to the **SPIRT Program***
January 1999 to January 2002 $15,000

DISR
Professor J. Williams
Bilateral Science & Technology Program: Improved Gettering Processes in Si and Device Performance
July 1998 to April 1999 $8,700

Professor J.S. Williams
Targeting Research Alliances - Developing a Strategy for Cooperative Materials Technology Projects with China
June 1999 to October 1999 $30,000

Professor J.S. Williams
Targeting Research Alliances – Business Model
1999 to 2000 $65,000

Professor J.S. Williams
Targeting Research Alliances – Material Network
1999 to 2000 $113.000

Professor J.S. Williams
US Asia Pacific Material Workshop
1998 to 1999 $40,000

DSTO
Vision Abell Contract
Professor C. Jagadish
Development of Indigenous Photodetectors for RF Photonic Links
1999 to 2000 $90,000

Laser Physics Centre

ABB Transmission and Distribution Pty Ltd - NSW Electricity Transmission (TRANSGRID)
Professor B. Luther-Davies *et al.*
High Voltage Optical Fibre Sensing
April 1998 to March 1999 $102,600

DETYA (Australian Research Council)
Dr M.J. Sellars
Australian Postdoctoral Research Fellowship
February 1998 to January 2001 $164,000

Dr C.J. Wei
Australian Postdoctoral Research Fellowship
June 1996 to June 1999 $175,000

Dr A.V. Rode
Queen Elizabeth II Research Fellowship
June 1996 to December 2000 $385,000

DEETYA (IREX Award)
Professor Byeong-Soo Bae, KAIST, Korea
Photosensitive ORMOSIL Materials for Planar Waveguide Applications $61,060

DETYA (Strategic Partnerships with Industry, Research and Training – SPIRT)
Dr R. Charters
Design, Fabrication & Evaluation of Planar Lightwave Circuits in Organically Modified Silicate Glasses for Telecommunications and Other Applications
June 1999 to June 2002 $220,132
(AOFR Contribution) $54,000

Professor B. Luther-Davies
Short Pulse Laser for Ranging Applications Incorporating Semiconductor Saturable Absorber
June 1999 to June 2002 $151,223
(EOS contribution) $45,000

DISR
Professor B. Luther-Davies *et al.*
Grant for Australian Photonics Cooperative Research Centre (Canberra node)
April 1992 to June 1999 $2,695,197

Nuclear Physics

ANSTO
Professor G. Dracoulis
Access to Major Research Facilities Program - Visit to Argonne National Laboratory $10,207
December 1999

DETYA (Australian Research Council)
Dr M. Dasgupta
Queen Elizabeth II Research Fellowship
April 1998 to March 2003 $360,000

DETYA (Research Infrastructure Equipment and Facilities - RIEF)
Professor G. Dracoulis
Enhanced Data Acquisition System for the Detection of Exotic Nuclear States
January 1999 to December 1999 $355,000

Optical Sciences Centre

DETYA (Australian Research Council)
Professor J.D. Love and Dr M. Elias (AOFR Pty Ltd)
APRA (Industry) Scholarship: Grating-assisted and Post Fused Taper Fibres
S. Ashby
March 1996 to March 1999 $71,598

Professor J.D. Love and Dr M. Elias (AOFR Pty Ltd)
APRA (Industry) Scholarship: Planar Optical Devices for Wavelength Division Multiplexing
K. Gaff
February 1997 to February 2000 $71,598

Dr A.V. Buryak
Australian Postdoctoral Research Fellowship
January 1997 to January 2000 $165,000

DETYA Australian Research Council Large Grant
Drs R. Sammut [ADFA]; A.V Buryak and Professor Yu.S. Kivshar
Parametric Wave Mixing in Nonlinear Optics
January 1998 to January 2001 $159,000

(Held jointly with ADFA)
DISR International Science and Technology Collaboration (Major Grants)
Professor Yu.S. Kivshar and Dr O. Bang
All-optical Signal Processing in Quadratic Nonlinear Materials
July 1997 to June 1999 $32,000

Centre for the Mind

News Ltd
Professor A.W. Snyder
Contribution to Research
July 1998 to June 2001 $150,000

Plasma Research Laboratory

DISR
Professor J. Harris *et al.*
National Plasma Fusion Research Facility
December 1995 to December 2001 $8,700,000

Professor J. Harris
National Plasma Fusion Research Facility
May 1996 to December 1999 $30,000

University of Canberra
Professor J. Harris
Plasma Fusion National Research Facility
May 1996 to December 1999 $30,000

University of Central Queensland
Professor J. Harris
Plasma Fusion National Research Laboratry
May 1996 to December 1999 $30,000

University of Sydney
Professor J. Harris
Plasma Fusion National Research Laboratry
May 1996 to December 1999 $45,000

(The above grants are to support a Technical Officer attached to National Plasma Fusion Project)

University of Sydney
Dr G.G. Borg and Dr D.J. Miljak
Technical Officer Support $25,000

DSTO
Professor J. Harris, Drs G.G.Borg and N.M. Martin
Research Agreement
Production of a Demonstration Plasma Antenna $37,000

Museum of Applied Arts and Sciences
Professor R.W. Boswell, Drs H. J. Gardner and R. Gingold
Software Licence Agreement - Powerhouse
June 1999 to June 2000 $25,000

Theoretical Physics

Air Force Office of Scientific Research- United States Airforce
Dr I.B. Talanina
Ultrafast Optical Logic with Semiconductor Nonlinear Directional Couplers
1998 to April 2000 US$54,060

DETYA (Australia Research Council)
Dr M. Gulacsi
Queen Elizabeth II Research Fellowship
June 1995 to May 2000 $364,300

DISR
Professor R.L. Dewar
High Performance Computing and Advanced Visualisation in Plasma Physics Research
May 1999 to June 1999 $14,000

Industrial Research Alliances Program - IRAP
Dr M. Gulacsi
Impurity Effects in Mesoscopic Systems
July 1999 to March 2000 $20,000

Dr M. Gulacsi
Target Research Alliances Program $10,000

Institution of Engineers
Professor R.L. Dewar
International Conference on Plasma Physics (ICPP 2002)
June 1998 to November 2002 $5,000

School Electronics Unit

DETYA (Research Infrastructure Equipment & Facilities - RIEF)
Dr T. Rhymes
Electrical Discharging Machine Facility $170,000

General Endowments
January 1999 to December 1999

Funds for Conferences, Summer Schools and Workshops
February 1996 to December 2000 $20,000

Donation from personal estate
June 1997 indefinite $103,000

Named Scholarships and Prizes

Jagadishwar Mahanty Prize
Funds to be matched by University Endowment Fund

The Australian Photonics Cooperative Research Centre (Canberra Division)

The Australian Photonics Cooperative Research Centre (APCRC) is an unincorporated collaborative venture. It was established initially in 1992 under the Commonwealth Government's Cooperative Research Centre scheme and its funding was renewed in April 1999 with $27.4M being provided by the Commonwealth for operations over the next seven years. As part of its renewal the APCRC is taking on a number of new partners. There are now five university members: The Australian National University, the Universities of Melbourne, Sydney, and New South Wales, the Royal Melbourne Institute of Technology, together with the Southern Sydney Institute, TAFE NSW. End users now include Telstra, DSTO, the Australian Electrical and Electronics Manufacturers Association, and the Electricity Commission of NSW. The industry partners are expected to be ABB Transmission and Distribution Ltd; ADC/AOFR; Allen & Buckeridge; Australian Photonics Pty Ltd; British Aerospace; CEOS; Coherent Scientific; Ericsson Australia; Filtronic Components; Future Fibre Technologies; JDS/ Uniphase; Photonic Technologies; Macquarie Bank; Nextrom; Redfern Fibres; Siemens; Thomson Marconi Sonar; Virtual Photonics; and Vision Abell. A feature of the new phase of the APCRC is the addition of partners from the defence industry.
The objectives of the APCRC include:

- improving the international competitiveness of Australian industry through transfer of photonic technology,
- providing industry with knowledge and skills in photonics through educational programs with an emphasis on high quality postgraduate training, and
- enhancing Australia's business opportunities in photonics, particularly in the Asia and Pacific regions.

At the beginning of this second phase of the APCRC photonic technology is undergoing an unprecedented growth worldwide. The speed and scale of the technological advances is amazing. This year, for example, long haul optical fibre transmission systems operating at 3Tbits/s have been demonstrated – equivalent to the transmission of some 1000 full-length movies each second across trans-Atlantic distances. Currently data rates on optical fibre transmission systems are increasing by an order of magnitude every four years or so, and the previous view that the bandwidth of the optical fibre systems was essentially unlimited is being rapidly challenged. Current industry predictions are for sustained growth of up to 60% p.a. in the foreseeable future.

Whilst some view research in this rapidly expanding field as straightforward development work, this is demonstrably false. Our researchers face huge challenges in both basic and applied science, with the major difference being that they cannot afford a leisurely approach to their endeavours because there is a real imperative to commercialise new ideas to help photonic technology maintain its growth potential. Furthermore the international shortage of skilled researchers makes it difficult to attract and retain key staff. In the past year the APCRC has established several new companies. Redfern Fibres, established last year, is now operating in profit and exceeding its business plan by 100%. This year Redfern Broadband Networks; Redfern Integrated Optics; Redfern Optical Components and Redfern Interlink were all established to lead the next wave of commercialisation of APCRC technologies. In addition the APCRC recently finalised arrangements for a joint venture on optical fibre manufacture in China with the Fasten Group.

Whilst these companies are being created by the APCRC itself, the broader industry sector in Australia is also trying to catch this wave of expansion. An analysis presented in the CRC's submission for renewal anticipated 18,000 new jobs in photonics would be created over the next decade if the APCRC is successful in its mission. The provision of these numbers of workers with skills relevant to photonics represents a major challenge

for Australian educators and with this in mind the APCRC has submitted a major proposal to the federal government's Science Lectureships Initiative to help boost education in photonics.

The management structure of the APCRC has been revised in phase two with Australian Photonics Pty Ltd (APPL) being appointed as the management and commercialisation agent for the Centre, with activities in the Centre being overseen by a new Board of Governors. In this new structure the Division Director positions have been abandoned, with greater management responsibilities handed to the Program Managers. Functional managers have been appointed with increased responsibilities to oversee the activities of the whole APCRC in Research (Professor Luther-Davies, Australian National University), Development (Dr Fleming, University of Sydney), Business Development (Professor Sceats, University of Sydney) and Education and Training (Dr Novak, University of Melbourne). As part of this restructuring the APCRC Executive have also been appointed as Directors of APPL.

Research

The APCRC's research is organised into four programs: planar integrated circuits (PICs); novel photonic components (NPCs); telecommunications technologies (TT), and photonic sensors and signal processing (NSSP). The Canberra activities mostly fall in the PICs area although the work on solitons and other nonlinear phenomena fall in the NPC program, whilst the ABB/Transgrid funded program on novel plastic optical fibres for voltage sensing is in NSSP. ANU researchers from the Laser Physics Centre, the Department of Electronic Materials Engineering, the Optical Sciences Centre and the Plasma Research Laboratory now contribute to the CRC.

The Canberra Division received $383,297 in Commonwealth and $102,600 in contract funding through the APCRC in 1998/99. The budget for 1999/2000 is currently being finalised.

APCRC Canberra Division research outcomes in 1999 have included:

- first demonstration of laser written digital directional coupler switches;
- demonstration of low-loss absorption at 1400nm in planar germanosilicate layers produced in the HARE reactor;
- development of the theory of incoherent spatial solitons with the basic effects demonstrated experimentally (interactions of vector solitons, soliton spiralling, multihump solitons);
- theory of self-focusing, nonlinear phase shift and pulse control in optical QPM superlattices—a new component for nonlinear WDM systems;
- new fundamental concepts of cascading effects, including multistep cascading, multiple frequency generation in Fibonacci superlattices, quadratic nonlinearities in photonic crystals;
- development of novel polymer optical fibres for voltage sensing.

RSPhysSE APCRC Staff

Division Director, APCRC Director of Research, Director of APPL
Professor B. Luther-Davies

Researchers
Dr N. Akhmediev (Key Researcher)
Dr A. Ankiewicz
Dr O. Bang (until 31 March)
Professor R. Boswell
Dr R. Charters
Dr E. Edmundson
Dr R. Elliman (from July)
Professor C. Jagadish (from July)
Professor Y. Kivshar (Key Researcher)
Dr W. Krolikowski
Professor J. Love (Division Deputy Director, CRC Fellow, Key Researcher)
Professor J. Mitchell (until June)
Dr E. Ostrovskaya (from July)
Dr A. Samoc
Dr M. Samoc (Key Researcher)
Professor A. Snyder (Key Researcher)
Dr H. Tan (from July)
Professor J. Williams (from July)

Technical Officers
Mr M. Aggett (from July)
Ms M. Krolikowska
Mr C. Macleod
Ms T. Martin

Office Manager
H. McMartin

Postgraduate Students
Mr T. Alexander
Ms S. Ashby
Mr J. Christou
Mr K. Gaff
Ms R. Jarvis
Ms E. Ostrovskaya
Mr A. Sukhorukov
Ms S. Tomljenovic-Hanic

Centre for Theoretical Physics

The National Centre for Theoretical Physics was started by the Department of Theoretical Physics in 1994. In March 1999 ANU Council authorised a change of name to *The Australian National University Centre for Theoretical Physics.* The CTP is a partner in a nascent National Institute for Theoretical Physics (centred in Adelaide) and also in the Asia Pacific Centre for Theoretical Physics (centred in Seoul).

The aims of the CTP are:

- to foster graduate education and research in physics within Australia and the Asia-Pacific region through annual summer schools;
- to promote innovative, interdisciplinary research through seminars and topical international research workshops typically lasting two or more weeks.

In order to draw upon the full depth and breadth of theoretical research expertise in the physical sciences available at the ANU, a resource unparalleled in Australia, a widely representative cross-campus advisory board has been set up. In addition to the ANUCTP Director and Deputy Director, the members of the Board are: the Director of the School, Professor E. Weigold, and Professors H.A. Bachor, R.J. Baxter, M.A. Dopita, D.J. Evans, N.H. Fletcher, B.L.N. Kennett, Yu.S. Kivshar and S. Marcelja.

The main activity of the CTP this year was to run the Twelfth Physics Summer School on *Quantum and Classical Chaos* (convenors Drs M. Gulacsi and S.Yu. Kun) at ANU, 11–22 January. The study of quantum and classical complex chaotic systems is one of the most rapidly developing directions in modern physics. The courses were designed to cover the following main directions: (i) fundamental problems of wave chaos, quantum-classical correspondence and quantum decoherence; (ii) universality of wave chaotic phenomena for a diverse variety of fields such as molecular, atomic and nuclear physics, physics of plasmas and solid state physics, optics and statistical physics; (iii) the primary importance of quantum chaos for modern technological applications, in particular, for nanostructure engineering.

The organizers were fortunate to attract distinguished lecturers and leading experts from overseas and from within Australia. The Summer School was attended by 70 participants, including 34 students.

Other activities were a new CTP Seminar series, convened by Dr M. Gulacsi, and, through the role of Dr M.P. Das as a co-convenor, being a partner in the 9th Gordon Godfrey Workshop on Condensed Matter: *Condensed Matter in Zero, One and Two Dimensions* (University of New South Wales, 8 November). (Dr Das has been a driving force in these workshops since 1991.)

Upcoming activities are the 13th Physics Summer School *Bose–Einstein Condensation: Atomic Physics to Quantum Liquids* and the workshops: *The Baxter Revolution in Mathematical Physics* (Canberra, Australia 3–19 February, 2000) and *Soft Condensed Matter: Physical and Biological Aspects* (Canberra, Australia, 16–29 October 2000).

For more details on its history, management and activities, see the Centre's Web site:
http://rsphysse.anu.edu.au/theophys/CTP

Director
Professor Robert L. Dewar

Deputy Director
Professor Vladimir V. Bazhanov

Centre for the Mind

The Centre for the Mind is a joint venture of two of Australia's premier universities, The Australian National University and the University of Sydney.

The Centre's activities are focused on investing in ground-breaking research, stage-managing spectacular initiatives which challenge and inspire, and acting as a nexus for the great minds of our world.

Research Summary

In March, Professors Allan Snyder and John Mitchell made the provocative hypothesis that 'genius' can be released in us all by simply switching off part of the brain.

To unveil these secrets, Snyder and Mitchell focused on savants. These rare individuals, although severely brain damaged, display extraordinary skills. According to Snyder and Mitchell's research, savants somehow access the inner workings of the brain. They do not process disparate facts into meaningful concepts, as do 'normal' people. They just copy what they see, hear and experience.

To expand the Centre's research in this area, the Centre for the Mind has forged an exciting new collaborative program with neurologists at The University of California and researchers from The Australian National University and the University of Sydney. Through this research the Centre for the Mind will investigate how savant skills in art, music and mathematics can be turned on in perfectly ordinary people who previously had no training or interest in such things.

The Centre has also launched a new research initiative to unravel what makes a champion in the broadest sense. This is in collaboration with The Australian Olympic Committee, leading Australian corporations, and eminent academics.

In 2000 the Centre for the Mind will appoint a number of post doctoral research fellows to support the Centre for the Mind's Research Program.

What makes a Champion?

The Centre for the Mind is the driving force behind *What makes a Champion?* – an international event to be held in Sydney immediately before the 2000 Olympic Games. The Prime Minister, The Hon. John Howard MP, is patron for this event.

What Makes a Champion? is our pilot for adding a permanent intellectual component to the Olympic Games. Here, celebrities, leading authorities, eminent researchers and champions from all walks of life will unravel the ingredients of what makes a champion.

Geniuses, Prodigies & Savants — Extraordinary people - what makes them tick

The Centre for the Mind's 1999 showcase event *Geniuses, Prodigies & Savants*, sponsored by New Scientist magazine and held in Sydney on 6–7 December, explored the exceptional achievements of geniuses, prodigies & savants, and the latest research in this area through a range of disciplines — medicine, health, psychology, education, the arts and creative endeavour.

Research highlights came from Professor Bruce Miller of the University of California, who discovered that dementia can bring on artistic genius; Professor Jack Pettigrew, FRS, of the University of Queensland, whose new theory on bipolar disorder reveals rich insights on creativity; and Professors Snyder and Mitchell, who presented their work on exceptional savant skills.

Inaugural "Creative Minds" Essay Competition for Schools

Art – More Creative than Science? was the provocative question put to high school students nationwide by the Centre for the Mind's first *"Creative Minds"* essay

competition. The competition encourages participants to think creatively and reach beyond the boundaries of conventional disciplines.

The winners can be found at www.centreforthemind.com

Setting Role Models for the Champions of the Future

In September the Centre initiated its ambitious endeavour — *Setting Role Models for the Champions of the Future* . A mosaic of events have been formulated which will catapult the intellectual creativity of youth to the frontier of knowledge. The project will include a unique magazine/web site, a think tank, plus a development program to nurture creativity and innovation.

Public Profile

The Centre for the Mind and its initiatives attract unprecedented media attention: dedicated television and radio profiles; BBC documentaries; features in *The Times of London*, *Financial Times*, *Nature*, and *New Scientist*, plus cover stories in most major dailies within Australia.

Mind Space, the Centre for the Mind's bi-annual newsletter, is distributed widely. As an extension of *Mind Space*, Professor Snyder initiated an occasional series of articles in *The Australian*. The articles 'The genius within' (November 1999) and 'Game, mindset and match' (December 1999) were published.

Broadcast on the Centre for the Mind's website (www.centreforthemind.com) is the latest information on the events at the Centre.

Other Activities

Visitor's Program

The Centre for the Mind supports scholars to come to Canberra to work in the Centre or attend one of the Centre's conferences. Visitors are helped and encouraged to make contact with relevant academic departments in Canberra, Sydney and elsewhere in Australia, and they may be invited to lecture at these places. It is consistent with the Centre's national role that visitors, especially those from overseas, should feel free to visit other Australian universities and institutions during their stay. The Centre also wishes to attract young scholars of high promise as well as those with established reputations. In April, Oliver Sacks MD, visited the centre providing valuable input into its planning of upcoming events and initiatives.

Creative Minds Dinner

In April the Centre hosted our Creative Minds Dinner. Dr Oliver Sacks, our Foundation Fellow and great friend of the Centre, attended together with our Advisory Council members and other distinguished guests, including Editor-in-chief of *The Australian* newspaper, David Armstrong, Dame Leonie Kramer, Chancellor of the University of Sydney, and Robyn Williams from the ABC.

Invited Talks

Presented *Brain, consciousness and human experience* conference in San Diego, California, 21–23 January (Professor A.W. Snyder)

Dinner Address, *Creative Minds* Dinner, 19 April

Award presentation *1999 Creative Minds Prize Essay Competition*, 8 May

Keynote Address *Reach for the stars*, Golden Key National Honour Society, 13 May (Professor A.W. Snyder)

Introduced Edward De Bono at the "Why I Want to be King of Australia: Lateral suggestions for a New Millenium" Literary Launch, 1 July 1999 (Professor A.W. Snyder)

Keynote Address *Breakthroughs come from way out in left field*, Adelaide Festival of Ideas, 10 July (Professor A.W. Snyder)

Presented *The Olympic Games: Quintessential venue for the exploration of human achievement* at the Olympics in the Next Millennium International Conference at the UNSW Centre for Olympic Studies, 22/23 September (Professor A.W. Snyder)

Guest, *2-Shot*, ABC TV interview with Philip Adams, 27 September

Keynote Address, Centre for the Mind's *Geniuses, Prodigies and Savants*, 6-7 December

The membership of the Board and Advisory Council are given on the website: http://www.edime.com.au/mind/main.htm

STAFF

Director
A.W. Snyder, SM MIT, MS Harv, PhD DSc Lond, FAA, FTS, FRS

Professor
D.J. Mitchell, BSc Syd, PhD NSW

Foundation Fellow
Dr O. Sacks

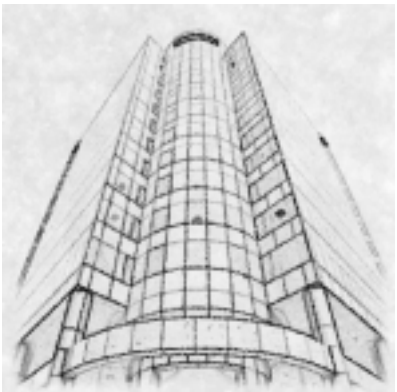
Distinguished Fellows
Professor D. Dennett
Professor H. Barlow
Professor H. Gardner
Professor V. Ramachandran

Visiting Fellows
Dr M. Djordjevic, Research School of Biological Sciences, ANU
Dr P. Gerrans
Dr J. Merson, author, film maker
Dr T. Thompson, RSPhysSE, ANU (from December)

Executive Manager
K. Galloway McLean (until February)
S. Oliphant BA (from March until July)
M. Taflaga (from August)

Other Staff
Andrea Robins
Jo Vickers (from March until October)
Terri Richardson (from October)
Megan Cusack (from November)

Service to Outside Organisations



During 1999 more than 20 members of the academic staff of RSPhysSE served as reviewers and referees for the Australian Research Council, AINSE and the Australian Academy of Sciences For confidentiality reasons, these are not listed. International review commitments are listed individually below.

Applied Mathematics

Dr H.K. Christenson

Regional Editor, Australia/New Zealand, *Journal of Dispersion Science and Technology*

Board Member, Multiple Sclerosis Society of the ACT

Professor S. Marcelja

Teacher, Statistical Thermodynamics Course, Göteborgs Universitet (March 1999)

Professor B.W. Ninham

Member, UNESCO World Commission on Ethics of Scientific Knowledge and Technology

Organiser, New International Scandinavian Research Institute in Basic Science planned to form in Malmo, Sweden

Joint supervision of a number of students and post docs, especially in Sweden, France, Italy

Dr A.M. Stewart

Vice President (Academic) and Treasurer ANU Branch National Tertiary Education Union

Atomic and Molecular Physics Laboratories

Professor S.J. Buckman

Member, General Committee, International Conference on the Physics of Electronic and Atomic Collisions (ICPEAC) 1997-2001

Member, Organising Committee, 11th Gaseous Electronics Meeting, Armidale

Member, Scientific Committee, 19th International Symposium on Electron-Molecule Collisions and Swarms, Japan

Grant Proposal Referee, National Science Foundation, USA

Professor J.H. Carver

Co-convenor, Comparative Planetary Atmospheres Symposium, Joint Assemblies, International Association of Meteorology and Atmospheric Sciences

Professor L.T. Chadderton

Founding Editor, *International Journal of Radiation Effects and Defects in Solids* (formerly Radiation Effects)

Member, Editorial Advisory Board, *Nuclear Tracks and Radiation Measurement*

Member, Editorial Advisory Board, *International Materials Science Forum*

Member, Steering Committee, Bilateral Science & Technology Agreement, Mexico and the Federal Government of Australia

Member, United Nations Committee on Photovoltaic Applications in Less-Developed Countries, UN Centre for Science & Technology for Development

Member, International Committee, Biennial Conference Series on Radiation Effects in Insulators

Member, International Committee, Biennial Conference Series on Particle Tracks in Solids

Professor R.W. Crompton

Chair, ACT Chapter, Australian Fulbright Association

Member, Editorial Advisory Board, *Physics of Atoms and Molecules*

Member, International Advisory Board, International Conference on Atomic and Molecular Data

Chair of Board, Rio Tinto National Youth Science Forum

Dr M.T. Elford

Member, Editorial Board, *Australian Journal of Physics*

Dr B.R. Lewis

Member, International Advisory Board, International Conferences on Vacuum Ultraviolet Radiation Physics

Associate Editor, *Journal of Quantitative Spectroscopy and Radiative Transfer*

Dr J.C.A. Lower

Joint Organizer, Humboldt99, the biennial meeting of the Australian Association of von Humboldt Fellows, September, Canberra, ACT

Treasurer, ACT Branch, Australian Institute of Physics

Professor E. Weigold

Chairman, Editorial Board, *Australian Journal of Physics* (until May)

Member, Board, Australian Photonics CRC

Chairman, National Committee for Physics, Australian Academy of Science

Member, International Scientific Committee, Symposium on Atomic Physics, Hanoi, July

Member, International Scientific Committee, Many-Particle Spectroscopy of Atoms and Molecules, Halle, Germany, July 2000

Member, International Scientific Committee, Sagamore 13, Stare Jablonski, Poland, September 2000

Chair, Selection Committee, AIP Boas Medal

Member, University of New England Grants Committee

Member, Nominating Committee, American Physical Society Few-Body Topical Group

Australian Representative, General Assembly, International Union of Pure and Applied Physics

Dr L.A. Woolf

Chair, Credit Union of Canberra

Member, Ministerial Consultative Committee on Non-government Schooling

Electronic Materials Engineering

Dr R.G. Elliman

Chairman, ACT Branch, Australian Institute of Physics

Member, Science Policy Committee, Australian Institute of Physics

Member, International Committee, Ion Beam Modification of Materials Conference Series

Member, International Committee, Ion Beam Analysis Conference Series

Member, AINSE Accelerator Science Specialist Committee

Member, AINSE Environmental Science Specialist Committee

Member, Governing Council, Electronic Materials Division, International Union of Vacuum Science Techniques and Applications

Member, Program Committee and Organising Committee, 11th Australian Conference on Nuclear Techniques of Analysis, Sydney, Australia, 24-26th November

Member, Program Committee and Organising Committee, 5th Vacuum Society of Australia Congress, Sydney, Australia, 24-26th November

Member, Program Committee, MicrOZcopy 2000 conference, Canberra, Australia, 6-11 February, 2000

Member, Program Committee, 12th International Conference on Ion Beam Modification of Materials, Porto Alegre, Brazil, (2000)

Member, International Editorial Board, *Nuclear Instruments and Methods B*, North Holland Press, Amsterdam.

Consultant, Pacific Solar Pty Ltd

Professor N.H. Fletcher

Editor-in-Chief, *Acoustics Australia*

Member, Australian Library Collections Task Force (National Library of Australia and the National Scholarly Communications Forum)

Official Visitor, Co-operative Research Centre for Molecular Engineering and Technology

Member, Stage I Review, Co-operative Research Centre for Antarctica and the Southern Ocean

Member, Editorial Board, *Journal of Sound and Vibration*

Member, Editorial Board, *Applied Acoustics*

Member, International Scientific Committee, 7th International Conference on Sound and Vibration

Professor C. Jagadish

Past-Chair, IEEE Australian Capital Territory Section

Chair, IEEE Australian Chapter of Electron Devices Society (EDS) and Lasers and Electro-Optics Society (LEOS)

Chair, IEEE Optoelectronic Devices Technical Committee, Electron Devices Society

Member, IEEE EDS Publications Committee

Member, International Advisory Committee, 11th International Semiconducting and Insulating Materials Conference, Canberra, 3-7 July, 2000

General Chair, 11th International Semiconducting and Insulating Materials Conference, Canberra, 3-7 July, 2000

Member, International Advisory Committee, COBRA, Inter university Research Institute, Eindhoven University of Technology, The Netherlands

Member, IEEE Compound Semiconductor Integrated Circuits Technical Committee, Electron Devices Society

Member, Administrative Committee, IEEE Electron Devices Society, USA, 1999-2001

Member, IEEE Compound Semiconductor Integrated Circuits Technical Committee of The Electron Devices Society

Chair, IEEE Workshop on Semiconductor Optoelectronics, Canberra, March

Member, International Scientific Committee, 3rd IMACS International Multi-conference on: Circuits, Systems, Communications and Computers (CSCC'99), Athens, Greece, 4-8 July

Member, Program Committee, Semiconductor Lasers, Conference on Lasers and Electro-Optics – Pacific Rim, Seoul, Korea, September

Reviewer, Australian Research Council, Large Grants, Fellowships, Small Grants

Dr M. Petravic

Member, Program Committee, MicrOZcopy 2000 Conference, Canberra, Australia, 6-11 February, 2000

Presenter, Workshop on the Ion Microprobe at the Science Conference

Dr M.C. Ridgeway

Grant Proposal Referee, Foundation for Research and Development, South Africa

Dr H.H. Tan

Treasurer, IEEE ACT Section

Newsletter Editor, IEEE Australian Chapter of Electron Devices Society and Lasers and Electro-Optics Society

Dr N. Welham

Member, Editorial Board, *Proceedings of the Australasian Institute of Mining and Metallurgy*

Committee Member, Canberra Branch Australasian Institute of Mining and Metallurgy

Newsletter Editor, Canberra Branch Australasian Institute of Mining and Metallurgy

Organising Committee Member, Southern Africa-Australia Mineral Sector Synergies Symposium

Press Officer, Southern Africa-Australia mineral Sector Synergies Symposium

Returning Officer, IEEE ACT Section

Returning Officer, IEEE Australian Chapter of Electron Devices Society and Lasers and Electro-optics Society

Consultant, Gold Mines of Sardinia Pty Ltd, Anaconda Nickel, Westinghouse and Sons of Gwalia.

Professor J.S. Williams

President, Australian Materials Research Society

Member, International Advisory Committee, International Conference Series on Ion Beam Analysis

Member, International Advisory Committee, International Conference on Ion Implantation Technology

Member, Executive Committee, International Union of Materials Research Society

Member, Editorial Board, *Radiation Effects and Defects in Solids*

Member, Public Affairs Committee, Materials Research Society, Pittsburg, USA

Member, Advisory Board, Applied Physics Reviews

External Member of Advisory Board, Strategic Program in Functional Materials, ANSTO

Head, Australian Delegation to China for Cooperation in Materials Development

Laser Physics Centre

Dr K.G.H. Baldwin

Editor, *Advances in Atom and Quantum Optics*, special issue *Journal of Optics B (Semiclassical and Quantum Optics)*, August

Member, Technical Program Committee, CLEO Pacific Rim

Member, Technical Program Committee, IQEC 2000

Member, Technical Program Committee, Atom Optics and Interferometry 2000

Member, National Committee for Spectroscopy, Australian Academy of Science

Member, ACT Branch Committee, Australian Institute of Physics

Member, Science Policy Committee, Australian Institute of Physics

Member, Australasian Council on Quantum Electronics

Chair, Australian Conference on Optics, Lasers and Spectroscopy Liaison Committee

Chair, Science Policy Committee, Federation of Australian Scientific and Technological Societies

Organiser, ACT Australian Institute of Physics "Adopt-a-Physicist" Program, ACT Secondary Colleges

Dr R. Charters

Member, Technical Committee, 24th Australian Conference on Optical Fibre Technology

Professor B. Luther-Davies

Director, Canberra Division, Australian Photonics Cooperative Research Centre

Director, Research, Australian Photonics Cooperative Research Centre

Director, Australian Photonics Pty Ltd

Dr N.B. Manson

Member, Editorial Board, *Photonics Science News*

Dr M. Samoc

Member, Editorial Board, *Photonics Science News*

Member, International Program Committee, 5th International Conference on Frontiers of Polymers and Advanced Materials, NATO Advanced Research Workshop on Polymers and Composites for Special Applications

Member, International Advisory Board, 8th Conference Electrical and Related Properties of Organic Solids

Nuclear Physics

Dr A.P. Byrne

Member, Committee and Minutes Secretary, ACT Branch of the Australian Institute of Physics

Participant , Australian Institute of Physics "Adopt-a-Physicist" Program

Supervisor, Narrabundah College student, International Baccalaureate Project

Dr M. Dasgupta

Committee Member, ACT Branch of the Australian Institute of Physics

Staff Member, Dickson College, ACT, for the "Adopt-a-Physicist" Program of the ACT Branch of the Australian Institute of Physics

Dr L.K. Fifield

Member, International Program Advisory Panel, 8th International Conference of Accelerator Mass Spectrometry, University of Vienna, 6 -10 September

ANU Representative, ACT Radiation Council

Professor G.D. Dracoulis

Member, International Advisory Panel, The Nucleus; New Physics for the New Millennium, Faure, South Africa, January

Member, International Advisory Committee, Challenges and Perspectives in Nuclear Structure 99, Crete, July

Member, International Advisory Committee, Fission and Neutron-Rich Nuclei, St. Andrews

Scotland, June

Member, International Advisory Committee Nuclear Structure 2000 NSCL, Michigan, USA, August 2000

Member, International Advisory Committee Luderitz 2000 - Fundamental and Applied Aspects in Modern Physics, Luderitzbuch, Namibia, November 2000

Member, 18th AINSE Nuclear and Particle Physics Program Committee, (in association with the AIP Congress), Adelaide, December 2000

Member, North America Committee, Australian Academy of Science, International Program of Scientific Visits

ANU Representative, Engineering and Physical Sciences Research Council (UK), ANU-EPSRC Agreement: beam time allocation

Referee, Engineering and Physical Sciences Research Council (UK), Senior Research Fellowship Scheme

Expert Referee, Engineering and Physical Sciences Research Council (UK), Research Grants; Nuclear Physics Programme

Evaluator, Foundation for Research Development (South Africa) - Evaluation of Research Outputs of Principal Grant Holders

Dr D.J. Hinde

Member, International Advisory Committee, Seventh International Conference on Nucleus-Nucleus Collisions, Strasbourg, July 2-7, 2000

Dr T. Kibédi

Supervisor, student projects within the CSIRO Student Research Scheme

Professor T.R. Ophel

ANU Representative, Australian Institute of Nuclear Science and Engineering (AINSE) Council

Convenor, AINSE Accelerator Science Specialist Committee

Dr A.E. Stuchbery

Member, Committee, and Social Secretary, ACT Branch of the Australian Institute of Physics

Member, Committee, Nuclear and Particle Physics Group (NUPP), Australian Institute of Physics

Member, Program Committee and Conference Chair, 18th AINSE Nuclear and Particle Physics Conference, Adelaide, 10 - 15 December, 2000

Supervisor, student projects within the CSIRO Student Research Scheme

Professor S.R. Taylor

Associate Editor, *Meteoritics and Planetary Science*

International Secretary, Geochemical Society

Member, Board of Advisers, The Planetary Society

Member, Nominations Committee, The Meteoritical Society

Organiser, Symposium at the Goldschmidt meeting of the Geochemical Society, Boston, August

Optical Sciences Centre

Professor Yu.S. Kivshar

Member, Editorial Board, Physical Review E (until July)

Associate Editor, Physical Review E (from July)

Chair, Subcommittee on Spatial Solitons, OSA Topical Meeting on Guided Waves (Dijon, September 1-3 France)

Program Chair, OSA Topical Meeting on Guided Waves (to be held in 2001)

Professor J.D. Love

Director, Siemens Science and Engineering Experience, ANU, 27-29 September

Plasma Research Laboratory

Dr G.G. Borg

Editor, *Czech Journal of Physic*s

Professor R.W. Boswell

Member International Organising Committee of ISPC 15, 2000

Vice-President, Member, Committee for the Gaseous Electronics Meeting

Vice-President, Vacuum Society of Australia

Lecturer, short course (eight hours) of plasma physics to Honours physics class, University of Marseilles, 27 September - 15 October.

Professor J.H. Harris

Member, Stellarator Physics Advisory Committee, Princeton Plasma Physics Laboratory, Princeton, USA

Member, Plasma Specialist Committee, AINSE

Dr J. Howard

Member, Plasma Specialist Committee, AINSE

Lecturer, 4th Year Electrical Engineering, *Electronic Engineering Case Studies*, University of Canberra

Dr M.G. Shats

Member, Program Committee, International Workshop, Role of Electric Fields in Plasma Confinement and Exhaust, Prague

Theoretical Physics

Professor R.J. Baxter

Member, Editorial Board, *Journal of Geometric and Functional Analysis*

Member, Editorial Board, *Journal of Statistical Physics*

Member, Advisory Board, *Physica A*

Member, Editorial Committee, *Philosophical Transactions of the Royal Society, Series A*

Member, Editorial Board, *Annals of Combinatorics*

Member, Editorial Board, *Theoretical Physics and Related Mathematics*

Dr M.P. Das

Member, Editorial Board, *Condensed Matter and Materials*

Member, International Advisory Committee, International Workshop on Superconductivity, Magneto-Resistive Materials and Strongly Correlated Quantum Systems, January, Hanoi, Vietnam

Member, Program Committee, 22nd International Workshop on Condensed Matter Theories, 18-23 June, Ithaca, Greece

Co-convenor, Gordon Godfrey Research Workshop on Condensed Matter Physics, 8 November, University of New South Wales

Co-convenor, Physics Summer School on Bose-Einstein Condensation, 17-28 January, 2000, ANU Centre for Theoretical Physics

Professor R.L. Dewar

Member, International Union of Pure and Applied Physics (IUPAP), Commission on Plasma Physics (C16)

Member, Editorial Board, *Australian Journal of Physics*

Chair, Sectional Committee 2, Australian Academy of Science

Member, Frederick White Prize Selection Committee, Australian Academy of Science

Committee Member, Australian Institute of Physics, ACT Branch

Associate Editor, *The Physicist*

Member, International Advisory Committee, International Congress on Plasma Physics Member, Program Committee for ICPP2000; Chair, Local Organising Committee for ICPP2002

Organiser, International Conference on High Performance Computing and Advanced Visualisation in Plasma Physics Research, 1–4 July, Magnetic Island, Queensland

Dr H.J. Gardner

Australian representative on IUPAP Commission on Computational Physics (C20)

Member, Organising Committee, Conference on Computational Physics, CCP2000, December 2000

Member, Organising Committee, Conference on Computational Techniques and Applications CTAC99, 20-24 September, ANU

Convenor, Workshop on Scientific Visualisation and Virtual Environments (in conjunction with the CTAC99 conference), 23 September, ANU

Dr M. Gulacsi

Deputy Director General, International Biographical Center

Co-convenor of the ANU CTP Summer School on Quantum and Classical Chaos, ANU, January

Dr S.Yu. Kun

Co-convenor of the ANU CTP Summer School on Quantum and Classical Chaos, ANU, January

Dr B.A. Robson

Member, Organising Committee, 18th AINSE Nuclear and Particle Physics Conference, Adelaide, SA, 10-15 December 2000

Dr S. Scott

Member, Editorial Board, *Classical and Quantum Gravity*

Member, Canberra Branch of AIP Committee

Treasurer, Australasian Society for General Relativity and Gravitation

Member, Advisory Committee, 4th Gravitational Wave Data Analysis Workshop, Rome, 2-4 December

Member, International Coordinating Committee for the 9th Marcel Grossman Meeting, Rome, 2-9 July 2000

Member, Scientific Organising Committee for the 16th International Conference on General Relativity and Gravitation to be held in Durban, 15-21 July 2001

Member, World Network Collaborative Data Analysis Group

Workshops and Conferences

Atomic and Molecular Physics Laboratories

Humboldt99, **Canberra, ACT**, September 1999. This biennial meeting of the Australian association of Alexander von Humboldt Fellows was jointly organised by Dr J.C.A. Lower.

Electronic Materials Engineering

IEEE Workshop on Semiconductor Optoelectronics, Research School of Physical Sciences & Engineering, 2 March 1999. The plenary speakers were Professor James Coleman of the University of Illinois at Urbana-Champaign and Professor Pallab Bhattacharya of the University of Michigan. The workshop was opened by Professor Erich Weigold, Director of RSPhysSE and organised by Professor C. Jagadish.

Optical Sciences Centre

International Workshop on Bose-Einstein Condensates and Atom Lasers, Research School of Physical Sciences and Engineering, 23-24 November, 1999. The workshop was organised by Professor Yu.S. Kivshar with the help of Dr C. Savage, Department of Physics, The Faculties. Those presenting invited talks were Dr J.J. Garcia-Ripoll, University of Castille, Spain, Dr W. Zhang, Macquarie University, Dr R. Ballagh, University of Otago, New Zealand, Drs E. Ostrovskaya and C. Savage, ANU, Drs J. Hope and M. Collett, University of Auckland, New Zealand, Professor P. Drummond, University of Queensland, Dr H. Wiseman, Griffith University.

Plasma Research Laboratory

The 22nd AINSE Plasma Science and Technology Conference was held on 8th and 9th February, 1999, at the Manning Clark Centre, ANU. Conference President, A/Professor A.D. Cheetham, was supported by other departmental conference committee members Professor J.H. Harris and Dr J. Howard. It was attended by delegates from Kyoto University, Japan, the University of Canberra, the University of Sydney, Flinders University, the University of Western Sydney, Central Queensland University, the Australian National University, the Australian Nuclear Science and Technology Organisation and the Australian Institute of Nuclear Science and Engineering. Ten papers and fourteen poster papers were presented by members of the Laboratory.

Theoretical Physics / Plasma Research Laboratory

The Australia/Japan/US Workshop on High Performance Computing and Advanced Visualization in Plasma Physics Research was held at Magnetic Island, Queensland, Australia, from 1- 4 July. This fifth Australia-Japan-US Workshop on aspects of theoretical plasma physics was organised by Professor R.L. Dewar. The Workshop had 24 participants, comprising 12 from Australia, 8 from Japan (including an Australian working in Japan) and 4 from the US. Eleven of the Australian participants were funded under the Department of Industry, Science and Resources' Industrial Research Alliances (IRAP) program. The participants were principally physicists or computer scientists (or both) but there were two industry representatives, one from Millenium Audio Visual and one from Intergraph Corporation. A feature of the workshop was the availability of immersive three-dimensional graphics projection facilities provided by a portable WEDGE system. The computer and projection facilities were organised by Dr H.J. Gardner, Professor R.W. Boswell, Dr B.D. Blackwell, and Mr P. Alexander. A Virtual Proceedings is available at http://rsphysse.anu.edu.au/~grp105/Magn_Island_Proceedings/Main_Page.html.

Theoretical Physics

Twelfth Physics Summer School: Quantum And Classical Chaos, 11 - 22 January 1999. A Centre for Theoretical Physics activity (see Section 3, ANU Centre for Theoretical Physics). Convenors: Dr M. Gulacsi and Dr S. Yu. Kun

Visitors

Applied Mathematics

Mr C. Arns, Petroleum Engineering, University of New South Wales
Dr A. Brandwood, Therapeutic Goods, Canberra
Professor J.H. Conway, Princeton University, USA
Dr R. Corkery, University of Lund, Sweden
Dr C. Drummond, CSIRO Melbourne
Professor J. Gibbs, Virgina Tech, USA
Dr S. Glassmeyer, Proctor and Gamble, USA
Professor R. Johnston, Department of Chemical Engineering, Monash University
Mr J. Kirkness, Westmead Hospital, NSW
Ms J-Y. Lee, Petroleum Engineering, University of New South Wales
Mr J. Longdell, University of Auckland, New Zealand
Dr N.B. Lyne, International Paper, New York, USA
Dr K. McGrath, University of Otago, NZ
Professor W.V. Pinczewski, Petroleum Engineering, UNSW
Dr A. Sakellariou, Physics, University of Melbourne
Professor T. Shidhar, Department Chemical Engineering
Dr P. Vinson, Proctor and Gamble, USA

Atomic and Molecular Physics Laboratories

Professor H.C.W. Beijerinck, Eindhoven University of Technology, The Netherlands
Dr M.J. Brunger, Flinders University
Professor M.L. Ginter, University of Maryland, USA
Professor R.A. Goody, Harvard University, USA
Professor W. Lawrance, Flinders University
Professor B.J. Orr, Macquarie University
Dr. A.T. Stelbovics, Murdoch University
Professor P.J.O. Teubner, Flinders University

Electronic Materials Engineering

Professor M.W. Austin, RMIT
Professor L.M. Brown, University of Cambridge, UK
Dr G. Clark, CEO Loral Communications, New York, USA
Professor D. Cockayne, University of Sydney
Professor R. De La Rue, University of Glasgow, Scotland
Professor M. Gal, UNSW
Dr I. Grzegory, High Pressure Research Centre, Poland
Ms A. Hart, Vision Abell Pty Ltd, SA
Dr O. Hill, National Nanofabrication Facility Pty Ltd
Professor R. Lamb, UNSW
Dr G. Li, Ledex Corporation, Taiwan
Dr Tony Lindsay, DSTO
Dr V-B. Maksvytis, CSIRO TIP
Dr L. Mar, National Nanofabrication Facility Pty Ltd
Professor J.M. Poate, New Jersey Institute of Technology, USA
Dr B. Raguse, CSIRO TIP
Mr T. Shaw, Filtronics Pty Ltd
Professor R. Smart, University of SA
Dr E. Wendler, Friedrich-Schiller-University, Jena, Germany

Professor J. Whitton, Queens University, Ontario, Canada
Mr I. Will, Vision Abell Pty Ltd, SA
Ms Y. Wilson, National Nanofabrication Facility Pty Ltd
Mr T. Wu, Ledex Corporation, Taiwan

Laser Physics Centre

Dr N.I. Zheludev, University of Southampton, United Kingdom
Dr C. Bossard, Institute of Quantum Electronics, ETH, Zurich, Switzerland

Nuclear Physics

Dr S.K. Aggarwal, Bhabha Atomic Research Centre, India
Dr S. Bayer, Department Nuclear Physics, ANU
Dr M. Cholewa, Director, MC Scientific Consulting, Melbourne
Dr S. Chappell, University of Oxford, UK
Dr N.M. Clarke, University of Birmingham, UK
Dr W.N. Catford, University of Surrey, UK
Dr P. Day, Manchester University, UK
Dr L. Donadille, University of Birmingham, UK
Dr B. Finnegan, University of Oxford, UK
Dr B. Fulton, University of Birmingham, UK
Dr M. Freer, University of Birmingham, UK
Mr D. Hunt, University of Oxford, UK
Mr P. Jagpal, University of Birmingham, UK
Dr K.L. Jones, University of Surrey, UK
Dr D. Mahboub, University of Surrey, UK
Dr S. Mullins, Department Nuclear Physics, ANU
Dr M-P. Nicoli, University of Birmingham, UK
Dr D. Oughton, Agricultural University of Norway
Professor A. Poletti, University of Auckland, New Zealand
Dr S. Singer, University of Birmingham, UK
Dr D.L. Watson, University of York, UK
Dr R.Ward, University of Staffordshire, UK

Optical Sciences Centre

Dr R. Ballagh, University of Otago, New Zealand
Dr A.R. Bishop, Los Alamos National Laboratory, USA
Dr M. Collett, University of Auckland, New Zealand
Professor M. De La Rue, University of Glasgow, Scotland
Dr. M De Sterke University of Sydney
Professor P. Drummond, University of Queensland
Professor S. Galiyev, University of Auckland, New Zealand
Dr J.J. Garcia-Ripoll, La Mancha University, Spain
Professor S. Gredeskul, Beer Sheva University, Israel
Dr H. He, University of Sydney
Dr J. Hope, University of Auckland, New Zealand
Professor S. Kawata, Osaka University, Japan
Professor E.A. Kuznetsov, Landau Institute for Theoretical Physics, Moscow, Russia
Dr O. Nielsen, Computer Science Lab, RSISE
Dr A. Saxena, Los Alamos National Laboratory, Los Alamos, USA
Professor C. Soukoulis, AMES Laboratory, USA
Dr H. Wiseman, Griffith University
Dr W. Zhang, Macquarie University

Plasma Research Laboratory

Dr B. Drevillon, Ecole Polytechnique, France
Dr T.W. Fredian, Massachusetts Institute of Technology, USA
Dr K. Toi, National Institute for Fusion Science, Japan
Dr T. Watari, National Institute for Fusion Science, Japan

Theoretical Physics

Professor B. Barrett, University of Arizona, USA
Dr A.R. Bishop, Los Alamos National Laboratory, USA
Professor J.P. Dougherty, University of Cambridge, UK
Professor A. Fisher, University College, London, UK
Professor S. Gredeskul, Ben-Gurion Univesity, Israel
Dr T. Matsumoto, Japan Atomic Energy Research Institute, Japan
Dr D. Monticello, Princeton University, USA
Professor R.B. Pandey, University of Southern Mississippi, USA
Professor D.N. Quang, National Centre for Natural Sciences and Technology, Vietnam
Dr C. Roberts, Argonne National Laboratory, USA
Ms V. Robins, University of Colorado, USA
Dr P. Smith, University of Newcastle
Professor E. Tosatti, International School of Advanced Studies, Italy
Professor A. Weiguny, Institute for Theoretical Physics Münster, Germany
Professor Y-S. Zhang, Institute of High Energy Physics, Academia Sinica, Beijing, PR China
Dr W. Zhang, Macquarie University, Sydney

Industry Delegations

- 21/4/99 Defence and Industry Study Course (DISC) (40)
- 11/5/99 and 30/11/99 LEDEX BlueLAB, Dr Tony Wu, Dr Alan Li (3)
- 2/6/99 Chief Minister's Department, ACT (12)
- 29/6/99 Nigel Warren, Investment Development Director for Invest Australia

International Delegations

- 17/6/99 Chinese Vocational and Technical Study Delegation (30)
- 30/8/99 Chinese Delegation– Professor Guan, Vice Chairman, Tsinghua and colleagues (3)
- 11/11/99 Chinese University Vice-Presidents (AVCC) (8)

(The School is grateful to Ms Fu Lan, EME, for acting as interpreter.)

Students Tours

- 28/9/99 Siemen's Science and Engineering Experience (80)
- National Youth Science Forum (coordinated by Laura Walmsley, EME)

Colloquium Speakers

Convenor Professor Yu. Kivshar

Professor C. Soukoulis, Ames Laboratory, Iowa State University, USA
Photonics Band Gap Materials

Professor Alan Bishop, Los Alamos National Laboratory, USA
The Promise and Challenge of Multiscale Materials Modelling

Professor Mark Saffman, Risø National Laboratory, Denmark
Pattern Formation: From Natural Beauty to Optical Information Processing

Professor John Prescott, Physics, University of Adelaide
Shards, Springs and Sandhills: Luminescence Dating towards One Million Years

Professor Robert Clark, UNSW
Construction of a Silicon-Based Solid State Quantum Computer

Professor L. Brown, University of Cambridge, UK
A Synchrotron in a Microscope: Applications of Electron Spectrometry in the Electron Microscope

Professor W.B. Lindquist, Stony Brook, USA
Investigating 3D Geometry of Porous Media from High Resolution Images

Professor Erio Tosatti, Trieste, Italy
Ordering and Phase Transitions at Surfaces

Dr Peter Fisk, CSIRO National Measurement Laboratory
The CSIRO Trapped Ion Clock

Professor Mike Lieberman, Berkeley, USA
The Inexorable Microelectronics Revolution and Plasma Processing

Professor David Blair, UWA
The Search for Gravitational Waves and Progress in Australia

Professor Peter Drummond, UQ
Parametric Solitons, Quantum Singularities and All…

National and International Links

Postdoctoral Fellowship Completions and Destinations

Atomic and Molecular Physics Laboratories

Dr D.R. Lun, ARC Postdoctoral Fellow, suspended in March to take up a postdoctoral position at the University of Colorado.

Theoretical Physics

Dr J.L.V. Lewandowski, Plasma Physics Laboratory, Princeton University, USA.