Research School of Physical Sciences & Engineering

Annual Report 2001

Editors
Dr Mark Ridgway
Dr Tim Thompson

Associate Editor
Dr Marek Samoc

Editorial assistance and collation
Martina Landsmann

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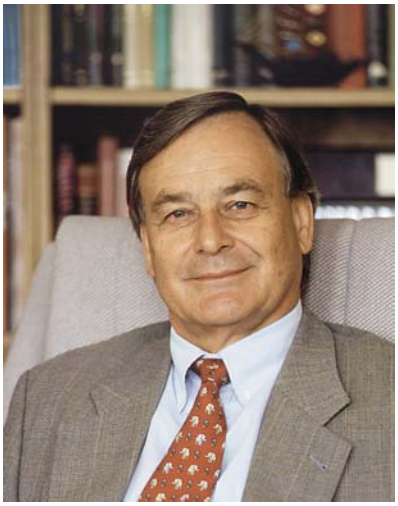
Director's Report



Professor Erich Weigold
- Director

In reviewing the achievements of the School over the past year, I continue to be most impressed by the outstanding quality of its research and research training activities and by the breadth of the research being undertaken. Despite difficulties due to constricting budgets, we maintain a healthy balance between pure, strategic and applied research over a broad spectrum of the physical sciences and engineering, and we continue to pursue commercialisation activities whenever possible.

The physical sciences are core wealth-creating sciences. This is recognised in the USA, Germany, Japan and other leading economies. Unfortunately the past half a decade has seen a considerable reduction in the nation's capabilities in the physical sciences, both in teaching and in research, and it will take some time to recover from this setback. The recent announcement by the Government of four research priority areas, three of which are in the physical sciences and engineering, will help address this in the future. It so happens that the School has very significant research strengths in these three priority areas, namely Nanomaterials and Biomaterials, Complex Systems, and Photon Science and Technology.

The ANU and the Research School have a responsibility to ensure the continued strength and world-leading quality of the physical sciences in Australia. A study by Linda Butler for the Australian Academy of Science entitled "Monitoring Australia's Scientific Research", released in October, showed that the ANU dominated the research output in the physical sciences (excluding astronomy) both in quality and quantity, with 18.5% of Australia's publications. The study also showed that Australia's presence in the core disciplines of physics, chemistry, and mathematics was low compared to other disciplines but that its performance in these disciplines was strong compared to the world average.

The School is continuing to manage change and to set new research directions. The Cabinet decision to give the IAS access to the National Competitive Grant Schemes (ARC, NHMRC, DEST schemes), although at a cost of 20% of our recurrent block funding, is a wonderful opportunity for us. One-quarter of the staff were eligible to apply for grants this year, and the School was extremely successful being awarded $805,000 in ARC Discovery grants and fellowships for 2002. The School was also very successful in ARC Linkage Equipment Grants and the latest Cooperative Research Centre round. The Department of Applied Mathematics plays a major role in the new Cooperative Research Centre for Functional Communication Surfaces, a university-industry centre established to develop the country's paper and printing capabilities. We continue to play a leading role in the Australian Photonics CRC, with more than half of the refereed journal publications of this CRC coming from our node.

The School set itself a number of priority themes for the near term. These are:

- Physical science and biology, and the physics of complex systems
- Physics and the environment
- Photonics, advanced communication and information processing
- Nanotechnology and materials science

and the full exploitation of its unique major national facilities.

During the year it has made significant progress in all these themes. The relocation of the Protein Dynamics group from the Chemistry Department in the Faculties has considerably strengthened the biophysics activity in the School. It established a Centre for Complex Systems, unifying the School's theoretical work. Late in the year this was formally expanded to become a cross-campus ANU Centre for Complex systems, with the subtitle: Theoretical Studies: From the Cosmos to Quantum Systems, from Statistical Mechanics to Biophysics. The environmental science initiative received significant additional support from the Institute Planning Committee, much of which was used to strengthen the Accelerator Mass Spectrometry program in the Heavy Ion Accelerator Facility. Novel research was undertaken in the areas of quantum computing, nanotechnology, and advanced communication.

It has been another good year for promotions with Rob Elliman and Neil Manson being promoted to Professor, Ken Baldwin, Boyd Blackwell, and Anatoli Kheifets to Senior Fellow, Robert Bark to Fellow, and Max Lederer and Jenny Wong-Leung to Research Fellow. Jenny Wong-Leung was also awarded a QEII Fellowship. Some other noteworthy honours include the award of the worlds "foremost prize in communications and information technology", the Marconi International Prize, to Professor Allan Snyder (shared with Bell Laboratory's pioneering optical physicist Dr Herwig Kogelnik), the election to Fellowship of the American Physical Society of Drs Brenton Lewis and Serdar Kuyucak, the election of Professor C. Jagadish to Fellow of the Institute of Electrical and Electronic Engineers (IEEE) and the Institute of Nanotechnology (UK), and the election of Professor Yuri Kivshar to Fellow of the American Optical Society. Dr Nick Welham received the Rossiter W. Raymond Award of the American Institute of Mining, Metallurgical and Petroleum Engineers for the best paper published by AIME in 2000 and was elected to Fellowship of the Minerals Engineering Society. As well as winning the Marconi Prize, Professor Allan Snyder was invited by the Royal Society to deliver its Clifford Paterson Prize Lecture to celebrate the 100th anniversary of the first trans-Atlantic wireless transmission. Professor Stjepan Marcelja was appointed Director of the Rudjer Boskovic Institute in Zagreb, a leading research institution with over four hundred scientists. Another highlight was the award of the Council Medal for General Staff Excellence (Team Award) to the team from the School's Electronics Unit, and an award to Mrs Susie Radovanovic by the Federal Minister of Immigration for voluntary work helping settle recent immigrants.

The year also produced some noteworthy awards to students. Mika Kohonen was awarded the Jagadishwar Mahanty Prize for best thesis 2000/2001, Scott Collis the John Carver Prize, Ira Cooke the Director's Prize and Annette Berriman the Director's Award for an article published in Nature and featured by Nature as a highlight. Sergei Kucheyev was awarded a Graduate Student Fellowship by the IEEE Electron Devices Society, an AINSE award for best student poster, and a silver medal for an oral presentation by the Materials Research Society. Tessica Weijers received the AINSE medal for best student oral presentation at the same conference where Sergei Kucheyev received his best student poster award.

The year was marked by the establishment of the Robert and Helen Crompton Scholarships for graduate student travel. This was made possible by a most generous donation to the School by Professor and Mrs Crompton, a donation which was matched by the University's Endowment for Excellence Fund.

Redevelopment of our fifty-year old buildings and inadequate facilities is critical to our future. The present buildings are inefficient and do not conform to current building standards. A masterplan for the School has been developed, but the University cannot at present fund all that is required. Nevertheless during 2002 a start will be made on the Cockcroft Building, enabling the Atomic and Molecular Physics Laboratories and part of the Plasma Research Laboratory to be rehoused in modern facilities meeting current safety standards.

The 100th anniversary of the birth of our founder, Sir Mark Oliphant, was celebrated by the Australian Academy of Science on the 8th of October by a Centenary Dinner and Lecture and by the School on Founder's Day later that same week. At the same time the Department of Industry Science and Resources announced the Sir Mark Oliphant International Frontiers of Science and Technology Conference Series.

Professor Barry Ninham, the Foundation Professor and Head of the Department of Applied Mathematics, formally retired at the end of the year. The School is greatly indebted to Barry for his many years of dedication to the School and for his success in producing outstanding graduates and in building a world-beating department. His department remains an informal group of theorists and experimentalists asking deep scientific questions that lie between and across the traditional disciplines of physics, chemistry, biology and earth sciences. Although formally retired Barry remains active on many fronts and will continue to be a most valued member of the School.

Finally it is important to record that despite the increasing difficulties due to funding constraints, the School has once again distinguished itself and made an increasing number of prominent contributions to the advancement of knowledge in the physical sciences and engineering. I congratulate all staff and students on the efforts they have made. The results of those efforts, summarised in this report, speak for themselves.

Annette Berriman receives the Director's Award for her article published in Nature and featured by Nature as a highlight.

Participants in the Carver Prize Seminar Series with Professor John Carver, Professor Erich Weigold and Professor Neil Manson.