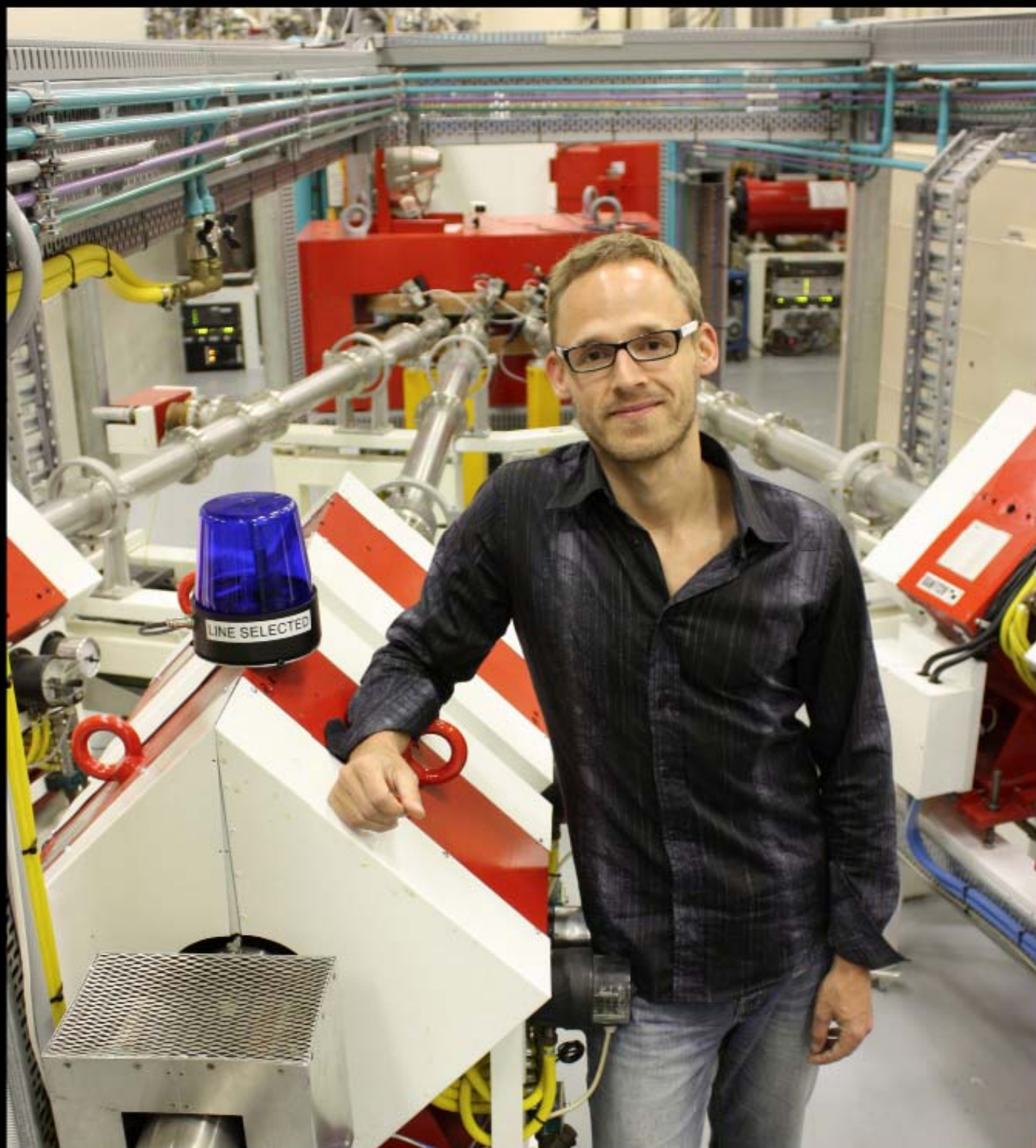


RESEARCH SCHOOL OF PHYSICS & ENGINEERING ANNUAL REPORT 2009



ANU COLLEGE OF PHYSICAL SCIENCES

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DIRECTOR'S REPORT



The Research School of Physics and Engineering (RSPE) represents Australia's largest university based research and teaching activity in the physics discipline. This year over 152 academics, 115 general staff and 178 students formed the School's greatest asset, its people. RSPE continues to serve both a national and international role as Australia's foremost physical sciences research establishment whilst ensuring our research directions remain appropriately aligned to national and international priorities and enhance the School's contribution to the wider interests of the University.

Outstanding research achievements and successes during 2009 again covered a broad range of the School's research including:

- a high profile research and major infrastructure in fusion science, accelerator science and nano-fabrication was recognised with the award and substantial funding under the Commonwealth Government's Super Science Initiative (around \$22 million over 4 years) - this will allow further enhancement of these national facilities;
- new schemes for, and the first demonstration of, optical quantum memory with greater than 50% efficiency, advances in nuclear quantum coherence, novel plasma space propulsion, the first demonstration of metamaterials with novel operation at microwave frequencies, development of Australia's first beamlines for positron science, leading research into semiconductor nanowire growth and device fabrication, further understanding of interacting systems in statistical mechanics, and a new scheme for classifying complex materials;
- the formal launch of Digital Core Laboratories, the school's fourth spin-off company, including a School investment of \$0.75m in the venture - this company specialises in ANU developed novel analysis of exploration cores for the oil and gas industries;
- successfully gaining Australian Research Council funding again with 68 Discovery Grants (totalling \$8,273,075 for 2009), 11 Linkage Grants (totalling \$1,148,110 for 2009) and the award of a Laureate Fellowship to Professor Chennupati Jagadish; and
- a high level of external collaboration through published works, research grants, visiting fellows and students.

During 2009 the School played a major role in hosting three Australian Research Council Centres of Excellence and three Australian Research Council Research Networks, as well as key National Collaborative Research Infrastructure Strategy (NCRIS) platform nodes for the Australian National Fabrication Facility and the Australian Microscopy and Microanalysis Research Facility. The School also successfully merged the Department of Physics with the Research School of Physical Sciences and Engineering under the new name of the Research School of Physics and Engineering.

Other major achievements this year were:

- the increase of the number of higher degree research students to 110;
- the establishment of an education working party that recommended and put in place steps to provide individual mentoring of undergraduate students with a focus on PhB (Bachelor of Philosophy, Honours) and advanced degree students and a greater involvement of all academic staff in undergraduate teaching;
- a leading cross-campus effort to coordinate energy research at ANU;
- communication of the School's research achievements through *ScienceWise* and *ANU Reporter* as well as key press releases of scientific breakthroughs; and

- the establishment of a working party to formulate a tenure policy and for succession planning and mentoring of mid-career academics in the School; and
- further progress on our Endowment and Development efforts with the appointment of a full-time Development Manager to commence in early 2010.

This year saw the passing away of Emeritus Professor Fred Barker, who will be greatly missed by all.

Below we have listed major achievements by staff members including promotions of academic staff and some examples of national and international events where staff members were directly involved.

Jim Williams

Honours, Awards & Academic Promotions

Professor Hans Bachor – Award for Outstanding Services to Physics, Australian Institute of Physics
 Professor John Close – Finalist, Australian Museum Eureka Prize
 Professor George Dracoulis – Chancellor's Award for Distinguished Contribution to the University
 Ms Karen Jackson – Australasian Research Management Society Excellence Award
 Professor Chennupati Jagadish – Australian Laureate Fellowship, Australian Research Council
 Professor John Love – W.H. (Beattie) Steel Medal, Australian Optical Society
 Dr Craig Savage – Vice Chancellor Award for Teaching Excellence 2008 (*announced 2009*)
 Dr Ilya Shadrivov – Geoff Opat Early Career Researcher Prize, Australian Optical Society
 Emeritus Professor Erich Weigold – Member of the Order of Australia (Australia Day)
 Professor Jim Williams – Member of the Order of Australia (Queen's Birthday)

During 2009 the following staff received promotions:

Level E – Professors Mahananda Dasgupta, Andrew Stuchbery, Andrei Rode and Susan Scott

Level C – Drs Shannon Notley, Nicholas Robins and Rongping Wang

Level B – Drs Jong Chow, Jiri Janousek and Casten Makochekanwa

Conferences, Workshops & Events (in date order)

- Professor John Howard – Chair, Eighth Japan–Australia Plasma Diagnostics Workshop, Canberra & Murrumbidgee, 2–5 February
- Professor Nail Akhmediev – Keynote Speaker, Sixth IMACS (International Association for Mathematics and Computers in Simulation) International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, USA, 23–26 March
- Professor Yuri Kivshar – Local Convenor, Eighth International Photonic & Electromagnetic Crystal Structures Meeting (PECS VIII), Sydney, 5–9 April
- Professor Chennupati Jagadish – Co-organiser, Semiconductor Nanostructures towards Electronic and Optoelectronic Device Applications II, European Materials Research Society Symposia, Strasbourg, France, 8–12 June
- Dr Tim Wetherell – Keynote Speaker, Clockwork Universe, Questacon, Canberra, 26 June
- Professor Andrew Stuchbery – Chair, Frontiers of Nuclear Structure Through Spectroscopy and Reactions, Gordon Research Conference on Nuclear Chemistry, New London, USA, 21–26 June
- Dr Christine Charles – Speaker, Women in Physics Tour, Australian Institute of Physics, seven tours, April – September
- Professor Vladimir Bazhanov – Plenary Speaker, XVI International Congress on Mathematical Physics, Prague, 3–8 August
- ARC Centre of Excellence for Quantum–Atom Optics – Winner, ABC New Inventors, Multimode Entanglement, 12 August
- Professor David Hinde, International Advisory Committee, Tenth International Conference on Nucleus–Nucleus Collisions, China Institute of Atomic Energy, Beijing, 16–21 August
- ARC Centre for Ultrahigh Bandwidth Devices for Optical Systems and Sydney University – ABC Catalyst, Photonic Chip, 3 September
- Dr Mark Ridgway, International Committee, Radiation Effects in Insulators Conference, Italy, 30 August–4 September
- Department of Nuclear Physics – Ninth Annual Workshop in Nuclear Techniques, Canberra, 28 September–1 October
- Professor Robert Dewar – Honoured Guest, A Symposium Celebrating Professor Robert Dewar's Accomplishments in Plasma Physics, Atlanta, USA, 31 October

- Professor Nail Akhmediev – International Organizing Committee, International Workshop on Dissipative Solitons, Adelaide, 29 November–3 December
- Dr Dragomir Neshev – Program Committee, Australian Conference on Optical Fibre Technology, Adelaide, 29 November–3 December
- Dr Andrew Truscott – Program Committee, Australasian Conference on Optics, Lasers and Spectroscopy, Adelaide, 29 November–3 December

Fellowships of Australian Academies and key International Professional Societies

American Physical Society (APS)

- Professor Kenneth Baldwin (since 2008)
- Professor Rod Boswell (since 1998)
- Professor Stephen Buckman (since 1998)
- Emeritus Professor Robert Crompton (since 1995)*
- Adjunct Professor Mukunda Das (2003)*
- Professor Robert Dewar (since 1980)
- Professor George Dracoulis (since 1993)
- Professor Chennupati Jagadish (since 2003)
- Professor Anatoli Kheifets (since 2004)
- Professor Yuri Kivshar (since 2006)
- Professor Brenton Lewis (since 2001)
- Emeritus Professor Erich Weigold (since 1990)*
- Professor Jim Williams (since 2006)

Australian Academy of Science (AAS)

- Professor Rod Boswell (since 2008)
- Emeritus Professor Robert Crompton (since 1979)*
- Professor Robert Dewar (since 1992)
- Professor George Dracoulis (since 1997)
- Professor Neville Fletcher (since 1976)*
- Professor David Hinde (2006)
- Professor Stephen Hyde (since 2005)
- Professor Chennupati Jagadish (since 2005)
- Professor Yuri Kivshar (since 2002)
- Professor Stjepan Marcelja (since 1991)*
- Emeritus Professor Barry Ninham (since 1978)*
- Emeritus Professor Erich Weigold (since 1986)*
- Professor Jim Williams (since 2003)

Australian Academy of Technological Sciences and Engineering (ATSE)

- Professor Rod Boswell (since 1999)
- Professor Neville Fletcher (since 1987)*
- Professor Chennupati Jagadish (since 2002)
- Professor Barry Luther-Davies (since 2005)
- Emeritus Professor Erich Weigold (since 1996)*
- Professor Jim Williams (since 1992)

Institute of Electrical and Electronics Engineers (IEEE)

- Professor Chennupati Jagadish (since 2002)

Materials Research Society (MRS)

- Professor Jim Williams (since 2008)

Optical Society of America (OSA)

- Professor Hans Bachor (since 2009)
- Professor Kenneth Baldwin (since 2000)
- Professor Chennupati Jagadish (since 2005)
- Professor Yuri Kivshar (since 2001)
- Professor Wieslaw Krolikowski (since 2007)
- Professor Brenton Lewis (since 2003)