

EDUCATION REPORT

*Professor John Close
Deputy Director (Education)*



2013 has been another successful year for the Physics Education Centre (PEC). Student numbers in physics have grown steadily over the last five years, and a training in physics continues to be relevant to modern society, not only as a discipline in its own right, but also as an enabling science for students whose major interest lies in other areas. ANU and RSPE are unique in Australia in their ability to provide a research-led education to an undergraduate student population. In 2013, we continued to expand our undergraduate research project offerings and expanded the involvement of research staff in the research-led teaching enterprise.

Key staff in PEC continue to make important contributions to our operation. Professor John Close continued as head of the Physics Education Centre and took over as honours convenor. Professor Wieslaw Krolikowski continued in his role as HDR convenor with A/Prof Fu Lan and A/Prof Elena Ostrovskaya as co-convenors. A/Prof Patrick Kluth took over as special topics coordinator with Dr Sudha Mokkalapati as 3rd year convenor. Dr Cormac Corr continued as 2nd year coordinator with a major role coordinating the second year lab program, and A/Prof Paul Francis continued as first year coordinator. A/Prof Jodie Bradby continued as PhB convenor.

A substantial number of RSPE staff are involved and active in the Physics Education Centre in diverse roles. Undergraduate lecturers are drawn from all departments in RSPE. These staff exhibited tremendous dedication in bringing their expertise to the undergraduate population through lectures, through lab sessions and through special research topics. The 2013 lecturers are listed elsewhere in this report. Lecturing staff were supported by a large number of graduate student demonstrators who ran tutorials, laboratory sessions and provided help with assignments to our undergraduate cohort. Although too numerous to list here, the contribution made by our student demonstrators and tutors is highly valued by the Physics Education Centre. In addition to lecturing staff, the honours program is supported by honours supervisors and examiners, and we thank those staff involved in that program.

Departmental education coordinators continued to play an important role in the Physics Education Centre providing information to staff in their local areas and driving the research/teaching culture in the School. The complete list of 2013 education coordinators is also provided elsewhere in this report. Their service in this important role is much appreciated. Similarly, the year convenors (listed at the end of this report) play an important role in coordinating courses within each year. Again their service is much appreciated by staff and students in PEC.

In the last few years, our first-year student numbers have grown markedly. First-year is the only year that has streamed courses. The strong demand for Physics highlights its continued relevance as a discipline in its own right and as an enabling discipline for other fields. The growing numbers in our Foundations Course (PHYS1001), our main-stream first-year physics courses (PHYS1101 and 1201) and our Life Physics course (PHYS1004) put increased demand on our technical support staff. In his role as Head Technical Officer, Mr Andrew Papworth led a very able team of technical and administrative staff. In addition, Mr Papworth continued to lead RSPE's outreach program. Mr Mika Kohonen provided excellent support and leadership in the first year laboratories with electronic support from Mr Shane Grieves. Mr Papworth was awarded a Director's Prize for his leadership in outreach.

PHYSICS EDUCATION CENTRE

Physics Education Centre Lecturers

Undergraduate Coursework

PHYS 1001 Foundations of Physics

Nick Robins, John Debs

PHYS1101 Advanced Physics I

Paul Francis, Andre Carvalho

PHYS1004 Life Physics

Adrian Sheppard, Jodie Bradby

PHYS1201 Advanced Physics II

Craig Savage, Marcus Doherty, Ben Buchler

PHYS2013 Quantum Mechanics

Craig Savage, Andrew Truscott

PHYS2020 Thermal Physics

Frank Mills, Vladimir Mangazeev, Rachel Salmeron

PHYS2016 Electricity and Magnetism

Cormac Corr, Igor Ivanov

PHYS2017 Waves and Optics

Ben Buchler, Robert Ward

PHYS3001 Advanced Theoretical 1

Joe Hope, Andre Carvalho

PHYS3033 Nuclear Physics

Greg Lane, Cedric Simenel, Maurits Evers

PHYS3034 Fluid Mechanics

Ross Kerr, Andy Hogg, Yvan Dossmann, Bishakhdata Gayen (RSES)

PHYS3057 Optical Physics

Dan Shaddock, Dragomir Neshev, Vincent Daria

PHYS3060 Fibre Optic Communication Systems

Jong Chow

PHYS3041/3044/5 Special Research Topics

Patrick Kluth

PHYS3002 Advanced Theoretical II

Susan Scott, Michael Hush

PHYS3031 Atomic Physics

Matt Sellars, Steve Gibson

PHY3032 Condensed Matter Physics

Patrick Kluth, Rob Elliman, Jenny Wong-Leung

PHYS3051/ENGN4613: Microphotonics,
Biophotonics and Nanophotonics

Jong Chow

PHYS3058 Work Experience in Photonics

Jong Chow

PHYS3060/ENGN4513: Fibre Optic
Communications Systems

Jong Chow

PHYS3070 Physics of the Earth

Hrvoje Tkalcić and Giampiero Iaffaldano (RSES)

MATH2406 Mathematical Methods 2 Honours

Vladimir Mangazeev, Murray Batchelor

MATH3351/MATH6211 Topics in Mathematical
Physics Honours

David Ridout, Murray Batchelor

Honours Coursework

Science Communication: Hans Bachor

Electromagnetism: Mathew Hole

Quantum Mechanics: Joseph Hope

Classical Mechanics: David Williams

Statistical Mechanics: Edie Sevick (Chemistry)

Scattering Physics: Stephen Buckman and Mahananda
Dasgupta

Quantum Measurement: Mathew James (CECS)

Nonlinear Physics: Dragomir Neshev, Andrey
Sukhorukov

Non-equilibrium Statistical Mechanics: Denis Evans
(Chemistry)

Relativistic Electricity and Magnetism: Ron Burman
(UWA) with Nick Robins

General Relativity: Susan Scott

Surface Physics: Maarten Vos

Car Physics: David Williams

Graduate coursework

Master of Photonics Courses

PHYS6500 Optical Physics

Daniel Shaddock, Dragomir Neshev

PHYS6501 Fibre Optic Communication Systems

Jong Chow

PHYS6502 Microphotonics, Biophotonics &
Nanophotonics

Jong Chow

PHYS6503 Work Experience in Photonics

Jong Chow

PHYS6504 Semiconductors

Andrew Blakers (Engineering)

PHYS8505 Research Project

Jong Chow

Master of Engineering Courses

ENGN6512 Optical Physics

Daniel Shaddock, Dragomir Neshev

ENGN6513 Fibre Optic Communication Systems

Jong Chow

ENGN6613 Microphotonics, Biophotonics & Nanophotonics

Jong Chow

ENGN6625 Power Electronics

Boyd Blackwell

PHYS8013 Principles of Energy Generation and Transformation

Igor Skryabin (Engineering)

Master of Nuclear Science Courses

PHYS8201 Nuclear Fundamentals

Andrew Stuchbery

PHYS8202 Reactor Science

Andrew Stuchbery, Tony Irwin

PHYS8203 Accelerator Science

Matthew Reed

PHYS8204 Nuclear Radiation

Greg Lane

PHYS8205 Nuclear Fuel Cycle

Andrew Stuchbery

PHYS8206 Nuclear Measurement Methods

Greg Lane

Undergraduate Year Coordinators

Paul Francis (1st year)

Cormac Corr (2nd year)

Patrick Kluth (3rd year) and Special Topics Coordinator

James Sullivan/John Close (Honours)

Departmental Education Coordinators

Joseph Hope: Department of Quantum Science

Matt Sellars: Laser Physics

Cormac Corr: Plasma Physics

Adrian Sheppard: Applied Mathematics

Patrick Kluth: Electronic Materials Engineering

Andrew Stuchbery: Nuclear Physics

Elena Ostrovskaya: Nonlinear Physics

Stephen Gibson: Atomic and Molecular Physics Laboratories

Vladimir Mangazeev: Theoretical Physics

Professional Staff

Departmental Administrator

Laura Walmsley

Assistant Departmental Administrator

Gaye Carney

HDR student support (College)

Karen Nulty

Liudmila Mangos/Karen Scholte

Technical Staff

Head Technical Officer

Andrew Papworth

Laboratory Development Officer

Mika Kohonen

Technical Officer (Electronics)

Shane Grieves

Laboratory Coordinators

First year: Mika Kohonen

Second year: Cormac Corr