

EDUCATION

*Professor John Close
Deputy Director (Education)*



2012 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 2012, we continued to expand our undergraduate research project offerings and expanded the involvement of research staff in the research led teaching enterprise.

The most significant change to the management of PEC in 2012 was in its leadership. After many years of dedicated contribution to physics education at the ANU, A/Prof Anna Wilson resigned as leader of the PEC to take up a new position at the University of Oxford. Her expertise in physics education, and her detailed knowledge of how the PEC operates within RSPE and within the ANU are a role model for future leaders of the organisation. We wish her all the best in this new phase of her career.

A very substantial number of RSPE staff are involved and active in the PEC 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. 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 PEC. 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 continue to play an important role in the PEC providing information to staff in their local areas and driving the research/teaching culture in the School. The complete list of 2012 education coordinators is provided at the end of this report. Their service in this important role is much appreciated. Similarly, the year convenors 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 years, our first year numbers have grown markedly. First year is the only year that has streamed courses. The strong demand highlights the continued relevance of physics as a discipline in its own right and as an enabling discipline for other fields. The growing numbers in our Foundations Course, our main-stream first year physics courses and our Life Physics course put increased demand on our technical support staff.

ANU and RSPE are complex organisations and expert administrative staff are essential to the smooth running of the organisation. Our administrative staff play key-roles in the Department. Our administrative staff fielded a myriad of questions from both students and staff during the year, and their contribution to ANU and RSPE is an essential part of our success.

2012 has been a very successful year with increasing student numbers and increasing involvement of staff across the School in the research led teaching enterprise that is at the core of the PEC's mission. We thank all those involved in making 2012 a success, and we look forward to 2013.

STAFF WHO CONTRIBUTED TO TEACHING

Physics Education Centre Lecturers

Undergraduate Coursework

PHYS 1001 Foundations of Physics
Nick Robins, A. Shavlov, John Debs

PHYS1101 Advanced Physics I
Craig Savage, Paul Francis

PHYS1004 Life Physics
Adrian Sheppard, Jodie Bradby

PHYS1201 Advanced Physics II
Craig Savage, Paul Francis, John Love

PHYS2013 Quantum Mechanics
Anna Wilson, Andrew Truscott

PHYS2020 Thermal Physics
Frank Mills, Vladimir Mangazeev, Rachel Salmeron,
Anna Wilson

PHYS2016 Electricity and Magnetism
John Close, Cormac Corr, Igor Ivanov

PHYS2017 Waves and Optics
Ben Buchler, Jong Chow

PHYS3001 Advanced Theoretical 1
Joe Hope, Andre Carvalho

PHYS3033 Nuclear Physics
Greg Lane, Cedric Simenel, Maurits Evers

PHYS3034 Fluid Mechanics
Ross Kerr, Andy Hogg, Ross Griffiths, Graham Hughes
(RSES)

PHYS3057 Optical Physics
Dan Shaddock, Dragomir Neshev, Vincent Daria

PHYS3060 Fibre Optic Communication Systems
John Love and Jong Chow

PHYS3041/3044/5 Special Research Topics
Joe Hope

PHYS3002 Advanced Theoretical II
Susan Scott, Michael Hush

PHYS3031 Atomic Physics
Matt Sellars, Steve Gibson

PHY3032 Condensed Matter Physics
Patrick Kluth, David Williams, Jenny Wong-Leung

PHYS3051/ENGN4613: Microphotronics, Biophotonics and Nanophotonics
John Love

PHYS3058 Work Experience in Photonics
John Love

PHYS3060/ENGN4513: Fibre Optic Communications Systems
John Love, Jong Chow

PHYS3070 Physics of the Earth
Hrovje Tkalcic, Ian Jackson (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: Steve 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
John Love

PHYS6502 Microphotronics, Biophotonics & Nanophotonics

STAFF WHO CONTRIBUTED TO TEACHING

John Love

PHYS6503 Work Experience in Photonics
John Love

PHYS6504 Semiconductors
Andrew Blakers

PHYS8505 Research Project
John Love

Master of Engineering Courses

ENGN6512 Optical Physics
Daniel Shaddock, Dragomir Neshev

ENGN6513 Fibre Optic Communication Systems
John Love

ENGN6613 Microphotonics, Biophotonics & Nanophotonics
John Love

ENGN6625 Power Electronics
Boyd Blackwell

Master of Nuclear Science Courses

PHYS8201 Nuclear Fundamentals
Andrew Stuchbery

PHYS8202 Reactor Science
Andrew Stuchbery, Tony Irwin

PHYS8203 Accelerator Science
Andrew Stuchbery

PHYS8204 Nuclear Radiation
Greg Lane

PHYS8205 Nuclear Fuel Cycle
Andrew Stuchbery

PHYS8206 Nuclear Measurement Methods
Greg Lane

Undergraduate Year Coordinators

Paul Francis (1st year)

Anna Wilson (2nd year)

Joseph Hope (3rd year) and Special Topics Coordinator

Jodie Bradby PhB convenor

David Williams (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 (JAG)

Karen Nulty

Liudmila Mangos

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: Ben Buchler, Anna Wilson