

Welcome from the Congress Chairs

On behalf of the organising committee, we are delighted to welcome you to the 19th Congress of the Australian Institute of Physics (AIP) and the 35th Australian Conference on Optical Fibre Technology (ACOFT). Whilst ACOFT has been staged in Melbourne many times, this marks the third time the AIP Congress has been held in Melbourne, the last being in 1992 and the first in 1980.

The 2010 AIP Congress also incorporates the annual meeting of the Australian Optical Society as well as meetings of many of the AIP's technical groups. With over 700 delegates, the AIP/ACOFT 2010 Congress will be the most diverse scientific meeting in the Australian physics calendar. It provides a forum for discussions within specialist physics topic areas and opportunities for physicists from academia, government, industry and the commercial sector to keep up to date in areas outside their core interests. The 2010 Congress represents only the second time that it has been co-located with ACOFT which attracts optical fibre researchers investigating issues ranging from fundamental challenges in fibre design and fabrication to applications including telecommunications, biomedicine and imaging. First held in 1977, as a workshop on guided wave photonics, ACOFT is the second oldest conference series in the world in this topic area and of ongoing significance in the "information age".

In 2010 we also celebrate the 50th anniversary of the laser with our opening plenary lectures highlighting developments in ultrafast and optical fibre lasers and special Laserfest sessions exploring the past and future of this extraordinary invention. Other special sessions include the Women in Physics forum and a short course on nanofabrication. We look forward to meeting you in the relaxed environment of the welcome reception on Sunday evening, catered poster sessions on Monday and Wednesday evenings and the Congress Dinner on Tuesday night at the Plaza Ballroom on Collins Street. The Congress venue, Melbourne's new Convention and Exhibition Centre, is located a short stroll along the Yarra River from Melbourne's CBD. We hope that you will find an opportunity to explore Melbourne, its architecture, laneways, galleries, excellent shopping and world-class restaurants.

A large conference such as this relies on the inspired efforts of a dedicated team and we thank our program committee chairs, Elisabetta Barberio and Peter Hannaford (AIP) and David Moss (ACOFT), as well as all members of the organising committee and the AIP and ACOFT programme committees, the AIP stream convenors and the abstract and paper reviewers as well as our ever-attentive conference managers Kymberlee Senior and Janette Sofronidis. We also would like to extend a special thanks to Gaby Bright, Stuart Wyithe and Peter Johnston who made significant contributions to the early organisation of the conference.

We would also like to take the opportunity to express our deep appreciation for the generous support of our sponsors and exhibitors that has made this Congress possible. Please take time to visit the exhibition, meet our exhibitors and explore the diverse range of products and services on display.

Away from the busy lives we lead at our universities, research institutions and businesses we hope that this conference will provide you with a relaxed, but stimulating, meeting place to reflect on your research, get together with old and new friends, establish collaborations and see the future of physics in our students and early-career scientists. We hope you enjoy your participation in the 2010

Australian Institute of Physics Congress and the Australian Conference on Optical Fibre Technology:
Living Physics.

Associate Professor Andrew Peele
La Trobe University AIP 2010 Co-Chair

Associate Professor Ann Roberts
The University of Melbourne AIP 2010 Co-Chair

Associate Professor Stephen Collins
Victoria University ACOFT 2010 Chair

Welcome from the President - Australian Institute of Physics

Welcome to the 19th Australian Institute of Physics Congress, incorporating the 35th Australian Conference on Optics and Fibre Technology (ACOFT). As with previous congresses, many societies or common interest groups have combined to hold their specialist meetings during the period of the Congress. As the biggest gatherings of Australian physicists, our congresses provide opportunities for networking across the discipline and allow all delegates to hear talks by distinguished speakers on a wide range of physics topics. Of particular note this year will be recognition of the 50th anniversary of the first operation of a laser, a reminder of how physics continues to shape modern technology and provide tools that facilitate advances in other fields of science. To run a congress like this requires dedicated effort by many people. I thank all those who have contributed, in particular co-chairs of the Congress organising committee, Andrew Peele and Ann Roberts, and Stephen Collins, chair of ACOFT.

I wish all delegates an enjoyable and rewarding Congress.

Brian James, President - Australian Institute of Physics

Abstract Reviewers

ACOFT

David Moss
Peter Farrell
Stuart Jackson
Steve Madden
Annan Mitchell
Dominic Murphy

Acoustics, Music and Ultrasonics

Roger Rasool

Astronomy and Astrophysics

Warrick Couch

Atomic & Molecular Physics

Andy Martin

Biophysics / Biomedical Physics

Harry Quiney

Complex Systems, Computational & Mathematical Physics

Andrew Melatos

Condensed Matter, Materials and Surface Physics

Gary Bryant

Chris Pakes

Salvy Russo

Education & History of Physics

Maurizio Toscano

Pam Mulhall

Meteorology, Oceanography, Environmental Physics and Climate Change

John Zillman

Nuclear and Particle Physics

Nicole Bell

Martin Sevier

Mahananda Dasgupta

Optics, Photonics and Lasers

Russell McLean

Tim Davis

Snjezana Tomljenovic-Hanic

Plasma Science

Christine Charles

Quantum Information, Concepts and Coherence Group

Andrew Greentree

Relativity and Gravitation

Leo Brewin

Renewable Energy

Paul Mulvaney

Solar, Terrestrial and Space Physics

Iver Cairns
Marcus Duldig
Trevor Harris
Vasili Lobzin
Roman Makarevich
Dave Neudegg
Iain Reid
Colin Waters

Synchrotron Science

Martin de Jonge
Karen Siu

Women in Physics

Nicoleta Dragomir

PROGRAM

Sunday 5th December

1300 - 1900	Registration Open – Level 2, Pre-Function Area
1200 - 1600	Exhibitors Move In
1500 - 1900	Speaker Preparation Room Open – Speaker Room 201
1700 - 1900	Exhibition Hall Open – Banquet Room 201
1700 - 1900	WELCOME RECEPTION – Exhibition Hall – Banquet Room 201. Refreshments served, included with Registration Welcome Reception: Sponsored by IOP Institute of Physics
1700 - 1900	Authors to set up posters for Session 1

Monday 6th December

0730 - 1730	Registration Open – Level 2, Pre-Function Area							
0730 - 1730	Speaker Preparation Room Open – Speaker Room 201							
0800 - 1030	Authors to continue poster set up for Session 1							
0800 - 1830	Exhibition Open – Banquet Room 201							
0830 - 0900	CONGRESS OPENING Banquet Room 202							
0900 - 0945	PLENARY 1 – Professor Margaret Murnane University of Colorado, USA Attosecond Light and Science at the Timescale of the Electron Banquet Room 202 – Chair: Keith Nugent Session sponsor – ARC Centre of Excellence for Coherent X-ray Science							
0945 - 1030	PLENARY 2 – Professor David Payne University of Southampton, UK Presentation Title to be advised Banquet Room 202 – Chair: Stephen Collins							
1030	All Session 1 posters to be on display							
1030 - 1100	Morning Tea – Banquet Room 201 – Sponsored by La Trobe University Casual Poster Viewing – Exhibition Hall							
1100 - 1230	CONCURRENT SESSION 1							
	1A ACOFI KEYNOTE SESSION 1 Session sponsor: CUDOS	1B Astronomy & Astrophysics	1C Nuclear & Particle Physics 1	1D Meteorology, Oceanography, Environmental Physics & Climate Change 1	1E AOS – Sensing/Lasers	1F Solar, Terrestrial & Space Physics 1	1G AOS – Diamond Photonics	1H CMMSP – Surface & Materials
	Banquet Room 202	Meeting Room 203	Meeting Room 204	Meeting Room 207	Meeting Room 208	Meeting Room 209	Meeting Room 205	Meeting Room 206
	Chair: David Moss	Chair: Duncan Galloway	Chair: Martin Sevier	Chair: John Zillman	Chair: Ann Roberts	Chair: Iver Cairns	Chair: Snjezana Tomljenovic-Hanic	Chair: Chris Pakes
1100 - 1130	Dr Rene Essiambre Alcatel-Lucent USA Fiber Capacity Limits: Information Theory meets Optical Communication and Fiber Physics (Keynote 30 mins)	Krzysztof Bolejko (#632) Australian National University ACT Evolution of Dark Energy in the Inhomogeneous Universe	Martin White (Invited 30 mins) University of Melbourne VIC First results from the ATLAS Experiment	Neville Nicholls (Invited 30 mins) Monash University VIC Myths about Global Warming & the IPCC	Katarina Svanberg (Invited 30min) Lund University Hospital SWEDEN Diagnostics & Treatments of Tumours using Laser Techniques	Iain Reid (Invited 30 mins) University of Adelaide SA Long Term Mesospheric Nightglow Observations	Thomas Babinec (Invited, 30 mins) Harvard University USA Diamond Nanophotonics and Quantum Optics	Alastair Stacey (30 mins, #439) University of Melbourne VIC Near Edge X-Ray Absorption Fine Structure as a Tool for Diamond Surface Engineering
1115 - 1130		Victor Flambaum (#182) University of New South Wales NSW Variation of the Fundamental Constants from Big Bang to Atomic Clocks: Theory and Observations						
1130 - 1200	Professor Arthur Lowery Monash University VIC Optical Frequency Division Multiplexing (Keynote 30 mins)	Michael Brown (#188) Monash University VIC Does Every Massive Galaxy Host an Active Galactic Nucleus?	Ahmad Galea (#68) University of Melbourne VIC Late Decaying WIMP Dark Matter and the Disruption of Large Scale Structure	Jorgen Frederiksen (#315) CSIRO Marine And Atmospheric Research VIC Changes and Projections in Southern Hemisphere Climate and Weather Systems	Peter Domachuk (#765) University of Sydney NSW Biopolymer Photonics: Unnatural Uses for Natural Materials	Joel Younger (#526) University of Adelaide SA Analysis of Radar Detected Meteor Showers	Matthew Henderson (#516) University of Adelaide SA Fabrication of a Hybrid Diamond-Tellurite Material for Quantum Photonics Applications	Dougal McCulloch (#736) RMIT University VIC The Electron Loss Near-Edge Structure of Cubic Boron Nitride
1145 - 1200		Taissa Danilovich (#594) University of Melbourne VIC The Physical Basis of the Tully-Fisher Relation	Anna Phan (#180) University of Melbourne VIC Search for the Light Scalar Top in ATLAS at the LHC for a Centre-of-Mass Energy of 7 TeV	Joanna Turner (#276) University of Southern Queensland QLD Ultraviolet Reflection and Outdoor Workers: Why Warm Seasons Have Less Influence on Reflected UV Exposures than Cool Seasons	William Olds (#527) Queensland University of Technology QLD Non-Invasive Identification of Substances in Opaque Containers Based on Raman Spectroscopy	Svetlana Petelina (#111) La Trobe University VIC Ice Layers in the Polar Summer Mesosphere: Properties and Indications of Climate Change	Brant Gibson (#296) The Innovation Group VIC Emission Dipole Imaging in Diamond Single Emitters	Barbara Fairchild (#346) University of Melbourne VIC The Amorphous Carbon/Diamond Interface in Ion Implanted Diamond
1200 - 1230	Seb Savory University College London UNITED KINGDOM Digital Coherent Transceivers: From Access to Core (Keynote 30 mins)	Duncan Galloway (#432) Monash University VIC Fundamental Physics from Accreting Neutron Stars	David Jennens (#234) University of Melbourne VIC ATLAS Calorimeter Response to Single Isolated Hadrons	Bronwyn Dolman (#447) ATRAD SA A Comparison of Radiosonde and Radar Measurements of Winds	Peter McGlynn (#475) RMIT University VIC A Modern Replacement for the Dobson Spectrometer	Peter Dyson (#360) La Trobe University VIC Stability of Large Fabry-Perot Spectrometer at a Remote Site	Brant Gibson (#501) The Innovation Group VIC Single Photon Emission from Diamond Embedded in Tellurite Glass	Keal Byrne (#518) University of Western Australia WA Optical and Structural Properties of the Argyle Pink Diamond Defect Centre
1215 - 1230		Simon Ellis (#442) Australian Astronomical Observatory NSW GNOSIS: A Fibre Bragg Grating OH Suppression Unit for Near-Infrared Spectrographs	Mark Boland (#143) Australian Synchrotron VIC The Australian Collaboration for Accelerator Science	TBC	Nick Chang (#484) University of Adelaide SA An Efficient Q-Switched Er:YAG Laser for Coherent Remote Sensing	Robert Greenwood (#365) Bureau Of Meteorology VIC Ocean Wind-Wave Measurements using the TIGER SuperDARN Radars	Taras Plakhotnik (#515) University of Queensland QLD NV-Centers in Nanodiamonds At Temperatures Between 300 K And 700 K: Perspectives on Nanothermometry and Other Applications	TBC
1230 - 1330	Lunch Break (please note, lunch is not provided by congress) Casual Poster Viewing – Exhibition Hall					The Decadal Plan Discussion Solar, Terrestrial & Space Physics (Business Lunch) 1245 - 1315		