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Links and Communications

As a research centre of excellence, CUDOS aspires to build peer-to-peer links with the leading international researchers and research groups. At the same time, we aim to establish a strong presence within the Australian research and industry communities. Our activities in this area are summarised in this section.

Major CUDOS presence at ACOFT/AOS

The Australian Conference on Optical Fibre Technology (ACOFT) and the Annual Meeting of the Australian Optical Society (AOS) are the two major conferences for the Australian optics and photonics communities. In 2004 they were co-located in Canberra, with around 200 registrants. CUDOS played a major role in this meeting:

- Professor Eggleton was Chair of the Technical Program Committee for ACOFT while Dr Walsh was a member of the Organising Committee and Prof de Sterke was a member of the Technical Program Committee for the AOS meeting.
- Professor McPhedran was awarded the Medal of the AOS at a plenary session and presented a plenary talk entitled "It's optics, naturally".
- CUDOS students Darren Freeman (ANU) and Tom White (Sydney) were joint winners of the Wanda Henry Prize for best student presentation at the ACOFT meeting while Paul Steinvurzel (Sydney) won the OSA/SPIE prize for best student presentation at the AOS meeting.

Around 30 CUDOS researchers and students attended the meeting and gave twenty one presentations (oral and poster), including three invited presentations.

International meetings

CUDOS researchers continue to have a major presence in international meetings, both as members of technical program committees and as invited or keynote speakers. The full lists of committees and invited talks are presented elsewhere, but some highlights include:

- Three of the eight papers in the prestigious post-deadline session of the OSA Topical Meeting on Nonlinear Guided Waves and Applications (Toronto) were from CUDOS.
- CUDOS CIs played leadership roles in two of the major optics meetings held in Australia during 2004: Professor Eggleton chaired the Technical Program Committee of the Australian Conference on Optical Fibre Technology (ACOFT) in Canberra while Professor Min Gu chaired the Organising Committee for the 8th International Conference on Optics Within Life Sciences (OWLS) in Melbourne.

Science Foundation presentation in CUDOS laboratory

The Federal Minister for Education, Science and Training, Dr Brendan Nelson, visited the School of Physics during 2004 to present a cheque to the Harry Messel Endowment fund. The presentation was made in the CUDOS laboratories in the School. After the presentation Dr Nelson was given a tour of the laboratories by Professor Eggleton, and spent some time in discussion with students.

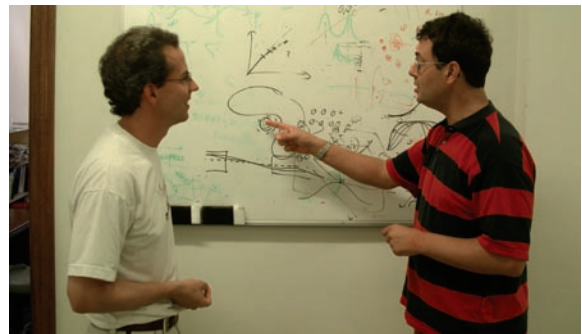


▲ The Hon Brendan Nelson (left) hearing about CUDOS research from Prof Eggleton and (right) learning about microfluidics from Peter Domachuk.

Visiting scientists

CUDOS benefited from visits and extended stays at its nodes by a number of distinguished visiting scientists during the year. In several cases, senior academics from North America elected to spend their sabbatical leave or take up a travelling fellowship working with CUDOS researchers, a resounding vote of endorsement for the strength and international profile of our research.

A/Professor Marc Dignam (Physics Department, Queen's University, Kingston, Ontario) is spending 8 months working



▲ Marc Dignam (left) and Martijn de Sterke discuss density of states in photonic crystals.

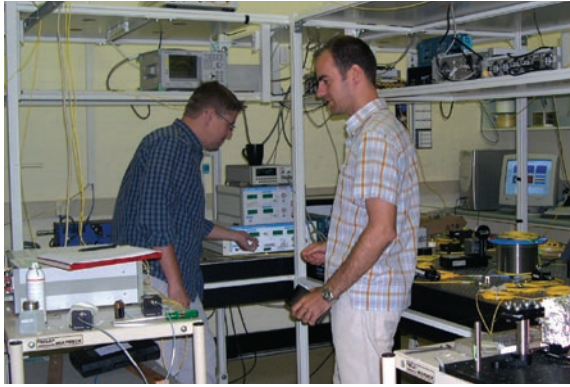
at Sydney University, with Profs de Sterke and McPhedran, and with David Fussell studying radiation dynamics in microcavities. Two manuscripts describing the results are in preparation.

Dr Nathan Kutz (University of Washington, Seattle) spent six months at the University of Sydney, working with Professor Eggleton on Raman processes in fibre lasers.

Dr Martin Rochette, a Canadian photonics expert with experience in both academia and industry, was awarded a prestigious Canadian travelling Fellowship, tenable anywhere in the world. Much to the delight of CUDOS, he has elected to spend his Fellowship working with Professor Eggleton at Sydney. Martin is playing a key role in the development of high speed photonic devices.

International and national collaborations

Canadian Photonics Fabrication Centre: Dr David Moss, Principal Research Fellow with CUDOS, has established a strong relationship with the Canadian Photonics Fabrication Centre (CPFC). The CPFC provides simulation, design, fabrication, testing, and prototyping services using fabrication and testing facilities amongst the best in the world.



▲ Dr Martin Rochette (right) and Dr Ian Littler in one of the CUDOS laboratories.

Bandwidth Foundry and RMIT: Professor Kivshar has collaborated with Professor Austin's group at the Royal Melbourne Institute of Technology to develop periodic structures for use in experimental studies of optically induced photonic lattices. Professor Eggleton's group has commenced collaboration with the same group and with the Bandwidth Foundry to develop microfabrication capabilities for a range of project opportunities.

University of Queensland: Professor Eggleton, as part of a new Discovery project on applications of microfluidics to photonics, has established a collaboration with Associate Professor Justin Cooper White of the Particles and System Design Centre at the University of Queensland. A/Prof Cooper-White's group expertise in microfluidics has led to new approaches in controlling the shape of the meniscus in sub-micrometre channels. By applying these results to microfluids inside the capillaries of a microstructured fibre, Professor Eggleton's team has demonstrated novel photonic devices exhibiting optical switching and tunable spectral filtering.

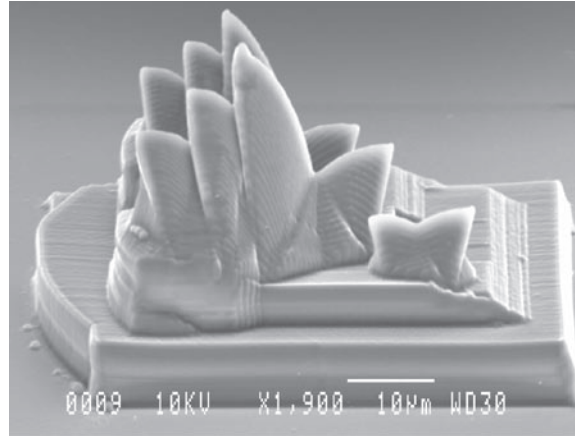
Collaboration with Japan: A research student, Mr. Michihiro Takii, from Professor Y. Kawata's Optical Science Lab in Shizuoka University, worked in Professor Gu's group at Swinburne to develop a photopolymerisation method for fabricating 3-D photonic crystals.

Minifab: The Swinburne team has successfully fabricated a super-resolution filter through collaboration with MiniFab, a spin-off company from Swinburne. Use of the filter has enabled an improvement in fabricating 3-D photonic crystals.

Publicity

Major awards: While they are primarily personal honours, major awards to CUDOS researchers raise the profile of CUDOS activities amongst scientific peer groups and the general community. Professor Eggleton's award of the Malcolm McIntosh medal for Physical Scientist of the year received extensive coverage in the national press, with page 2 articles in the Australian and the Sydney Morning Herald. The award was presented at a ceremony in Parliament House attended by a "who's who" of Australian science.

Articles in the popular press: The Swinburne group headed by Professor Min Gu achieved national recognition with their "micro-sculpture" of the Sydney Opera House, which was featured in articles in the Australian, The Age, the Herald Sun as well as on ABC TV and Radio. Professor McPhedran's work with colleagues to explain the optical basis of jellyfish colours was reported in the UK daily newspaper "The Guardian".



▲ A three dimensional image of the Sydney Opera House created at Swinburne using two photon laser polymerisation.

Yuri Kivshar and colleagues have written a series of articles suitable for a general scientific audience on solitons and other nonlinear optical phenomena that have appeared in Physics Today and Optics and Photonics News.

Physics in Industry: Dr Walsh presented an overview of CUDOS research in the context of trends in the telecommunications industry at the Physics in Industry Day, hosted by the Australian Institute of Physics at the University of Western Sydney.

High School Education Outreach

A web site that provides resource material for high school teachers in modern optical communications and photonics is being developed with CUDOS support by Dr Paul Stokes, a candidate for the Master of Teaching degree at Sydney University. Dr Stokes' work is being supervised by Professor McPhedran and is based on two modules of the Higher



▲ Justin Blows explains optical communications principles to a workshop of high school teachers.

School Certificate syllabus in New South Wales, "The World Communicates" and "The Age of Silicon".

Dr Justin Blows has strong links with the NSW Science Teachers Association. At a meeting of the Association held at Sydney University in 2004, Dr Blows presented a laboratory "hands on" session to around twenty teachers demonstrating the principles of laser modulation and its application to communications.