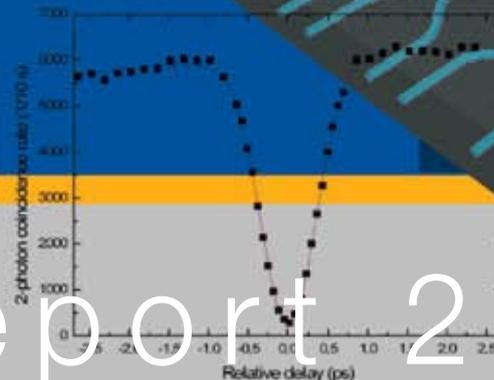
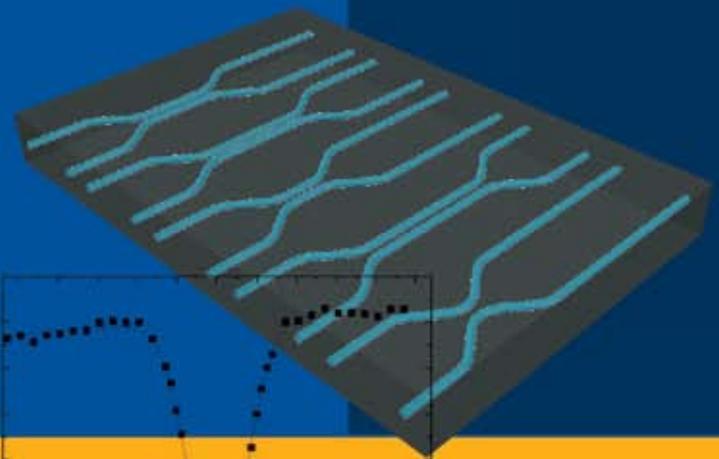
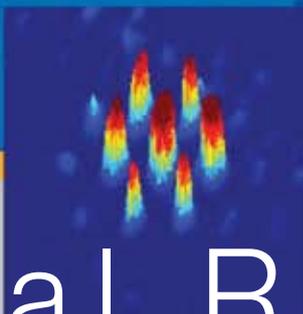
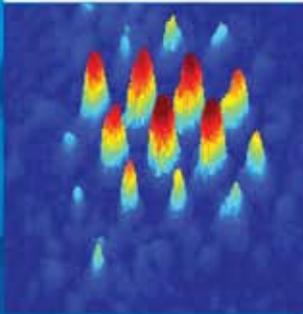
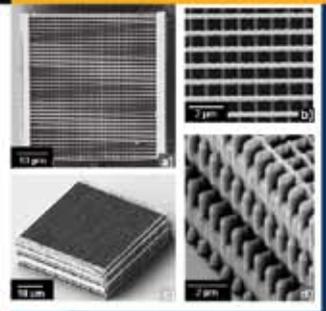
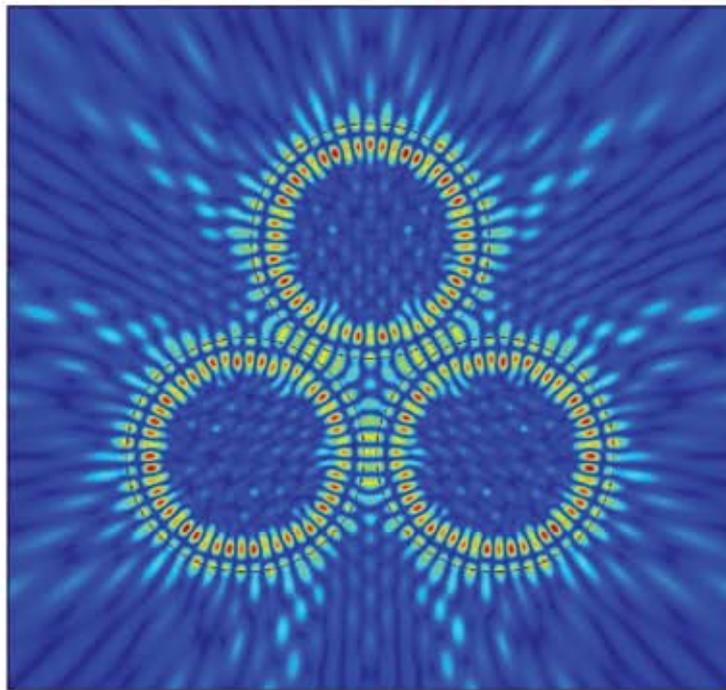
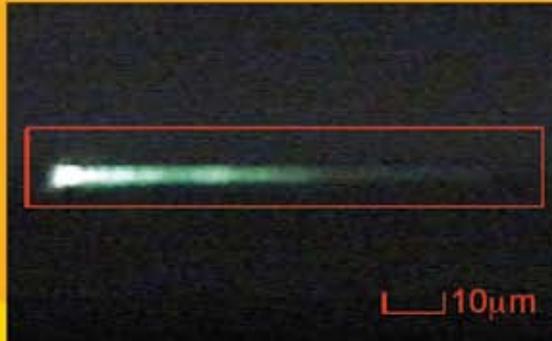


CUDOS

The Centre for Ultrahigh bandwidth Devices for Optical Systems (CUDOS)



Annual Report 2008

Links and Commercialisation

The links built by CUDOS come from a range of sources

- Visiting students and researchers join one or other of our nodes for periods of between a month or a year, often leaving not just with a jointly authored publication but with ideas for new research collaborations. During 2008 we welcomed 15 visiting students and more than 20 academic researchers.
- Our Partner Investigators are key to building strong links at a group level. As an example, Professor Kuipers (FOM Amsterdam) and Professor Krauss (St Andrews) are both Partner Investigators but also collaborate with CUDOS through their participation in an EU-funded project, SPLASH. This group-to-group interaction has expanded collaborations with other academics in the SPLASH collaboration in Glasgow and Milan. Our collaboration with Professor Wilson (Oxford) has led to a series of visits by Dr Martin Booth (Oxford) funded by an international collaboration grant from Leverhulme Trust (UK). Our Partner Investigators and other collaborators are welcomed to our Annual Workshop each year



Partner Investigators and visitors at the CUDOS Workshop in 2008 and 2009

- Our Chief Investigators and senior researchers are often 'on the road', either attending conferences or visiting other laboratories, and these visits often lead to collaborations. Examples during 2008 include a collaboration with Prof. Daniel Jaque's group at Universidad Autónoma de Madrid, Spain, which was strengthened after Dr. Guangyong Zhou visited Spain in June to study the radiation properties of rare-earth ion in photonic crystals, which could lead to active photonic devices. Mr. Airán Ródenas Seguí, a PhD student from Prof. Jaque's group, visited Swinburne for 3 months and worked on the photonic crystal fabrication in rare-earth ion doped lithium niobate. So far two joint papers have been resulted from this collaboration.
- Our Advisory Board has been extremely helpful in building strategic links with key industry sectors, with Dr Steve Frisken providing an industry perspective on some of our optical signal

processing activities and Mr Laurie Bode playing an active role in linking our researchers at RMIT, Macquarie and Sydney with opportunities in the defence sector

CUDOS is a Centre with strong national and international links and agreements in place. In Australia NICTA and DSTO are collaborators through the involvement of scientists from each institution as Partner Investigators. Centre researchers also collaborate with Optium Inc via a Linkage Grant and Redfern Polymer Optics, where co-location on the ANU campus has led to arrangements for shared facilities of significant benefit to both parties. The Centre also has links with Bandwidth Foundry International (equipment sharing) and makes its facilities at different nodes available as required for external users.

Internationally, the Centre now has formal collaborative agreements in place with two European Networks of Excellence (PHOREMOST and NEMO) and with Projects funded under the European Commission's Future and Emerging Technologies program. We are also formally a member of Action 299 of the European Cooperation in Science and Technology (COST) Program.

Funding from the International Science Linkages Program has been obtained to support the collaboration with the Slow Photon Light Activated Switch (SPLASH) project and with Professor Martin Pemble and the Tyndall Institute, Ireland. In each case the grants provide funds for collaborative activities outside, but highly complementary to, the CUDOS CoE program. Technical aspects of each project are discussed in the Slow Light and 3D Photonic Crystal Flagship reports.

Conference and Workshop Activities

ICO-OECC meeting

Centre staff played leading roles in the organisation and programming of one of the largest optics and photonics events seen in Australia for the past ten years, the 13th Opto Electronics and Communications Conference (OECC) and the 21st Congress of the International Commission for Optics (ICO). The meetings also incorporated ACOFT, the Australian Conference on Optical Fibre Technology and the Annual Meeting of the Australian Optical Society. Over 700 delegates attended this 'mega-meeting' at the Darling Harbour Convention Centre from thirty seven different countries including Australia.

Professor Eggleton chaired the OECC meeting and Dr Walsh the ICO meeting. Prof de Sterke chaired the subcommittee on 'Frontiers in Photonics' while Profs Kivshar and Gu were members of the ICO Technical Program Committee. Dr Steel and Dr Tomljenovic-Hanic organised a Workshop as part of OECC 2008 entitled "High-Q cavities: how much is enough?"



The registration booth at the ICO/OECC meeting at Darling Harbour



Plenary session at the ICO/OECC Meeting

The role played by CUDOS staff in organising this meeting and the strong representation by CUDOS researchers at the meeting indicates yet again the leadership by the Centre of the Australian optics and photonics community.

The meeting featured two events that demonstrated the strong links the Centre has with industry and the wider community. The first of these was the launch of a product by one of the exhibitors at the meeting, Optium (now Finisar). The product originated directly from a collaboration between Ben Eggleton (CI) and Dr Steve Frisken (Optium) under a Linkage grant, but with a strong dependence on the facilities and research skills of the Centre.

The second was a press release issued by the Centre to coincide with the presentation of a landmark paper in a post-deadline session of the OECC meeting. The paper presented CUDOS results on all-optical demultiplexing at 640 Gb/s and the press release heralded what this meant for next generation optical communications systems. The reaction to this press release was nothing short of extraordinary, with intense interest from Australian and international media resulting in numerous interview including a segment on the highly-regarded Business Sunday program. The inventory of media stories is catalogued in the Outreach section.

7th CUDOS Workshop

The 2007 Annual Workshop was held at Murramarang Resort on the NSW South Coast over three days in February. This event is the one opportunity for all CUDOS researchers, both staff and students, to meet and discuss their research and to network socially. There is a strong focus on student involvement, with one session dedicated to student posters and a significant prize awarded to the best student poster. We also awarded a prize to the best student outreach activity.



A full house for the oral sessions at the CUDOS Workshop



Students set up their equipment to demonstrate optical effects to school students as part of the Outreach competition.

Metamaterials Tutorial Workshop

The Centre regularly organises tutorial workshops for staff, students and others in areas of current interest. This year Dr Boris Kuhlmeier (Sydney) organised a series of tutorial addressing the subject of Metamaterials, with introductory-level presentations through to in-depth surveys of the latest experimental results in plasmonics, cloaking and nonlinear metamaterials. The Workshop was attended by sixty researchers and students from inside and outside of CUDOS.

Commercialisation

The commercialisation by Finisar of the Waveshaper (www.waveshaper.net) was a major outcome for the Centre. This product grew out of the results of a collaborative project funded under a Linkage grant but which drew substantially on CUDOS facilities and the expertise of CUDOS researchers. The success of this project and the confidence that the Company has in the skills and expertise of the Centre in high bandwidth optical systems has led to a second Linkage project which will commence in 2009.