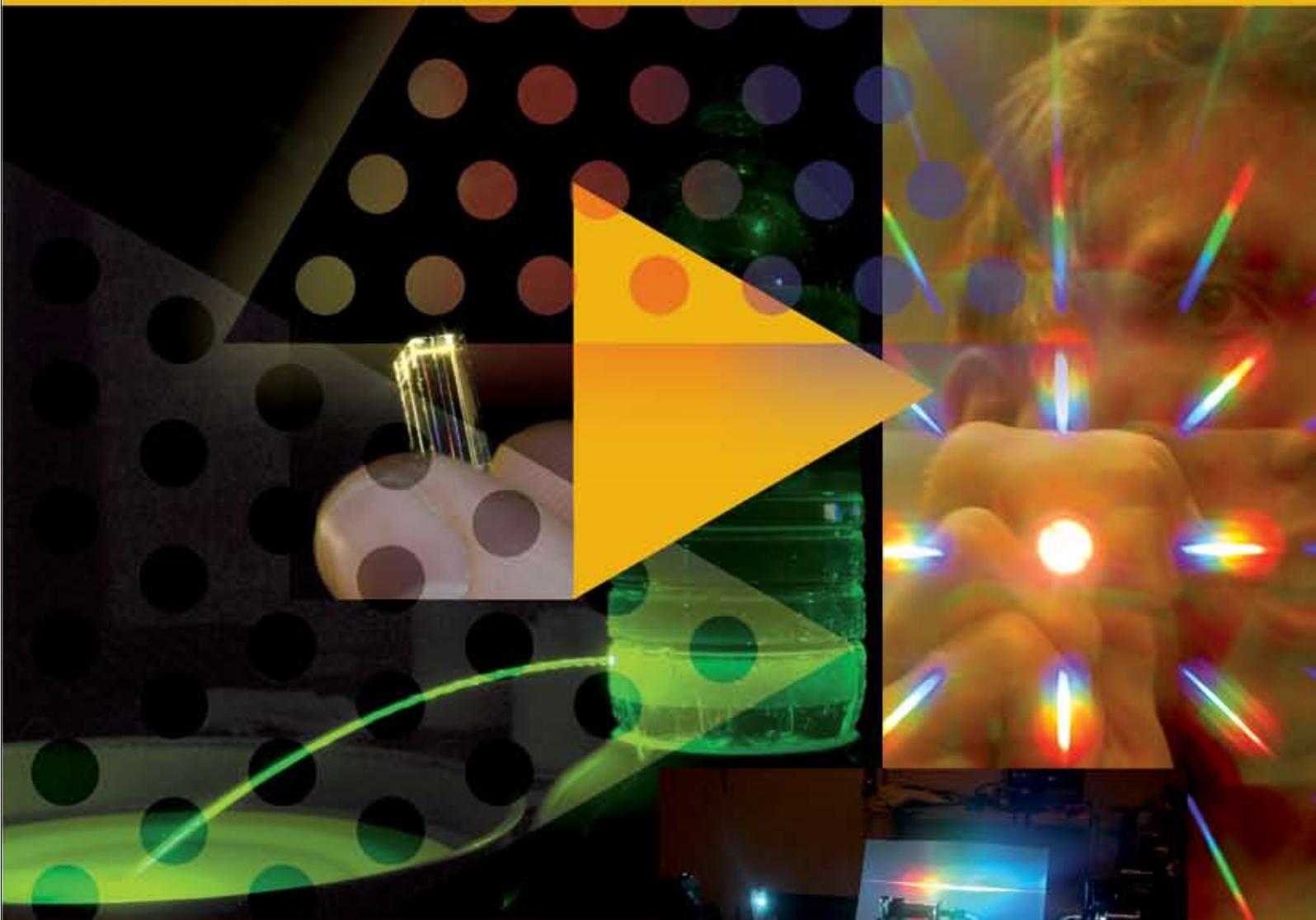


CUDOS

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



A N N U A L R E P O R T

2006



Martijn de Sterke



▲ CUDOS staff and students at the Slow Light Workshop, held at Cogee.

The CUDOS students continue to do great things! Some of the highlights of 2006, including the Student Competition and Prizes are discussed in some detail below. However the sheer numbers are impressive in themselves: at the end of 2006 we had five Honours and 27 postgraduate students on our books, with 4 leaving during the year: Peter Domachuk took a postdoc position at Tufts University in Boston (USA), Andrew Lee joined Warsash Scientific, Ross McKerracher joined ARPANSA, the Australian Radiation Protection and Nuclear Safety Regulator, and Sam Myers went to work for Silverbrook Research. We wish them well in their future endeavours. A list of all honours and postgraduate students associated with the Centre during 2006 is shown.

Student competition: As mentioned, one highlight of the year was the student competition. The students were challenged to write a 500-1000 word popular article about their research, suitable for publication in magazines like *New Scientist*. The competition was a great success with 13 submissions from students at all levels of training, varying from undergraduate honours students to senior PhD students. The jury, arranged by Kali Madden, consisted of David Ellyard from the National Council for the Australian Science Communicators, Sara Phillips (Senior Editor with *COSMOS* magazine), and Ross McPhedran from CUDOS. *COSMOS* also provided some of the prizes. The winners were announced at the Hervey Bay workshop. First prize went to Peter Domachuk from the University of Sydney, who received \$1000 for his article "Music of the Spheres," about optical trapping and manipulation. Second prize (\$250) went to Dane Austin, also from the University of Sydney, for "Explosion of colour," about supercontinuum generation in optical fibres. Third prize (\$100) was awarded to Luke Stewart from Macquarie University for "Smart Gemstones," about the fabrication of artificial opals. In addition, six students were highly commended, and four received meritorious participations. These articles have in fact been quite a coup: Peter's article was published in the on-line edition of *COSMOS* magazine, and Luke's has appeared on

the Future Materials website. In addition, six of the articles have now appeared in different issues of *AOS News*, the newsletter of the Australian Optical Society, with some of the others still to come. All competition entries can be found at <http://cudos.org.au/cudos/studentcomp06/>

Slow light workshop: Following enthusiastic responses to previous tutorial workshops, a workshop dedicated to Slow Light was held on 16 June in Cogee. Organized by Christelle Monat, Andrey Sukhorov, Tom White, and de Sterke, it attracted over 60 internal delegates from all nodes. In 13 presentations by CUDOS researchers, many of a tutorial nature, the relevant key concepts and current literature were reviewed, as were CUDOS' activities in the area and how these fit into the wider picture. The workshop was enthusiastically received by students and by more experienced researchers. We all came away with an increased appreciation of some of the general issues, and of the challenges involved in realizing some of the potential applications.

Student prizes: Many of the students won prizes this year. Christian Rosberg was awarded the Robert and Helen Crompton Travel Scholarship from the ANU (for an amount up to \$4000), to give an oral presentation of his work at a conference of his choice. Steven Morrison was awarded the 2006 Scholarship/ARNAM Award (\$800) at the ETOPI7 conference in Sydney. Vahid Ta'eed was the winner of AIP Postgraduate Student prize. As the University of Sydney representative, he competed for this prize with students from all other physics departments in the state of New South Wales! During our Workshop in Hervey Bay we organized a prize for the best student posters: the winners were Cameron Smith and Mike Ventura, with second prize shared by Neil Baker, Steve Morrison and Hong Nguyen.

Collaboration: An important benefit for the students of working in a Centre like CUDOS is the opportunity to draw on the expertise of many others and to collaborate with people from all through the Centre. A few examples: in 2006, Ben Johnston (Macquarie) worked intensively with Prof Solomon Saitel, a colleague from Bulgaria visiting Yuri Kivshar. This collaboration led to the demonstrations of both cascaded nonlinear processes in a single period PPLN device and interference effects of the second harmonic waves in this device. Aaron Matthews (ANU) visited the Centre for Micro-Photonics at Swinburne University to work with Min Gu and Guangyong Zhou on two- and three-dimensional photonic crystal modelling, and the implementation of a photonic crystal beamsplitter in photopolymer. Robert Fischer (ANU), with help from Jeremy Bolger and Mark Pelusi, used the University of Sydney facilities to do experiments focused on second-harmonic generation in strontium barium niobate at telecommunications wavelengths.



▲ Peter Domachuk dons the winner's COSMOS cap.