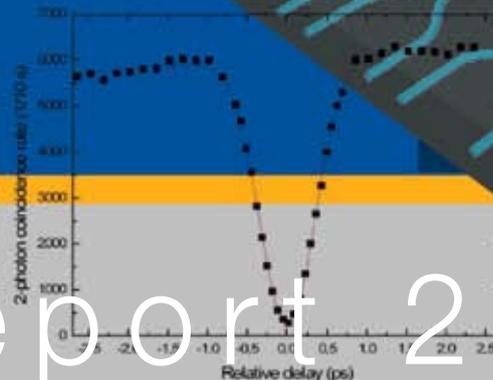
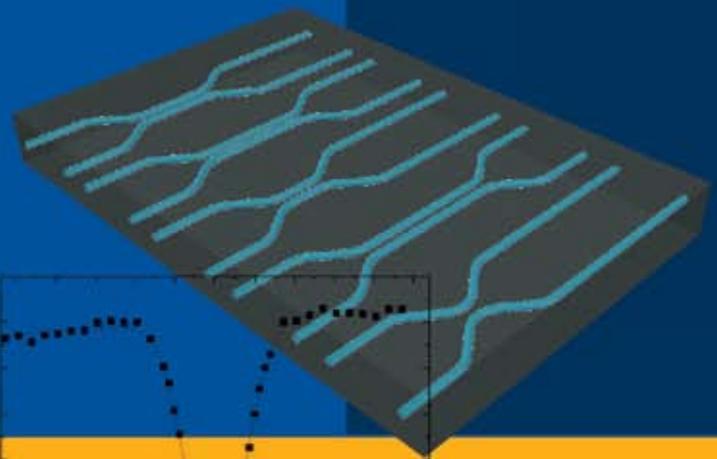
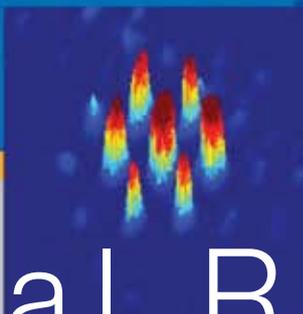
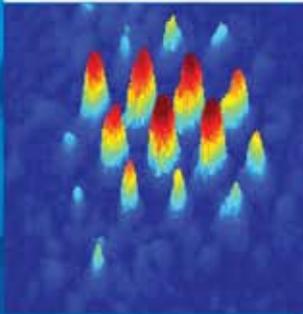
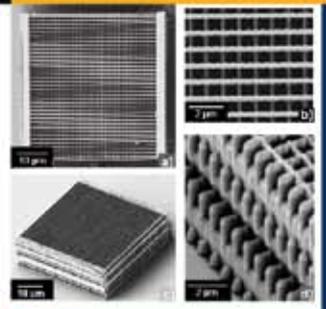
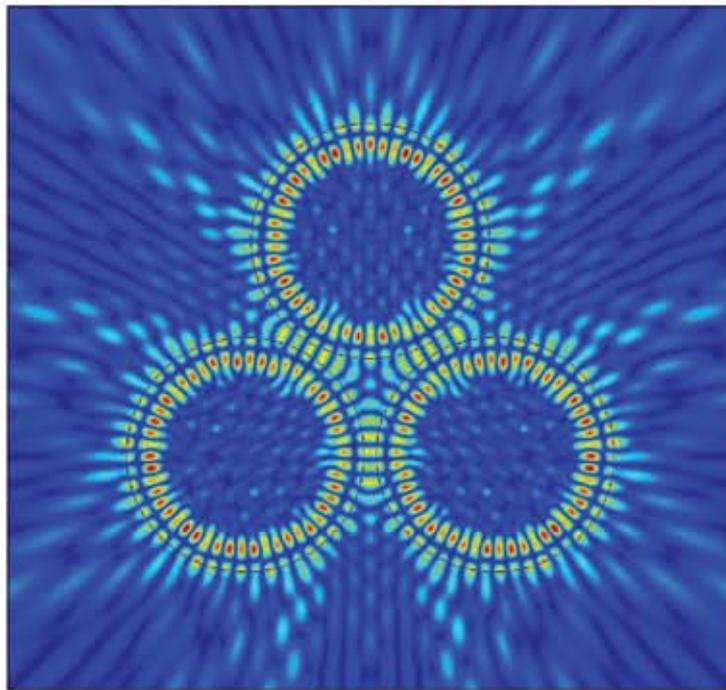
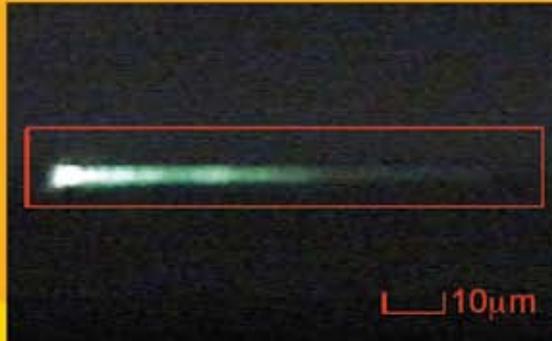


CUDOS

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



Annual Report 2008

Outreach Coordinator Ms Kali Madden



Early this year our Director was named one of the most influential scientists in Sydney.[1] Not only does this recognition reflect well on Ben and his scientific leadership, it also demonstrates the positive public opinion of the significance of the research being performed by the many highly respected members of CUDOS, and their capacity to communicate it.

This year outreach (public communication of science) efforts were further supported and recognized by the introduction of a \$1,000 CUDOS Outreach Prize. The award is open to all CUDOS staff and students. The award aims to highlight significant outreach performed within the Centre for the previous year, whilst encouraging those who already do outreach to communicate their efforts with other CUDOS members and the optics community. Winners of the 2008 prize are discussed further below.

In addition, staff and students were treated to a session on communicating science at the 2008 annual CUDOS workshop this year. The Sydney University School of Physics Science Communicator, Dr Phil Dooley, facilitated the session. Talks were also given by the specially invited Dr Mark Butler (Head Teacher Science, Gosford High School) and Dr Dooley.

As in previous years, this year CUDOS members across the board actively engaged with the community at many levels to bring optics and photonics into the limelight. Whether bringing outback students to optics (see 2008 Highlights), photonics to science in the city, or engaging in school talks, class lab tours, student research schemes and more, our national coordinated effort saw many members of the public having the opportunity to engage with our research and the people performing it.

We also saw a growing interest in using multimedia for communications that overcome some of the major resourcing challenges of public science communication, whilst enabling a broader audience to gain access to, and be entertained by the material. An effective animation developed this year by CUDOS students is discussed further in 2008 Highlights.

To learn more about CUDOS outreach activities (past and pending) see our web site and newsletters, or email Kali (kali@ics.mq.edu.au).

[1.] The (top100): Sydney's most influential people (science). the(sydney)magazine (Issue #57). January 2008.

2007 Outreach Prize

As part of supporting the excellent outreach performed by staff and students across CUDOS nationally, in 2008 an outreach prize of

\$1,000 was awarded to the Australian National University Outreach Group for the 2007 program "Optics in the Outback". The prize was collected at the 2008 CUDOS Workshop by Christian Rosberg on behalf of himself, Robert Fischer and Amrita Prasad.



Christian Rosberg being awarded the CUDOS Outreach Prize with prize judges Kali Madden and Dr Phil Dooley

We are pleased to note that Robert Fischer has since moved into optics outreach full time, relocating to Belgium to work with the group of our esteemed Partner Investigator, Prof. Dr. Ir. Hugo Thienpont who is also recognized for his contributions to Photonics in Education. Robert was co-founder of the original Optics in the Outback program at the Australian National University (as reported in the 2007 Annual Report) and we look forward to hearing more as our European colleagues take optics outreach to new levels.

- C. R. Rosberg, R. Fischer, and A. Prasad, "Long-Distance Learning: Teaching Optics in the Outback," Optics and Photonics News, 18(6), 22 (2007).

CUDOS High School Science Talks: A Snap Shot

Feedback from teachers who book our students for talks suggests that talks delivered by our research students are well received, with questions about careers often high on the agenda for attending high school students. The following feedback on talks delivered by three CUDOS students from Macquarie University and the University of Sydney this year demonstrates the type of experience our outreach presenters can deliver to students.

"They [the CUDOS research students] gave four presentations to two groups of 45 yr 11 students, one group of 50 year 12 students and a more informal presentation to 15 kids from the science extension group at lunchtime. In total, 70% of our senior physics students were able to hear the presentation.

Doug Little talked about the scientific method and the difference between course work and research. Michael Lee and Luke Stewart followed Doug with presentations that gave snap shots of CUDOS research at Sydney and Macquarie. The presentations were at exactly the right level and the students really enjoyed them. Please congratulate [the students] on my behalf."

Head Teacher Science, Gosford High School, Dr Mark Butler

Some 2008 Highlights

Animated Photonics Entertains and Educates: Phrame-by-Phrame Photonics

As discussed in the Education and Training Report, the 2008 CUDOS student competition was themed to support outreach this year. The winning entry was an animation using a technique known as "stop motion" or "frame-by-frame" that makes an object



A sequence of frames from Phrame-by-Phrame Photonics, discussed in 2008 Highlights

Photos from Bridging the Gap, discussed in 2008 Highlights



Students and parents huddle to look at the water-waveguide setup.



Aliaksandr explaining his holograms.



Students are watching Malte demonstrating nonlinear conversion.



Students and parents are trying out a Michelson Interferometer.



appear to move on its own by showing a continuous sequence of incrementally moved objects. The objects, or actors in this instance, were staff and students of Macquarie CUDOS pretending to be photons in order to demonstrate some properties of light and its behaviour when relating to various devices.

The movie has since been used in high school science classes and shown to high school science teachers who were very keen to use the movie with their classes to inspire students to make their own movies. We believe it has gone as far afield as Italy so far.

Bridging the Gap: An optics outreach program targeting teens in rural Australia

Amrita Prasad, Khu Vu, Ting Han, Aliaksandr Minovich, Sarah Beavan

CUDOS students at the Australian National University (ANU) hosted a major outreach event in July. The 'Bridging the Gap' outreach program was funded by a CUDOS outreach grant, enabling four high school students aged 14-17, along with their accompanying guardians and a teacher from Nowra High School to visit the university for two days. Nowra High School was one among several schools that received an open invitation sent out by the ANU CUDOS students to schools in the regional areas and outskirts of New South Wales.

Along with time donated by many members of the host institution, the program was made possible with support from the Australian Institute of Physics, the Optical Society of America, the Research School of Physical Sciences and Engineering, and the Department of Physics at the ANU. In addition, outreach resources prepared by CUDOS students at other institutions were also utilized, including students at Macquarie University for the 'Phrame-by-Phrame Photonics' video, and Sam Campbell at the University of Sydney for use of the photonic chip animation. Optics demonstrator items were generously supplied by the University of Rochester OSA local section. Read more about the program in OPN December 2008, page 12.

This project was an extension of the very successful 'Optics in the Outback' outreach program in 2007 (OPN June 2007, page 22). The aim was to bring students and parents who were in the process of considering the universities and disciplines for further study to the university to showcase areas of study and research in science, particularly Optical Physics and Communication.

- A. Prasad, K.T Vu, T. Han, A. Minovich and A. Prasad, "Bridging the Gap," Optics and Photonics News, 19(12), (2008).

Publicity

If the success of a Centre were measured by the number of column inches in newspaper articles, and numbers of radio interviews and television reports, CUDOS would have had its most successful year in 2008 and arguably the most successful year ever of any Centre of Excellence.

A barrage of media interest resulted from a press release issued during the OECC meeting to coincide with the post deadline presentation by researchers from CUDOS and DTU (Denmark) of a low-power penalty, error-free demultiplexing experiment at 640 Gb/s carried out entirely in the optical domain. Later in the year a publication appeared in the OSA journal Optics Express and the accompanying press release – again – stirred up the same level of interest.

The tables detailing the number and nature of media outlets who carried this story make compelling reading. They also provide the justification for taking our story to the public. It is clear that through

the media reports and interviews with our senior researchers, a fairly detailed account of the Centre's rationale and achievements in developing solutions for the next generation internet have reached a large number of people in Australia and elsewhere. This includes not just the 'people in the street' who fund our research and are the ultimate beneficiaries, but politicians, senior public servants and University officers and prospective commercial partners (venture financiers, photonics companies, etc), all of whom are stakeholders in our research.

The extraordinary response from lay people and technical experts alike also demonstrate the intense interest from the community in the future of the internet, which will be a defining feature of our society in twenty years time. There is also a high degree of sophistication in this interest – from many of the interviews and articles there is a clear recognition that our work represents what is possible, not what will actually happen.

Type of Media	Number of articles	Examples
News (printed and on line)	> 60 articles in countries including Australia, Canada, India, UK, Ireland, Italy, USA, Hungary, Turkey, Finland, Denmark, Portugal, Russia, Spain, China	Sydney Morning Herald; The Australian; The West Australian; La Stampa; CBC online (Canada); ADN (Spain); The Economic Times (India); The Inquirer (UK); Elektronikpraxis (Germany)
Radio interviews	> 20 interviews	ABC
Television	1 in depth feature lasting > 10 minutes.	Business Sunday (Ross Greenwood) on the Nine network