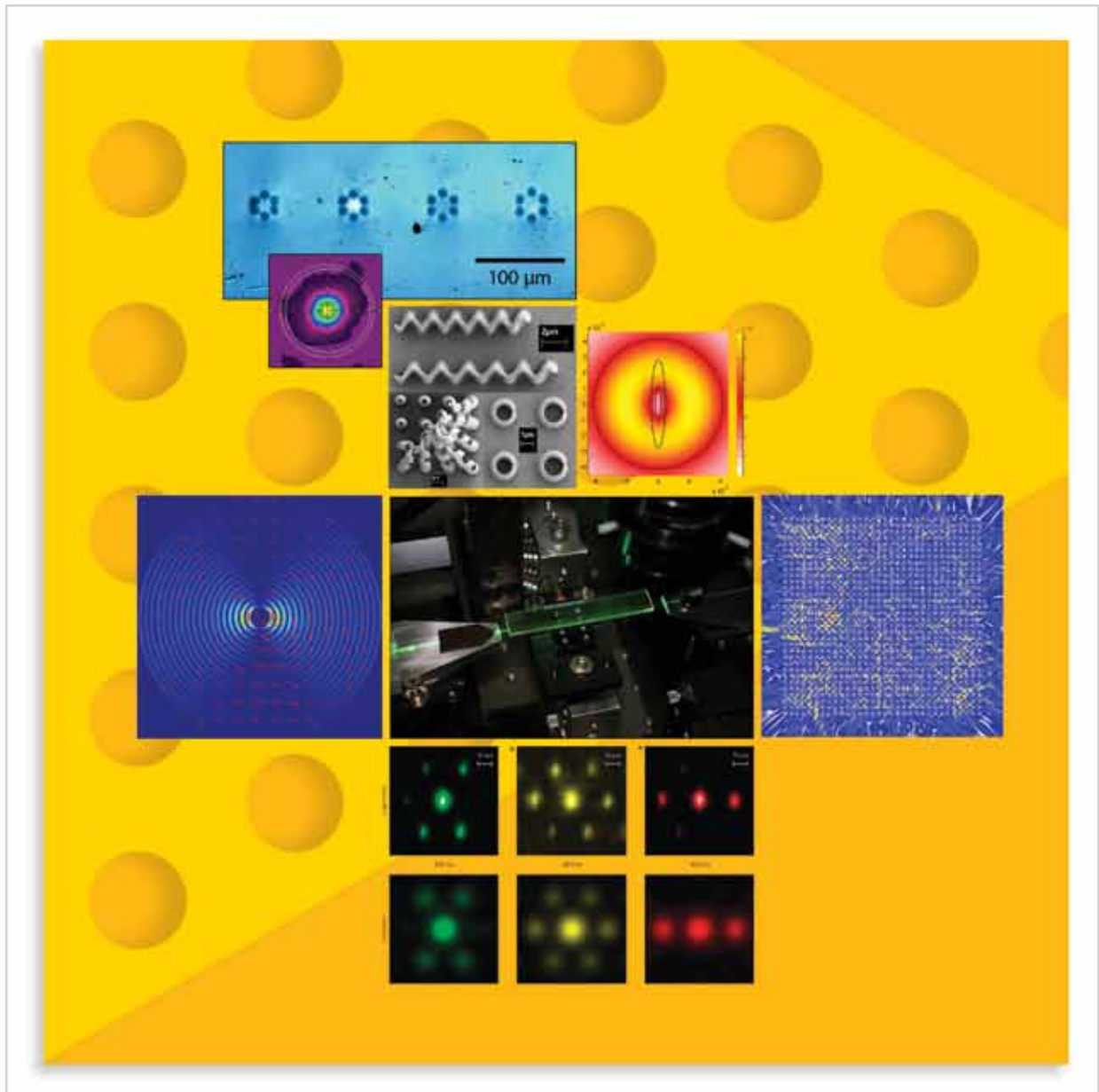


ANNUAL 2009 REPORT



CUDOS

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

Outreach Highlight

A virtual learning system by the outreach team at Macquarie University led by Associate Professor Judith Dawes has proven popular this year.

The Photonic Simulator teaches users how to build – and communicate through – their own optical networks and has been demonstrated to be an effective teaching and learning tool through the accompanying research.

Over 500 high school students have played with the Photonic Simulator in school based workshops and almost 100 science teachers have been introduced to Photonics via the simulator in teacher workshops.

The team won joint 1st place in the Outreach competition at the CUDOS workshop and was Highly Commended in the Engineering Excellence Awards for Education and Training. The Photonic Simulator was one of only 6 award-winning innovations to be selected for inclusion in an innovation display in Sydney's Powerhouse Museum in 2010. This display, connecting our everyday experiences of communications with the underlying Photonics, will be seen by over half a million museum visitors throughout the year.

International interest, including offers of translations, have come via an Education article about the process of designing and implementing the simulator as an effective outreach tool published in Optics and Photonics News (OPN), as well as a paper reported at Education and Training in Optics and Photonics (ETOP) in Wales.



The Macquarie University team collects an Engineering Excellence Award for Education and Training

Student Chapters, Optical Society of America (OSA)

Four of the five Australia based OSA student chapters were led by CUDOS students in 2009. OSA chapters are specifically funded to organize a variety of events to “Advance the Science and Technology of Light” with each chapter running significant events in a year.

Australian and New Zealand postgraduate students convene at the CUDOS sponsored KOALA conference jointly organized by the University of Sydney and Macquarie University OSA student chapters.

2009 Events included:

- Meetings and social gatherings such as BBQs, a soccer tournament, optics and photonics trivia night
- Student talks with pizza
- Lab assistant scheme
- Invited talks by visiting academics
- Industry lab tour
- High School visits
- High School Teachers workshop
- Public lectures
- Postgraduate research workshop
- Open days

Photonic Simulator: Build Optical Networks Online





Australian and New Zealand postgraduate students convene at the CUDOS sponsored KOALA conference jointly organized by the University of Sydney and Macquarie University OSA student chapters.

Statistics on Student Chapters

- > CUDOS has 4 Optical Society of America Student Chapters
 - University of Sydney
 - Macquarie University
 - Swinburne
 - Australian National University
- > Chapters are between 1-3 years old.
- > Between 10-15 members per chapter after only a few years.
- > Primarily funded through special grants made available by the OSA to conduct outreach.
- > Grants are submitted every 6. Maximum USD\$1000 per grant.



A selection of posters prepared for student talks

Publicity

Television

The CUDOS research on all optical signal processing gained international attention in 2008 when ground-breaking research on optical time division demultiplexing at 640 Gb/s, published in collaboration with a group at the Danish Technical University, was highlighted worldwide in the popular and technical press.

Following this international interest Catalyst, the highly-regarded science program on free to air television, approached CUDOS to

film an in-depth segment on the technology of all optical signal processing. The context for the segment was the twin demands of the ever-increasing demand for bandwidth and the need to dramatically reduced the energy consumption per bit of information transmitted. The segment highlighted the need for breakthrough technology to address these two potentially conflicting demands.

Typically 5 – 10% of the viewing public watches this popular science show, implying that over one million Australians watched the segment on CUDOS research and its application to ultrahigh speed information processing.



Stills from the Catalyst program

Articles

- Optics and Photonics News (OPN), September 2009, Vol 20 No 9 "Photonics simulator stimulates learning"
- Swinburne Magazine, September 2009, Issue #7 "Computing sees the light"
- Australasian Science Magazine, Issues 87, June 2009 "A dearth of research communication by scientists"

Independent public talks

- "Living at the speed of light" by Dr Jesse Shore, Science Communicator Sponsored by the Powerhouse Museum (Sydney talk) and BrisScience (Brisbane talk)

OPTICS | EDUCATION

Photonic Simulator Stimulates Learning

Adam Strickland, Sam Campbell, Kall Madden,
Nemanja Jovanovic, Benjamin F. Johnston,
Robert Williams and Judith M. Dawes



Ninth-grade students test the photonic simulator at the Macquarie Siemens Science Experience.

Eduardo Granado/Macquarie OSA Student chapter

A virtual learning system shows high school students how to build—and communicate through—their own optical networks.