



**Australian Institute of Physics
NSW Branch (April Public Talk)**

**Ultrafast Photonic Integrated Circuits:
Unlocking the bandwidth**

Professor Benjamin J. Eggleton

**Director, CUDOS ARC Centre of Excellence, ARC Federation Fellow
Centre for Ultrahigh Bandwidth Devices for Optical Systems,
University of Sydney**

Tuesday 24th April 2007 @ 6.00PM

At the

Slade Lecture Theatre, School of Physics, University of Sydney

Public talk arranged by: The Australian Institute of Physics (NSW Branch)

Entrance is FREE

Summary of talk:

This talk will review our progress towards developing fundamentally new all-optical signal processing technologies to replace the copper based electronic switching in next generation ultrahigh bandwidth communications networks. We will achieve this by building an ultrafast photonic integrated circuit based on a leading-edge material, which will allow us to control, switch, and route light, at ultrahigh bandwidths, dispensing with electronics and integrating the key technologies onto a single chip. Our advances will lead to (i) ultrahigh bandwidth networks, (ii) significantly reduced size and costs of telecommunications infrastructure, and (iii) new generations of mid-infrared technologies for environmental, biomedical and imaging sensors. CUDOS is a research consortium between five Australian Universities: The University of Sydney, Macquarie University, University of Technology Sydney, Australian National University and Swinburne University of Technology. The CUDOS research program has two central themes: nanophotonics and nonlinear photonics. Our goal of achieving ultra-high-speed, all-optical signal processing on a single photonic chip is addressed by combining these two themes to develop micron-scale photonic components incorporating nonlinear photonics processes. This talk will review progress on CUDOS flagship projects that represent ambitious cross-node collaborations toward this goal: i) Dispersionless slow light in photonic crystals; (ii)





All-optical switching and regeneration schemes based on low-loss waveguides and photonic crystals; and (iii) optofluidic tunable photonic components for sensing applications.

Brief Biography of the Speaker:

Benjamin Eggleton is currently a Federation Fellow and Professor of Physics at the University of Sydney. He is Research Director of the Centre for Ultrahigh-bandwidth Devices for Optical Systems (CUDOS), an ARC Centre of Excellence. He studied at the University of Sydney, obtaining his BSc (Hons 1) in 1992 and his PhD in Physics in 1996. After graduation, he went to the United States to join the world's leading research institute in his field, Bell Laboratories, as a Postdoctoral Fellow in the Optical Physics Department. He then transferred to the Optical Fiber Research Department as a Member of Technical Staff and was subsequently promoted to Technical Manager of the Optical Fibre Grating group. Soon after this, he became the Research Director of the Specialty Fiber Business Division of Bell Lab's parent company, Lucent Technologies; here, he drove Lucent's research program in optical fibre devices. He has co-authored more than 180 journal papers, has presented more than 40 invited and plenary presentations at international conferences, and has filed 35 patents. He has received several significant awards. Most notably, in 2004 he received the Prime Minister's Malcolm McIntosh Science Prize for Physical Scientist of the Year, in 2003 the ICO Prize (International Commission for Optics), and in 1998 was awarded the Adolph Lomb Medal from the Optical Society of America. Other achievements include the award of the distinguished lecturer award from the IEEE/LEOS, a R&D 100 award, and being made an OSA fellow in 2003. He is an Associate Editor for IEEE Photonic Technology Letters, a member of the editorial advisory board for Optics Communications and serves as Vice-President of the Australian Optical Society. Professor Eggleton will be presented with the 2007 Pawsey Medal from the Australian Academy of Sciences.

Detailed Schedule for Tuesday, 24th March 2007:

- **6:00-6.30 pm REFRESHMENTS, Slade Lecture Theatre.**
- **6.35-7.30 pm LECTURE by Professor Benjamin J. Eggleton.**
- **8.00 pm DINNER with the Speaker at Buon Gusto (Italian), 368 Abercrombie Street, Chippendale.**

E-mail Dr Fred Osman (fred_osman@exemail.com.au) if you will be able to join us for dinner.

Travel Directions:

- Train to Redfern station and walk to the **School of Physics**.
- Buses 422, 423, 426, 428, 448, and 450 from Circular Quay to City Road / King, or 412, 435, 438, 470, 483 etc. along Parramatta Road from Circular Quay.
- Drive and park in various parking lots. You will need to pay for parking (**\$6 flat-rate after 4 pm**) and display the ticket in your car. You may also find parking places on public roads outside the Uni.

