

## PHOTONICS SYSTEMS

### Development of board-level optical interconnects based on the use of multimode polymer waveguides

Ian White is head of Photonics Research at the University of Cambridge and leads the Centre for Photonics Systems. He has built up a substantial research activity in the field of optoelectronics and optical communications and his team numbers approximately 45 people publishing on average 60 papers a year. In terms of research output, the group is one of the largest in the field of optoelectronic systems in the UK. Highlights of his research have included: the development of the first all-optical laser diode flip flop, the first negative chirp electroabsorption modulator and the invention of a technique for transmitting radio frequency signals over long distances of multimode optical fibre. Several of these advances have already made commercial impact, the offset launch technique for enhancing the bandwidth of optical fibre links having already been adopted within Gigabit Ethernet standard. He currently chairs the channel model sub-task force of the IEEE 10 GbE LRM standard.

The CPS group has been involved, together with Dow Corning Corporation, in several research projects (STOIC/PIES/PSIAC) since 2005 on the development of board-level optical interconnects based on the use of multimode polymer waveguides. These projects have yielded interesting scientific results and led to important publications at major conferences and journals in the field. The main research activities include the following topics:

Design, fabrication and characterisation of multimode polymer waveguides and waveguide components for high-speed board-level optical interconnects

Development of interconnection architectures for card-to-card and chip-to-chip optical communications

The development of manufacturing and assembly methods for the production of low-cost optoelectronic (OE) PCBs and the cost-effective integration of optical and electrical component on conventional PCBs

The integration of different materials with polymer waveguides (liquid crystals, fluorescent dyes, active glasses)

#### Professor White's three main research themes are:

- Controlled generation of diode laser light
- Spatial manipulation of waveguided light
- Ultrashort pulse phenomena in laser diodes and related devices



Professor Ian White

Head of Photonics Research, Cambridge

Supported EPSRC

#### Applicable to:

- Optics
- Communications
- Lasers

#### Partner Company:

- Dow Corning Corporation

#### Prof White's areas of expertise:

- Semiconductor lasers
- Optical data communications
- MMF systems (digital and analogue)
- High-speed optical communications systems
- Wavelength conversion and WDM networks
- Optical amplifiers
- Optical non-linearities for switching and routing applications
- Short pulse generation
- RF over fibre
- Semiconductor lasers

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