

## Scaling New Heights in Photonics with Recent Developments in Fibre Optic Technology

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### **Abstract:**

The Optoelectronics Research Centre (ORC) at the University of Southampton in the United Kingdom is one of the world's largest and most successful institutes for photonics research. Many of the major developments in today's global optical fibre infrastructure were pioneered by ORC researchers such as the world renowned Professor Sir David N. Payne, Director of the ORC. The developments comprise the optical fibres and optical amplifiers that power the internet, including the EDFA (Erbium doped fibre amplifier), Photonic Crystal Fibre (PCF) technology that forms the core of most supercontinuum fibre lasers, the fibre gyroscope now used extensively in a range of modern aircraft to aid navigation, a range of optical fibre sensor technologies, and the rare-earth doped fibre laser used for a variety of applications ranging from manufacturing, over medicine, to defence. In addition, many of these technologies were initially commercialised through spin-out companies from the ORC.

We will in this talk highlight some of the latest exciting developments in the field of optical fibre technology from the ORC. We will show examples of state-of-the-art optical fibres for next generation telecommunication systems, cutting edge optical fibre sensor designs, and new fibre laser configurations for applications in metrology, high performance sensing and machining. The talk will be relevant to students and researchers interested optical fibre technology, and for people interested in becoming involved with, and a part of, this exhilarating field.



**Dr Morten Ibsen** is an Associate Professor in the ORC at the University of Southampton where he leads a research group on fibre grating technology. He is also the programme Director for a new M.Sc. course focusing specifically on optical fibre technology.

His research interests include specialised fibre grating design, fabrication and characterisation; dynamic aspects of fibre gratings including pulse-shaping and frequency conversion, together with devices and systems utilising gratings. These include single-frequency fibre lasers, poled optical fibres, and complex code generators in optical code-division multiple-access (OCDMA) applications. In these areas he has published more than 300 journal and conference papers. Recently he has become involved with exciting new work on the exploitation of fibre Bragg grating technology in medicine, therapeutic health applications and optical imaging.

Dr M. Ibsen has been the Program and General Chair of the OSA Conference on Bragg Gratings, Photosensitivity and Poling in Glass Waveguides (BGPP), and is a past holder of a Royal Society of London, University Research Fellowship (URF). He is the recipient of a joint R&D100 Award with Lawrence Livermore National Laboratory, UC Davis and Stanford University in the USA, for the invention and development of the FemtoScope, an ultrafast time-microscope based on complex fibre Bragg gratings. Dr Ibsen is also a co-founder of SPI Lasers, a world-leading supplier of energy-efficient, flexible fibre lasers for marking, cutting and welding applications.



**Dr Ping Hua** was born in Wuxi, China and graduated in Physics from Suzhou University, China. She obtained the PhD degree in Optoelectronics from the ORC, University of Southampton, UK. Ping came to the UK in 1989 and has been with the ORC since 1990 where she currently is working as a senior researcher. Her research interests include integrated optical waveguide-based sensors applied to biology, chemistry and environmental monitoring systems. Furthermore, she is involved with training and supervision of postgraduates and research staff in Cleanroom Technology.