OPTOELECTRONICS RESEARCH CENTRE

LIST OF PhD PROJECTS PROPOSED FOR YEAR 2008 INTAKE
(projects and supervisors may vary)

Further information on application process available from: ORC Student Office,
University of Southampton, Highfield Campus, Bldg 47/Room 1001, Southampton SO17 1BJ, United Kingdom
E-mail: admissions@orc.soton.ac.uk Tel. +44 (0)23 80598066/80593150

Dr W S Brocklesby	• New technology for a nanoscale x-ray source: towards single isolated molecule scattering • Nanoscale nonlinear optics
Dr Neil Broderick	• Non-linear manipulation of ultra short pulses • The design and fabrication of microstructured fibres • Slow light in periodic media
Prof W A Clarkson *Advanced Solid-State Sources Group*	• Power-scaling concepts for fibre lasers and amplifiers • Fibre-bulk hybrid lasers
Prof RW Eason	• Growth of thin film waveguides by Pulsed Laser Deposition (PLD) • Micro- and nanostructuring of nonlinear optical materials (With Dr Sakellaris Mailis) • Femtosecond laser processing of optical materials *(with Dr Christos Grivas)*
Prof D Hewak *Novel Glass and Waveguide Group*	• Infrared optical fibre based on sulphide glasses for new fibre lasers, medical, aerospace and sensing applications • Planar optical waveguides and devices in new glass, in particular by new chemical vapour deposition techniques • Glass microsphere fabrication and application, for radically new integrated optical devices
Dr Morten Ibsen *Fibre Bragg Gratings Group*	• Bragg grating design, device fabrication and tunable Bragg grating technologies. • Design and applications of low-noise high-power single-frequency Bragg grating all-fibre lasers for new wavelength regimes. • Femtosecond-writing of periodic structures in new materials (in collaboration with the Physical Optics Group). • Optical Coherence Tomography (OCT) and biomedical imaging. • Bragg gratings for use in medical applications.
Prof P G Kazansky	• Poled glasses and optical glass waveguides with large second-order nonlinearities • Fibre atom waveguides and atomic integrated circuits • Direct write of 3D photonic structures
Dr Wei Loh *Soft Glass Group*	• Nano-engineered photonic materials and devices • Compound glass materials, fibres and integrated optical devices • Optical techniques for enhanced medical imaging
Dr Jacob MacKenzie	• Advanced solid-state planar lasers *(with Prof DP Shepherd)*
Dr T Melvin	• Integrated optical devices for bioanalysis: • Creation of a novel highly sensitive diffraction biosensor for detection of DNA sequences Self-written waveguides • Biomolecule manipulation, sorting and analysis in optical fields using integrated planar waveguide devices in collaboration with Prof. James Wilkinson
Prof T P Newson	*www.orc.soton.ac.uk/dofs/* • Distributed fibre optic sensing
Dr J Nilsson *High-power fibre devices*	• Kilowatt fibre sources • Compact high power fibre lasers operating in near-infrared • Cladding-pumped Raman fibre devices • Pulsed high-energy, high-power, fibre devices • Cladding-pumped Raman fibre amplifiers and doped fibre amplifiers for telecom applications

Prof D J Richardson	• Pulsed high power fibre lasers and amplifiers *(with Dr A Malinowski)* • Nonlinear optics in multimode fibres: Modelling *(with Dr Peter Horak)* • Nonlinear optics in multimode fibres: Experiments *(with Drs A Malinowski & J Price)* • Optical processing and transmission in future optical networks *(with Dr P Petropoulos)* • Optical code division multiple access network technology *(with Dr P Petropoulos)* • The fabrication and applications holey/microstructured fibres • Optical fibre nanowires and nanowire devices *(with Dr Gilberto Brambilla)*
Prof H N Rutt *Infrared Technology Group (IRST)*	• Solid state infrared modulators • Photoacoustic gas detection • 'Down hole' sensors for oil wells • Low cost remote sensing of water content • Photosensitivity and gratings in glass fibres and waveguides • Formulation of new compound glasses for lasers and amplifiers • Fabrication of glass fibres and planar waveguides
Dr J K Sahu *Silica Fibre Fabrication Group*	*www.orc.soton.ac.uk/silica/* • Novel photosensitive materials for telecoms applications • Reducing nonlinear effects such as stimulated Brillouin scattering, in optical fibre suitable for kilowatt fibre lasers
Dr P J A Sazio	• Microstructured optical fibres as templates for the deposition of functional materials such as silicon and germanium to add new electronic/photonic degrees of freedom • Fabrication of next generation holey fibre devices with semiconductor based photonics; metallo-dielectric plasmonic effects, electronic function, engineered nonlinearities, *(with Dr Anna Peacock)*
Dr Anna Peacock	• Fiberised semiconductor devices for nonlinear photonics and applications
Prof D P Shepherd	• Novel, high-power, nonlinear optical sources and applications • Intelligent light sources • Coherent control
Prof P G R Smith	• Planar waveguide devices for WDM applications • Tunable planar Bragg gratings using liquid crystals • Development of periodically poled nonlinear optical materials for efficient frequency conversion into the visible and mid-infrared • Contact-bonded waveguides for lasers and non-linear optics
Prof J S Wilkinson *Integrated Photonics Devices Group*	*www.orc.soton.ac.uk/ipd.html/* • Microstructured waveguide surface-enhanced Raman sensors • Modelocked Ti:sapphire waveguide lasers
Prof M N Zervas	• Fibre DFB lasers • Inverse scattering techniques for grating characterisation and design
Prof NI Zheludev *Nanophotonics & Meta-materials Group*	www.nanophotonics.org.uk/niz • Molecular scale phase change photonic and bio-sensing functionalities (femto-Joule and single photon switching and memory elements) • Resonant meta-material detector of nanoparticles • Plasmonic nano-torch and free-electron laser on a chip • Subwavelength resolution lens-less optical microscopy and energy localization in meta-materials (an alternative to the negative index super-lens) • Nano-structured photonics surfaces as elemental base of highly integrated photonics devices • Photonic meta-materials: "invisible metals" and optical frequency "superconductors" • Underling physics of the new information carrier for photonic devices: controlling surface plasmon-polariton waves in switchable plasmon waveguides • Hyperspectral visualtization of plasmons in nanostructures