

# University of Edinburgh (UNIED)

## Institute of Micro and Nano Systems & Collaborative Optical Spectroscopy

The Institute for Integrated Micro and Nano Systems (IMNS) brings together researchers from integrated circuit design, system-on-chip design, microfabrication, MEMS, micro-machining and neural computation. Research activities range from industrially-focussed process development and low-power system-on-chip design to long-term research into circuit design, system architectures, micro-stereolithography and novel structures on silicon, with strong links to the life sciences. The Collaborative Optical Spectroscopy, Micromanipulation and Imaging Centre (COSMIC) is a centre for interdisciplinary research funded by SHEFC, Scottish Enterprise, industrial sponsors and normal research grants. COSMIC incorporates advanced characterisation, visualisation and control of materials at the molecular level. Interest and involvement from industries that need to characterise and control the properties of complex materials, including biological systems, at the molecular and nanoscale level is actively encouraged and the centre participates in numerous industry-led partnerships.

UNIED-INMS was among the pioneers in the development of CMOS imaging, creating the start-up company VLSI Vision which was subsequently to become the core competence centre of STMICRO's Imaging Division. UNIED-INMS has been active in CMOS image sensor development within these organisations for many years before rejoining academia to undertake research in optical biosensing. In its previous role in STMICRO partner UNIED-INMS worked on the world's first single-chip video camera and on the design of low-noise, highly-parallel readout architectures for mobile and digital still camera applications [C-15,C-16]. UNIED-COSMIC is a diverse end-user community of senior scientists with extensive research in the field of biophotonics [C-6,C-17]. UNIED-INMS and COSMIC have a successful track record of collaboration in a number of projects.

Dr. Robert Henderson is a lecturer at the School of Engineering and Electronics in the IMNS. In 1996, he was appointed senior VLSI engineer at VLSI Vision Ltd, Edinburgh, UK where he worked on the world's first single chip video camera and was project leader for numerous other CMOS image sensors. From 2000, as principal VLSI engineer in ST Microelectronics Imaging Division he developed very high volume, low noise image sensors for mobile phone applications. He has thus extensive design experience and an exceptionally good relationship with the industrial partner STMICRO which should greatly facilitate development of the MEGAFRAME imager. He joined Edinburgh University in 2005 to pursue his research interests in CMOS integrated circuit design, imaging and biosensors. He is the author of 30 papers and 12 patents. He was awarded the 1990 IEE J. J. Thomson Premium.

Dr. David Dryden is a Reader in the School of Chemistry. Prior to this appointment he held a Royal Society University Research Fellowship and a Wolfson Foundation Fellowship. DD is the author of over 50 publications in biochemistry and biophysics. He uses optical methods such as fluorescence and circular dichroism to study proteins and DNA and has focused on the biochemistry and spectroscopy of the EcoKI molecular machine. Currently, he is working on the fluorescence imaging of single protein and DNA molecules.

Dr. Anita Jones is a Senior Lecturer in Physical Chemistry. She has extensive experience in luminescence spectroscopy, laser-induced fluorescence and time-resolved fluorescence studies of polyatomic molecules in solution phase, the solid state and supersonic molecular beams. Her PhD was on time-resolved fluorescence of molecular crystals followed by a PDRA in Prof. David Phillips' group at the Royal Institution where she carried out high resolution spectroscopy and lifetime measurements on jet-cooled molecules.

Nick Read is a Professor in Fungal Cell Biology within the Institute of Cell Biology. He has been an author on over 80 publications. His research is primarily concerned with analysing the regulation of hyphal growth and morphogenesis, especially in relation to hyphal fusion, vesicle trafficking; and calcium signalling. Much of his research is focussed on analysing living cells using a wide range of advanced imaging and measurement techniques in combination with vital fluorescent dyes and recombinant probes. Considerable emphasis is placed on interdisciplinary research.

Dr. J. Crain is a Reader in Physics. His background is in condensed matter physics and disordered materials with an emphasis on biologically-inspired problems. He is currently Director of the COSMIC Research Center at the University of Edinburgh, Leader of the Scottish Universities Physics Alliance (SUPA) Biophotonics Initiative, Fellow of the Institute of Physics (IOP), regular Visiting Professor at the IBM T.J. Watson Research Center in New York, member of the steering committees of the IoP Liquids Group and the Scottish Bioinformatics Research Network. He has extensive experience and high visibility in leading large collaborative research programs at the physical/life science interface in both academic and industrial sectors involving experiment and simulation. He has authored over 100 publications and holds 5 patents.