

EPSRC Centre for Doctoral Training in  
**PHOTONIC INTEGRATION** for   
**ADVANCED DATA STORAGE**

# Conclave 2016

Wednesday 22<sup>nd</sup> & Thursday 23<sup>rd</sup> June

GoGlasgow Urban  
Hotel



# ACADEMIC PROFILES



**PROF. ROBERT BOWMAN** Head of QUB School of Maths and Physics and Director of PIADS CDT. Current research is directed towards the development and evaluation of advanced materials for data storage technology, including investigating rare earth magnetism, rare-earth-ferromagnetic coupling phenomena, tailored magnetic multilayers and materials to facilitate heat assisted magnetic recording sponsored by industry.

**DR. SOLVEIG FELTON** Joined the Centre for Nanostructured Media as a lecturer in 2013. Currently her interests are focused on nanomagnetism, studying magnetic domain structures and artificial frustrated magnets using techniques such as Magnetic Force Microscopy (MFM) and Lorentz Transmission Electron Microscopy (LTEM) and studying the magnetic interactions in molecular materials using Superconducting Quantum Interference Device (SQUID) magnetometry.



**PROF. MARTY GREGG** Leads the nanoscale ferroelectric activity in Queen's University Belfast. He has had research activities on ferroelectric thin films and superlattices grown by Pulsed Laser Deposition (PLD) in the past, but more recently his research has involved the characterisation and understanding of well-controlled nanoscale ferroelectric entities cut from high purity bulk crystals using Focused Ion Beam milling.

**DR. FUMIN HUANG** Joined the Centre for Nanostructured Media in 2013. Current research interests include nanophotonics and plasmonic sensing. His expertise is in Scanning Near-field Optical Microscopy and Raman Spectroscopy.



**DR. BOB POLLARD** Senior lecturer and academic of the Centre for Nanostructured Media and director of the spin out company Causeway sensors. His career has focussed on the fabrication of ultra thin films and functional nanostructures, with interest on nanorod arrays for optical sensing.

# ACADEMIC PROFILES



**PROF. JOHN MARSH** Head of the School of Engineering and Professor of Optoelectronic Systems at the University of Glasgow, deputy director of the CDT. His work has included research into the fundamental electrical and optical properties of semiconductors, development of novel optoelectronic devices, processes for creating photonic integrated circuits, integrated mode-locked lasers for ultra-short pulse generation, and the development and manufacturing of high-power laser array products.

**PROF. MARC SOREL** Marc has been engaged in research related to integrated optics, silicon photonics and semiconductor lasers for over 15 years. He has published over 300 journal and conference papers, and serves or has served in several conference scientific committees including ECIO, ECOC, Photonics North and CLEO Europe. Research Projects include Semiconductor Ring Lasers, Ultrashort pulse laser diodes, Coupled ring resonators on silicon-on-insulator and InSb-based midIR LEDs for gas sensing.



**DR. DAMIEN MCGROUTHER** Research aims to provide fundamental insight into the behaviour and performance properties of technologically relevant materials and structures with nanometre scale dimensions. Work focuses on the following areas: Nanomagnetism: domain & domain wall behaviour in thin films and nanostructures influenced by rapid magnetic field pulses and current induced spin transfer. Development of novel Transmission Electron Microscopy (TEM) techniques for imaging magnetic structure with high spatial and temporal resolution and performance of in-situ experiments.

**DR. STEPHEN MCVITIE** Senior lecturer with the department of Physics and Astronomy at the University of Glasgow. Dr McVitie's interests include the development of magnetic imaging techniques using electron microscopy and magnetic force microscopy and micromagnetic characterisation of magnetic thin films.



**PROF. RICHARD HOGG** Recently joined the University of Glasgow as professor of Electronics & Nanoscale Engineering and is primary supervisor to Iain Butler on the CDT working on a project using Quantum Dot semiconductor lasers in extreme environments.



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# ACADEMIC PROFILES

**DR IAN MACLAREN.** Research concentrates on using electron microscopy to study the structure and chemistry of materials and devices at the nanoscale and below. Current projects include researching the atomic structure of nanoscale features such as boundaries and defects in functional oxide materials, atomic structure of dielectric optical coatings for high precision interferometry (in collaboration with the Institute for Gravitational Research, structure and chemistry of nanoprecipitates in steels, nanoscale mechanisms of corrosion of Zircaloy in pressurised water, absolute quantification of the nanoscale chemistry of materials, novel developments in the use of fast pixel detectors for scanning transmission electron microscopy and quantitative studies of the structure and chemistry of semiconductor heterostructures, especially for optoelectronic devices.



**DR. DONALD MACLAREN** Lecturer in the Materials and Condensed Matter Physics Group. Research interests include nanostructural characterisation using advanced techniques, including electron and scanned probe microscopies. Modern technologies including microelectronics & coatings are driven by a synergy of new nanostructured materials and advanced characterisation tools. The materials promise unique or enhanced physical properties but can be compromised by subtle, atomic-scale variations. His research focuses on nanometric characterisation of materials in order that we might capitalize on their emergent functionalities and develop transformative technologies.

**PROF. SANDY COCHRAN** Research focuses on materials and systems to apply ultrasound principally in medicine and life sciences. His lab is the only one in the UK dedicated to medical ultrasound materials and systems, and one of only a handful like it in the world. He is particularly interested in new piezoelectric materials and better utilisation of existing materials, miniature devices for clinical applications of high resolution ultrasound imaging, focused ultrasound surgery and ultrasound-targeted drug delivery, ultrasound for transmission beamforming and manipulation of cells and particles, miniature and microscale ultrasound systems for biomedical applications and ultrasound and other techniques for sensing in the body.



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# STUDENT PROFILES



L-R bottom row, Matthew Colbear, Hannah Johnston, Emma Marlow, David Kane, Jennifer Mackel  
L-R top row, Jade Scott, Thomas Jess, Liam Wright, Alison Cowan, Iain Butler



**MUGAHID ALI** Mugahid is currently investigating alternative plasmonic materials; in particular, the optical and thermal properties of silver nanoparticles that is coated with transition metal nitrides such as TiN, ZrN, HfN to design and explore nano-plasmonic antennas for light concentration and harvesting for the use in heat assisted magnetic recording (HAMR).

**MATT COLBEAR** Comes from a chemistry background and has found the first year very useful in order to be able to get some hands on experience with some of the equipment he may use in the future for his PhD. In Matt's PhD, he'll be investigating a multi-ferroic crystal which has naturally occurring domain walls in the material.

**HANNAH JOHNSTON** Hannah's semester project focused on the optimisation of surface enhanced raman spectroscopy of gold nanorods and how this can be used in biosensing applications. In her PhD project, she hopes to optimise the design of integrated optical devices based on laser interactions with nanostructured arrays.

# STUDENT PROFILES

**EMMA MARLOW** Emma chose the CDT over PhD programmes because of the unique opportunity to utilise resources from both Queen's and University of Glasgow. Her PhD begins in June 2016, where she will be using nanostructured plasmonic arrays for optical detection mechanisms.

**DAVID KANE** David will concentrate on localised surface plasmon resonant nanostructures for biosensing and is very much an experimentalist, with much involvement in the deposition and characterisation of the materials.

**JENNIFER MACKEL** Jennifer graduated from QUB last year with an MSci in Physics and Astrophysics. She will begin her PhD in September in the study of skyrmion lattices for potential memory applications.

**IAIN BUTLER** Joined the CDT to allow himself to combine interests/skills to progress technology. So far he has enjoyed experiencing different labs between the universities and can't wait to start the PhD in being able to use the world class facilities available to the students. Iain's PhD project will be mainly based Glasgow, using Quantum Dot semiconductor lasers in extreme environments.

**ALISON COWAN** Alison's research background focused on transmission electron microscopy and she plans to continue that work in the university of Glasgow, using the technology to study the effect of magnetostriction.

**JADE SCOTT** Jade studied for her undergraduate physics degree in the University of Liverpool. Her PhD topic is antiferromagnetic materials for optical recording, primarily based at Queens.

**THOMAS JESS** Thomas will investigate the thermal effects on nanostructured magnetic media by growing samples and characterising their magnetic and structural properties.

**Liam Wright** Liam's previous academic work is mostly computational-based; from micro-magnetic simulations to gravitational waves. Currently he is interested in plasmonic excitations in metamaterials, which he hopes to examine further in the CDT.

# SCHEDULE OF EVENTS

## WEDNESDAY 22<sup>ND</sup> JUNE

- 1.00pm**      **Registration and buffet lunch**
- 2.30pm**      **Welcome from Students**
- 2.35pm**      **Overview of the CDT**
- 3.00pm**      **Presentations from Students of Cohort 1**  
Emma Marlow, David Kane, Ali Mugahid and Jade Scott,  
followed by open questions
- 3.30pm**      **Engagement Overview (Caryn Hughes)**
- 4.45pm**      **Refreshments/Networking**
- 5.00pm**      **Industrial Forum**  
Talks from Dr Brendan Lafferty (Seagate) and Dr Iwan  
Davies (IQE), followed by a period of open discussion
- 5.45pm**      **Free Time/Networking**
- 7.30pm**      **Conference Dinner**

## THURSDAY 23<sup>RD</sup> JUNE

- 9.00am**      **Presentations from Students of Cohort 2**  
Hannah Johnston, Iain Butler and Jennifer Mackel
- 9.15am**      **Invited talk from Prof. Leda Lunardi**
- 10.00am**      **Presentations from Students of Cohort 2**  
Matthew Colbear, Thomas Jess, Alison Cowan and Liam Wright
- 10.20am**      **Open Networking Session**
- 11.00am**      **Focused Networking Session**  
During this time we recommend that the 2015 Cohort meet with  
their primary and secondary supervisors, the 2016 Cohort meet with  
Executive & External Engagement Managers and closed Industrial-  
Academic meetings occur
- 12.30pm**      **Lunch**
- 2.00pm**      **Academic Round Table**  
Dr Stephen McVitie (UoG), Dr Matteo Clerici (UoG), Dr Donald  
Maclaren (UoG), Dr Fumin Huang (QUB), Dr Bob Pollard (QUB) and  
Dr Solveig Felton (QUB), followed by open panel discussion
- 3.15pm**
- 3.30pm**      **Close of Conclave**

# DELEGATE LIST

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