

## UK Semiconductors 2023 Technical Programme

This year's conference is being held in association with the UK Nitrides Consortium, the TMD-UK meeting on 2D materials and the EPSRC Future Photonics Hub, who are holding an Industry Day as part of the conference. We are pleased to welcome our plenary speakers who will provide extended presentations on the UK Government's semiconductor strategy, surfaces and interfaces in 2D materials and Ga<sub>2</sub>O<sub>3</sub>-based space electronics. We are also proud to host the prize talk for the IOP Semiconductor Physics Group thesis prize, on heat dissipation in perovskite solar cells.

In addition to the regular sessions of talks for each symposium, there will be a briefing and drop-in session for delegates to input to a study for the UK Semiconductor Infrastructure Initiative. The drop-in session will be running throughout the conference, co-located with the poster presentations. There will also be sessions on developments in heterogeneous integration and also system-level quantum materials, in association with the Materials for Quantum Network (M4QN).

Delegates may attend any sessions they wish and are encouraged to do so. You are also welcome to attend the other events at the conference: the Phil Buckle Research Communication Competition will be at lunchtime on day one of the conference, and the IOP Semiconductor Group AGM will be at lunchtime on day two.

**Plenary Lectures:** *Sean Redmond, Sarah Haigh, Dave Rogers*

**IOP Semiconductor Physics Group Thesis Prize Talk:** *Tom Hopper*

**Symposium A: Physics in Semiconductors**

**Symposium B: Optical Devices**

**Symposium C: Electronic Devices**

**Symposium D: Semiconductor Materials and Nanostructures**

**Symposium E: Mid-IR and THz Materials and Devices**

**Symposium F: Organic, Organic/Inorganic Hybrid Semiconductors and Perovskites**

**Symposium G: Wide-bandgap semiconductors**

**Symposium TMD: 2D Materials – incorporating the TMD-UK Meeting**

**Symposium Phot: EPSRC Future Photonics Hub Industry Day**

## Oral Presentations – Wednesday 12<sup>th</sup> July 2023

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
09:30	Registration and Refreshments, Atrium Level 2		
10:30	Plenary 1 <b>Photonic EGG and CHIPS</b>  <u>Sean Redmond</u>  Silicon Catalyst UK		
11:20	D-O-1 <b>Nanostructured devices in <math>\alpha</math>-Sn from low temperature MBE growth</b>  <u>Stuart Holmes</u> <sup>1</sup> , A. Engel <sup>2</sup> , C. Dempsey <sup>2</sup> , Y. Gul <sup>2,3</sup> , C. Palmstrøm <sup>2</sup> , M. Pepper <sup>1,3</sup>  <sup>1</sup> Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, UK <sup>2</sup> NSF Quantum Foundry, California NSI, University of California at Santa Barbara, USA <sup>3</sup> London Centre for Nanotechnology, University College London, 17-19 Gordon Street, London WC1H 0AH, UK	Phot-O-1 11:20 <b>An Overview of the EPSRC Future Photonics Hub</b>  <u>Sir David Payne</u>  University of Southampton, Southampton, UK	C-O-1 <b>3D-structured mesoporous silica memristors for temporal data processing and reservoir computing</b>  T. Zhang <sup>1</sup> , A. H. Jaafar <sup>1</sup> , P. Dai <sup>1</sup> , L. Shao <sup>2</sup> , A. L. Hector <sup>2</sup> , <u>Ruomeng Huang</u> <sup>1</sup>  <sup>1</sup> School of Electronics and Computer Science, University of Southampton, Southampton, UK <sup>2</sup> School of Chemistry, University of Southampton, Southampton, UK
11:35	D-O-2 <b>Low Defect Density Ge Buffer Using N-type Dopants and V-groove Substrates</b>  <u>Makhayeni Mtunzi</u> <sup>1</sup> , H. Jia <sup>1</sup> , Y. Hou <sup>2</sup> , X. Yu <sup>1</sup> , X. Yan <sup>2</sup> , I. Skandalos <sup>2</sup> , F. Gardes <sup>2</sup> , M. Tang <sup>1</sup> , H. Liu <sup>1</sup>  <sup>1</sup> Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, UK <sup>2</sup> Optoelectronics Research Centre, Centre for Photonic Metamaterials, University of Southampton, Southampton SO17 1BJ, UK	Phot-O-2 11:30 <b>High Sensitivity, Multispecies Raman-based Gas Detection Using Hollow Core Optical Fibres</b>  <u>Natalie Wheeler</u>  Optoelectronics Research Centre (ORC), University of Southampton, Southampton, UK	C-O-2 <b>Sub-micron scaling of ULTRARAM™ III- Sb charge-storage devices for non-volatile random-access memories</b>  <u>Xiuxin Xia</u> , C. Senior, M. Walker Long, P. Hodgson, M. Hayne  Department of Physics, Lancaster University, Lancaster LA1 4YB, UK

	<b>Pennine Lecture Theatre</b>	<b>Peak Lecture Theatre</b>	<b>Norfolk 210 Lecture Theatre</b>
11:50	<p>D-O-3  <b>MOCVD growth of InAs/InAlGaAs quantum dots for C-band lasers on InP and Si substrates</b></p> <p><u>Shangfeng Liu</u><sup>1</sup>, Z. Yan<sup>1</sup>, B.-P. Ratiu<sup>1</sup>, H. Jia<sup>2</sup>, P. Wong<sup>1</sup>, M. Tang<sup>2</sup>, H. Liu<sup>2</sup>, S. Shutts<sup>1</sup>, P. M. Smowton<sup>1</sup>, Qiang Li<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, UK  <sup>2</sup>Department of Electronic and Electrical Engineering, University College London, UK</p>	<p>Phot-O-3 11:45  <b>Scalable 2D materials manufacturing</b></p> <p><u>laonnis Zeimpekis</u></p> <p>Optoelectronics Research Centre (ORC), University of Southampton, Southampton, UK</p>	<p>C-O-3  <b>Architecture Variations for the 12 nm Gate Nanosheet Transistors using Monte Carlo Simulations</b></p> <p><u>Murad G. K. Alabdullah</u><sup>1,2</sup>, B. B. Raj<sup>1</sup>, N. Seoane<sup>3</sup>, A. J. Garcia-Loureiro<sup>3</sup>, K. Kalna<sup>1</sup></p> <p><sup>1</sup>NanoDeCo Group, Dept. of EEE, Faculty of Science &amp; Engineering, Swansea University, Swansea, Wales, UK  <sup>2</sup>Electronic Techniques Dept., Kirkuk Technical Institute, Northern Technical University, Kirkuk, Iraq  <sup>3</sup>CITIUS, University of Santiago de Compostela, Spain</p>
12:05	<p>D-O-4  <b>Lateral tunnel epitaxy of III-V on 220 nm silicon-on-insulator for fully-integrated Si-photonics</b></p> <p><u>Zhao Yan</u><sup>1</sup>, B.-P. Ratiu<sup>1</sup>, W. Zhang<sup>2</sup>, O. Abouzaid<sup>1</sup>, M. Ebert<sup>2</sup>, G. T. Reed<sup>2</sup>, D. J. Thomson<sup>2</sup>, Q. Li<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, Cardiff, UK  <sup>2</sup>Optoelectronics Research Centre, University of Southampton, Southampton, UK</p>	<p>Phot-O-4 12:00  <b>Towards the best in Public Engagement</b></p> <p><u>Pearl John</u></p> <p>University of Southampton, Southampton, UK</p>	<p>C-O-4  <b>Ultra-Precise Additive Manufacturing Approach for Advanced Packaging</b></p> <p><u>Ł. Kosior</u><sup>1</sup>, K. Duczmal<sup>1</sup>, <u>Alf Smith</u><sup>2</sup></p> <p><sup>1</sup>XTPL, Poland  <sup>2</sup>Semitronics, UK</p>
12:20	<p>D-O-5  <b>High-Quality III-V Nanowires on Silicon and their Application in Optoelectronics</b></p> <p>L. Chen<sup>1</sup>, Y. Chu<sup>1</sup>, Z. Zhang<sup>1</sup>, Z. Cheng<sup>1</sup>, H. Liu<sup>2</sup>, A. M. Sanchez<sup>3</sup>, A. Velichko<sup>4</sup>, D. J. Mowbray<sup>4</sup>, <u>Yunyan Zhang</u><sup>1,2</sup></p> <p><sup>1</sup>School of Micro-Nano Electronics, Zhejiang University, Hangzhou, Zhejiang, 311200, China  <sup>2</sup>Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE, UK  <sup>3</sup>Department of Physics, University of Warwick, Coventry CV4 7AL UK  <sup>4</sup>Department of Physics and Astronomy and the Photon Science Institute, University of Sheffield, Sheffield S3 7RH, UK</p>	<p>Phot-O-5 12:10  <b>Hollow core fibre interconnections and wideband YDFA for 1 μm data transmission</b></p> <p><u>Sijing Liang</u></p> <p>Optoelectronics Research Centre (ORC), University of Southampton, Southampton, UK</p>	<p>C-O-5  <b>Back-end-of-line SiC memristor for neuromorphic computing</b></p> <p>D. Guo<sup>1</sup>, O. Kapur<sup>1</sup>, P. Dai<sup>1</sup>, L. Jiang<sup>2</sup>, C. H. de Groot<sup>1</sup>, <u>Ruomeng Huang</u><sup>1</sup></p> <p><sup>1</sup>School of Electronics and Computer Science, University of Southampton, Southampton, UK  <sup>2</sup>School of Engineering, University of Southampton, Southampton, UK</p>
		<p>Phot-O-6 12:20  <b>Recent advances in Active Fibres for amplification in Extended Transmission Bands</b></p> <p><u>Jayanta Sahu</u></p> <p>Optoelectronics Research Centre (ORC), University of Southampton, Southampton, UK</p>	

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12:35	<b>Lunch and Exhibition Heartspace Atrium Level 2 Poster Session Seminar Room 223</b>		
13:00			<b>Phil Buckle Research Communication Competition Norfolk 210 Lecture Theatre</b>
14:00	<p><b>UK Semiconductor Infrastructure Initiative</b></p> <p><u>Andi Jones</u>, Nicky Athanassopoulou</p> <p>IfM Engage Ltd., Institute for Manufacturing, 17 Charles Babbage Road, Cambridge CB3 0FS, UK</p>		
14:35	<p>B-O-1</p> <p><b>Towards a 10 GHz Single Photon Source at 1550 nm using Photonic Crystal Cavities</b></p> <p><u>Catherine Phillips</u><sup>1</sup>, M. Godsland<sup>2</sup>, A. Foster<sup>1</sup>, A. Brash<sup>1</sup>, R. Dost<sup>1</sup>, N. Babazadeh<sup>2</sup>, E. Sala<sup>2</sup>, N. Martin<sup>1</sup>, L. Wilson<sup>1</sup>, J. Heffernan<sup>2</sup>, M. S. Skolnick<sup>1</sup>, M. Fox<sup>1</sup></p> <p><sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield, UK <sup>2</sup>EPSRC National Epitaxy Facility, Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, UK</p>	<p>Phot-O-7</p> <p><b>CORNERSTONE silicon photonics prototyping capability</b></p> <p><u>Milos Nedeljkovic</u></p> <p>Optoelectronics Research Centre (ORC), University of Southampton, Southampton, UK</p>	<p>D-O-6</p> <p><b>Fabrication of GaAs antireflective nanostructures by single pulse laser interference lithography</b></p> <p><u>Zhiheng Lin</u>, Y.-R. Wang, I. S. Han, Y. Wang, M. Hopkinson</p> <p>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S3 7HQ UK</p>
14:50	<p>B-O-2</p> <p><b>Exploring Cavity-Enhanced Emission from Type-II GaSb Quantum Ring Devices at Telecommunication Wavelengths</b></p> <p><u>Gizem Acar</u><sup>1</sup>, S. Jones<sup>1</sup>, P. Hodgson<sup>1</sup>, F. Alvarado-Cesar<sup>2</sup>, R. Beanland<sup>2</sup>, M. Hayne<sup>1</sup></p> <p><sup>1</sup>Department of Physics, Lancaster University, Lancaster LA1 4YB, UK <sup>2</sup>Department of Physics, University of Warwick, Coventry CV4 7AL, UK</p>	<p>Phot-O-8</p> <p><b>Laser sources for quantum technologies</b></p> <p><u>Thomas Slight</u></p> <p>Sivers Photonics Ltd., 4 Stanley Boulevard, Hamilton International Technology Park, Blantyre, Glasgow G72 0BN, UK</p>	<p>D-O-7</p> <p><b>Variable Shaped Beam lithography for semiconductor photonics and metasurface applications</b></p> <p><u>Mathias Haedrich</u>, E. Linn, I. Stolberg</p> <p>Vistec Electron Beam GmbH, Ilmstrasse 4, 07743 Jena, Germany</p>

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15:05	<p>B-O-3</p> <p><b>Non-local Impact Ionization Coefficients in <math>Al_{0.8}Ga_{0.2}As</math></b></p> <p><u>Shadia Albeladi</u><sup>1,2</sup>, A. P. Craig<sup>1</sup>, J. P. R. David<sup>3</sup>, A. R. J. Marshall<sup>1</sup></p> <p><sup>1</sup>Physics Department, Lancaster University, Lancaster LA1 4YB, UK  <sup>2</sup>Physics Department, King Abdulaziz University, Rabigh, Saudi Arabia  <sup>3</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK</p>	<p>Phot-O-9</p> <p><b>SEMIconductors Programme at Innovate UK</b></p> <p><u>Iain Mauchline</u></p> <p>Innovate UK</p>	<p>D-O-8</p> <p><b>Photonics design theory enhancing light extraction efficiency in quantum dot light emitting diodes</b></p> <p><u>Diyar Mousa Othman</u><sup>1</sup>, R. Liu<sup>1</sup>, J. Weinstein<sup>2</sup>, Q. Q. Lyu<sup>3</sup>, B. Hou<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK  <sup>2</sup>Department of Chemistry, University of Sheffield, Sheffield S10 2TN, UK  <sup>3</sup>Ipswich Research Centre, Huawei Technologies Research &amp; Development (UK) Ltd. Ipswich IP5 3RE, UK</p>
15:20	<p>B-O-4</p> <p><b>Sub-microsecond Si APD based Infrared Radiation Thermometer</b></p> <p><u>Louis Karapateas</u>, M. J. Hobbs, J. R. Willmott</p> <p>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK</p>	<p>Phot-O-10</p> <p><b>MISSION – Silicon Photonics for medical and environmental sensing</b></p> <p><u>Goran Mashanovich</u></p> <p>Optoelectronics Research Centre, University of Southampton, Southampton SO17 1BJ, UK</p>	<p>D-O-9</p> <p><b>Energy Efficient Blue Organic LEDs</b></p> <p><u>Paloma dos Santos</u></p> <p>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK</p>
15:35	Refreshments and Exhibition, Atrium Level 2		
15:55	<p>IOP Prize Talk</p> <p><b>Probing ultrafast energy losses and heat dissipation in perovskite materials and devices</b></p> <p><u>Tom Hopper</u></p> <p>SLAC National Accelerator Laboratory, Stanford University, 2575 Sand Hill Rd., Menlo Park, CA 94025, USA</p>		
16:30	<p>B-O-5</p> <p><b>Designing electrically pumped PCSEs based on a honeycomb nanowire pattern</b></p> <p><u>Balthazar Temu</u>, B.-P. Ratiu, C. Messina, S. S. Oh, Q. Li</p> <p>School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK</p>	<p>Het-O-1</p> <p><b>Heterogeneous integration capabilities through the National Epitaxy Facility</b></p> <p><u>Jon Heffernan</u></p> <p>EPSRC National Epitaxy Facility, Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK</p>	<p>F-O-1</p> <p><b>Strong-coupling of organic excitons in unconventional all-solution-processable microcavities</b></p> <p><u>Kyriacos Georgiou</u><sup>1</sup>, M. Athanasiou<sup>1</sup>, R. Jayaprakash<sup>2</sup>, D. Lidzey<sup>2</sup>, G. Itskos<sup>1</sup>, A. Othonos<sup>1</sup></p> <p><sup>1</sup>University of Cyprus, Cyprus  <sup>2</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield, UK</p>

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16:45	<p>B-O-6</p> <p><b>Design and analysis of Vertical Cavity Surface Emitting Laser Operating at 795nm for Atomic Magnetometer Applications</b></p> <p><u>Saad. G. Muttalak</u><sup>1</sup>, I. Kostakis<sup>2</sup>, M. Missous<sup>1</sup></p> <p><sup>1</sup>Department of Electrical and Electronic Engineering, University of Manchester, UK  <sup>2</sup>Integrated Compound Semiconductors, Manchester, UK</p>	<p>Het-O-2</p> <p><b>High accuracy transfer printing and heterogeneous integration at the University of Strathclyde</b></p> <p><u>Michael Strain</u></p> <p>Institute of Photonics, University of Strathclyde, Glasgow, UK</p>	<p>F-O-2</p> <p><b>The Design and Simulation of Electrically Pumped Active VCSEL Diode Based on Metal Halide Perovskite</b></p> <p><u>Renjun Liu</u>, D. M. Othman, A. Osypiw, W. Solari, B. Hou</p> <p>School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK</p>
17:00	<p>B-O-7</p> <p><b>The Current Status of GaSb/GaAs Quantum Ring Vertical Cavity Surface Emitting Lasers</b></p> <p><u>Sam Jones</u><sup>1</sup>, P. D. Hodgson<sup>1</sup>, R. Beanland<sup>2</sup>, M. Hayne<sup>1</sup></p> <p><sup>1</sup>Department of Physics Lancaster University, Lancaster LA1 4YB, UK  <sup>2</sup>Department of Physics, University of Warwick Coventry CV4 7AL, UK</p>	<p>Het-O-3</p> <p><b>Opportunities for Heterogeneous integration through the CORNERSTONE facility</b></p> <p><u>Milos Nedeljkovic</u></p> <p>Optoelectronics Research Centre (ORC), University of Southampton, Southampton, UK</p>	<p>E-O-1</p> <p><b>In silico optimisation of radiative recombination in InAs/GaSb superlattices</b></p> <p><u>Cónal Murphy</u><sup>1,2</sup>, E. P. O'Reilly<sup>1,2</sup>, C. A. Broderick<sup>3,1,2</sup></p> <p><sup>1</sup>Tyndall National Institute, University College Cork, Lee Maltings, Dyke Parade, Cork T12 R5CP, Ireland  <sup>2</sup>School of Physics, University College Cork, Cork T12 YN60, Ireland  <sup>3</sup>Materials Department, University of California, Santa Barbara, California 93106-5050, USA</p>
17:15	<p>B-O-8</p> <p><b>Determining the impact of facet roughness on etched facet InP laser devices, making comparisons to theoretical models</b></p> <p><u>Tristan T. Burman</u><sup>1</sup>, J. Patel<sup>2</sup>, H. Ashraf<sup>2</sup>, T. Grange<sup>2</sup>, C. Allford<sup>1</sup>, S. Shutts<sup>1</sup>, P. M. Smowton<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK  <sup>2</sup>KLA (SPTS Division), Ringland Way, Newport NP18 2TA, UK</p>	<p>Het-O-4</p> <p><b>Heterogeneous integration of photonic structures at the University of Bristol</b></p> <p><u>Krishna Balram</u></p> <p>Department of Electrical and Electronic Engineering, University of Bristol, Bristol BS8 1UB, UK</p>	<p>E-O-2</p> <p><b>Resonant cavity enhanced photodetectors for spectroscopic sensing of glucose in the combination spectral region</b></p> <p><u>Josh Fletcher</u><sup>1</sup>, A. Bainbridge<sup>1</sup>, L. Hanks<sup>1</sup>, K. Mamic<sup>1</sup>, F. J. Castaño<sup>2</sup>, A. Marshall<sup>1</sup></p> <p><sup>1</sup>Physics Department, Lancaster University, Lancaster LA1 4YB, UK  <sup>2</sup>ams-osram AG, Technology R&amp;D, Tobelbader Strasse 30, 8141 Premstaetten, Austria</p>

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
17:30	<p>B-O-9</p> <p><b>High-order distributed feedback lasers fabricated with mask-less projection lithography</b></p> <p><u>Ben Salmond</u><sup>1</sup>, Z. Cao<sup>1</sup>, S.-J. Gillgrass<sup>1</sup>, T. Peach<sup>2</sup>, M. Wale<sup>3</sup>, W. Meredith<sup>4</sup>, P. M. Smowton<sup>1,2</sup>, S. Shutts<sup>1,2</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, The Parade, Cardiff CF24 3AA, UK  <sup>2</sup>Institute for Compound Semiconductors (ICS), Translational Research Hub, Maindy Road, Cardiff CF24 4HQ, UK  <sup>3</sup>Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE, UK  <sup>4</sup>Compound Semiconductor Centre Ltd, St Mellons, Cardiff CF3 0LW, UK</p>	<p>Discussion</p> <p><b>Round table discussion on opportunities for heterogeneous integration in the UK semiconductor industry</b></p>	<p>E-O-3</p> <p><b>Demonstration of an InAs/InAsSb Type-II Superlattice Mid-Infrared Imaging Array</b></p> <p><u>George F. Seager</u>, V. Letka, A. R. J. Marshall</p> <p>Physics Department, Lancaster University, Lancaster LA1 4YB, UK</p>
17:45	<p>B-O-10</p> <p><b>Low-loss III-V photonics and high efficiency grating couplers incorporating low-index AlOx layers</b></p> <p><u>Fwoziah T. Albeladi</u><sup>1,2</sup>, S.-J. Gillgrass<sup>1</sup>, J. Nabialek<sup>1</sup>, R. Forrest<sup>1</sup>, C. Allford<sup>1</sup>, T. R. Albiladi<sup>1,3</sup>, M. Tang<sup>4</sup>, H. Deng<sup>4</sup>, H-Y. Liu<sup>4</sup>, S. Shutts<sup>1</sup>, P. M. Smowton<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, The Parade, Cardiff CF24 3AA. UK.  <sup>2</sup>Physics Department, Faculty of Science, University of Jeddah, Jeddah 21589, Saudi Arabia  <sup>3</sup>Physics And Astronomy Department, Faculty of Science, King Saud University, Riyadh 11451, Saudi Arabia  <sup>4</sup>Department of Electrical Engineering, University College London, Gower Street, London, UK</p>		<p>E-O-4</p> <p><b>Photon localization in aperiodic lattice quantum cascade lasers</b></p> <p>E. McNeill, <u>Subhasish Chakraborty</u></p> <p>Department of Electrical and Electronic Engineering, University of Manchester, Manchester M13 9PL, UK</p>
18:00	End of Session		
18:30	<p>Conference Dinner</p> <p>Forum Kitchen + Bar</p> <p>127-129 Devonshire Street, Sheffield S3 7SB</p>		

## Oral Presentations – Thursday 13<sup>th</sup> July 2023

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
09:00	Registration and Refreshments, Atrium Level 2		
09:30	Plenary 2 <b>Probing Surfaces and Twisted Interfaces in Transition Metal Dichalcogenides by Advanced Transmission Electron Microscopy</b>  <u>Sarah J. Haigh</u> , N. Clark, S. Shao, D. Kelly, G. Tainton, A. Weston, I. Grigorieva, R. Gorbachev  National Graphene Institute, University of Manchester, Manchester, UK		
10:15	Refreshments and Exhibition, Atrium Level 2		
10:45	G-O-1 <b>Cathodoluminescence study of ELOG <math>\alpha</math>-Ga<sub>2</sub>O<sub>3</sub></b>  M. Maruzane <sup>1</sup> , Y. Oshima <sup>2</sup> , P. Edwards <sup>1</sup> , R. Martin <sup>1</sup> , <u>Fabien Massabuau</u> <sup>1</sup>  <sup>1</sup> University of Strathclyde, Glasgow, UK <sup>2</sup> National Institute for Materials Science, Tsukuba, Japan	TMD-O-1 (Invited) <b>Merging bound states in the continuum and van der Waals materials for enhanced light-matter coupling</b>  <u>Andreas Tittl</u>  Faculty of Physics, Ludwig-Maximilians-Universität München, Germany	A-O-1 <b>Continuously Sustained Bose-Einstein Photon Condensate in a Semiconductor Quantum Well Open Microcavity</b>  <u>Ross C. Schofield</u> <sup>1</sup> , M. Fu <sup>1</sup> , E. Clarke <sup>2</sup> , A. Trapalis <sup>2</sup> , I. Farrer <sup>2</sup> , H. Dhar <sup>3</sup> , R. Mukherjee <sup>4</sup> , J. Heffernan <sup>2</sup> , F. Mintert <sup>1</sup> , R. A. Nyman <sup>1</sup> , R. F. Oulton <sup>1</sup>  <sup>1</sup> Blackett Laboratory, Imperial College London, Prince Consort Road, London SW7 2AZ, UK <sup>2</sup> EPSRC National Centre for III-V Technologies, University of Sheffield, Sheffield S1 3JD, UK <sup>3</sup> Department of Physics, Indian Institute of Technology, Bombay, Powai, Mumbai 400076, India <sup>4</sup> Zentrum für Optische Quantentechnologien, Universität Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany



	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
11:00	<p>G-O-2</p> <p><b>Probing defects in Gallium oxide alloys via Cathodoluminescence hyperspectral imaging</b></p> <p><u>Gunasekar Naresh-Kumar</u><sup>1,2</sup>, D. Hunter<sup>2</sup>, P. R. Edwards<sup>2</sup>, R. W. Martin<sup>2</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, UK <sup>2</sup>Department of Physics, SUPA, University of Strathclyde, Glasgow G4 ONG, UK</p>		<p>A-O-2</p> <p><b>Direct-write projection lithography of quantum dot micropillar single photon sources</b></p> <p><u>Petros Androvitsaneas</u><sup>1,2</sup>, R. N. Clark<sup>1,2</sup>, M. Jordan<sup>1,2</sup>, A. Trapalis<sup>3,4</sup>, I. A. Farrer<sup>3,4</sup>, W. Langbein<sup>5</sup>, A. J. Bennett<sup>1,2,5</sup></p> <p><sup>1</sup>School of Engineering, Cardiff University, Cardiff, UK <sup>2</sup>Translational Research Hub, Cardiff University, Cardiff, UK <sup>3</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, UK <sup>4</sup>EPSRC National Epitaxy Facility, University of Sheffield, Sheffield, UK <sup>5</sup>School of Physics and Astronomy, Cardiff University, Cardiff, UK</p>
11:15	<p>G-O-3</p> <p><b>Compressed Sensing for Photoluminescence Spectroscopy of Wide Bandgap Semiconductor Materials</b></p> <p><u>George Koutsourakis</u>, A. Thompson, J. C. Blakesley, F. A. Castro, S. Wood</p> <p>National Physical Laboratory, Hampton Road, Teddington TW11 OLW, UK</p>	<p>TMD-O-2</p> <p><b>Van der Waals materials for nanophotonic applications</b></p> <p><u>Panaiot G. Zotev</u><sup>1</sup>, Y. Wang<sup>2</sup>, D. Andres-Penares<sup>3</sup>, T. S. Millard<sup>1</sup>, L. Sortino<sup>4</sup>, N. Mullin<sup>1</sup>, D. Conteduca<sup>2</sup>, X. Hu<sup>1</sup>, C. Louca<sup>1</sup>, M. Brotons-Gisbert<sup>3</sup>, S. Randerson<sup>1</sup>, A. Genco<sup>1</sup>, J. Hobbs<sup>1</sup>, B. Gerardot<sup>3</sup>, T. F. Krauss<sup>2</sup>, A. I. Tartakovskii<sup>1</sup></p> <p><sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK <sup>2</sup>Department of Physics, University of York, York YO10 5DD, UK <sup>3</sup>School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh EH14 4AS, UK <sup>4</sup>Nanoinstitute Munich, Faculty of Physics, Ludwig-Maximilians- Universität, München, 80539, Munich, Germany</p>	<p>A-O-3</p> <p><b>Nonlinear Rydberg exciton-polaritons in Cu<sub>2</sub>O microcavities</b></p> <p><u>Anthonin Delphan</u><sup>1</sup>, M. Makhonin<sup>1</sup>, T. Isoniemi<sup>1</sup>, P. Claronino<sup>1</sup>, P. Walker<sup>1</sup>, M. S. Skolnick<sup>1</sup>, D. Krizhanovskii<sup>1</sup>, K. W. Song<sup>2</sup>, O. Kyriienko<sup>2</sup>, H. Ohadi<sup>3</sup>, M. Bayer<sup>4</sup>, M. Assmann<sup>4</sup>, Julian Heckötter<sup>4</sup></p> <p><sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK <sup>2</sup>Department of Physics and Astronomy, University of Exeter, Stocker Rd, Exeter EX4 4PY, UK <sup>3</sup>School of Physics &amp; Astronomy, University of St Andrews, St Andrews KY16 9AJ, UK <sup>4</sup>Fakultät Physik, TU Dortmund, August-Schmidt-Straße 4, Dortmund, 44227, Germany</p>
11:30	<p>G-O-4</p> <p><b>Suppressing leakage currents in 3C-SiC/Si devices through the fabrication of suspended structures</b></p> <p><u>Gerard Colston</u>, S. Pfeffer-Matthews, A. B. Renz, P. M. Gammon, M. Antoniou, V. A. Shah</p> <p>School of Engineering, University of Warwick, Coventry, CV4 7AL, UK</p>	<p>TMD-O-3</p> <p><b>Topological metasurfaces on transition metal dichalcogenide membranes</b></p> <p><u>Tommi Isoniemi</u>, X. Hu, P. Boutheyre, F. Benimetskiy, M. S. Skolnick, A. I. Tartakovskii, D. N. Krizhanovskii</p> <p>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK</p>	<p>A-O-4</p> <p><b>Sub-Bandgap Photoconductivity Response of Synthetic Cu<sub>2</sub>O to Pulsed Laser Excitation at IR Wavelengths</b></p> <p><u>Aisha S. Albeladi</u><sup>1,2</sup>, C. Hodges<sup>1</sup>, C. P. Allford<sup>1</sup>, S. Lynch<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, The Parade, Cardiff CF24 3AA, UK <sup>2</sup>Department of Physics, College of Science and Art, KAU, Rabigh 25732, Saudi Arabia</p>

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11:45	<p>G-O-5</p> <p><b>Optimisation of GaN-based blue-green lasers using different substrate orientations and improved confinement layers</b></p> <p><u>Rongzi Ni</u><sup>1</sup>, T. Wang<sup>1</sup>, M. Hopkinson<sup>1</sup>, J. Griffiths<sup>2</sup></p> <p><sup>1</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S3 7HQ, UK  <sup>2</sup>Huawei Technologies R&amp;D. Ltd. Martlesham Heath, Ipswich IP5 3RE, UK</p>	<p>TMD-O-4</p> <p><b>A high-resolution tuneable filter-based technique for semiconductor imaging</b></p> <p><u>Yameng Cao</u>, S. Wood, F. Araujo de Castro</p> <p>National Physical Laboratory, Hampton Road, Teddington, London TW11 0LW, UK</p>	<p>A-O-5</p> <p><b>The charge of non-magnetic fractional states in 1D In<sub>0.75</sub>Ga<sub>0.25</sub>As quantum wires</b></p> <p><u>Irene Villar Rodriguez</u><sup>1</sup>, Y. Gul<sup>1</sup>, S. Holmes<sup>1</sup>, C. Chen<sup>2</sup>, D. A. Ritchie<sup>2</sup>, M. Pepper<sup>1</sup></p> <p><sup>1</sup>London Centre for Nanotechnology, Department of Electrical and Electronic Engineering, University College London, 19 Gordon St, London WC1H 0AH, UK  <sup>2</sup>Cavendish Laboratory, University of Cambridge, 19 J. J. Thomson Avenue, Cambridge, CB3 0HE, UK</p>
12:00	<p>G-O-6</p> <p><b>Effect of electron-irradiation on defect density in n-type GaN Layers grown on Ammono-GaN Substrates</b></p> <p><u>Lijie Sun</u><sup>1</sup>, V. P. Markevich<sup>1</sup>, D. Binks<sup>2</sup>, M. P. Halsall<sup>1</sup>, I. F. Crowe<sup>1</sup>, A. R. Peaker<sup>1</sup>, P. Kruszewski<sup>3</sup>, J. Plesiewicz<sup>3</sup>, P. Prystawko<sup>3</sup>, S. Bulka<sup>4</sup></p> <p><sup>1</sup>Photon Science Institute and Department of Electrical and Electronic Engineering, University of Manchester, Manchester M13 9PL, UK  <sup>2</sup>Department of Physics &amp; Astronomy, University of Manchester, Manchester, UK  <sup>3</sup>Institute of High Pressure Physics, Polish Academy of Sciences, 01-142 Warsaw, Poland  <sup>4</sup>Institute of Nuclear Chemistry and Technology, Dorodna 16, 03-195 Warsaw, Poland</p>	<p>TMD-O-5</p> <p><b>Van der Waals Nanoantennas on Gold for Hosting High Q Factor Hybrid Mie-Plasmonic Resonances</b></p> <p><u>Sam A. Randerson</u><sup>1</sup>, P. G. Zotev<sup>1</sup>, X. Hu<sup>1</sup>, A. J. Knight<sup>1</sup>, Y. Wang<sup>1</sup>, S. Nagarkar<sup>1</sup>, D. Hensman<sup>1</sup>, Y. Wang<sup>2</sup>, A. I. Tartakovskii<sup>1</sup></p> <p><sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK  <sup>2</sup>Department of Physics, University of York, York YO10 5DD, UK</p>	<p>A-O-6</p> <p><b>Experimental Signature of Electron-Phonon Decoupling in Ion Damaged InSb Thin Films</b></p> <p><u>Jonathan Gough</u>, S. N. Holmes, G. Auton, H. Liu, M. Pepper</p> <p><sup>1</sup>Department of Electronic and Electrical Engineering, University College London, London WC1H 0AH, UK</p>
12:15	<p>G-O-7</p> <p><b>Unconventional biexcitons in (In,Ga)N quantum dots: an atomistic theoretical analysis</b></p> <p><u>James McCloskey</u><sup>1,2</sup>, S. Schulz<sup>1,2</sup></p> <p><sup>1</sup>Tyndall National Institute, University College Cork, Cork, Ireland  <sup>2</sup>School of Physics, University College Cork, Cork, Ireland</p>	<p>TMD-O-6</p> <p><b>The dynamics of surface plasmon polaritons explored through s-SNOM Fourier analysis of WS<sub>2</sub> nanophotonic antennas</b></p> <p><u>Alexander Knight</u>, X. Hu, A. Tartakovskii</p> <p>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK</p>	<p>A-O-7</p> <p><b>Quantum Wires in MBE Grown High Mobility GaAs Quantum Wells</b></p> <p><u>Iwan Pullen</u><sup>1</sup>, Y. Gul<sup>1</sup>, C. Chen<sup>2</sup>, D. Ritchie<sup>2</sup>, M. Pepper<sup>1</sup></p> <p><sup>1</sup>London Centre for Nanotechnology, Department of Electrical and Electronic Engineering, University College London, 19 Gordon St, London WC1H 0AH, UK  <sup>2</sup>Cavendish Laboratory, University of Cambridge, 19 J. J. Thomson Avenue, Cambridge, CB3 0HE, UK</p>

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12:30	<p>G-O-8</p> <p><b>Aluminium Nitride Quantum Light Source on Silicon Operating at Room-Temperature</b></p> <p><u>Joseph K. Cannon</u><sup>1,2</sup>, S. G. Bishop<sup>1,2</sup>, H. B. Yağci<sup>1,2</sup>, R. N. Clark<sup>1,2</sup>, S. R. Ibrahim<sup>1,2</sup>, J. P. Hadden<sup>1,2</sup>, A. J. Bennett<sup>1,2</sup></p> <p><sup>1</sup>School of Engineering, Cardiff University, Queen's Buildings, The Parade, Cardiff CF24 3AA, UK <sup>2</sup>Translational Research Hub, Cardiff University, Maindy Road, Cathays, Cardiff CF24 4HQ, UK</p>	<p>TMD-O-7</p> <p><b>Different Morphological Growth of Molybdenum Disulfide via Aerosol-Assisted Chemical Vapour Deposition due to Substrate-Induced Strain</b></p> <p><u>Lewis Adams</u>, N. Balakrishnan, P. D. Matthews</p> <p>School of Chemical and Physical Sciences, Keele University, Keele, Stoke-on-Trent ST5 5BG, UK</p>	<p>A-O-8</p> <p><b>Perovskite-inspired materials for indoor photovoltaics devices application</b></p> <p><u>Huimin Zhu</u><sup>1</sup>, P. Liu<sup>2</sup>, L. Penman<sup>1</sup>, R. Hoye<sup>2</sup>, F. Massabuau<sup>1</sup></p> <p><sup>1</sup>University of Strathclyde, Glasgow, UK <sup>2</sup>University of Oxford, Oxford UK</p>
12:45	Lunch and Exhibition Heartspace Atrium Level 2 Poster Session Seminar Room 223		
13:00			IOP Semiconductor Group AGM
14:00	IOP Student Research Communication Competition Prize-giving		
14:05	<p>Plenary 3</p> <p><b>The Dawn of the Era of Gallium Oxide Based Space Electronics?</b></p> <p><u>Dave J. Rogers</u><sup>1</sup>, F. H. Teherani<sup>1</sup>, V. E. Sandana<sup>1</sup>, P. Bove<sup>1</sup>, M. Razeghi<sup>2</sup></p> <p><sup>1</sup>Nanovation, 8 route de Chevreuse, 78117 Chateaufort, France <sup>2</sup>Center for Quantum Devices, ECE Dept., Northwestern University, Evanston IL60208, USA</p>		
14:55	<p>G-O-9</p> <p><b>An ab initio Study of Electron Transport in Ultra-Wide Band Gap Semiconductors</b></p> <p><u>Patrick Williams</u>, A. Dyson, P. Briddon</p> <p>Newcastle University, Newcastle, UK</p>	<p>TMD-O-8 (Invited)</p> <p><b>Femtosecond coherent phonon spectroscopy of monolayer TMDs</b></p> <p><u>Charles J. Sayers</u><sup>1</sup>, A. Genco<sup>1</sup>, C. Trovatiello<sup>1</sup>, S. Dal Conte<sup>1</sup>, V. Khaustov<sup>2,3</sup>, J. Cervantes-Villanueva<sup>4</sup>, D. Sangalli<sup>5</sup>, A. Molina-Sanchez<sup>4</sup>, C. Coletti<sup>2,6</sup>, C. Gadermaier<sup>1</sup>, G. Cerullo<sup>1</sup></p> <p><sup>1</sup>Dipartimento di Fisica, Politecnico di Milano, 20133 Milano, Italy <sup>2</sup>NEST, Istituto Italiano di Tecnologia, 56127 Pisa, Italy <sup>3</sup>Scuola Normale Superiore, Piazza San Silvestro 12, 56127 Pisa, Italy <sup>4</sup>ICMUV, University of Valencia, Catedrático Beltrán 2, E-46980 Valencia, Spain <sup>5</sup>ISM-CNR, Area della Ricerca di Roma 1, Monterotondo Scalo, Italy <sup>6</sup>Graphene Laboratories, Istituto Italiano di Tecnologia, 16163 Genova, Italy</p>	<p>M4QN</p> <p><b>System-level quantum materials</b></p>
15:10	<p>G-O-10</p> <p><b>Buffer-Free GaN-on-SiC HEMTs with Bond Pad Heat Sinks</b></p> <p><u>Aniket Dhongde</u>, A. Ofiare, K. Karami, E. Wasige</p> <p>High Frequency Electronics Group, James Watt School of Engineering University of Glasgow, Glasgow G12 8LT, UK</p>	<p><sup>1</sup>Dipartimento di Fisica, Politecnico di Milano, 20133 Milano, Italy <sup>2</sup>NEST, Istituto Italiano di Tecnologia, 56127 Pisa, Italy <sup>3</sup>Scuola Normale Superiore, Piazza San Silvestro 12, 56127 Pisa, Italy <sup>4</sup>ICMUV, University of Valencia, Catedrático Beltrán 2, E-46980 Valencia, Spain <sup>5</sup>ISM-CNR, Area della Ricerca di Roma 1, Monterotondo Scalo, Italy <sup>6</sup>Graphene Laboratories, Istituto Italiano di Tecnologia, 16163 Genova, Italy</p>	

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15:25	<p>G-O-11</p> <p><b>Investigation of Noise Performance of AlGaIn/GaN HEMTs</b></p> <p><u>Jing Wang</u>, Q.-X. Li, J. Kelly, C. Li</p> <p>James Watt School of Engineering, University of Glasgow, Glasgow, UK</p>	<p>TMD-O-9</p> <p><b>Ultrafast highly nonlinear behaviour of exciton-polaritons in MoS<sub>2</sub> monolayers and bilayers within planar microcavities</b></p> <p>A. Genco<sup>1</sup>, <u>Charalambos Louca</u><sup>1</sup>, C. Trovattello<sup>2</sup>, C. Cruciano<sup>1</sup>, S. Randerson<sup>3</sup>, P. Claronino<sup>3</sup>, R. Jayaprakash<sup>3</sup>, K. Watanabe<sup>4</sup>, T. Taniguchi<sup>4</sup>, D. G. Lidzey<sup>3</sup>, G. Cerullo<sup>1,5</sup>, A. I. Tartakovskii<sup>3</sup>, S. Dal Conte<sup>1</sup></p> <p><sup>1</sup>Dipartimento di Fisica, Politecnico di Milano, P.za Leonardo Da Vinci 32, Milan, Italy  <sup>2</sup>Department of Mechanical Engineering, Columbia University, New York, USA  <sup>3</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield, UK  <sup>4</sup>Advanced Materials Laboratory, National Institute for Materials Science, Tsukuba, Japan  <sup>5</sup>IFN, CNR, P.za Leonardo da Vinci 32, 20133, Milan, Italy</p>	
15:40	<p>G-O-12</p> <p><b>Impact of Cap Doping on Noise Figure of GaN HEMTs</b></p> <p><u>Qing-xia Li</u>, J. Wang, C. Li</p> <p>James Watt School of Engineering, University of Glasgow, Glasgow, UK</p>	<p>TMD-O-10</p> <p><b>Spin-order-dependent magneto-elastic coupling in two dimensional antiferromagnetic MnPSe<sub>3</sub> observed through Raman spectroscopy</b></p> <p>D. J. Gillard<sup>1</sup>, <u>Daniel Wolverson</u><sup>2</sup>, O. M. Hutchings<sup>1</sup>, A. I. Tartakovskii<sup>1</sup></p> <p><sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK  <sup>2</sup>Department of Physics, University of Bath, Bath BA2 7AY, UK</p>	
15:55	Refreshments, Atrium Level 2		
16:15	<p>D-O-10</p> <p><b>Wafer-scale photoluminescence imaging of nanostructured GaN-based LED materials</b></p> <p>G. Koutsourakis<sup>1</sup>, F. Richeimer<sup>1</sup>, A. Yudin<sup>2</sup>, T. Zhu<sup>2</sup>, Y. Liu<sup>2</sup>, <u>Sebastian Wood</u><sup>1</sup></p> <p><sup>1</sup>National Physical Laboratory, Hampton Road, Teddington TW11 0LW, UK  <sup>2</sup>Poro Technologies Ltd, 13 Evolution Business Park, Impington CB24 9NG, UK</p>	<p>TMD-O-11 (Invited)</p> <p><b>Tuneable excitons in emerging 2D materials</b></p> <p><u>Monica Craciun</u></p> <p>University of Exeter, Exeter, UK</p>	<p>D-O-17</p> <p><b>Linking structural, optical, and magneto-optical properties of InAsSb/GaAs quantum dots through genetic optimization algorithms</b></p> <p><u>Giulio Barbieri</u><sup>1</sup>, J. M. Llorens<sup>1</sup>, A. G. Taboada<sup>1</sup>, J. M. Ripalda<sup>1</sup>, L. Stanojević<sup>2</sup>, A. Gallego Carro<sup>2</sup>, J. M. Ulloa<sup>2</sup>, B. Alén<sup>1</sup></p> <p><sup>1</sup>Instituto de Micro y Nanotecnología, IMN-CNM, CSIC (CEI UAM+CSIC) Isaac Newton, 8, E-28760, Tres Cantos, Spain  <sup>2</sup>Institute for Optoelectronic Systems and Microtechnology (ISOM), Universidad Politécnica de Madrid, Avda. Complutense 30, 28040 Madrid, Spain</p>

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
16:30	<p>D-O-11</p> <p><b>Three-dimensional epitaxy of low defect 3C-SiC on a geometrically modified silicon substrate</b></p> <p>Gerard Colston, K. Turner, A. B. Renz, P. M. Gammon, M. Antoniou, V. A. Shah</p> <p>School of Engineering, The University of Warwick, Coventry, CV4 7AL, UK</p>		<p>D-O-18</p> <p><b>Theoretical analysis of lateral-field quantum dot electro-absorption modulation</b></p> <p>Tommy Murphy<sup>1,2</sup>, C. A. Broderick<sup>3,1,2</sup>, F. H. Peters<sup>2,1</sup>, E. P. O'Reilly<sup>1,2</sup></p> <p><sup>1</sup>Tyndall National Institute, University College Cork, Lee Maltings, Dyke Parade, Cork T12 R5CP, Ireland  <sup>2</sup>School of Physics, University College Cork, Cork T12 YN60, Ireland  <sup>3</sup>Materials Department, University of California, Santa Barbara, California 93106-5050, USA</p>
16:45	<p>D-O-12</p> <p><b>Investigating the Effect of Crystal Morphology on Optoelectronic Properties of Zinc Phosphide Thin Films via Optical-pump Terahertz Probe Spectroscopy</b></p> <p>Yinghong Huang<sup>1</sup>, X. Liu<sup>1</sup>, R. Paul<sup>2</sup>, E. Z. Stutz<sup>2</sup>, M. Zamani<sup>2</sup>, D. A. Damry<sup>1</sup>, L. Buswell<sup>2</sup>, S. Escobar Steinvall<sup>2</sup>, J.-B. Leran<sup>2</sup>, M. Dimitrievska<sup>2</sup>, A. Fontcuberta i Morral<sup>2</sup>, J. L. Boland<sup>1</sup></p> <p><sup>1</sup>Photon Science Institute, Department of Electrical and Electronic Engineering, University of Manchester, Alan Turing Building, Oxford Road, Manchester M13 9PL, UK  <sup>2</sup>Laboratory of Semiconductor Materials, Institute of materials, Faculty of Engineering, École Polytechnique Fédérale de Lausanne, 1015 Lausanne, Switzerland</p>	<p>TMD-O-12</p> <p><b>Dimensionality crossover for electrons and excitons in anisotropic moiré semiconductors</b></p> <p>David A. Ruiz-Tijerina<sup>1</sup>, I. Soltero<sup>2</sup></p> <p><sup>1</sup>Instituto de Física, UNAM, Mexico City, Mexico  <sup>2</sup>National Graphene Institute, University of Manchester, Manchester, UK</p>	<p>D-O-19</p> <p><b>Optimising InAs/InAlGaAs/InP (001) quantum dot materials for conventional band applications grown by molecular beam epitaxy</b></p> <p>Calum Dear, X. Yu, H. Jia, J. Yuan, H. Deng, M. Tang, H. Liu</p> <p>Department of Electronic and Electrical Engineering, University College London, London, UK</p>

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
17:00	<p>D-O-13 <b>Growth and scattering mechanisms of metamorphic In<sub>0.81</sub>Ga<sub>0.19</sub>As quantum wells</b></p> <p><u>Yilmaz Gul</u><sup>2</sup>, J. T. Dong<sup>2</sup>, A. N. Engel<sup>2</sup>, C. P. Dempsey<sup>2</sup>, S. Chatterjee<sup>2</sup>, S. N. Holmes<sup>1</sup>, M. Pepper<sup>1</sup>, C. J. Palmstrøm<sup>2,3</sup></p> <p><sup>1</sup>London Centre for Nanotechnology, University College London, 17-19 Gordon Street, London WC1H 0AH, UK <sup>2</sup>Materials Department, University of California, Santa Barbara, CA 931063, USA <sup>3</sup>Department of Electrical and Computer Engineering, University of California, Santa Barbara, CA 93106, USA</p>	<p>TMD-O-13 <b>One-dimensional channels in moiré superlattices of twisted 1T' WTe<sub>2</sub> bilayers</b></p> <p><u>Samuel J. Magorrian</u>, N. D. M. Hine</p> <p>Department of Physics, University of Warwick, Coventry, UK</p>	<p>D-O-20 <b>Selective Area Intermixing in the InAs QDs Lasers for Photonic Integrated Circuits</b></p> <p><u>Pawan Mishra</u><sup>1</sup>, A. Enderson<sup>1</sup>, F. T. Albeladi<sup>1,2</sup>, S.-J. Gillgrass<sup>1</sup>, L. Jarvis<sup>1</sup>, N. Peng<sup>3</sup>, Y. Long<sup>1</sup>, R. Lahiri<sup>1</sup>, S. Shutts<sup>1</sup>, M. Tang<sup>4</sup>, H.-Y. Liu<sup>4</sup>, P. M. Smowton<sup>1</sup></p> <p><sup>1</sup>Future Compound Semiconductor Manufacturing Hub, School of Physics and Astronomy, Cardiff University, The Parade, Cardiff CF24 3AA, UK <sup>2</sup>Physics Department, Faculty of Science, University of Jeddah, Jeddah 21589, Saudi Arabia <sup>3</sup>Surrey Ion Beam Centre, University of Surrey, Guildford, Surrey, UK <sup>4</sup>Department of Electrical Engineering, University College London, London, UK</p>
17:15	<p>D-O-14 <b>Atomic layer deposition of advanced nanoscale structures for silicon passivation</b></p> <p><u>John D. Murphy</u>, S. L. Pain, A. Wratten, E. Khorani, T. Niewelt, N. E. Grant</p> <p>School of Engineering, University of Warwick, Coventry CV4 7AL, UK</p>	<p>TMD-O-14 <b>Spontaneous symmetry breaking of domain wall networks in lattice-reconstructed TMD twisted heterobilayers</b></p> <p><u>Mike A. Kaliteevsky</u><sup>1,2</sup>, V. V. Enaldiev<sup>1,2</sup>, V. I. Fal'ko<sup>1,2,3</sup></p> <p><sup>1</sup>National Graphene Institute, University of Manchester, Manchester M13 9PL, UK <sup>2</sup>University of Manchester, School of Physics and Astronomy, Manchester M13 9PL, UK <sup>3</sup>Henry Royce Institute for Advanced Materials, University of Manchester, Manchester M13 9PL, UK</p>	<p>D-O-21 <b>Growth and Characterisation of InAs Quantum Dots on GaP/Si Substrates by Droplet Epitaxy in MOVPE</b></p> <p><u>Paige E. Baldwin-McDonald</u><sup>1</sup>, E. M. Sala<sup>1,2</sup>, Jon Heffernan<sup>1,2</sup></p> <p><sup>1</sup>Department of Electronic and Electrical Engineering, The University of Sheffield, North Campus, Broad Lane, Sheffield S3 7HQ, UK <sup>2</sup>EPSRC National Epitaxy Facility, University of Sheffield, North Campus, Broad Lane, Sheffield S3 7HQ, UK</p>
17:30	<p>D-O-15 <b>MOCVD growth of Sb-based Type-II superlattices from mid-wave to long-wave infrared bands</b></p> <p><u>Richard Brown</u><sup>1</sup>, C. Liu<sup>1,2</sup>, B. Liang<sup>3</sup>, P. Wong<sup>1</sup>, I. Davies<sup>2</sup>, Q. Li<sup>1</sup></p> <p><sup>1</sup>School of Physics and Astronomy, Cardiff University, Cardiff, UK <sup>2</sup>IQE plc. Cardiff, Wales, CF3 0LW, UK <sup>3</sup>California NanoSystems Institute, University of California, Los Angeles, USA</p>		<p>D-O-22 <b>Site-controlled InAs/GaAs Quantum Dot arrays for nanophotonics</b></p> <p>C. L. Chan<sup>1</sup>, A. Trapalis<sup>1</sup>, C. Ovenden<sup>1</sup>, <u>Ian Farrer</u><sup>1,3</sup>, D. Hallett<sup>2</sup>, E. Clarke<sup>3</sup>, M. S. Skolnick<sup>2</sup>, J. Heffernan<sup>1,3</sup></p> <p><sup>1</sup>Department of Electronic and Electrical Engineering, University of Sheffield, North Campus, Sheffield S3 7HQ, UK <sup>2</sup>Department of Physics and Astronomy, University of Sheffield, Hicks Building, Sheffield S3 7RH, UK <sup>3</sup>National Epitaxy Facility, University of Sheffield, Sheffield S3 7HQ, UK</p>

	Pennine Lecture Theatre	Peak Lecture Theatre	Norfolk 210 Lecture Theatre
17:45	<p>D-O-16</p> <p><b>Influence of growth conditions of the structural and opto-electronic quality of <math>\text{Al}_x\text{Ga}_{1-x}\text{As}_{1-y}\text{Bi}_y</math> for the Next Generation of APDs</b></p> <p><u>Mathew Carr</u><sup>1</sup>, N. Bailey<sup>1</sup>, M. Sharpe<sup>2</sup>, J. England<sup>2</sup>, R. Richards<sup>1</sup>, J. David<sup>1</sup></p> <p><sup>1</sup>Department of Electronic &amp; Electrical Engineering, University of Sheffield, Sheffield, UK <sup>2</sup>University of Surrey, Guildford, UK</p>		<p>D-O-23</p> <p><b>Fabrication of droplet epitaxial III-V nanostructure arrays using in situ direct laser interference patterning</b></p> <p><u>Im Sik Han</u>, Y.-R. Wang, Z. Lin, Y. Wang, M. Hopkinson</p> <p>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, UK</p>
18:00	Conference Close		

## Poster Presentations

### Symposium A: Physics in Semiconductors

A-P-1

#### Optimisation of hole transport in p-doped GaN/AlGaIn superlattices

Mengxun Bai, J. Rorison, E. Harbord

Department of Electrical and Electronic Engineering, University of Bristol, Bristol BS8 1UB, UK

A-P-2

#### Observation of Zitterbewegung in semiconductor microcavities

Paul M. Walker<sup>1</sup>, S. Lovett<sup>1</sup>, A. Osipov<sup>2</sup>, A. Yulin<sup>2</sup>, P. U. Naik<sup>1</sup>, C. E. Whittaker<sup>1</sup>, I. A. Shelykh<sup>3,2</sup>, M. S. Skolnick<sup>1</sup>, D. N. Krizhanovskii<sup>1</sup>

<sup>1</sup>Department of Physics and Astronomy, University of Sheffield, S3 7RH, Sheffield, UK

<sup>2</sup>Department of Physics and Technology, ITMO University, St. Petersburg, 197101, Russia

<sup>3</sup>Science Institute, University of Iceland, Dunhagi 3, IS-107, Reykjavik, Iceland

A-P-3

#### Electron velocity simulation for compound semiconductor devices using NextNano software

A. Hamid, Ata Khalid

High Frequency Semiconductor Device Physics Laboratory, Cranfield University, UK

A-P-4

#### Dimensionality effects in suspended GaAs/AlGaIn heterostructures

Georgios Stefanou<sup>1</sup>, S. N. Holmes<sup>1,2</sup>, C. Chen<sup>1</sup>, T. A. Mitchell<sup>1</sup>, D. A. Ritchie<sup>1,3</sup>, C. G. Smith<sup>4,1</sup>

<sup>1</sup>Cavendish Laboratory, University of Cambridge, JJ Thomson Avenue, Cambridge, CB3 0HE, UK

<sup>2</sup>London Centre for Nanotechnology, 17-19 Gordon Street, London WC1H 0AH, UK

<sup>3</sup>Department of Physics, Swansea University, Singleton Park, Swansea SA2 8PP, UK

<sup>4</sup>Hitachi Cambridge Laboratory, 15 JJ Thomson Avenue, Cambridge CB3 0FD, UK

A-P-5

#### I-V characteristics of recessed micrometre to nanometre scale AuGeNi ohmics

Georgios Stefanou<sup>1</sup>, J. R. A. Dann<sup>1</sup>, E. Miele<sup>1</sup>, C. Chen<sup>1</sup>, D. A. Ritchie<sup>1,2</sup>, C. G. Smith<sup>3,1</sup>

<sup>1</sup>Cavendish Laboratory, University of Cambridge, JJ Thomson Avenue, Cambridge CB3 0HE, UK

<sup>2</sup>Department of Physics, Swansea University, Singleton Park, Swansea SA2 8PP, UK

<sup>3</sup>Hitachi Cambridge Laboratory, 15 JJ Thomson Avenue, Cambridge CB3 0FD, UK

### Symposium B: Optical Devices

B-P-1

#### Band Structure Dependent Processes and Optimisation of GeSn Lasers

Aneirin R. Ellis<sup>1</sup>, I. P. Marko<sup>1</sup>, D. A. Duffy<sup>2</sup>, S. Ojo<sup>3</sup>, W. Du<sup>3</sup>, S.-Q. Yu<sup>3</sup>, S. J. Sweeney<sup>1,2</sup>

<sup>1</sup>James Watt School of Engineering, University of Glasgow, Glasgow G12 8LT, UK

<sup>2</sup>ZiNIR Ltd., Eastbourne BN22 7QP, UK

<sup>3</sup>Department of Electrical Engineering, University of Arkansas, Fayetteville, Arkansas 72701, USA

B-P-2

#### Al<sub>2</sub>O<sub>3</sub> Ring Resonator Operating in Ultraviolet to Blue Wavelength Range for Photonic Integrations

Lifeng Bao, Y. Hou, G. Reed, F. Gardes

Optoelectronics Research Centre, University of Southampton, Southampton SO17 1BJ, UK



B-P-3

**Design Optimisation Approaches for Type-I and Type-II “W”-Semiconductor Lasers for Near-Infrared Applications**

Dominic A. Duffy<sup>1,2</sup>, I. P. Marko<sup>1,3</sup>, S. J. Sweeney<sup>1,2,3</sup>

<sup>1</sup>Department of Physics and Advanced Technology Institute, University of Surrey, Guildford GU2 7XH, UK

<sup>2</sup>ZiNIR Ltd, Eastbourne BN22 7QP, UK

<sup>3</sup>James Watt School of Engineering, College of Science and Engineering, University of Glasgow, Glasgow G12 8LT, UK

B-P-4

**AlGaInAs-InP Lasers Operating at 1.55  $\mu\text{m}$**

Maryam S Alsayyaji<sup>1</sup>, S. Shutts<sup>1,2</sup>, P. M. Smowton<sup>1,2</sup>

<sup>1</sup>School of Physics and Astronomy, Cardiff University, The Parade, Cardiff CF24 3AA, UK

<sup>2</sup>Institute of Compound Semiconductors (ICS), Cardiff University, Translational Research Hub, Maindy Road, Cardiff CF24 4HQ, UK

B-P-5

**Fast-ALD Solutions to Enable MicroLED Adoption**

Alf Smith<sup>1</sup>, M. Weimer<sup>2</sup>

<sup>1</sup>Semitronics, UK

<sup>2</sup>Forge Nano, USA

## **Symposium C: Electronic Devices**

C-P-1

**Unipolar Digital Logic in the 6.1-Å Family of Semiconductors**

Jonathan Hall, M. Hayne

Department of Physics, Lancaster University, Lancaster, UK

C-P-2

**Development of normally-off channels for ULTRARAM™ arrays**

Serdar B. Tekin, P. D. Hodgson, X. Xia, M. Hayne

Department of Physics, Lancaster University, Lancaster LA1 4YB, UK

C-P-3

**Miniature Integrated Rectennas Using Novel Tunnel Diodes**

Christopher Walsh, S. G. Muttalak, M. Missous

Department of Electrical & Electronic Engineering, University of Manchester, Manchester, M13 9PL, UK

## **Symposium D: Semiconductor Materials and Nanostructures**

D-P-1

**Photoluminescence investigation of laser patterned InGaAs DE quantum dot arrays**

Yaoxun Wang, Z. Lin, Y. Wang, I. S. Han, M. Hopkinson

Department of Electronic & Electrical Engineering, University of Sheffield, Sheffield S3 7HQ, UK

D-P-2

**Surface Sensitive Nearfield Nanoscopy and Spectroscopy of Surface States in Topological Insulator  $\text{Bi}_2\text{Te}_3$  Nanostructures**Dan Johnson<sup>1,2</sup>, T. Vincent<sup>1</sup>, X. Liu<sup>1</sup>, B. Gholizadeh<sup>1</sup>, C. Knox<sup>3</sup>, J. Freeman<sup>3</sup>, B. Hickey<sup>3</sup>, E. Linfield<sup>3</sup>, S. Sasaki<sup>3</sup>, O. Kazakova<sup>2</sup>, N. Huáng<sup>2</sup>, J. Boland<sup>1,2</sup><sup>1</sup>Photon Science Institute, Department of Electrical and Electronic Engineering, Faculty of Science and Engineering, University of Manchester, Oxford Road, Manchester M13 9PL, UK<sup>2</sup>National Physical Laboratory, Hampton Road, Teddington TW11 0LW, UK<sup>3</sup>School of Physics and Astronomy, E. C. Stoner Laboratory, University of Leeds, Leeds LS2 9JT, UK

D-P-3

**Investigation of the Effect of Gamma Radiation on the Optical Properties of Self-Assembled  $\text{In}_{0.52}\text{Ga}_{0.48}\text{As}$  Quantum Dots Grown on (100) GaAs Substrates by Molecular Beam Epitaxy using Bismuth as a surfactant**Amra Ali Alhassni<sup>1,2</sup>, J. F. Felix<sup>3</sup>, J. Fredy<sup>3</sup>, I. P. Kazakov<sup>4</sup>, M. Henini<sup>1</sup><sup>1</sup>School of Physics and Astronomy, University of Nottingham, Nottingham NG7 2RD, UK<sup>2</sup>Department of Physics, College of Sciences, AL Baha University (BHU), Saudi Arabia<sup>3</sup>Institute of Physics, NFA, University of Brasília (UnB), Brasília, DF, 70910-900, Brazil<sup>4</sup>Department of Solid-State Physics, P.N. Lebedev Physical Institute, Russian Academy of Sciences, Moscow, 119991, GSP-1, Russia

D-P-4

**Studying inhomogeneous composition in InGaAs nanowires grown on silicon-on-insulator**Nourh A. Almalki, B. Maglio, Q. Li, P. M. Smowton

School of Physics and Astronomy, Cardiff University, The Parade, Cardiff CF24 3AA, United Kingdom

D-P-5

**Remote Epitaxy of GaAs on Graphene**Ben Ramsay<sup>1</sup>, M. Zulqurnain<sup>1,2</sup>, O. J. Burton<sup>3</sup>, M. Al-Hada<sup>1</sup>, L. E. Goff<sup>1</sup>, S. Hofmann<sup>3</sup>, L. C. Hirst<sup>1,4</sup><sup>1</sup>Cavendish Laboratory, Department of Physics, 19 JJ Thomson Avenue, Cambridge CB3 0HE, UK<sup>2</sup>Cambridge Graphene Centre, University of Cambridge, Cambridge CB3 0FA, UK<sup>3</sup>Department of Engineering, University of Cambridge, Cambridge CB3 0FA, UK<sup>4</sup>Department of Materials Science and Metallurgy, University of Cambridge, Cambridge CB3 0FS, UK

D-P-6

**Fabrication of wafer-scale silicon V-grooves for integration of III-V semiconductors on (001) Si**A. Moskalenko, Philip A. Shields

Department of Electrical &amp; Electronic Engineering, University of Bath, Bath BA2 7AY, UK

D-P-7

**Investigation of Electrically Active Defects in  $\text{GeSiSn/Si}$  Multi Quantum Wells Using Deep Level Transient Spectroscopy Technique**Abdulaziz Almalki<sup>1,2</sup>, A. Nikiforov<sup>3</sup>, V. Timofeev<sup>3</sup>, D. Pridachin<sup>3</sup>, M. Henini<sup>1</sup><sup>1</sup>School of Physics and Astronomy, University of Nottingham, Nottingham NG7 2RD, UK<sup>2</sup>Physics department, Science Faculty at Yanbu, Taibah University, Yanbu, Madina Mounawara, Saudi Arabia<sup>3</sup>Rzhanov Institute of Semiconductor Physics, Siberian Branch of the Russian Academy of Science, Novosibirsk, Russia

D-P-8

**Towards Direct-bandgap Group-IV Semiconductors via Ion Implantation Induced Strain**

M. G. Masteghin<sup>1</sup>, T. Schulli<sup>2</sup>, S. Wood<sup>3</sup>, H. Jia<sup>4</sup>, C. Morrison<sup>5</sup>, B. N. Murdin<sup>1</sup>, P. A. F. Anastasi<sup>5</sup>, S. K. Clowes<sup>1</sup>, H. Liu<sup>4</sup>, D. C. Cox<sup>1</sup>, Stephen J. Sweeney<sup>6,1</sup>

<sup>1</sup>Advanced Technology Institute, University of Surrey, Guildford GU2 7XH, UK

<sup>2</sup>European Synchrotron Radiation Facility (ESRF), 38000 Grenoble, France

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<sup>5</sup>Silson Ltd., Southam, Warwickshire CV47 1NE, UK

<sup>6</sup>James Watt School of Engineering, University of Glasgow, Glasgow G12 8LT, UK

**Symposium E: Mid-IR and THz Materials and Devices**

E-P-1

**Numerical Simulation of Terahertz Propagation Through Atmospheric Sand and Dust Turbulence**

Ivor L. Morrow<sup>1,3</sup>, A. Al-Khalidi<sup>4</sup>, A. Kahlid<sup>2,3</sup>

<sup>1</sup>Antennas and Electromagnetic Systems Engineering, Cranfield University, UK

<sup>2</sup>High Frequency Semiconductor Device Physics Laboratory, Cranfield University, UK

<sup>3</sup>Center for Antenna Communications and Technology Innovation, Milton Keynes University, UK

<sup>4</sup>Electronic and Nanoscale Engineering, University of Glasgow, UK

**Symposium F: Organics, Hybrids and Perovskites**

No posters

**Symposium G: Wide-bandgap Semiconductors**

G-P-1

**Temperature and excitation dependence of recombination efficiency in cubic InGaN/GaN Quantum Wells**

William R. Fieldhouse-Allen<sup>1</sup>, D. Dyer<sup>1</sup>, M. J. Kappers<sup>2</sup>, M. Frentrup<sup>2</sup>, D. J. Wallis<sup>2,3</sup>, R. A. Oliver<sup>2</sup>, D. J. Binks<sup>1</sup>

<sup>1</sup>Department of Physics and Astronomy, University of Manchester, Manchester, UK

<sup>2</sup>Department of Materials Science & Metallurgy, University of Cambridge, Cambridge, UK

<sup>3</sup>Centre for High Frequency Engineering, University of Cardiff, Cardiff, UK

G-P-2

**Comparative study of the optical properties of  $\alpha$ -,  $\beta$ - and  $\kappa$ -phase  $\text{Ga}_2\text{O}_3$** 

Lewis Penman<sup>1</sup>, Z. Johnston<sup>1</sup>, Y. Oshima<sup>2</sup>, C. McAleese<sup>3</sup>, F. Massabuau<sup>1</sup>

<sup>1</sup>University of Strathclyde, Glasgow, UK

<sup>2</sup>National Institute for Materials Science, Tsukuba, Japan

<sup>3</sup>AIXTRON Ltd, Cambridge, UK

G-P-3

**Production monitoring of GaN HEMT process by spectroscopic ellipsometry**

Anna Bölcskei-Molnár, P. Basa, B. Fodor, B. Kalas, A. Sütő

Semilab Semiconductor Physics Laboratory Co. Ltd., 1117 Budapest, Prielle K. u. 4/A, Hungary

G-P-4

**Noise Performance and RF Performance of AlGaIn/GaN HEMTs on Diamond Substrate**

Jing Wang, Q.-X. Li, J. Kelly, C. Li

James Watt School of Engineering, University of Glasgow, UK

**Symposium TMD: 2D Materials (TMD-UK Meeting)**

TMD-P-1

**s-SNOM applied to study exciton plasmon polaritons in anisotropic ZrSe<sub>3</sub> and NbOI<sub>2</sub>**

Zara S. Taylor, A. J. Knight, Y. Wang, T. Chester-Parsons, A. I. Tartakovskii

Department of Physics and Astronomy, Hicks Building, University of Sheffield, Sheffield S3 7RH UK

TMD-P-2

**Highly nonlinear Mie-exciton-polaritons in monolayer semiconductors placed on WS<sub>2</sub> nanoantennas on a gold substrate**

Yadong Wang<sup>1</sup>, X. Hu<sup>1</sup>, S. Randerson<sup>1</sup>, C. Louca<sup>1</sup>, P. G. Zotev<sup>1</sup>, T. F. Krauss<sup>2</sup>, Y. Wang<sup>2</sup>, A. I. Tartakovskii<sup>1</sup>

<sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Hicks Building, Hounsfield Rd, Sheffield S3 7RH UK

<sup>2</sup>Department of Physics, University of York, York YO10 5DD, UK

TMD-P-3

**Strongly coupled BIC and exciton states in gratings made from quasi-bulk WS<sub>2</sub>: a new tunable platform for polaritonics**

Paul Bouteyre<sup>1</sup>, X. Hu<sup>1</sup>, C. Louca<sup>1</sup>, Y. Wang<sup>1</sup>, P. Zotev<sup>1</sup>, Y. Wang<sup>2</sup>, A. I. Tartakovskii<sup>1</sup>

<sup>1</sup>Department of Physics and Astronomy, University of Sheffield, Sheffield S3 7RH, UK

<sup>2</sup>Department of Physics, University of York, York YO10 5DD, UK

TMD-P-4

**Hexagonal Boron Nitride Thickness Estimation from Optical Contrast**

Dan Forbes, D. Andres-Penares, M. Brotons-Gisbert, B. D. Gerardot

School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, UK

TMD-P-5

**GEIC: Pioneering Next-Generation Technologies and Collaborative Solutions**

Noel Natera Cordero

Graphene Engineering Innovation Centre, University of Manchester, Sackville Street, Manchester M13 9PL, UK