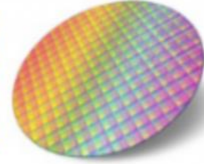




# SIOE 2024



## Semiconductor and Integrated Opto-Electronics Conference

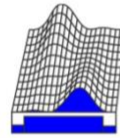
2nd - 4th April 2024  
Cardiff University



Compound Semiconductor Centre



HUAWEI



Photon Design®

IOP | Institute of Physics  
Semiconductor Physics Group



# *Conference Locations*

**Tues 2<sup>nd</sup>, Wed 3<sup>rd</sup> and Thurs 4<sup>th</sup> April**

**Location:** Centre for Student Life

**Address:** Park Place, Cathays, Cardiff, CF10 3BB

**Parking:** On-street pay and display at Park Place and on Museum Avenue (we cannot reimburse costs)

**Registration location:** Centre for Student life, 2<sup>nd</sup> floor

**Oral presentations:** Sir Stanley Thomas Lecture Theatre, 2<sup>nd</sup> floor

**Refreshment location:** Centre for Student life, 4<sup>th</sup> floor

**Careers session:** Centre for Student life, 4<sup>th</sup> floor

**Poster Session & Reception location:** Spark

**Address:** Maindy Road, Cardiff, Wales, UK, CF24 4HQ

**Banquet location:** Conerstone, Charles Street, CF10 2SF

For location maps and directions between venues, please go to

<https://compoundsemiconductorhub.org/sioe-conference/>

For those observing Ramadan, there are prayer rooms located on the 4<sup>th</sup> floor.

# Programme

## Tuesday 2nd April

**Registration** Floor 2; 13.00 onwards

**Welcome Address** Stanley Thomas Lecture Theatre; 13.55 – 14.00

**Session 1: Growth and Materials** Stanley Thomas Lecture Theatre; 14.00 –  
16.00

Refreshment Break 16.00 – 16.30; CSL, 4th Floor

**Session 2: Light Emitters** Stanley Thomas Lecture Theatre; 16.30 – 17.30

*Break and walk to venue 17.30 – 17.45*

**Session 3: Poster Session (including buffet and drinks) sponsored by IOP**

**Semiconductors, Photon Design and Compound Semiconductor Centre**

Transitional Research Hub; 17.45 – 19.45

## Wednesday 3rd April

**Session 4: Detectors** Stanley Thomas Lecture Theatre; 08.30 – 10.00

**Session 5: Facilities** Stanley Thomas Lecture Theatre; 10.00 – 10.20

*Refreshment Break 10.20 – 11.00; CSL, 4th Floor*

**Session 6: Moving Towards Integration** Stanley Thomas Lecture Theatre; 11.00 – 13.00

*Lunch 13.00 – 14.00; 4th Floor, sponsored by Huawei*

**Session 7: Material Characterisation** Stanley Thomas Lecture Theatre; 14.00 – 15.00

*Refreshment Break 15.00 – 15.30, 4th Floor*

**Session 8: Lasers and Applications I** Stanley Thomas Lecture Theatre; 15.30 -  
17.00

**Complimentary Professional Headshots** *4th Floor, 16.45 - 18.45*

**Careers Session** *4th Floor, 17.00 - 18.30*

*Walk to venue Break 18.30– 18.45*

**Conference Banquet Reception,** The Cornerstone ; 18.45 – 19.45

**Conference Banquet, sponsored by Huawei** The Cornerstone ;19.45 Onwards

## **Thursday 4th April**

**Session 9: Lasers and Applications II** Stanley Thomas Lecture Theatre; 09.00 – 10.00

*Refreshment Break 10.00 – 10.30, 4th Floor*

**Session 10: Lasers and Applications III** Stanley Thomas Lecture Theatre;10.30 – 12.30

*Lunch 12.30 – 13.30; 4th Floor, sponsored by Huawei*

**End of conference**

# Programme, Tuesday 2<sup>nd</sup> April

## Registration

Centre for Student Life, Stanley Thomas Lecture Theatre; 13.00 onwards

## Welcome Address

Centre for Student Life, Stanley Thomas Lecture Theatre; 13.55 – 14.00

## Session 1: Growth and Materials

Centre for Student Life, Stanley Thomas Lecture Theatre; 14.00 – 16.00

### 14.00 S24\_39 Antiphase boundary-free III-V materials epitaxially grown on on-axis Si (001) substrate by thin Si buffer

X Zhang\*, H Jia, H Deng, H Liu and M Tang

*Department of Electronic and Electrical Engineering, University College London, Torrington Place, London, WC1E 7JE, United Kingdom*

### 14.15 S24\_40 Molecular Beam Epitaxy Growth of GaAs and Ge Buffers on V-Groove Si

M Mtunzi<sup>1\*</sup>, H Jia<sup>1</sup>, Y Hou<sup>2,6</sup>, X Yu<sup>1</sup>, H Zeng<sup>1</sup>, J Yang<sup>1</sup>, I Skandalos<sup>2</sup>, W Li<sup>3</sup>, K El Hajraoui<sup>4</sup>, Q Ramasse<sup>4</sup>, M.G Masteghin<sup>5</sup>, F Gardes<sup>2</sup>, M Tang<sup>1</sup>, S Chen<sup>1</sup> and H Liu<sup>1</sup>

*<sup>1</sup>Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, United Kingdom. <sup>2</sup>Optoelectronics Research Centre, University of Southampton, Southampton, SO17 1BJ, United Kingdom. <sup>3</sup>Beijing Key Lab of Microstructure and Property of Advanced Materials, Faculty of Materials and Manufacturing, Beijing University of Technology, Beijing 100124, People's Republic of China. <sup>4</sup>SuperSTEM, SciTech Daresbury Science and Innovation Campus, Block J, Keckwick Lane, Daresbury, WA4 4AD, United Kingdom. <sup>5</sup>Department of Electrical and Electronic Engineering, University of Surrey, Guildford, Surrey, GU2 7XH, United Kingdom*

### 14.30 S24\_05 MOCVD growth of InAs/GaSb Type-II superlattices for infrared detectors

R Brown<sup>1</sup>, C Liu<sup>1,2</sup>, K.M Wong<sup>1</sup>, J.I Davies<sup>2</sup>, Q Li<sup>1\*</sup>

*<sup>1</sup>School of Physics and Astronomy, Cardiff University, United Kingdom <sup>2</sup>IQE plc. Cardiff, Wales, CF3 0LW, United Kingdom*

### 14.45 S24\_20 Optical properties of GaAs<sub>1-x</sub>Bix MQW and In<sub>x</sub>Ga<sub>1-x</sub>As MQW structures

N.A. Adham, F Harun\*, J.P.R David and R.D Richards

*University of Sheffield (UK), \*UniKL BMI (Malaysia)*

### 15.00 S24\_27 Optoelectronic properties of Al<sub>x</sub>Ga<sub>1-x</sub>As<sub>y</sub>Sb<sub>1-y</sub> on GaSb

S.W Zhao<sup>1</sup>, X Jin<sup>1</sup>, A.P Craig<sup>2</sup>, A.R.J Marshall<sup>2</sup>, X Yi<sup>3</sup>, M Modak<sup>3</sup>, G.S Buller<sup>3</sup>, C Hing Tan<sup>1</sup> and J.P.R David<sup>1</sup>

*<sup>1</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield S1 3JD, United Kingdom. <sup>2</sup>Physics Department, University of Lancaster, Lancaster, LA1 4YB, United Kingdom. <sup>3</sup>School of Engineering & Physical Sciences, Heriot-Watt's University, Edinburgh, EH14 4AS, United Kingdom*

### 15.15 S24\_17 Effective dislocation filter layers for epitaxial growth of InP on silicon

B-P Ratiu<sup>1</sup>, S Liu<sup>1</sup>, H Jia<sup>2</sup>, Z Yan<sup>1</sup>, K M Wong<sup>1</sup>, M Martin<sup>3</sup>, M Tang<sup>2</sup>, T Baron<sup>3</sup>, H Liu<sup>2</sup>, Qiang Li<sup>1</sup>

<sup>1</sup>School of Physics and Astronomy, Cardiff University, UK. <sup>2</sup>Dept. of Electronic & Electrical Engineering, University College London, UK. <sup>3</sup>Univ. Grenoble Alpes, CNRS, CEA-LETI, MINATEC, LTM, F-38054 Grenoble, France

**15.30 S24\_34 Optically active InAs/InAlGaAs/InP (001) quantum dot laser materials enhanced by cyclic defect annealing**

C Dear<sup>1</sup>, H Jia<sup>1</sup>, J-S Park<sup>1</sup>, K El Hajraoui<sup>2</sup>, J Yuan<sup>1</sup>, H Deng<sup>1</sup>, M Tang<sup>1</sup>, Q Ramasse<sup>2</sup> and H Liu<sup>1</sup>

<sup>1</sup>Department of Electronic and Electrical Engineering, University College London, London

<sup>2</sup>SuperSTEM, Daresbury

**15.45 S24\_10 Molecular beam epitaxy of AlGaIn alloys with compositional fluctuations: Development of wavelength-switchable ultraviolet light emitting diodes**

P.G Roy<sup>1</sup>, S Sen<sup>2</sup> and Anirban Bhattacharyya<sup>1</sup>

<sup>1</sup>Institute of Radio Physics and Electronics, University of Calcutta, Kolkata 700009, INDIA. <sup>2</sup>Centre for Research in Nanoscience and Nanotechnology, University of Calcutta, Kolkata 700106, INDIA

*Refreshment break 16.00- 16.30; 4<sup>th</sup> Floor*

**Session 2: Light Emitters**

Centre for Student Life, Stanley Thomas Lecture Theatre; 16.30 – 17.15

**16.30 S24\_38 Advances in Room-Temperature Single-Photon LEDs Using GaSb/GaAs Quantum Rings**

G Acar<sup>1</sup>, L Leguay<sup>2</sup>, S Jones<sup>1</sup>, P Hodgson<sup>1</sup>, A Schliwa<sup>2</sup>, M Hayne<sup>1</sup>

<sup>1</sup>Department of Physics, Lancaster University, Lancaster LA1 4YB, UK. <sup>2</sup>Institute of Solid-State Physics, Technical University of Berlin, Berlin 10623, Germany

**16.45 S24\_43 Understanding the composition growth dependence of nanowires for light emission.**

N. A. Almalki, C. Hodges, B. Maglio, Q. Li, and P. M. Smowton

Cardiff School of Physics and Astronomy, Cardiff University, Maindy Road, Cardiff CF24 4HQ

**17.00 S24\_37 Novel GaSb Quantum Ring Light Emitting Diodes (QR-LED) with Distributed Bragg Transmitter (DBT) Operating at Telecommunication Wavelength**

G Acar<sup>1</sup>, S Jones<sup>1</sup>, P Hodgson<sup>1</sup>, F Alvarado-Cesar<sup>2</sup>, R Beanland<sup>2</sup> and M Hayne<sup>1</sup>

<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

*Break and walk to venue*

**Session 3: Posters & Reception Sponsored by Compound Semiconductor Centre Photon Design and IOP Semiconductor**

Spark, 17.30 – 19.00

**S24\_12 Towards Four Wave Mixing in Silicon Waveguides Using Distributed Bragg Reflector Cavities for Quantum Applications**

S Bala, J Blatcher, J Pugh and M Cryan

*School of Electrical, Electronic and Mechanical Engineering, University of Bristol, Woodland Road, Bristol, United Kingdom, BS8 1UB*

**S24\_35 Emission Polarisation Switching in Single CuInZnS3 Quantum Dots**

N Alhazmi, V Singh, O Evans, A Stewart, W Solari, A Osypiw, B Hou, and W Langbein

*School of Physics and Astronomy, Cardiff University, Cardiff CF24 2AA*

**S24\_44 Characterisation of Silicon-Nitride Waveguides for Silicon-based Photonic Integrated Circuits of Silicon-Nitride Waveguides for Silicon-based Photonic Integrated Circuits**

Yun Long<sup>1</sup>, Pawan Mishra<sup>1</sup>, Fwoziah Albeladi<sup>1</sup>, Dun Qiao<sup>1</sup>, Richard Forrest<sup>1</sup>, Ilias Skandalos<sup>2</sup>, Frederic Gardes<sup>2</sup>, Peter M Smowton<sup>1</sup>

<sup>1</sup> *Cardiff School of Physics and Astronomy, Cardiff University, Maindy Road, Cardiff CF24 4HQ* <sup>2</sup> *Optoelectronics Research Centre, University Rd, Southampton SO17 1BJ*

**S24\_54 Monolithic Integration of Optical Coherence Tomography**

L Michael<sup>1</sup>, F.T. Albeladi<sup>1,2</sup>, G Berry<sup>3</sup>, M Robertson<sup>3</sup>, G.F. Cotella<sup>3</sup>, H Liu<sup>4</sup> and P.M. Smowton<sup>1,5</sup>.

(1) *School of Physics and Astronomy, Cardiff University, The Parade, Cardiff, CF24 3AA.* (2) *Physics Department, Faculty of Science, University of Jeddah, Jeddah, Saudi Arabia.* (3) *Ipswich Research Centre, Huawei Technologies Research and Development (UK) Limited, Phoenix House, B55 Adastral Park, Martlesham Heath, Ipswich, IP5 3RE.* (4) *Department of Electronic and Electrical Engineering, University College London, Torrington Place, London, WC1E 7JE.* (5) *Institute of Compound Semiconductors (ICS), Cardiff University, Translational Research Hub, Maindy Road, Cardiff, CF24 4HQ.*

**S24\_55 Non-Mechanical Beam Steering**

J Francis and P.M Smowton

*School of Physics and Astronomy, Cardiff University, The Parade, Cardiff, CF24 3AA*  
*Institute of Compound Semiconductors (ICS), Cardiff University, Translational Research Hub, Maindy Road, Cardiff, CF24 4HQ*

**S24\_56 Identification of confined energy states in InAs/GaAs quantum dots for the determination of the gain/absorption spectrum**

B Jakobs<sup>1</sup>, L Jarvis<sup>1</sup>, D Gallagher<sup>2</sup>, L Ponnampalam<sup>3</sup>, P.M. Smowton<sup>1</sup>

<sup>1</sup>*School of Physics and Astronomy, Cardiff University, Cardiff, UK.* <sup>2</sup>*Photon Design, Oxford, UK.* <sup>3</sup>*Department of Electronic and Electrical Engineering, University College London, London, UK*

# Programme, Wednesday 5<sup>th</sup> April

## Session 4: Detectors

Centre for Student Life, Stanley Thomas Lecture Theatre; 08.30 – 10.30

### 8.30 S24\_26 Characterisation of GaAs/GaAsBi heterostructure photodiodes

S Gao, X Tao, X Jin, Y Liu, N.J. Bailey, C Hing Tan, J.P R. David and R.D Richards

*Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, U.K*

### 8.45 S24\_42 Low excess noise Al<sub>0.75</sub>Ga<sub>0.25</sub>AsSb on InP

X Jin<sup>1</sup>, Q Tian<sup>1</sup>, H.I.J Lewis<sup>1</sup>, X Yi<sup>2</sup>, S Xie<sup>3,5</sup>, B Liang<sup>4</sup>, D.L. Huffaker<sup>4,6</sup>, C Hing Tan<sup>1</sup> and J.P. R. David<sup>1</sup>

<sup>1</sup>*Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, S1 3JD, UK.* <sup>2</sup>*Institute of Photonics and Quantum Sciences, Heriot-Watt University, Edinburgh, EH14 4AS, UK.* <sup>3</sup>*School of Physics and Astronomy, Cardiff University, Cardiff, CF24, UK.* <sup>4</sup>*California NanoSystems Institute, University of California, Los Angeles, California, 90095, USA.* <sup>5</sup>*Microsemi Ltd, Shanghai, 200001, China (Present address).* <sup>6</sup>*Electrical Engineering Department, The University of Texas at Arlington, Texas, USA (Present address)*

### 9.00 S24\_29 Etch depth dependence on the dark current density of long-wave infrared InAs/GaSb photodiode

P O'Dowd Phanis\*<sup>1</sup>, D Kwan<sup>1,2</sup>, C Maxey<sup>2</sup>, M Kesaria<sup>1</sup>

<sup>1</sup>*School of Physics and Astronomy, Cardiff University, the Parade, Cardiff, CF24 3AA, UK, Present address:*

<sup>2</sup>*Leonard UK, First Avenue, Millbrook Industrial Estate, Southampton SO15 0LG.*

### 9.15 S24\_09 Infrared photodetectors based on pBn InGaAs/GaAsSb type-II superlattice on InP for detection in extended wavelength range

P Cao<sup>a, b</sup>, H Peng<sup>a, b</sup>, T Wang<sup>a, b</sup>, W Zheng<sup>a, b</sup>, N Davison<sup>c</sup> and Q Zhuang<sup>c</sup>

<sup>a</sup>*Laboratory of Solid-State Optoelectronics Information Technology, Institute of Semiconductors, Chinese Academy of Sciences, Beijing 100083, China.* <sup>b</sup>*State Key Laboratory on Integrated Optoelectronics, Institute of Semiconductors, Chinese Academy of Sciences, Beijing 100083, China.* <sup>c</sup>*Physics Department, Lancaster University, Lancaster UK LA1 4YB*

### 9.30 S24\_03 ITO Bolometer with Metamaterial Perfect Absorber

K.J. Thornton\*, P Dong, S.F.J. Blair, J.S. Male, C.P. Reardon, Y Wang and T.F. Krauss

*Photonics Research Group, School of Physics, Engineering and Technology, University of York, York, YO10 5DD*

### 9.45 S24\_18 Customizing the band gap of colloidal quantum dots for high-performance solution-processed photovoltaics

H Ji, P.M. Smowton and B Hou

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

## Session 5: Facilities

Centre for Student Life, Stanley Thomas Lecture Theatre; 10.00 – 11.00

### 10.00 S24\_32 National Epitaxy Facility enabling semiconductor research in the UK

Z.K. Bishop<sup>1\*</sup>, E. Clarke<sup>1</sup>, E.M. Sala<sup>1</sup>, I. Farrer<sup>1</sup>, R.A. Oliver<sup>2</sup>, H. Liu<sup>3</sup>, M.S. Skolnick<sup>4</sup>, and J. Heffernan<sup>1</sup>

<sup>1</sup>*Department of Electronic and Electrical Engineering, University of Sheffield.* <sup>2</sup>*Department of Materials Science and Metallurgy, University of Cambridge.* <sup>3</sup>*Department of Electronic and Electrical Engineering, University College London.* <sup>4</sup>*Department of Physics and Astronomy, University of Sheffield*



10.10 ICS

*Refreshment break 10.20 – 11.00; 4<sup>th</sup> Floor*

## **Session 6: Moving Towards Integration**

Centre for Student Life, Stanley Thomas Lecture Theatre; 11.00 – 13.00

### **11.00 S24\_36 Optimisation of photonic crystal slab cavities for high Q-factor at target eigenfrequencies**

A Nilabh<sup>a\*</sup>, N Monim<sup>a</sup>, W Langbein<sup>b</sup> and F Masi<sup>a</sup>

*<sup>a</sup>School of Biosciences, Cardiff University, Cardiff CF10 3AT. <sup>b</sup>School of Physics and Astronomy, Cardiff University, Cardiff CF10 3AT*

### **11.15 S24\_07 Towards the fabrication of a Phase Change Material (PCM)-based phase shifter: Simulation, Design, and Fabrication**

A Shoaab, F Gardes, I Zeimpekis, T.D Bucio and M Banakar

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

### **11.30 S24\_11 Design of a C-band InP based Mach-Zehnder Modulator**

Z Chen<sup>1,2\*</sup>, C.E Smith<sup>1</sup>, V Rodrigues<sup>1</sup>, X Dai<sup>1</sup>, P Pagnod-Rossiaux<sup>1</sup>

*<sup>1</sup>3SP Technologies, Route de Villejust, 91625 Nozay Cedex, France. <sup>2</sup>LTCl, Télécom Paris, Institut Polytechnique de Paris, 19 place Marguerite Perey, Palaiseau, 91120, France. <sup>3</sup>Center for High Technology Materials, University of New Mexico, Albuquerque, New Mexico, USA*

### **11.45 S24\_21 Optically Controlled RF Reflective Switches**

J Yang, Y Zhang and M Cryan

*School of Electrical, Electronic and Mechanical Engineering, University of Bristol*

### **12.00 S24\_02 Analysis of Barrier-Well Tunnel Diodes for Improved Curvature Coefficient**

C Walsh and M Missous

*Department of Electrical & Electronic Engineering, The University of Manchester, Manchester, M13 9PL, United Kingdom*

### **12.15 S24\_06 Photonic integrated circuits for biosensing**

S. Ibrahim<sup>1,2</sup>, D. Davies-Armstrong<sup>1,2</sup>, S. Naserikarimvand<sup>3</sup>, S. Whelan<sup>4</sup>, O. J. Guy<sup>3</sup>, A. J. Bennett<sup>1,2</sup>, J. P. Hadden<sup>1,2</sup>

*<sup>1</sup>School of Engineering, Cardiff University, Queens Building, The Parade, Cardiff, CF24 3AA, UK. <sup>2</sup>Translational Research Hub, Cardiff University, Maindy Road, Cathays, Cardiff, CF24 4HQ, UK. <sup>3</sup>Department of Chemistry, School of Engineering and Applied Sciences, Faculty of Science and Engineering, Swansea University, Swansea SA2 8PP, UK.*

### **12.30 S24\_46 Achieving Reduced Absorption for Low Loss Passive Photonics Components by Using Ion Implantation**

Abigail Enderson<sup>1</sup>, Pawan Mishra<sup>1</sup>, Lydia Jarvis<sup>1</sup>, Fwoziah Albeladi<sup>1</sup>, Sara-Jayne Gillgrass<sup>1</sup>, Nianhua Peng<sup>2</sup>, Mingchu Tang<sup>3</sup>, Huiyun Liu<sup>3</sup>, Samuel Shutts<sup>1</sup>, and Peter M. Smowton<sup>1</sup>

*<sup>1</sup>School of Physics and Astronomy, Cardiff University, The Parade, Cardiff. CF24 3AA. United Kingdom.*

*<sup>2</sup>Surrey Ion Beam Centre, University of Surrey, Guildford, Surrey, United Kingdom.*

*<sup>3</sup>Department of Electrical Engineering, University College London, London, United Kingdom.*

**12.45 S24\_24 A study of the effects of Micro-Transfer Printing on the Performance of SAM Avalanche Photodiodes**

Y Alimi<sup>1</sup>, B Guilhabert<sup>2</sup> and M Strain<sup>2</sup>

<sup>1</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, S1 3JD, UK. <sup>2</sup>Institute of Photonics, Dept. of Physics, University of Strathclyde, Technology and Innovation Centre, 99 George Street, Glasgow, G1 1RD

*Lunch 13.00 – 14.00; 4<sup>th</sup> Floor sponsored by Huawei*

**Session 7: Material Characterisation**

Centre for Student Life, Stanley Thomas Lecture Theatre; 14.00 – 15.00

**14.00 S24\_47 QuickSEs Enabling Rapid Feedback to Epitaxy**

J. Baker<sup>1</sup>, C. P. Allford<sup>1</sup>, S. Gillgrass<sup>1</sup>, J. I. Davies<sup>2</sup>, S. Shutts<sup>1</sup>, P. M. Smowton<sup>1,3</sup>

<sup>1</sup> Future Compound Semiconductor Manufacturing Hub, Cardiff University, UK. <sup>2</sup> IQE plc, Cardiff, UK. <sup>3</sup> Institute for Compound Semiconductors, Cardiff University, UK.

**14.15 S24\_31 Time-of-Flight Elastic Recoil Detection Analysis and Rutherford Backscattering Spectrometry to Characterise Al<sub>x</sub>Ga<sub>1-x</sub>As<sub>1-y</sub>Bi<sub>y</sub> Avalanche Photodetectors**

C. McAleese<sup>1</sup>, M. K. Sharpe<sup>1</sup>, M. R. Carr<sup>2</sup>, J. P. R. David<sup>2</sup> and R. D. Richards<sup>1</sup>

<sup>1</sup>Ion Beam Centre, Advanced Technology Institute, University of Surrey, Guildford, GU2 7XH, UK. <sup>2</sup>Electronic and Electrical Engineering Department, The University of Sheffield, Sheffield, S1 3JD, UK

**14.30 S24\_04 Extended defects characterisation of 50 mm GaN wafer using electron channelling contrast imaging in a scanning electron microscope**

K. Nicholson<sup>1</sup>, D. Muir<sup>2</sup> and N. Gunasekar<sup>1</sup>

<sup>1</sup> School of Physics and Astronomy, Cardiff University, Cardiff CF24 3AA, United Kingdom <sup>2</sup> School of Earth and Environmental Sciences, Cardiff University, Cardiff CF10 3AT, United Kingdom

**14.45 S24\_14 Holographic measurement of the gain of semiconductor waveguides**

L. Zens,<sup>1</sup> V. Besaga,<sup>2</sup> J. Möller,<sup>1</sup> N. C. Gerhardt,<sup>1</sup> and M. R. Hofmann<sup>1</sup>

<sup>1</sup>Ruhr-University Bochum, Universitaetsstr. 150, 44801 Bochum, Germany. <sup>2</sup> Friedrich Schiller Universität Jena, Abbe Center of Photonics, Albert-Einstein-Straße 6, 07745 Jena, Germany

*Refreshment break 15.00 – 15.30; 4<sup>th</sup> Floor*

**Session 8: Lasers and Applications I**

Centre for Student Life, Stanley Thomas Lecture Theatre; 15.30 – 17.00

**15.30 S24\_13 Room Temperature Lasing from GaAs/InGaAs/InGaP Quantum Well Nanowires**

B Temu, Z Yan, B-P Ratiu, K. M Wong, S Soon Oh and Q Li

**15.45 S24\_48 Developing 1.55  $\mu\text{m}$  quantum dot lasers compatible with epitaxy on silicon substrates**

M.S Alsayyadi<sup>1,2</sup>, Z Cao<sup>1</sup>, B Salmond<sup>1</sup>, Q Li<sup>1</sup>, S Shutts<sup>1,3</sup> and P.M Smowton<sup>1,3</sup>

(1) School of Physics and Astronomy, Cardiff University, the Parade, Cardiff, CF24 3AA, (2) Physics Department, Faculty Of Science, University Of Taibah, Almadinah 42353, Saudi Arabia (3) Institute of Compound Semiconductors (ICS), Cardiff University, Translational Research Hub, Maindy Road, Cardiff, CF24 4H

**16.00 S24\_16 Optimizing Distributed-Feedback Quantum Cascade Lasers: Comprehensive Insights into Spatial Hole Burning and Linewidth Enhancement Factor Impact**

S. Zaminga<sup>1\*</sup>, L. Columbo<sup>2</sup>, C. Silvestri<sup>3</sup>, M. Gioannini<sup>2</sup>, and F. Grillot<sup>1,4</sup>

<sup>1</sup>LTCI Télécom Paris, Institut Polytechnique de Paris, Palaiseau, 91120, France. <sup>2</sup>Dipartimento di Elettronica e Telecomunicazioni, Politecnico di Torino, Torino, Italy. <sup>3</sup>School of Electrical Engineering and Computer Science, The University of Queensland, Brisbane, Australia. <sup>4</sup>Center for High Technology Materials, University of New-Mexico, Albuquerque, NM 87106, USA

**16.15 S24\_15 Mid-Infrared InAs/GaInSb W-Quantum Well based Interband Cascade Lasers**

M. Bentley<sup>\*1</sup>, P. Ghosh<sup>1</sup>, P. J. Carrington<sup>2</sup>, Q. Zhuang<sup>1</sup>

<sup>1</sup>Department of Physics, Lancaster University, LA1 4YB. <sup>2</sup>School of Engineering, Lancaster University, LA1 4YW

**16.30 S24\_23 Hybrid Integration of Mid-IR Quantum Cascade Lasers on Ge-on-Si Platform**

L Zhou<sup>1</sup>, K M Groom<sup>1</sup>, D.G Revin<sup>1</sup>, C.J Mitchell<sup>2</sup>, G Mashanovich<sup>2</sup>, J Heffernan<sup>1</sup>

<sup>1</sup>Department of Electronic and Electrical Engineering, University of Sheffield, Sheffield, S1 3JD, UK. <sup>2</sup>Optoelectronics Research Centre, University of Southampton, Southampton, SO17 1BJ, UK

**16.45 S24\_22 Diode Area Melting and the Opportunities for Advanced Optoelectronics in Additive Manufacturing**

K Groom<sup>1</sup>, S. Veetil<sup>1</sup>, Z. Zhang<sup>1</sup>, L. Zhou<sup>1</sup>, J. Willmott<sup>1</sup>, I. Wraith<sup>1</sup>, M. Alsaddah<sup>2</sup>, A. Aydin<sup>2</sup>, A.Liang<sup>2</sup>, R. Brown<sup>2</sup>, H. Caglar<sup>2</sup>, C. Majewski<sup>2</sup>, K. Mumtaz<sup>2</sup>

<sup>1</sup>Dept. of Electronic & Electrical Engineering, University of Sheffield, S1 3JD. <sup>2</sup>Dept. of Mechanical Engineering, University of Sheffield, S1 3J

**Complimentary Profession headshot**

4th Floor, 16.45 - 18.45

**Careers Session**

4th Floor, 17.00 - 18.30

*Break and walk to venue*

**Conference Banquet Reception**

The Conerstone 18.45 – 19.45

**Conference Banquet, sponsored by Huawei**

The Conerstone; 19.45 onwards

# Programme, Thursday 4<sup>th</sup> April

## Session 9: Lasers and Applications II

Centre for Student Life, Stanley Thomas Lecture Theatre; 9.00 – 10.30

### 9.00 S24\_49 Achieving Reduced Absorption for Low Loss Passive Photonics Components by Using Ion Implantation

P Mishra<sup>1,\*</sup>, A Enderson<sup>1,\*</sup>, L Jarvis<sup>1</sup>, F Albeladi<sup>1</sup>, S-J Gillgrass<sup>1</sup>, N Peng<sup>2</sup>, M Tang<sup>3</sup>, H Liu<sup>3</sup>, S Shutts<sup>1</sup>, and P.M. Smowton<sup>1</sup>

<sup>1</sup>School of Physics and Astronomy, Cardiff University, The Parade, Cardiff. CF24 3AA. United Kingdom. <sup>2</sup>Surrey Ion Beam Centre, University of Surrey, Guildford, Surrey, United Kingdom. <sup>3</sup>Department of Electrical Engineering, University College London, London, United Kingdom.

### 09.15 S24\_50 Improving the performance of p-doped QD lasers and modulators

L Jarvis<sup>1</sup>, B.C. Maglio<sup>2</sup>, F Albeladi<sup>1</sup>, S-J Gillgrass<sup>1</sup>, C.P. Allford<sup>1</sup>, MTang<sup>3</sup>, H Liu<sup>3</sup>, S Shutts<sup>1</sup>, and P.M. Smowton<sup>1,\*</sup>

<sup>1</sup>. School of Physics and Astronomy, Cardiff University, The Parade, Cardiff. CF24 3AA. United Kingdom. <sup>2</sup>. Institute of Arctic Biology, University of Alaska Fairbanks, Fairbanks, AK 99775, United States of America. <sup>3</sup>. Department of Electrical Engineering, University College London, London, United Kingdom.

### 09.30 S24\_25 1.3 $\mu\text{m}$ Optically Pumped Quantum Dot Photonic Crystal Laser Designed at Bounded States in the Continuum

D. Lei, J Wang, N. C. Panoiu, H Liu and M. Tang

Department of Electronic and Electrical Engineering, University College London, Torrington Place, London WC1E 7JE, U.K

### 09.45 S24\_51 1390nm Dilute Nitride VCSELs on 150mm GaAs

I.F Obuseli<sup>1</sup>, C.P Allford<sup>1</sup>, S. Gillgrass<sup>1</sup>, A. Clark<sup>3</sup>, K. Nunna<sup>3</sup>, J.I Davies<sup>2</sup> and P.M Smowton<sup>1</sup>

<sup>1</sup> EPSRC Future Compound Semiconductor Manufacturing Hub, School of Physics and Astronomy, Cardiff University, Cardiff, UK, CF24 3AA <sup>2</sup> IQE NC, Gallimore Dairy Road, Greensboro, NC 27409, USA <sup>3</sup> IQE plc, Pascal Close, St. Mellons, Cardiff, UK, CF3 0LW

### 10.00 S24\_41 GaSb/GaAs Quantum-Ring Vertical-Cavity Surface-Emitting Lasers Approaching 1.3- $\mu\text{m}$ Emission

S. Jones, P. D. Hodgson, and M. Hayne

Department of Physics, Lancaster University, Lancaster LA1 4Y

### 10.15 S24\_28 Bidirectional Widely Tuneable 1310 nm MEMS VCSEL

M Payandeh \*, H.K Sahoo and E Semenova

Department of Electrical and Photonic Engineering, Technical University of Denmark, 2800 Kgs. Lyngby, Denmark

*Refreshment break 10.30 – 11.00; 4<sup>th</sup> Floor*

## Session 10: Lasers and Applications III

Centre for Student Life, Stanley Thomas Lecture Theatre; 11.00 – 12.30

### 11.00 S24\_52 1<sup>st</sup> Order Gratings for Laterally Coupled DFB lasers Fabricated with E-Beam and Focused Ion Beam Lithography

B. Salmond<sup>1</sup>, T. Peach<sup>2</sup>, D. Read<sup>1,3</sup>, D. John<sup>3</sup>, B. Mitchell<sup>3</sup>, B. Thibeault<sup>3</sup>, T. Richter<sup>4</sup>, A. Nadzeyka<sup>4</sup>, P. Mazarov<sup>4</sup>, F. Meyer<sup>4</sup>, J. Fridmann<sup>4</sup>, Y. Yu<sup>4</sup>, W. Meredith<sup>5</sup>, M. Wale<sup>6</sup>, P. Smowton<sup>1,2</sup> and S. Shutts<sup>1,2</sup>

<sup>1</sup>School of Physics and Astronomy, Cardiff University, 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 Electrical and Computer Engineering, University of California Santa Barbara, Santa Barbara, CA 93106, USA. <sup>4</sup>Raith GmbH, Konrad-Adenauer-Allee 8, 44263 Dortmund, Germany. <sup>5</sup>Compound Semiconductor Centre Ltd, St Mellons, Cardiff CF3 0LW. <sup>6</sup>Department of Electronic and Electrical Engineering, University College London, London WC1E 7JE

### 11.15 S24\_45 Thermal Performance of VCSELs on Germanium Substrates

J. Baker<sup>1</sup>, C. P. Allford<sup>1</sup>, S. Gillgrass<sup>1</sup>, J. I. Davies<sup>2</sup>, S. Shutts<sup>1</sup>, P. M. Smowton<sup>1,3</sup>

<sup>1</sup>Future Compound Semiconductor Manufacturing Hub, Cardiff University, UK. <sup>2</sup>IQE plc, Cardiff, UK. <sup>3</sup>Institute for Compound Semiconductors, Cardiff University, UK.

### 11.30 S24\_33 Semiconductor Lasers Subject to Frequency Modulated Optical Injection

K. A. Shore<sup>(1)</sup>, Y. Fan<sup>(2)</sup> and Y. Hong<sup>(1)</sup>

<sup>(1)</sup> Bangor University, School of Computer Science and Electronic Engineering, LL57 1UT, Wales, UK. <sup>(2)</sup> Hangzhou Institute of Technology, Xidian University, Hangzhou, 311200, China;

### 11.45 S24\_30 Time-dependent flip-flop spiking memory in RTD neurons

G. Donati\*, D. Owen-Newns, J. Robertson and A. Hurtado

Institute of Photonics, Dept. of Physics, University of Strathclyde, Glasgow, UK

### 12.00 S24\_01 Analysis of the Dynamical Response of Electrically Pumped Nano-laser Arrays

K. A. Shore<sup>(1)</sup>, Y. C. Wang<sup>(2)</sup>

<sup>(1)</sup> Bangor University, School of Computer Science and Electronic Engineering, LL57 1UT, Wales, UK. <sup>(2)</sup> Guangdong Provincial Key Laboratory of Photonics Information Technology, School of Information Engineering, Guangdong University of Technology, Guangzhou 510006, China

### 12.15 S24\_19 Optical VCSEL-based Spiking Neural Networks for High-Speed Target Detection and Tracking

J. Robertson,<sup>1\*</sup> P. Kirkland,<sup>2</sup> G. Di Caterina,<sup>2</sup> and A. Hurtado<sup>1</sup>

<sup>1</sup>Institute of Photonics, Dept. of Physics, University of Strathclyde, Glasgow, UK, <sup>2</sup>Dept of Electronic and Electrical Engineering, University of Strathclyde, Glasgow, UK

*Lunch 12.30 – 13.30; 4<sup>th</sup> Floor*

**Conference Ends**