NATIONAL EPITAXY FACILITY | UKRI Engineering and Physical Sciences Research Council | Universities of Sheffield Cambridge & University College London

Christmas Newsletter 2025

Welcome to the National Epitaxy Facility's Christmas Newsletter.
We hope you enjoy reading a summary of this years news and achievements!

MBE Equipment Award

One of the main Facility highlights this year is being awarded a £7 million investment from EPSRC at the University of Sheffield. The investment will fund new MBE equipment which will revolutionise the discovery and development of new semiconductor materials. The AI-driven equipment will be equipped with the very latest innovations, including state-of-the-art metrology tools, that will help position the UK as an international leader in semiconductor development.

Team Celebrations

RAEng Fellowship

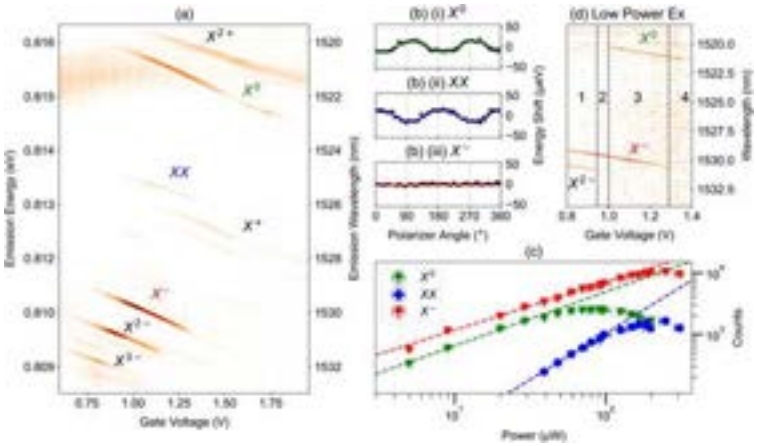
Congratulations to our Director Prof Jon Heffernan, who was elected a Fellow of the Royal Academy of Engineering for his exceptional contribution to semiconductor research. Jon joined 73 other leading figures in the fields of engineering and technology to be elected this year, who were admitted to the Academy at a ceremony in London in November.

New Years Honours List

We were also delighted to congratulate Prof Rachel Oliver on being awarded an OBE in the New Years Honours List 2025 for her services to Materials Engineering.

Scientific Highlights

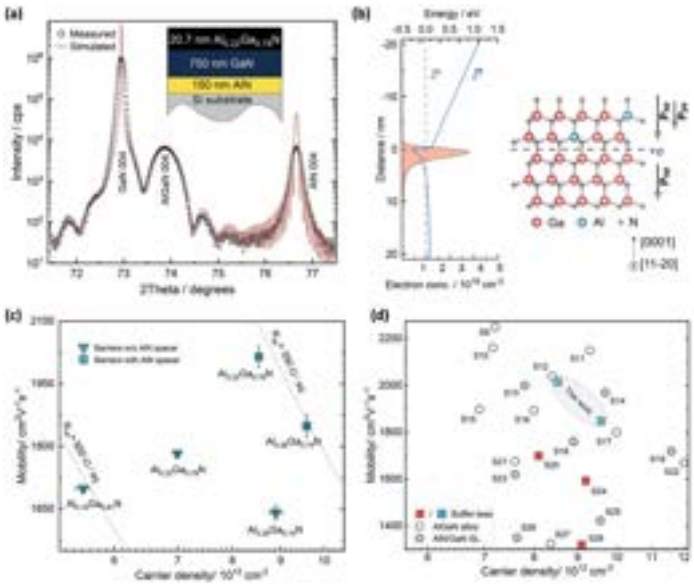
University of Sheffield



Stark tuning and charge state control in individual telecom C-band quantum dots (N. Martin et al.)

The Facility and the Department of Physics at the University of Sheffield demonstrated electrical tuning and charge state control of single droplet epitaxy InAs/InP quantum dots (QDs) emitting in the telecom C-band for the first time, a key step toward scalable, low-loss-fiber compatible quantum light sources. These QDs were developed and grown by our JR showerhead MOVPE reactor and embedded in a InP-based n^{++}-i-n^{+} heterostructure.

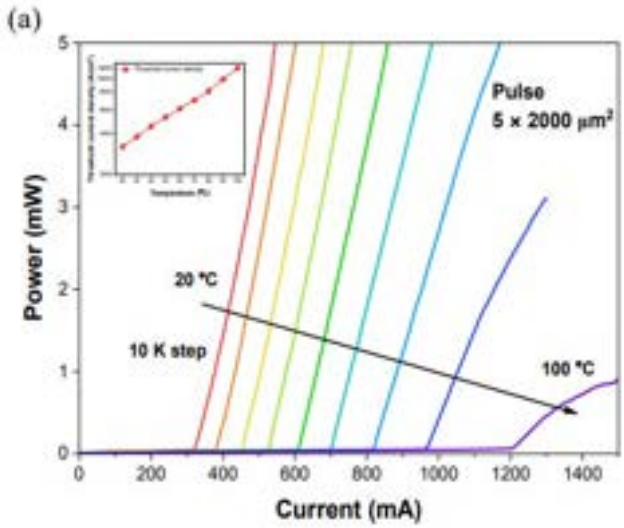
University of Cambridge



Buffer-Less Gallium Nitride High Electron Mobility Heterostructures on Silicon (S. Ghosh et al.)

The Cambridge Centre for Gallium Nitride demonstrated that gallium nitride transistor structures with excellent performance can be grown on silicon without using the complex buffer that are normally considered necessary. The bufferless structures Cambridge have developed will make it easier to extract heat from the transistors, keeping them working efficiently and will also reduce the resource usage involved in transistor production. Saptarsi Ghosh, the lead author of this work, has now taken up a Lectureship at Swansea University, where he continues to develop novel wide bandgap materials and devices.

University College London



High-performance InAs/InP Quantum Dot Lasers on InP and Si (H. Jia et al)

High-performance InAs/InP quantum-dot (QD) lasers have been developed using a modified indium flush technique at UCL NEF. This technique allows for precise control of dot-height distribution and enables the tailoring of emission wavelength. Using this approach, a record-low threshold current density (J_{th}) of 63 A/cm^2 per QD layer and high-temperature operation up to 140 °C have been demonstrated by 7-stack InAs/InP QD lasers on InP substrates.

Events & Conferences

UK Semiconductors 2025

UK Semiconductors 2025 was another great conference - our largest yet, with over 340 delegates and 50 exhibitors and sponsors. We had a much larger exhibition area this year and the new addition of exhibitor technical presentations.

UKS 2026 is on Wednesday 1st and Thursday 2nd July and registration is now open!

There will be a new ‘Women and Non-Binary in Semiconductors’ session, and a focus session by IOP’s Thin Films and Surfaces Group on the ‘Metrology for Emerging Semiconductor Materials’.

Book now!

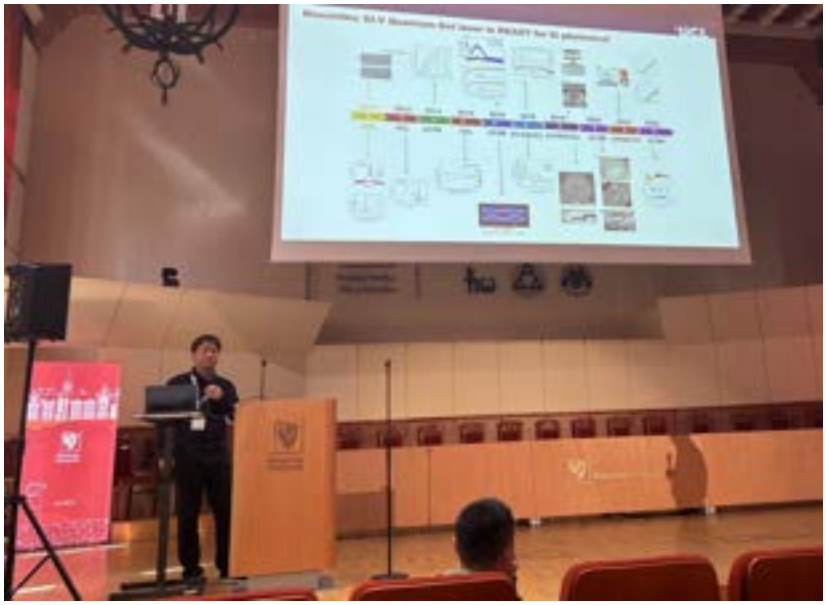
UK National Quantum Technologies Showcase

Dr Zofia Bishop attended the UK National Quantum Technologies Showcase in November, with the University of Surrey's Ion Beam Centre. The event was associated with the Institute of Physics Quantum Week, celebrating the first 100 years of Quantum Science and Technology and the International Year of Quantum.

Royce Growth UK Symposium 2025

Dr Zofia Bishop, Dr Edmund Clarke and Dr Menno Kappers attended the Growth UK Symposium in November, giving talks on MBE and MOVPE growth techniques, and an overview of the Facility.

iNternational Nano-Optoelectronics Workshop (iNOW) 2025



Prof Huiyun Liu attended the International Nano-Optoelectronics Workshop in Poland in July, giving an invited talk on ‘Compound III-V quantum-dot lasers monolithically grown on Si platform’.

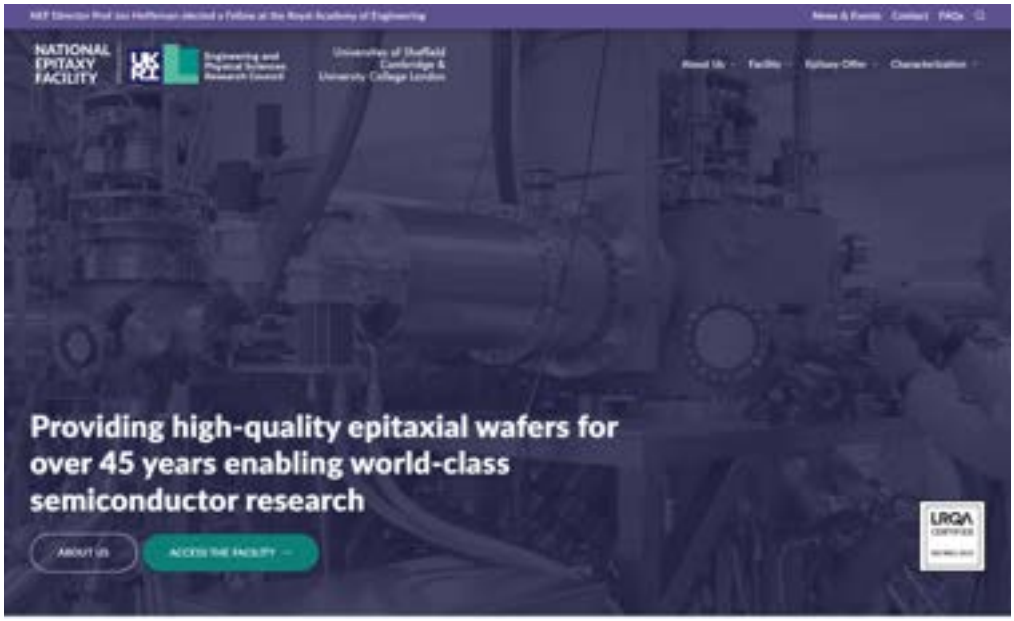
International Conference on Nitride Semiconductors (ICNS-15)

Prof Rachel Oliver attended ICNS 15 in Malmo, Sweden in July, giving a talk on ‘the role of dislocations in etching porous GaN’.

Westminster All Party Parliamentary Group meeting on Semiconductors

Prof Jon Heffernan and Dr Elisa Sala attended the All Party Parliamentary Group (APPG) meeting on Semiconductors in Westminster in February, meeting Sheffield Central MP Abtisam Mohamed. We are delighted that Sheffield continues to play a key role in developing the semiconductor sector to deliver growth and economic impact for the UK.

New Website!



We have a new Facility website! It is much more user friendly and interactive, with new pages including ‘About Semiconductors’, a timeline of the Facility over the last 45 years and a new Characterization section.

Visit our website

Wishing everyone a Merry Christmas and Happy New Year!

Our mailing address is: epitaxyfacility@sheffield.ac.uk