Autumn 2025

Advanced Technology Institute Newsletter
Faculty of Engineering and Physical Sciences

Welcome to the New Academic Semester!

As the days grow shorter and the pace quickens, we find ourselves at the start of another exciting semester. The corridors are once again buzzing with energy as new undergraduate, postgraduate, and PhD students join us—bringing fresh perspectives and enthusiasm to our vibrant community.

I hope you had a restful summer and are feeling recharged for a semester filled with impactful research, inspiring teaching, and meaningful collaboration.

Over the summer, we celebrated the success of the UK–India Advanced Semiconductor Workshop, which laid the groundwork for several promising initiatives. These are all progressing, with possible high-level delegation imminent. In partnership with the Royce Institute, Cambridge, and Southampton, we're now advancing a series of programmes focused on energy materials and smart electronics—core pillars of our mission.

This week, our perovskite solar cell research at ATI was featured in the Financial Times, highlighting its potential global impact. Work published in Joule has sparked international interest, including discussions around major funding for space-based solar technologies.

Meanwhile, the IBC has completed a successful mid-year review, demonstrating strong performance in both impact and device delivery to UK industry. Our translational efforts continue to grow, and we're grateful to Silverray for sponsoring a new PhD studentship starting this October.

Enjoy the highlights in this edition of the newsletter. It promises to be a dynamic and rewarding quarter, and I look forward to connecting with many of you in the weeks ahead.

Ravi Silva

Minister Jitendra Singh, the Minister of Science & Technology, visiting the University of Surrey.

IN THIS ISSUE

News

NEW UK–INDIA DEGREE TO DEVELOP TALENT IN SUSTAINABLE SEMICONDUCTOR TECHNOLOGIES

Left to right: Professor Satheesh Krishnamurthy, Director of the Surrey and UK National Ion Beam Centre; Professor Pallavi Mane, MIT Manipal; Professor Tim Dunne, Acting Vice Chancellor at the University of Surrey; Professor Ravi Silva, Interim Director of the Institute of Sustainability, and Director of the Advanced Technology Institute

The University of Surrey and Manipal Institute of Technology (MIT Manipal), a part of the Manipal Academy of Higher Education, have launched a dual-degree programme to help close the global skills gap in semiconductor technologies. The new programme will prepare students for roles in industries such as artificial intelligence, machine learning, clean energy, transport and defence.

The programme was launched at the 2025 UK–India Advanced Semiconductors for Sustainable Technologies conference, held at Surrey's Guildford campus. It allows students to start their studies at MIT Manipal and complete a master's at Surrey. Students will gain hands-on experience in manufacturing processes, advanced materials, sustainable technologies and power electronics. On graduation, they will receive two qualifications – an M.Tech from MIT Manipal and an MSc from Surrey – preparing them for roles in fast-growing industries.

Wonderful to have hosted Dr Geetika Madan Patel VP from Parul University.

Z Pulse being awarded an Innovation Pitch Award, at the Cambridge Wearables Innovation Forum, hosted at Pembroke College, Cambridge.

It was a great pleasure to welcome Prof. Limin Wu, President of Inner Mongolia University, China, and his high-level delegation to the University of Surrey.

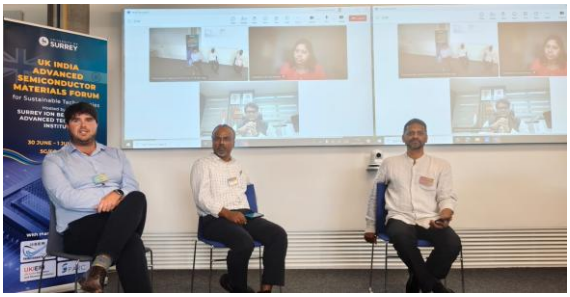
Celebrating 125 years of advanced materials science and technology at the House of Lords.

Past Events

The Surrey Ion Beam Centre and the Advanced Technology Institute jointly hosted a successful two-day **UK-India Conference on Advanced Semiconductor Materials for Sustainable Technologies** at the 5G/6G Innovation Centre, University of Surrey. The event brought together over 80 leading multidisciplinary experts from academia, industry, and government to foster bilateral collaboration in semiconductor research, with a focus on sustainable technologies and skills development.

The conference featured over 30 distinguished speakers—15 from prominent UK institutions including Cambridge, Swansea, and the Henry Royce Institute, and 15 from leading Indian institutions such as IISc Bangalore, IIT Delhi, IIT Madras, and Manipal University. The speaker lineup was curated to reflect Equality, Diversity, and Inclusion (EDI) principles, balancing early-career researchers with senior academics.

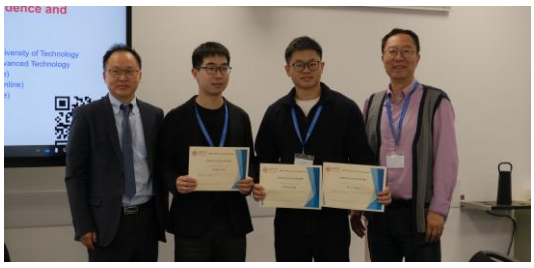
The conference concluded with a high-level panel discussion featuring representatives from the Department for Science, Innovation and Technology (DSIT), Foreign, Commonwealth and Development Office (FCDO), India's Department of Science and Technology (DST), and the Ayushman National Research Foundation (ANRF) chaired by Prof Satheesh Krishnamurthy. The panel addressed critical topics such as collaboration challenges, funding mechanisms, and ensuring mutual benefits for both nations.



James Penny, DSIT; Professor Sathiyan, IIT Madras; Professor Satheesh Krishnamurthy, Director of the Surrey and UK National Ion Beam Centre.

Dr Kai Yang successfully hosted the **ABCP 2025 Annual Conference** at the University of Surrey on 12–13 September. The event brought together more than 200 researchers, industry partners, and distinguished guests.

Key participants included Dr. Jen Bardsley (Head of Enabling Research and Science, British Council, UK), Professor Lisa M. Collins (Pro Vice-Chancellor, Research and Innovation, University of Surrey), Professor Hongbiao Dong FREng (President of ABCP; Professor of Materials Engineering and Deputy Head of School of Engineering, University of Leicester), and Professor Sir Keith Burnett (CBE FRS FLSW FInstP, Chair of the Nuffield Foundation; President of the Institute of Physics, UK).



Prof Hongbiao Dong, FREng, President of ABCP, University of Leicester; Dr Benyi Cao, Senior Lecturer in Geotechnical Engineering, Surrey; Dr Kai Yang, Lecturer of Energy Materials and Nanotechnology; Prof Wei Li, FBA MAE FAcSS, Executive Vice-President of ABCP, UCL.

In recognition of Dr Kai Yang role in organizing the event, he was honoured to receive the Excellence Award for Conference Organization.

Staff News

Congratulations to **Professor Ravi Silva** for being appointed as a panel member for UoA 12 Engineering for 2029 Research Excellence Framework (REF).

Congratulations to **Professor Wei Zhang** for being selected for the 2025 Highly Cited Researcher list from Clarivate.

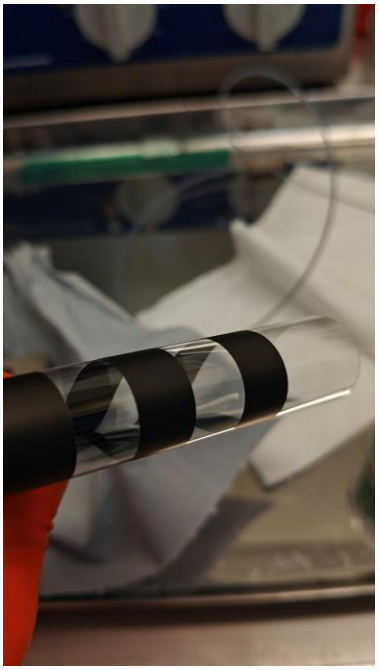


Figure 1 Slot-die coated graphene-based electrodes on a flexible substrate.

Congratulations to **Dr Dimitar Kutsarov** who has secured funding from the Henry Royce Institute for Advanced Materials at the University of Manchester in round 5 of their Industrial Collaboration Program. During the project starting on the 1st of October 2025, GraphEnergyTech and the Graphene Center at the ATI will develop "Novel Carbon-Based Electrode Materials for High-Performance Emerging Solar Cell Technologies with Enhanced Sustainability".

Through this collaboration, GraphEnergyTech will formulate and optimize conductive inks in-house, while the Graphene Centre at the ATI will provide independent characterization and large-area solar cell fabrication and testing using its advanced fabrication and metrology facilities. By enabling affordable and environmentally friendly electrode technologies, the project supports the commercialisation of next-generation solar technologies and strengthens the UK's leadership in innovating in sustainable energy materials.

We are happy to announce that **Dr Jae Sung Yun**, Lecturer in Energy Technology at the Advanced Technology Institute (ATI), has been awarded a highly competitive collaborative research grant from Gyeongsang National University (GNU) in South Korea!

Selected from a strong field of applicants, this significant partnership will focus on the design, qualification testing, and analysis of space solar cells and electronics. This critical work aims to advance the reliability and performance of space-based technologies, directly aligning with Dr. Yun's research in space photovoltaics.

The grant offers substantial support, providing up to £700,000 over three years, with a planned start date of November 1, 2025. This collaboration will also involve Gyeongnam Techno Park and marks a major step forward for the ATI's impact on international aerospace and space technology research. Congratulations to Dr. Yun and his team!

PhD News

The **ATI** is delighted to welcome 3 new students to our cohort:
Xiong Yinong – working with Wei Zhang
Jing Zhang – working with Wei Zhang
Jesse Francis – working with Ravi Silva

Papers and Presentations

Dr Matthew Sharpe

Dr Matthew Sharpe's paper on "Enhancing radiation resilience of wide-band-gap perovskite solar cells for space applications via A-site cation stabilization with $PDAI_2$" has been published in Joule!

He also attended SiliconPV2025 and nPV workshop in University of Oxford. He was privileged to have the opportunity to present in the Highlights session, due to his abstract being ranked in the top 5 out of nearly 150 others after 4 rounds of peer review.

Dr Eva Bestelink

Dr Eva Bestelink presented the first demonstration of organic multimodal transistors (OMMTs) at the SID IMID conference in Busan, South Korea, which were fabricated in collaboration with researchers at Joanneum Research, Weiz, enabled by EMERGE funding for facillities access. Dr Bestelink and Dr Sporea have secured additional EMERGE funds to continue OMMTresearch, which would be useful for developing future organic thin-film transistor backplanes for microLED pixel driving.

Prof Ravi Silva gave an invited talk at IISERTVM and met with colleagues to discuss our national research programme sponsored by the British Council and UKIERI on sustainable advanced semiconductor technologies.

Professor Ravi Silva

ATI Viva voce examinations in 2025

Our research students who have passed their PhD viva voce examinations in 2025

Dr Gianluc Romulus Lui (Supervisors: Prof Marian Florescu, Dr Izabela Jurewicz)
Project: Photonic Band Gaps in Ordered and Disordered Materials: Fundamentals and Applications

Dr Surajit Kar (Supervisors: Dr Yunlong Zhao, Prof Ravi Silva, Prof John Joe McFadden)
Project: Free-Standing Microelectrode Probes for High-Resolution Interrogation of Living Cells

Dr Patryk Golec (Supervisors: Dr Radu Sporea, Prof Marian Florescu)
Project: Compact Modelling of Source Gated and Multimodal Thin Film Transistors

Dr Shaoyin Li (Supervisors: Prof Qiong Cai, Dr Tan Sui)
Project: UV-Micro-Patternable Ionogel Electrolytes: Design, Preparation, and Applications in Energy Storage Devices

Dr Alexander Rubinstein (Supervisors: Prof Roger Webb, Prof Jonathan England)
Project: Computer Simulation of Energetic Ion-Solid Interactions

Dr Md Delowar Hussain (Supervisors: Prof Ravi Silva, Dr Jae Yun)
Project: Integration of Mechanical Energy Harvesters with the Internet of Things

ATI Publications since May 2025

2D Material Decorated ZnO for Screen Printable Wearable Textile-Based Piezoelectric Nanogenerator
in ENERGY & ENVIRONMENTAL MATERIALS 10.1002/eem2.70138; IF5 14.7

Entropy-driven strategy for enhancing OER kinetics and achieving robust long-term stability in water oxidation using α-Fe2O3 photoanodes
in CHEMICAL ENGINEERING JOURNAL 10.1016/j.cej.2025.167380; IF5 13.5

Morphological insights into Se-driven charge transport and enhanced performance in Sb2(S,Se)3 solar cells
in JOURNAL OF MATERIALS CHEMISTRY A 10.1039/d5ta05469a; IF5 10.3

Robust Passivation of Perovskite Using Rubidium Iodide for Efficient Photovoltaic Applications under Various Illumination Environments
in SMALL STRUCTURES 10.1002/sstr.202500188; IF5 11.7

Susceptible organic cations enable stable and efficient perovskite solar cells
in JOULE 10.1016/j.joule.2025.101879; IF5 43.7

Enhancing radiation resilience of wide-band-gap perovskite solar cells for space applications via A-site cation stabilization with PDAI2
in JOULE 10.1016/j.joule.2025.102043; IF 43.7

From Glycine to Porphyrin: How to Make Carbon Polymer Dots with Effective Photoinduced Virucidal Activity
in CARBON 10.1016/j.carbon.2025.120771 IF10

Machine Learning Drives a Path to Defect Engineering for Suppressing Nonradiative Recombination Losses in Cu2ZnSn(S,Se)4 Solar Cells
in ACS APPLIED MATERIALS & INTERFACES 10.1021/acsami.5c01764 IF5 8.5