

Faraday Institution Conference 2025

Energising the UK Battery Ecosystem

Tuesday 9 September | Warwick Arts Centre, University of Warwick

08:30-10:00 Registration and refreshments
Lower Foyer, Ground Floor

10:00-10:10 **Welcome Address | The Theatre, First Floor**

Professor Martin Freer, CEO, Faraday Institution

10:10-10:20 **Host's Welcome | The Theatre, First Floor**

The Rt Hon Greg Clark, Executive Chair of the University of Warwick's Innovation District

10:20-10:30 **Opening Remarks | The Theatre, First Floor**

Professor Julia Sutcliffe, Chief Scientific Adviser, Department of Business and Trade (DBT)

10:30-11:20 **Academic Keynote Talk | The Theatre, First Floor**

Professor Sir Stanley Whittingham, Distinguished Professor of Chemistry and Materials Chemistry and Engineering, Binghamton University (USA)

Li Batteries: 50 Years Old and the Future Challenges for an American Based Industry

Chaired by: Professor Louis Piper, Professor of Battery Innovation, WMG – University of Warwick

11:20-12:00 **Industry Keynote Talk | The Theatre, First Floor**

Dave Rawlins, Head of Engineering – Heavy Industry and Decarbonisation, Fortescue Zero

Enabling rapid decarbonisation: Achieving cost effective, scalable, and deployable real zero solutions for mine operations

Chaired by: Professor Louis Piper, Professor of Battery Innovation, WMG – University of Warwick

12:00-14:00 Lunch and Exhibition

Butterworth Hall, Ground Floor

12:50-13:40 **Henry Royce Institute and Faraday Institution Lunchtime Session | The Studio, Ground Floor**

Identifying Infrastructure Needs for The Electrochemical Sciences

This lunchtime session will present emerging capabilities for research and development and promote a discussion of where there are gaps in capabilities available in the UK, and how these might be filled. This will be part of a series of workshops across the electrochemical sciences that will inform the development of a Statement of Need in Research Infrastructure for submission to EPSRC. There will be an opportunity to hear about the latest emerging capabilities, and to provide your input on areas that should be prioritised when identifying new infrastructure needs.

14:00-16:00 *Parallel Session* The Theatre, First Floor

Session | Active Materials & Supply Chain

Chaired by: Professor Paul Anderson, Professor of Strategic Elements and Materials Sustainability at University of Birmingham and Co-Director of the Birmingham Centre for Strategic Elements and Critical Materials

This theme covers all aspects of battery active materials supply chains for Li-ion and beyond Li-ion technologies from mining through to synthesis to performance in a battery cell. Hear about the development of global battery supply chains from virgin raw materials to recycled active materials, as well as discussions on Life Cycle Analysis studies of battery active material supply chains. Also included in the scope will be talks on new methods of sustainable material synthesis, processing parameters and surface engineering.

14:00-14:40 **Invited talk: Dr Evi Petavratzi, Principal Mineral Commodity Expert, British Geological Society (BGS)**
From Mine to Megawatt: The critical raw materials behind battery technology

14:40-15:00 **Selected Talk: Dr Beth Murdock, Material Scientist, Redoxion**
Building a resilient LiFe1-xMnxPO4 supply chain: scalable synthesis for a sustainable future

15:00-15:20 **Selected Talk: Malene Fumany, PhD Researcher, King's College London**
Unravelling the interdependencies of policies, battery materials supply, and battery costs using a policy-economic framework

15:20-15:40 **Selected Talk: Dr Marcin Orzech, Senior Research Officer, Swansea University**
Prussian White as extremely sustainable cathode for Na-ion batteries: scaling-up of zero waste synthesis

15:40-16:00 **Selected Talk: Dr Evangelos Kallitsis, Research Associate, Imperial College London**
Power play: A multi-criteria analysis of present and future battery technologies

14:00-16:00 *Parallel Session* Woods Scawen, Upper Foyer, Ground Floor
Session | Battery Modelling

Chaired by: Professor James Marco, Professor of Battery Systems and Head of the Battery Systems Research Group, WMG – University of Warwick

The development and use of new modelling methods is fundamental to our ability to accelerate innovation from early cell development, through to the integration of cells into systems and their final deployment. The session will explore recent advances that demonstrate the value that modelling methods and tools bring across the entire battery ecosystem focussing on the interface between scientific discovery, engineering and manufacturing.

14:00-14:20	Selected Talk: Roksana Jackowska, PhD Researcher, University of Birmingham <i>Kinetic limitations in Single-Crystal NCM cathode electrodes</i>
14:20-14:40	Selected Talk: Dr Edmund Dickinson, Head of Electrochemistry, About:Energy <i>What does it take to model lithium iron phosphate (LFP) cells? An electrochemical investigation</i>
14:40-15:20	Invited talk: Dr Sam Cooper, Reader in Artificial Intelligence for Materials Design in the Dyson School of Design Engineering and Imperial College London <i>Characterisation and design of electrodes using image-based AI</i>
15:20-15:40	Selected Talk: Dr Kit McColl, Postdoctoral Research Associate, Bath University <i>Mitigating voltage fade in Li-rich Mn-based layered oxide cathode materials</i>
15:40-16:00	Selected Talk: Dr Eric Woillez, Research Engineer, The French Alternative Energies and Atomic Energy Commission (CEA) <i>Classification of kinetic limitations in porous electrodes from the non-dimensional numbers of impedance spectroscopy</i>

14:00-16:00 *Parallel Session* The Studio, Upper Foyer, Ground Floor
Session | Battery Safety & Abuse

Chaired by: Dr Mel Loveridge, Associate Professor of Electrochemical Materials, WMG – University of Warwick

This themed session will span many aspects that are critical to Li and Na-ion battery safety. The core themes will encompass characterisation, testing and forensic approaches – this includes operando methods and includes early detection of failure modes. The session will also include discussion of materials and component improvements that are designed to improve safety and mitigate failure. Policy and regulation will be included as well as more technical considerations along with key aspects relevant to fire services.

14:00-14:20	Selected Talk: Arthur Fordham, PhD Researcher, UCL <i>Listening to Batteries: Integrating Acoustic Techniques and High-Speed Synchrotron X-ray Radiography for Early Detection of Battery Failure</i>
14:20-14:40	Selected Talk: Begum Gulsoy, Lead Engineer, WMG – University of Warwick <i>Novel In-Situ Cell Instrumentation for Enhanced Battery Safety Evaluation</i>
14:40-15:00	Selected Talk: Dr Mark Wootton, Research Associate, University of Sheffield <i>Microkinetic Modelling for LIB Cathode Decomposition</i>
15:00-15:20	Selected Talk: Elliott Read, Lead Engineer (Cell Safety), WMG – University of Warwick <i>Sidewall rupture in cylindrical lithium-ion batteries - how does it affect thermal runaway propagation and what can we do about it?</i>
15:20-16:00	Invited talk: Dr Jonathan Buston, Principal Scientist, Health and Safety Executive (HSE) <i>What do we mean by safe?</i>

16:00-18:00 **Exhibition Session | [Meet our exhibitors here.](#)**
Butterworth Hall, Ground Floor

16:00-18:00 **Poster Session**
Mead Gallery, Ground Floor

18:15-20:30 **Welcome Networking Reception**
National Automotive Innovation Centre, Lord Bhattacharyya Way, University of Warwick, CV4 7AL
 Catch up with existing colleagues and make new acquaintances at our welcome networking reception held on the first evening of the conference. Delegates will be treated to an evening of networking in the National Automotive Innovation Centre, the hub of automotive research and innovation in the West Midlands. This event is free to attend but must be pre-booked via the conference registration form.

Faraday Institution Conference 2025

Energising the UK Battery Ecosystem

Wednesday 10 September | Warwick Arts Centre, University of Warwick

09:00-09:50 Academic Keynote Talk | The Theatre, First Floor

Professor Shirley Meng, The Liew Family Professor at the Pritzker School of Molecular Engineering, University of Chicago (USA)

Energy Storage Research Alliance - Innovation Beyond Lithium

Chaired by: Dr Valentina Gentili, Battery Innovation Programme Director, Innovate UK

09:50-10:30 Morning Refreshments

Butterworth Hall, Ground Floor

10:30-12:30 *Parallel Session* The Theatre, First Floor

Session | New Battery Chemistries & Interfaces (1)

Chaired by: Professor Venkataraman Thangadurai, Chair in Energy, University of St. Andrews

Boosting the energy density of existing Li-ion batteries requires the investigation of new battery chemistries and materials to increase the capacity of electrodes, and enhance the cell voltage, C-rate, and electrode lifetime. Some of these gains will be achieved by modifying the electrode/electrolyte interface. Insights are needed in both fundamental understanding and engineering advances. This theme intends to provide a forum for the dissemination of new advances and development in but not limited to next-generation Li-ion batteries, Na-ion/K-ion/multivalent ion batteries, solid-state batteries, and metal batteries. The theme focuses on the follow aspects:

- Materials discovery of cathodes and anodes
- Mechanisms of charge storage in cathodes and anodes
- Mechanisms of metal plating and stripping
- Impact of the electrode/electrolyte interface
- Innovations in electrolytes including conventional liquid and solid-state electrolytes

10:30-11:10 Invited talk: Professor John Irvine, Professor of Chemistry, University of St. Andrews

Developing Sodium Ion Chemistry for Sustainable Batteries

11:10-11:30 Selected Talk: Professor Lee Johnson, Professor of Electrochemistry, University of Nottingham

Interfacial and electrolyte solution reactions at nickel-rich electrodes

11:30-11:50 Selected Talk: Dr Gerard Bree, Assistant Professor, WMG – University of Warwick

LMFP anodefree batteries: The ultimate in low cost, high energy density lithium cells?

11:50-12:10 Selected Talk: Dr Juliane Fiates, Postdoctoral Research Associate, Newcastle University

Designing Stable Solid Electrolyte Interphases for Anode-Free Batteries: Insights from Atomistic Modelling

12:10-12:30 Selected Talk: Dr Nagaraju Goli, Research Associate, Imperial College London

Additive manufacturing of microelectrodes for aqueous microbatteries

10:30-12:30 *Parallel Session* Woods Scawen, Upper Foyer, Ground Floor

Session | Electrode Manufacturing

Chaired by: Professor Patrick Grant, Vesuvius Chair of Materials and Pro-Vice-Chancellor (Research), University of Oxford

Manufacturing of battery electrodes is a cornerstone of energy storage innovation and battery cell development. This session will delve into the intricate processes and challenges involved in electrode manufacturing and development, through exploration of its scientific, engineering, and industrial dimensions. The theme will focus on how scientific and engineering understanding can be used to optimise electrode interfaces at all levels to ensure best performance in cell, from lab scale to full production. We will look to encompass critical aspects of slurry based and dry electrode manufacture, for both liquid and solid-state electrolyte systems. It will consider aspects such as (but not limited to) formulation and additives, understanding and development of mixing, coating, drying and calendaring technologies and their effects on electrode structure and performance. It will further consider electrode influence on critical parameters such as electrolyte wetting/ penetration and formation, along with influences of non-active components such as current collectors.

10:30-10:50 Selected Talk: Dr Pengcheng Zhu, Senior Research Associate, University of Oxford

Advanced laser processing for electrode architecture design and manufacturing for high-energy and high-power lithium-ion batteries

10:50-11:10	Selected Talk: Dr Erdogan Guk, Associate Professor, WMG – University of Warwick <i>Non-Destructive Ultrasonic Evaluation of Calendering Parameters on Lithium-Ion Battery Cathode Microstructure and Performance</i>
11:10-11:50	Invited talk: Dr Hieu Duong, Chief Manufacturing Officer, AM Batteries (USA) <i>Dry Battery Electrode Manufacturing Technologies</i>
11:50-12:10	Selected Talk: Tú Nguyen, PhD Researcher, Flemish Institute of Technological Research <i>Insights into High-loading 3D-printed LFP Electrodes in High Energy Density Li-ion Batteries</i>
12:10-12:30	Selected Talk: Dr Marveh Forghani, Postdoctoral Research Associate, University of Oxford <i>Optimizing Current Distribution in Large-Format Li-ion Batteries by Casting In-Plane Graded Electrode Materials</i>

10:30-12:30 *Parallel Session* **The Studio, Upper Foyer, Ground Floor**

Session | Advances in Recycling & Reuse

Chaired by: Dr Lizzie Driscoll, Research Fellow, University of Birmingham

This session will provide an overview of the current global and national battery recycling industry. New and improved strategies for recycling battery components will be explored, focussing on non-active materials with greater challenges for recovery such as electrolytes, hard carbon and binders, seeking to identify solutions for adoption. The session will cover advances in physical separation, methods of making recycling processes safer, minimising waste and boosting efficiency. In addition, the session will consider to how overcome the challenges in the recycling of next-generation chemistries and larger cell formats.

10:30-10:50	Selected Talk: Dr Julius Butime, Dean - School of Computing and Engineering Sciences, Strathmore University <i>Advancing Battery Recycling and Second-Life Applications in Kenya for Sustainable Energy Storage</i>
10:50-11:10	Selected Talk: Lou Cooper, PhD Researcher, University of Birmingham <i>Green Solvents for the recovery of PVDF binder from lithium-ion battery electrodes</i>
11:10-11:30	Selected Talk: Stiven Lopez Guzman, PhD Researcher, CIC energiGUNE <i>Direct recycling of LNMCO cathodes from different states of life</i>
11:30-11:50	Selected Talk: Dr Jake Yang, Lecturer of Physical Chemistry, University of Leicester <i>Short loop recycling of lithium-ion battery black mass using vegetable oil and ultrasound</i>
11:50-12:30	Invited talk: Professor Louise Horsfall, Chair of Sustainable Biotechnology, University of Edinburgh <i>A Bio-enabled Circular Economy for Batteries</i>

12:30-14:00	Lunch and Exhibition Butterworth Hall, Ground Floor
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14:00-14:40	Industry Keynote Talk The Theatre, First Floor Dr Reza Younesi, Founder of Altris AB and Associate Professor at Department of Chemistry - Ångström Laboratory, Uppsala University <i>From fundamental understanding to upscaled production of sodium-ion batteries</i> Chaired by: Ian Ellerington, Technology Transfer Director, Faraday Institution
14:40-16:00	From Innovation to Market The Theatre, First Floor Chaired by: Ian Ellerington, Technology Transfer Director, Faraday Institution For battery research to have a real-world impact it needs researchers, leaders, business people and entrepreneurs who can put breakthroughs on a path to commercialisation. In this session invited speakers will discuss their inspirational journeys from research lab to successful spin out companies in the battery space. They will highlight the challenges they faced along the way, how they were overcome, their motivations and rewards, and the importance of the help they received.
14:40-14:55	Invited Talk: Dr Gyen Ming Angel, Director of Venture Building, Prosemino <i>How to Create a Clean Tech Company: Lessons from Building a Startup that Builds Startups</i>
14:55-15:10	Invited Talk: Dr Ola Hekselman, CEO and Co-founder, Solveteq <i>Talk Title TBC</i>
15:10-15:25	Invited Talk: Dr Alice Merryweather, Co-founder and Head of Applications, Illumion <i>illumion: Shining a light on batteries</i>
15:25-15:40	Invited Talk: Dr Gareth Hartley, Head of Lithium-Sulfur, Gelion <i>Reviving UK technology leadership: How Gelion has become a global leader in sulfur battery development</i>

15:40-16:00	Q&A with all speakers
16:00-18:00	Exhibition Session Meet our exhibitors here. Butterworth Hall, Ground Floor
16:00-18:00	Poster Session Mead Gallery, Ground Floor
19:00-23:30	Faraday Institution Conference Dinner & Community Awards Coventry Cathedral, Priory St, Coventry CV1 5AB A must-attend for all registered delegates! Our popular Conference Dinner will take place inside the iconic Coventry Cathedral in Coventry city centre, nestled next to the breathtaking ruins of the original 14th-century cathedral and widely regarded as a masterpiece of resilience and modernist design. As is now tradition, as well as a pre-dinner drinks reception and three course meal, dinner guests will celebrate the winners of our Faraday Institution Community Awards announced on the night. After-dinner guest speaker: Robert Llewellyn, Founder, Fully Charged Show Renowned EV advocate and Founder of the Fully Charged Show, Robert will indulge us with his outlook of the EV landscape, the future of transport and the vital role batteries play.

Faraday Institution Conference 2025

Energising the UK Battery Ecosystem

Thursday 11 September | Warwick Arts Centre, University of Warwick

10:00-12:00 *Parallel Session* The Theatre, First Floor

Session | New Battery Chemistries & Interfaces (2)

Chaired by: Dr Georgina Gregory, Royal Society Dorothy Hodgkin Fellow, University of Oxford

Boosting the energy density of existing Li-ion batteries requires the investigation of new battery chemistries and materials to increase the capacity of electrodes, and enhance the cell voltage, C-rate, and electrode lifetime. Some of these gains will be achieved by modifying the electrode/electrolyte interface. Insights are needed in both fundamental understanding and engineering advances. This theme intends to provide a forum for the dissemination of new advances and development in but not limited to next-generation Li-ion batteries, Na-ion/K-ion/multivalent ion batteries, solid-state batteries, and metal batteries. The theme focuses on the follow aspects:

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- Mechanisms of charge storage in cathodes and anodes
- Mechanisms of metal plating and stripping
- Impact of the electrode/electrolyte interface
- Innovations in electrolytes including conventional liquid and solid-state electrolytes

10:00-10:40 **Invited talk: Dr Robert House, Associate Professor of Materials, University of Oxford**

Advances in high energy density cathode materials for Li and beyond Li batteries

10:40-11:00 **Selected Talk: Kanyapat Yiamsawat, PhD Researcher, University of Oxford**

Balancing Performance and Environmental Impact: Recyclable Fluorinated Polymers in Solid-State Batteries

11:00-11:20 **Selected Talk: Professor Darren Walsh, Professor of Chemistry, University of Nottingham**

Cycling Magnesium Electrodes in Simple Salt Glyme Electrolytes and the Prospects for High Performance Magnesium Batteries

11:20-11:40 **Selected Talk: Dr Sundeep Vema, Postdoctoral Research Associate, University of Cambridge**

Impurity deposition drives contact loss at Li metal-solid electrolyte interface in solid-state batteries

11:40-12:00 **Selected Talk: Dr Ashley Willow, Senior Lecturer, Swansea University**

Design and Validation of "Anode-Free" Sodium-Ion Pouch Cells Employing Prussian White Cathodes

10:00-12:00 *Parallel Session* Woods Scawen, Upper Foyer, Ground Floor

Session | Advanced Characterisation & Degradation

Chaired by: Dr Gabriel Perez, Instrument Scientist, ISIS Neutron and Muon Source

A thorough understanding of degradation and failure mechanisms in battery systems is critical for developing effective countermeasures to mitigate these issues and extend battery life. These mechanisms result from a wide variety of structural and morphological changes occurring across multiple scales within the system, often intertwined in complex ways that make them challenging to investigate. Addressing this requires a comprehensive suite of advanced characterisation techniques, such as those available at central facilities. This session will explore

a diverse range of characterisation approaches, and the strategies used to establish degradation mechanism in battery systems. Topics will include in situ/operando methods, software and simulation tools, and advanced electrochemical techniques. Additionally, optimised methods for tracking battery health throughout its effective lifetime will be discussed.

10:00-10:20	Selected Talk: Dr Ashok Menon, Senior Research Fellow, WMG – University of Warwick <i>Towards Ideal Operando Experiments: Characterising Degradation Processes in Unmodified Pilot Line Single- and Multi-layered Pouch Cells through Operando X-ray and Neutron Techniques</i>
10:20-10:40	Selected Talk: Dr Haijun Ruan, Assistant Professor, Coventry University <i>Harnessing AI to enable fast diagnostics of degradation modes towards precise mitigation of battery degradation</i>
10:40-11:20	Invited talk: Professor Nuria Garcia-Araez, University of Southampton <i>Operando gas analysis to unpin the root reactions triggering degradation of high energy batteries</i>
11:20-11:40	Selected Talk: Dr Wei Yu, Assistant Professor, Tohoku University (Japan) <i>Isotopic ¹³C mesoporous carbons decouple degradation in lithium-oxygen batteries</i>
11:40-12:00	Selected Talk: Dr Chengge Jiao, Staff Scientist, Thermo Fisher Scientific <i>Automated FIB Cross-Sectioning for 3D SIMS: Local Volume and Global Volume ⁷Li+ Distribution in NMC811</i>

10:00-11:30 *Parallel Session* **The Studio, Upper Foyer, Ground Floor**

Session | Maximising Academic-Industry Collaboration

Chaired by: Professor Emma Kendrick, Professor of Energy Materials, University of Birmingham

In this session, we'll explore how we can bridge the gap to leverage the strengths of both academia and industry to accelerate innovation. We'll hear from leading experts from universities and companies who will share their experiences, challenges, and success stories in collaborative R&D. Importantly, we will highlight the impact of Faraday Institution-funded initiatives such as Industry Sprints, which have played a key role in fostering collaboration, providing industrial experience and new skills to academic researchers, and delivering tangible benefits to both sectors.

10:00-10:20	Invited Talk: Dr W. Dhammika Widanage, Head of Battery Modelling, Breathe Battery Technologies <i>Shifting Gears: Do's and Don'ts on the Path from Academia to Industry</i>
10:20-10:35	Industry Sprint Flash Talk: Professor Serena Margadonna, Chair of Chemical Engineering, Swansea University <i>Co-Designing Scalable Battery Technologies: Insights from an Industry Sprint Project</i>
10:35-10:50	Industry Sprint Flash Talk: Dr Mike Thomas, Centre of Excellence Lead, Morgan Advanced Materials <i>ZEST - Li Battery fibers and maximising Industrial - Academic collaboration</i>
10:50-11:30	Panel Discussion: What might the future state of academic and industrial collaboration look like? - Dr Jerry Barker, Founder and CEO, Redoxion - Dr Julius Butime, Dean - School of Computing and Engineering Sciences, Strathmore University - Dr Serena Gallanti, Principal Scientist, Agratas - Professor Serena Margadonna, Chair of Chemical Engineering, Swansea University - Dr Mike Thomas, Morgan Advanced Materials - Dr Dhammika Widanage, Head of Battery Modelling, Breathe Battery Technologies

12:00-13:30	Lunch and Exhibition Butterworth Hall, Ground Floor
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13:30-14:20	Closing Panel Discussion – Battery Roadmaps The Theatre, First Floor Chaired by: Dr Valentina Gentili, Battery Innovation Programme Director, Innovate UK This final session will showcase the battery future development from an academic, government and industry lens, covering EU, Asia and US if possible, and will: • Set the scene with UK battery landscape, cross sector demand and development targets. • Cover new developments driven by regulations (Rules of Origin, EU passport) • Discuss EU opportunities and shine a focus on possible future development
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	Panellists: - Dr Carmen Cavallo, Senior Research Scientist, R&D, FAAM - Bozorg Khanbaei, Policy Officer, BEPA (Batteries European Partnership Association) - Dr Hadi Moztarzadeh, Head of Technology Trends, Advanced Propulsion Centre - Tim Powell, Transport Sector Lead, STFC Hartree Centre - Rebecca Schapira, Deputy Director for Advanced Manufacturing, Department for Business and Trade (DBT) - Dr Ulderico Ulissi, Head of Overseas Tech & Startup Cooperation, CATL
14:20-15:00	Closing Keynote Talk The Theatre, First Floor Professor Paul Monks, Chief Scientific Adviser, Department for Energy Security and Net Zero (DESNZ) <i>Getting to Net Zero: what's in store for batteries?</i> Chaired by: Professor Martin Freer, CEO, Faraday Institution
15:00-15:20	Poster Awards Presentation The Theatre, First Floor
15:20-15:45	Closing Remarks The Theatre, First Floor Professor Martin Freer, CEO, Faraday Institution