

# Programme of Events 2024/25

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The IET Sussex Network has arranged or planned 15 talks over the 2024/25 season, from October to May. You can register for talks by going to our web site ([engx.theiet.org/local-networks/se3](http://engx.theiet.org/local-networks/se3)) and following the link under 'Our events:'. From our home page you can also find links to the events programmes of our neighbouring IET Networks and other Professional Engineering Institutions that hold talks in our area.

This season, as for the last, our talks are all in-person events, being held either at Crawley College or at the University of Sussex in Falmer. Refreshments are provided before the talks and you have a chance to chat with other members and guests.

All events advertised on these pages are also open to members of the IMechE, BCS, ICE, IMarEST, IOM, RAeS and RCEA and guests are welcome at all events. Where the speakers agrees, we will endeavour to record the talk and post the video on the Sussex Network YouTube channel. Details can be found on our home page.

Please remember that information will be added to the programme as it becomes available, so any downloaded version may be out of date.

The IET accept no responsibility for any loss, injury or inconvenience caused to members or guests in consequence of their attendance at events. Members/guests who are concerned as to the availability of disabled access to any event/visit should enquire in the first instance to the contact email on our home page. Failing this, any committee member will be willing to assist. Registration is required for all meetings, which can be done through our home page.

At the time of writing not all details had been finalised. So if details of a talk are missing then please come back to this page at a later date.

# Events 2024

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| <b>Crawley</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Tuesday 1st October</b> | <b>18:30 for 19:00</b> |
| <b>Battery Technology</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                            |                        |
| Professor Qiong Cai, Professor in Sustainable Energy and Materials, University of Surrey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |                        |
| Development of sustainable and clean energy sources that are viable alternatives to fossil fuel technologies is one of the most pressing issues in today's society. Rechargeable batteries are promising clean energy technologies which can: serve as storage sources at local and grid-scale for wide deployment of a variety of renewable energy technologies, provide power sources for electric and hybrid vehicles for low-carbon or zero-carbon emission transportation systems, and provide power sources for various portable and wearable electronic devices. In this talk, I will discuss the current paradigm with lithium (Li)-ion batteries, the opportunities, and challenges with developing Li-ion batteries in the competitive global race. I will also introduce some of the most promising next-generation batteries such as sodium-ion batteries, lithium-sulfur batteries, solid-state batteries, and redox flow batteries. I will also discuss the sustainability issues around batteries, and the development of recycling methods for Li-ion batteries. |                            |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                            |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                        |
| Registration required. Go to the <a href="#">IET Sussex home page</a> and follow links to events.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                        |

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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Tuesday 15th October</b> | <b>18:30 for 19:00</b> |
| <b>Mobile phone system and hardware evolution from 1G to 6G</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |                        |
| Dr Mike Underhill, Former Professor, University of Surrey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |                        |
| This presentation is a tribute to the very interesting, perceptive and informative Short Course lecture notes of Professor Ian Robertson of the University of Leeds. Ian sadly died on 6th June 2024, a month before he was due to talk from these slides at the University of Surrey. Ian's slides had no speaker's notes and so as an ex-colleague of Ian's, Mike presented his guess of what Ian would have said at the Short Course in July. Fortunately the presentation was well received and now Mike will repeat the key points of the courses and add from his own experience and knowledge in the field. |                             |                        |
| John Maynard Smith Big Lecture Theatre, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                             |                        |
| Registration required. Go to the <a href="#">IET Sussex home page</a> and follow links to events.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |                        |

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| <b>Crawley</b>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Tuesday 5th November</b> | <b>18:30 for 19:00</b> |
| <b>Why have weather forecasts improved?</b>                                                                                                                                                                                                                                                                                                                                                                                         |                             |                        |
| Bob Riddaway, ex-President of the European Meteorological Society                                                                                                                                                                                                                                                                                                                                                                   |                             |                        |
| Technological developments have underpinned the increase in accuracy of weather forecasts. In particular, from the mid-1960s the use of increasingly sophisticated numerical models coupled with an enhanced availability of observations have led to modern five-day forecasts being as accurate as one-day forecasts 50 years ago. These developments will be discussed along with benefits of having accurate weather forecasts. |                             |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR                                                                                                                                                                                                                                                                                                 |                             |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                             |                             |                        |
| Registration required. Go to the <a href="#">IET Sussex home page</a> and follow links to events.                                                                                                                                                                                                                                                                                                                                   |                             |                        |

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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Tuesday 19th November</b> | <b>18:30 for 19:00</b> |
| <b>Where are all the autonomous cars?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |                        |
| Dr Arash Dizqah, Director of the Smart Vehicles Control Laboratory, University of Brighton                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                              |                        |
| We've all dreamed of cars that drive themselves, but our roads are still filled with human drivers. Why? This talk will unpack this puzzle from two angles: First, we'll explore the cutting-edge technology behind autonomous vehicles and the hurdles keeping them off our streets. Then, we'll take a thrilling leap into the future. How will self-driving cars revolutionize our road systems? Get ready for a mind-bending look at how connected and autonomous vehicles could reshape our cities and lives. Get your groove on and let's take a walk in the woods! |                              |                        |
| Fulton A, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              |                        |
| Registration required. Go to the <a href="#">IET Sussex home page</a> and follow links to events.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                              |                        |

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| <b>Crawley</b>                                                                                                                                                                                                                                                                             | <b>Tuesday 3rd December</b> | <b>18:30 for 19:00</b> |
| <b>Sussex and Surrey Institute of Technology</b>                                                                                                                                                                                                                                           |                             |                        |
| Paul Rolfe, Associate Principal & Director, Sussex & Surrey Institute of Technology                                                                                                                                                                                                        |                             |                        |
| This talk will cover the strategic objectives of the Sussex and Surrey Institute of Technology, the activities that it undertakes in collaboration with local employers, the technology and techniques that it has available, and how it works in partnership with our local universities. |                             |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR                                                                                                                                                        |                             |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                    |                             |                        |
| Registration required. Go to the <a href="#">IET Sussex home page</a> and follow links to events.                                                                                                                                                                                          |                             |                        |

## Events 2025

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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Tuesday 21st January</b> | <b>18:30 for 19:00</b> |
| <b>Leveraging Federated Machine Learning to Improve Intrusion Detection in Internet of Things Network</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                             |                        |
| Mohammed Al-khafajiy, Senior Lecturer in Computer Science, School of Engineering & Physical Sciences, University of Lincoln                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                             |                        |
| The rapid development of Internet of Things (IoT) devices has significantly increased network attacks and cyber threats, necessitating robust and efficient Intrusion Detection Systems (IDS). Traditional IDS approaches often struggle with the unique challenges posed by IoT environments, such as data privacy concerns, device heterogeneity, and limited computational resources. This talk will focus on the innovative use of Federated Machine Learning (FML) to enhance intrusion detection in IoT environments. FML mitigates data privacy risks while maintaining the ability to learn from a diverse range of data sources using decentralised model training approach. Highlighting the potential of FML as a solution to strengthen IDS effectiveness against evolving cyber threats, along with other real-world applications in IoT networks. |                             |                        |
| John Maynard Smith Big Lecture Theatre, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                             |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                             |                        |
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| <b>Crawley</b>                                                                                                                                                                                                                                                                                                                                                                    | <b>Tuesday 4th February</b> | <b>18:30 for 19:00</b> |
| <b>Using AI to write simple software applications</b>                                                                                                                                                                                                                                                                                                                             |                             |                        |
| Professor Stewart Bryant, Visiting Professor, University of Surrey                                                                                                                                                                                                                                                                                                                |                             |                        |
| Large language models are transforming the way that we write software. Using these tools we can significantly improve productivity and bring the ability to write effective software within the reach of less specialist engineers. This talk provides insight into the tools and approach that Stewart used in implementing software applications within a number of frameworks. |                             |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR                                                                                                                                                                                                                                               |                             |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                           |                             |                        |
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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Tuesday 18th February</b> | <b>18:30 for 19:00</b> |
| <b>Where are all the nuclear fusion power plants?</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |                        |
| Dr David James CEng, FIET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |                        |
| <p>In the late 1960's it was predicted that within 20 years we would have commercial fusion reactors, generating power that was so cheap it would almost be given away. Today, some 55 years later, there is still no commercial power plant using nuclear fusion. But are things about to change?</p> <p>After reminding ourselves about the basic physics of the fission and fusion processes, David will look at the technological approaches that have been followed in an attempt to generate power from the fusion of atoms. Over the intervening decades a lot of research has taken place around the world, so he will review that before looking at the approaches now being followed by private ventures.</p> <p>Finally, David will get out his crystal ball and look to see how the road to fusion power might develop.</p> <p>This talk was prepared for and given to the Retired Engineers Association in Worthing in October last year.</p> |                              |                        |
| John Maynard Smith Big Lecture Theatre, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                              |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                              |                        |
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| <b>Crawley</b>                                                                                                                                                                                                                                                                                                                                                                | <b>Tuesday 4th March</b> | <b>18:30 for 19:00</b> |
| <b>Unravelling RF Angular Orbital Momentum</b>                                                                                                                                                                                                                                                                                                                                |                          |                        |
| Dr Tim Brown CEng, Senior Lecturer in RF Antennas and Propagation, University of Surrey                                                                                                                                                                                                                                                                                       |                          |                        |
| <p>Orbital angular momentum (OAM) describes a new form of electromagnetic radio waves for use in radio frequency (RF) communications. Unravelling OAM into a new concept, linear angular momentum multiplexing (LAMM), provides useful new opportunities particularly for wireless connectivity in tunnels. Tim will describe this seminal work and its future potential.</p> |                          |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR                                                                                                                                                                                                                                           |                          |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                       |                          |                        |
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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                  | <b>Tuesday 18th March</b> | <b>18:30 for 19:00</b> |
| <b>Small Modular Reactors</b>                                                                                                                                                                                                                                                                                                  |                           |                        |
| Dr David James CEng, FIET                                                                                                                                                                                                                                                                                                      |                           |                        |
| Recent news items suggest that Small Modular Reactors are the future of nuclear power in the UK. But what are they? Why is there a growing interest in their development? What technologies do they use? And when are they likely to be putting power into the grid? This talk hopes to shed some light on to these questions. |                           |                        |
| John Maynard Smith Big Lecture Theatre, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                         |                           |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                        |                           |                        |
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| <b>Crawley</b>                                                                                                                      | <b>Tuesday 1st April</b> | <b>18:30 for 19:00</b> |
| <b>Title TBA</b>                                                                                                                    |                          |                        |
| Speaker TBA                                                                                                                         |                          |                        |
| Synopsis TBA                                                                                                                        |                          |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR |                          |                        |
| Refreshments from 18:30                                                                                                             |                          |                        |
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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Tuesday 15th April</b> | <b>18:30 for 19:00</b> |
| <b>Cable failure investigations in the power industry</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |                        |
| Simon Sutton, Director of International Technical Services, Doble Engineering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |                        |
| Cables are an increasing vital part of the electricity supply industry from HVDC interconnects between the UK and Europe, to the export and inter-array cables of offshore wind farms. This talk will consider why cable owners carry out failure investigations and how the conclusions can be used to improve asset management. We'll also look at some of the frequently used methodologies which can applied to any asset type, e.g. 5 Whys Analysis, the pros/cons of following these approaches, and some of the common analytical tools used during forensic investigations. Finally, we'll use a cable case study to demonstrate how all these elements come together to give actionable outcomes following the investigation. |                           |                        |
| Fulton A, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |                        |
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# Sussex Network

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| <b>Crawley</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Tuesday 6th May</b> | <b>18:30 for 19:00</b> |
| <b>UK Power Networks DSO: 2 years on</b>                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |                        |
| Zivanayi Musanhi, Regional Development Manager, Distribution System Operator at UK Power Networks                                                                                                                                                                                                                                                                                                                                                                   |                        |                        |
| UK Power Networks DSO (Distribution System Operator) was established in 2023 with responsibility for ensuring that sufficient and timely network capacity is available at lowest cost to UK Power Networks customers, using customer flexibility, data and digital technologies. The DSO is at the heart of UK Power Networks' strategy to ensure that acts as an enabler, and not a blocker, to the energy transition for the customers and communities it serves. |                        |                        |
| This talk will explain how UK Power Networks DSO is fulfilling the roles defined by the Regulator, Ofgem, and the progress made two years since its inception.                                                                                                                                                                                                                                                                                                      |                        |                        |
| Immersive Space room on the ground floor of the Longely 2 building at Crawley College, College Road, Crawley, West Sussex, RH10 1NR                                                                                                                                                                                                                                                                                                                                 |                        |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                             |                        |                        |
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| <b>Falmer</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Tuesday 20th May</b> | <b>18:30 for 19:00</b> |
| <b>Hydrogen technologies: from production to applications in hard-to-electrify sectors</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         |                        |
| Professor Qiong Cai, Professor in Sustainable Energy and Materials, University of Surrey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                        |
| Hydrogen is a zero-carbon fuel that has promise to change our energy landscape and eliminate our dependence on fossil fuels. In this talk, I will give an overview of the hydrogen rainbow and the related various hydrogen production routes, then focus on production of green hydrogen through electricity of water with renewable electricity input. I will then introduce examples of how hydrogen can be used to decarbonize several hard-to-electrify sectors including heavy goods vehicles, aviation, marine, cement production, and steel making industry. Challenges associated with hydrogen storage and transport will also be covered, and the role of ammonia as a hydrogen carrier will be discussed. |                         |                        |
| Fulton A, University of Sussex, Falmer, Brighton BN1 9QT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                         |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                        |
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| <b>Crawley</b>                                                                                                                                                                                                                                                            | <b>Tuesday 29th May</b> | <b>18:30 for 19:00</b> |
| <b>Linear Accelerators in Radiotherapy: Site visit at Elekta</b>                                                                                                                                                                                                          |                         |                        |
| Speaker TBA                                                                                                                                                                                                                                                               |                         |                        |
| Join Elekta, a global leader in radiotherapy solutions, for an introduction to the linear accelerator. Enjoy an engaging evening of networking, insightful talks, guided tours of their machine portfolio and a behind-the-scenes look at their manufacturing facilities. |                         |                        |
| Elekta Limited, Cornerstone, London Road, Crawley RH10 9BL                                                                                                                                                                                                                |                         |                        |
| Refreshments from 18:30                                                                                                                                                                                                                                                   |                         |                        |
| Registration required. Go to the <a href="#">IET Sussex home page</a> and follow links to events.                                                                                                                                                                         |                         |                        |