Welcome to Electrochem 2016

We welcome all delegates, exhibitors and sponsors to Leicester and to Electrochem 2016. For many of you it will be your first visit to Leicester, a city with Roman heritage, pivotal involvement in the nation’s medieval history and a vibrant multicultural contemporary ambience.

A compelling reason to hold Electrochem 2016 in Leicester is to celebrate a 20th century scientific accomplishment: this year is the 75th anniversary of the invention of the potentiostat by Hickling in the Department of Chemistry at the then University College of Leicester. The manuscript describing the concept and its practical application was submitted to the RSC’s Transactions of the Faraday Society in September 1941. This device has facilitated research in all fields of electrochemistry, from the fundamentals of interfacial dynamics to contemporary global societal challenges associated with sensing and energy. These challenges may arise at the molecular- or nano-scales in the research laboratory or at environmental or grid scales in implementation. We also celebrate the 50th anniversary of the first RRDE papers published by Albery and Bruckenstein. Initially used primarily to study fundamental reaction dynamics and adsorption, variants of the RRDE technique now provide critical information in the evaluation of catalytic materials for energy storage and conversion devices.

These scientific accomplishments and capabilities provide the motivation for the selection of the symposium themes at Electrochem 2016. We hope that you will engage with these themes and, perhaps, initiate research that will be celebrated in anniversaries at Electrochem meetings in decades to come.
Global Participation

This year’s Electrochem conference has had contributions from 29 countries:

- UK
- Ireland
- Germany
- Australia
- USA
- India
- Netherlands
- France
- Brazil
- Pakistan
- Japan
- Italy
- Austria
- Canada
- Spain
- Korea
- Iran
- Chile
- Morocco
- Saudi Arabia
- Iraq
- Portugal
- Switzerland
- Sri Lanka
- Taiwan
- China
- Cuba
- South Africa
- Nigeria
- Argentina
Conference Venue

This year’s conference is at **Stamford Court**, The University of Leicester's premier conference venue.

Located on the University of Leicester’s Oadby campus in the leafy southern suburbs of Leicester these facilities are easy to get to by car from the M1 and the M69 by following the outer ring road towards Leicester Race Course.

The Conference venue address is:

Stamford Court  
University of Leicester  
Manor Road  
Oadby  
LE2 2LH

Accommodation

Accommodation booked through the registration process is close to the conference venue at either **John Foster Hall** or **Bowder Court**, which are 4* campus accommodation accredited by Quality in Tourism.
Halls of Residence, Oadby Student Village

PLEASE NOTE

The University of Leicester is fully committed to its environmental policy. With this in mind we would encourage you and your delegates to use public transport in the first instance. Should this not be possible complimentary car parking is available wherever possible on site (areas marked 'P') and in the event that you do travel by car we would ask that you car share wherever possible. On arrival should you find the parking near your intended hall/ accommodation area full, please use one of the other available car parks and refrain from parking on public roads.

By Bus – 0870 608 2608
Route 30A and 31A from City Centre via Leicester train station to the Halls of Residence.

By Train – 0845 748 4950
Leicester has a main line connection to London, the north and the Midlands via East Midlands Trains with regular connections to London St Pancras, Sheffield, Leeds, Birmingham and Lincoln.

By Taxi
The Halls of Residence are approximately three miles from the train station. Ask to be taken to the Halls of Residence in Oadby and NOT the University of Leicester.

ABC – 0116 255 5111
City Taxis – 0116 255 5222
West End – 0116 270 9922
Supporters

The organising committee would like to thank the following companies for supporting Electrochem 2016.
Exhibitors

- **Goodfellow** supplies small to medium quantities of metals and materials for research, development, prototyping and specialised manufacturing operations. Our Web Catalogue lists a comprehensive range of materials in many forms including rods, wires, tubes and foils. There is no minimum order quantity and items are in stock for immediate shipment worldwide. Custom-made items are available to special order, including ceramic and glass components through our Ceramic and Glass Division.

  [www.goodfellow.com](http://www.goodfellow.com)

- **Metrohm** serve the research and academic produces with four different potentiostat/galvanostat lines from Metrohm Autolab and DropSens for a wide range of electrochemical applications, as well as modular extensions, software and accessories. Metrohm Autolab and DropSens customers can look expect excellent sales and service support from a dedicated team of Electrochemists based at Metrohm’s prestigious laboratories in the UK.


- **Hiden Analytical** has been a global leader in the design and manufacture of scientific instruments for research, development and production applications. Our products address a diverse range of applications including: precision gas analysis, differential electrochemistry mass spectrometry (DEMS), plasma diagnostics by direct measurement of plasma ions and ion energies, SIMS probes for UHV surface science and catalysis performance quantification. Our quadrupole mass spectrometers have gained worldwide recognition for their precision and outstanding performance.

  [www.hidenanalytical.com](http://www.hidenanalytical.com)

- **Blue Scientific** provides a handpicked portfolio of market-leading scientific instruments. Official UK distributor for Ametek, offering the complete range of electrochemical testing instruments from Solartron Analytical and Princeton Applied Research. These include single and multi-channel systems, and the world’s most cited potentiostats, galvanostats, FRAs and impedance test systems, at a wide range of price points. Applications include corrosion, energy, research electrochemistry and materials testing.

  [www.blue-scientific.com](http://www.blue-scientific.com)
Exhibitors

- **Alvatek** supplies high performance research tools for Electrochemistry, Corrosion, Fuel Cell and Battery applications. We offer a wide range of potentiostats, impedance analyzers, fuel cell research equipment, battery cyclers, electronic loads and QCM’s as well as complementary accessories such as cells, electrodes and rotators. Our philosophy is simply to offer high performance, competitive products backed up by first class Customer Service and Support. 2016 has seen many new products from our suppliers. Do visit our stand for a chat and to discuss any applications. You would be very welcome.

[www.alvatek.co.uk](http://www.alvatek.co.uk)

- **Pine Research Instrumentation** manufactures a full line of affordable, durable and reliable electrochemical research equipment. Pine offers benchtop bipotentiostat/galvanostat instruments as well as portable USB potentiostat systems, all of which are controlled using our powerful AfterMath software package. We offer unique quartz electrochemical cells for photoelectrochemistry and spectroelectrochemistry, and we are the world leader in rotating disk, ring-disk, and cylinder electrode instrumentation. Our line of compact voltammetry cells, featuring screen-printed patterned electrodes, provides a quick and easy way to perform routine electrochemical measurements.

[www.pineresearch.com](http://www.pineresearch.com)
Poster Prize Sponsors

- **Physical Chemistry Chemical Physics (PCCP)** is an international journal for the publication of cutting-edge original work in physical chemistry, chemical physics and biophysical chemistry.

  [www.rsc.org/journals-books-databases/about-journals/PCCP](http://www.rsc.org/journals-books-databases/about-journals/PCCP)

- **Analyst** publishes analytical and bioanalytical research that reports premier fundamental discoveries and inventions, and the applications of those discoveries, unconfined by traditional discipline barriers.

  [http://www.rsc.org/journals-books-databases/about-journals/analyst/](http://www.rsc.org/journals-books-databases/about-journals/analyst/)

- **Analytical Methods** welcomes early applied demonstrations of new analytical methods with clear societal impact.

  [www.rsc.org/journals-books-databases/about-journals/analytical-methods](http://www.rsc.org/journals-books-databases/about-journals/analytical-methods)
Advertisers

- **Springer** is a leading global scientific, technical and medical publisher, providing researchers in academia, scientific institutions and corporate R&D departments with quality content via innovative information products and services. Springer is part of Springer Nature, one of the world’s leading global research, educational and professional publishers.

  [www.springer.com](http://www.springer.com)

- **Elsevier** is a world-leading provider of information solutions that enhance the performance of science, health, and technology professionals, empowering them to make better decisions, deliver better care, and sometimes make groundbreaking discoveries that advance the boundaries of knowledge and human progress. Elsevier provides web-based, digital solutions — among them ScienceDirect, Scopus, Elsevier Research Intelligence and ClinicalKey — and publishes over 2,000 journals, including The Lancet and Cell, and more than 33,000 book titles, including a number of iconic reference works. Elsevier is part of RELX Group, a world-leading provider of information and analytics for professional and business customers across industries.


Media Sponsors

- **American Elements**, global manufacturer of high purity cathode, anode, & electrolyte materials for battery, fuel cells, electrochemical systems, photovoltaic solar panels, & renewable energy applications.

  [www.americanelements.com](http://www.americanelements.com)

- **Sensor100** is an international network of people and organisations active in the development and commercialisation of bio-sensors and chemical sensors.

  [www.sensor100.com](http://www.sensor100.com)
# Symposia Key and Lecture Venues

<table>
<thead>
<tr>
<th>Symposium</th>
<th>Scientific Committee</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrochemical Techniques and Tools</strong></td>
<td>Prof. Richard Nichols</td>
</tr>
<tr>
<td>Shearsby</td>
<td>Dr Sarah Horswell</td>
</tr>
<tr>
<td>Lecture Theatre 3</td>
<td>Dr Steve Fryatt</td>
</tr>
<tr>
<td></td>
<td>Dr Jay Wadhawan</td>
</tr>
<tr>
<td><strong>Energy, Materials and Green Electrochemistry</strong></td>
<td>Prof. Jason Riley</td>
</tr>
<tr>
<td>Gilber Murray</td>
<td>Prof. Andrew Abbott</td>
</tr>
<tr>
<td>Lecture Theatre 1</td>
<td>Dr Laurence Hardwick</td>
</tr>
<tr>
<td></td>
<td>Dr Iris Nandhakumar</td>
</tr>
<tr>
<td><strong>Electrochemical Sensing</strong></td>
<td>Prof. Peter Fielden,</td>
</tr>
<tr>
<td>Mowsley/Hoby</td>
<td>Prof. John Hart</td>
</tr>
<tr>
<td>Lecture Theatre 2</td>
<td>Dr Sara Baldock</td>
</tr>
<tr>
<td><strong>Electrochemistry for Fuel Cells</strong></td>
<td>Prof. Jason Riley</td>
</tr>
<tr>
<td>Mowsley/Hoby</td>
<td>Prof. Andrew Abbott</td>
</tr>
<tr>
<td>Lecture Theatre 2</td>
<td>Dr Laurence Hardwick</td>
</tr>
<tr>
<td></td>
<td>Dr Iris Nandhakumar</td>
</tr>
</tbody>
</table>

---

**Programme at a Glance**

Presenters names are listed in the timetable below.

Titles of talks on the following pages.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00</td>
<td>Buffet Lunch + Registration</td>
</tr>
<tr>
<td>13:00</td>
<td>Introduction + Housekeeping</td>
</tr>
<tr>
<td>13:10</td>
<td>Rachel Sapstead</td>
</tr>
<tr>
<td>13:30</td>
<td>Vivek J. Padmanabhan</td>
</tr>
<tr>
<td>13:50</td>
<td>Siti Nurul Azian Zakaria</td>
</tr>
<tr>
<td>14:10</td>
<td>Sarah Horswell</td>
</tr>
<tr>
<td>13:00</td>
<td>Asuman Unal</td>
</tr>
<tr>
<td>13:30</td>
<td>Matteo Bonomo</td>
</tr>
<tr>
<td>14:10</td>
<td>Jet-Sing M. Lee</td>
</tr>
<tr>
<td>14:30</td>
<td>Lisa Kleimeinger (RSC:ES Prize Winner)</td>
</tr>
<tr>
<td>13:10</td>
<td>Kamonwad Ngamchuea (Regional Prize Winner)</td>
</tr>
<tr>
<td>13:30</td>
<td>Paolo Bertocell</td>
</tr>
<tr>
<td>13:50</td>
<td>Kevin C. Honeychurch</td>
</tr>
<tr>
<td>14:10</td>
<td>Damien K Corrigan</td>
</tr>
<tr>
<td>14:30</td>
<td>Refreshments, Posters, Exhibitors/Accommodation Check-in</td>
</tr>
<tr>
<td>14:00</td>
<td>Andy Wain (Keynote)</td>
</tr>
<tr>
<td>14:40</td>
<td>Samuel Guy Booth</td>
</tr>
<tr>
<td>15:00</td>
<td>Antoine Baars</td>
</tr>
<tr>
<td>15:20</td>
<td>Close</td>
</tr>
<tr>
<td>17:00</td>
<td>Wednesday Evening Poster Session &amp; Social Gathering</td>
</tr>
<tr>
<td>19:00</td>
<td>Dinner John Foster Hall</td>
</tr>
<tr>
<td>07:30</td>
<td>Breakfast John Foster Hall</td>
</tr>
<tr>
<td>09:00</td>
<td>Plenary - Geoffrey Barker Medal Lecture: Richard J Nichols</td>
</tr>
<tr>
<td>10:00</td>
<td>Isidoro López Marin</td>
</tr>
<tr>
<td>10:40</td>
<td>Robert Dalglish</td>
</tr>
<tr>
<td>10:40</td>
<td>Jagdeep Singh Sagu</td>
</tr>
<tr>
<td>11:00</td>
<td>Narinder Bains</td>
</tr>
<tr>
<td>11:40</td>
<td>Dhuha Albusalah</td>
</tr>
<tr>
<td>12:20</td>
<td>Jamil A Juma</td>
</tr>
<tr>
<td>12:40</td>
<td>Sallih Cihangir</td>
</tr>
<tr>
<td>13:40</td>
<td>Mailis M. Loungasuoryi</td>
</tr>
<tr>
<td>14:00</td>
<td>Edward Frank Dalton</td>
</tr>
<tr>
<td>14:40</td>
<td>Chuhong Lin</td>
</tr>
<tr>
<td>15:00</td>
<td>Edmund Dickinson</td>
</tr>
<tr>
<td>15:20</td>
<td>Zakiya Al Amri</td>
</tr>
<tr>
<td>15:40</td>
<td>Michelle Browne (Regional Prize Winner)</td>
</tr>
<tr>
<td>16:00</td>
<td>Edward Brightman</td>
</tr>
<tr>
<td>16:20</td>
<td>Mark Symes</td>
</tr>
<tr>
<td>16:40</td>
<td>Keynote: A. Robert Hillman</td>
</tr>
<tr>
<td>17:00</td>
<td>Naseem Iqbal</td>
</tr>
<tr>
<td>17:20</td>
<td>Bruno de Souza Machado</td>
</tr>
<tr>
<td>07:30</td>
<td>Thursday Evening Conference Dinner</td>
</tr>
<tr>
<td>09:00</td>
<td>Breakfask John Foster Hall</td>
</tr>
<tr>
<td>10:00</td>
<td>Tim Albrecht (Keynote)</td>
</tr>
<tr>
<td>10:40</td>
<td>Belle Taylor</td>
</tr>
<tr>
<td>10:40</td>
<td>Andrew Lodge</td>
</tr>
<tr>
<td>11:00</td>
<td>Eden May Dela Pena</td>
</tr>
<tr>
<td>11:40</td>
<td>Fikret Yildirim</td>
</tr>
<tr>
<td>12:00</td>
<td>John Collins</td>
</tr>
<tr>
<td>12:40</td>
<td>Dr Steven Brewer</td>
</tr>
<tr>
<td>13:00</td>
<td>Eduardo N. Schulz</td>
</tr>
<tr>
<td>13:20</td>
<td>Close</td>
</tr>
</tbody>
</table>

**Wednesday Afternoon**

**Thursday**

**Friday Morning**
Wednesday Afternoon

Spectroscopy & Scattering Session

13:10-13:30: Acquisition of Time-Resolved Neutron Reflectivity Data for Dynamic Electrochemical Experiments
Rachel M Sapstead, University of Leicester, UK.

13:30-13:50: In Situ Surface Enhanced Infrared Spectroscopy to Track Interfacial Processes Relevant to Non-Aqueous Lithium-Oxygen Batteries
Vivek J. Padmanabhan, University of Liverpool, UK.

13:50-14:10: In-situ Electrochemical Characterisation of Iron Sulfide-Electrolyte Interface under Anoxic Conditions
Siti N. A. Zakaria, University College London, UK.

14:10-14:30: The Effect of Applied Electric Field on Structure of Lipid Bilayers
Sarah L Horswell, University of Birmingham, UK.

14:30-16:00: Refreshments, Posters, Exhibitors/Accommodation Check-In

16:00-16:40: Keynote: Using Spectroelectrochemistry to Probe Surface Reaction Pathways in Heterogeneous Catalysis
Andy Wain, National Physical Laboratory, UK.
Electrochemical Techniques & Tools

Wednesday Afternoon Continued

16:40-17:00: XAS Spectroelectrochemistry to Follow Metallic Nanoparticle Deposition at a Liquid/Liquid Interface
   Samuel G Booth, University of Manchester, UK.

17:00-17:20: Equivalent Circuit Fitting with Nonlinear Elements

17:20: Close

Thursday

Spectroscopy & Scattering Session Continued

09:00-09:50: Geoffrey Barker Medal Lecture: STM Studies in Ionic Liquids of Electrochemical Single Molecule Transistors and Molecular Wires
   Richard J Nichols, University of Liverpool, UK.

10:00-10:20: Cryo-Spectroelectrochemistry of Temperature Sensitive Copper-Oxygen Complexes
   Isidoro Lopez, Université de la Bretagne Occidentale, France.

10:20-10:40: Current and Future Electrochemistry Capabilities at the ISIS Neutron Scattering Facility
   Robert M. Dalgliesh, ISIS Neutron and Muon Source, UK.

Electroplating Session

10:40-11:00: The Effect of Ultrasound on Acid Copper Electroplating Additive - Sulphopropyl Sulphonate
   Narinder Bains, Coventry University, UK

11:00-11:40: Refreshments, Posters, Exhibitors

11:40-12:00: Electroplated Nanocomposites: Cobalt and Nickel Coatings with Nano SiC Particles Produced by Pulse Reverse Plating (PRP) Technique
   Dhuha Albusalih, University of Leicester, UK.

12:00-12:20: The Effect of Organic Additives in Electrodeposition of Co from Deep Eutectic Solvents
   Jamil A. Juma, University of Leicester, UK.

   Salih Cihangir, University of Leicester, UK.
Electrochemical Techniques & Tools

Thursday Continued

Advanced Electrochemistry Session

12:40-13:00: Effect of Electrode Potential on the Acid/base Properties of Graphene Nanoflakes
Mailis M. Lounasvuori, University College London, UK.

13:00-14:00: Lunch, Posters, Exhibitors

Rotating Disk Electrode Session

14:00-15:00: John-Albery Memorial Lecture: Stochastic Nanoelectrochemistry
Serge Lemay, University of Twente, The Netherlands.

15:00-15:20: Forgotten Applications of the Rotating Ring-Disk Electrode
Edward Frank Dalton, Pine Research Instrumentation, USA.

15:20-15:40: Refreshments, Posters, Exhibitors

15:40-16:00: The Hydrogen Oxidation Reaction on Platinum Nanoparticles: Understanding the Kinetics of Electrocatalytic Reactions via ‘Nano-Impacts’
Chuhong Lin, Oxford University, UK.

16:00-16:20: “COMSOL Multiphysics® for Electrochemists”
Edmund J.F. Dickinson, COMSOL Ltd, UK.

16:20-16:40: Deposition of Pt Nanoclusters on Au and their Catalytic Activity Toward Formic Acid Oxidation
Zakiya Al Amri, University of Bristol, UK.

16:40-17:00: Mineral Processing Using Deep Eutectic Solvents
Francesca Bevan, University of Leicester, UK.

17:00: Close
Electrochemical Techniques & Tools

Friday Morning

Single Molecule & Extreme Electrochemistry Session

09:00-09:50: **Faraday Medal Lecture**: Single Entity Electrochemistry: An Electroanalytical Perspective

*Justin Gooding, University of New South Wales, Australia.*

10:00-10:40: **Keynote**: Machine Learning for the Analysis of Single-Molecule Charge Transport Data

*Tim Albrecht, University College, London, UK.*

10:40-11:00: Electrochemical Investigation In Gaseous Plasma Media

*Belle Taylor, University College London, UK.*

11:00-11:40: Refreshments, Posters, Exhibitors

Applied Electrochemistry Session

11:40-12:00: The Application of Electrochemistry in the Nuclear Industry: Development of the ELENDES process from laboratory to pilot scale

*John Collins, C-Tech Innovation Ltd, UK.*

12:00-12:20: Scaling Up of Aluminium Electroplating Processes from Ionic Liquids and Deep Eutectic Solvents

*Steven Brewer, C-Tech Innovation Ltd, UK.*

12:20-12:40: Extraction and Electrocatalytic Polymerisation of Thiophene from Oil Using Ionic Liquids

*Jalil H. Kareem, University of Leicester, UK.*

12:40-13:00: Experimental/Theoretical Study of the Effect of Chloride and Sulphate Anions over the Electrochemical Deposition of Rh over Ag Substrate

*Eduardo N. Schulz, INIEC - Universidad Nacional del Sur, Argentina.*

13:00: Close
Wednesday Afternoon

13:10-13:30: The Effect of MWCNT on Electrochemical Deposition of Polyaniline and Polypyrrole Films and Their Redox Switching in Ionic Liquid
Asuman Unal, University of Leicester, UK.

13:30-13:50: Effect of Non Conjugated Pending Groups on the Sensitizing Action of Alkylated Squaraines in NiO Based p-DSCs
Matteo Bonomo, University of Rome "La Sapienza", Italy.

Jet-Sing M. Lee, University of Liverpool, UK.

14:10-14:30: Electrochemical Performance of Solid Oxide Electrolysers with 3D Inkjet Printed Microstructures
Lisa Kleiminger, Imperial College London, UK.
RSC Ensgy Sector 2015 PhD Thesis Award winner

14:30-16:00: Refreshments, Posters, Exhibitors/Accommodation Check-In

16:00-16:20: Achieving Both High Selectivity and Current Density for CO₂ Reduction to Formate on Nanoporous Tin Foam Electrocatalysts
Dongwei Du, University of Warwick, UK.

16:20-16:40: Intrinsically Microporous Films and Membranes in Electrochemistry
Frank Marken, University of Bath, UK.

16:40-17:00: Comparison of the Influence of Different Conductive Additives on the Electrochemical Performance of Activated Carbon Based Supercapacitors
Dona T. L. Galhena, University of Cambridge, UK.
SCI Electrochemistry postgraduate conference (South East) Regional Prize.
**Wednesday Afternoon Continued**

17:00-17:20: Immersion Coatings of Au and Pd from Deep Eutectic Solvents: Influence of Speciation on Galvanic Processes  
*Andrew Ballantyne, University of Leicester, UK.*

17:20: Close

**Thursday**

09:00-09:50: **Geoffrey Barker Medal Lecture:** STM Studies in Ionic Liquids of Electrochemical Single Molecule Transistors and Molecular Wires  
*Richard J Nichols, University of Liverpool, UK.*

10:00-10:20: Electrodeposition of Platinum on Porous Titanium Materials from a Flowing Electrolyte  
*Luis F. Arenas, University of Southampton, UK.*

10:20-10:40: Anodized Steel Electrodes for Supercapacitors  
*Jagdeep S. Sagu, Loughborough University, UK.*

10:40-11:00: Embroidered Three-Dimensional Electrodes for Redox Flow Batteries  
*Noemí Aguiló-Aguayo, University of Innsbruck, Austria.*

11:00-11:40: Refreshments, Posters, Exhibitors

11:40-12:00: Efficient Electrocatalytic Water Oxidation at Neutral and High pH by Adventitious Nickel at Nanomolar Concentrations  
*Mark D. Symes, University of Glasgow, UK.*

12:00-12:20: Development of Highly Efficient Electrocatalysts for Direct Alcohol Fuel Cells  
*Wen-Feng Lin, Loughborough University, UK.*

12:20-12:40: Dissolution of Pyrite and Other Iron Sulfide Minerals using Deep Eutectic Solvents  
*Ahmed Z. M. Al-Bassama, University of Leicester, UK.*

12:40-13:00: Electrorecovery of Neodymium Ions from Cyphos®IL-101/Ethanol Electrolyte Containing Hydrogen Chloride at Room Temperature  
*Dmytro Kozak, Tohoku University, Japan.*

13:00-14:00: Lunch, Posters, Exhibitors
Thursday Continued

14:00-15:00: **John-Albery Memorial Lecture: Stochastic Nanoelectrochemistry**  
*Serge Lemay, University of Twente, The Netherlands.*

15:00-15:20: **Cobalt Hydroxide Nanoflakes for Energy Conversion and Storage Applications**  
*Aurelie A. S. Rovetta, Trinity College Dublin, Ireland.*

15:20-16:00: **Refreshments, Posters, Exhibitors**

16:00-16:20: **Towards Solar Energy Conversion without Solid Electrodes utilizing Dye-sensitized Electroactive Soft Interfaces**  
*Micheál D. Scanlon, University College Cork, Ireland.*

16:20-16:40: **Diffusion in Deep Eutectic Solvents-Water Mixtures**  
*Azhar Y Al-Murshedi, University of Leicester, UK.*

16:40-17:00: **Low Overpotential High Activity Mixed Manganese and Ruthenium Oxide Electrocatalysts for Oxygen Evolution Reaction in Alkaline Media**  
*Michelle P. Browne, Trinity College Dublin, Ireland.*  
**Shelagh Campbell Memorial Award**

17:00-17:20: **Effect of the Radiation Dose Rate on the Stability of LDPE Based Alkaline Anion Exchange Membranes for Electrolysers**  
*Mohamed Mamlouk, Newcastle University, UK.*

17:20: **Close**
Energy, Materials & Green Electrochemistry

**Friday Morning**

09:00-09:50: **Faraday Medal Lecture**: Single Entity Electrochemistry: An Electroanalytical Perspective  
*Justin Gooding, University of New South Wales, Australia.*

10:00-10:20: The Electrodeposition of Vertically Aligned Mesoporous Silica Films for Use as Templates for the Electrodeposition of Nanowires in Supercritical Fluids  
*Andrew W. Lodge, University of Southampton, UK.*

10:20-10:40: Pulse Deposition of Copper Using an Additive-Containing EnFACE Electrolyte  
*Eden May Dela Pena, University of Strathclyde, UK.*

10:40-11:00: Determining Potential of Zero Charge from Density Functional Theory based Molecular Dynamics  
*Jiabo Le, University of Aberdeen, UK.*
*Butler Meeting Regional Prize*

11:00-11:40: Refreshments, Posters, Exhibitors

11:40-12:00: Sliding Wear Mechanisms with Variable Electroplated Co-W Alloys  
*Fikret Yildirim, University of Leicester, UK.*

12:00-12:20: Electrodeposition of Bright Zinc – Nickel Alloy from Deep Eutectic Solvent  
*Hasan AL-Esary, University of Leicester, UK.*

12:20-12:40: Oxygen Bubble Templated Anodic Deposition of Porous Oxides  
*Nicola Comisso, ICMATE – CNR, Italy.*

12:40-13:00: Lanthanide Salts as Deep Eutectic Solvents  
*Shannon Stodd, University of Leicester, UK.*

13:00: Close
Advance Programme
Electrochemical Sensing

Wednesday Afternoon

Kamonwad Ngamchuea, University of Oxford, UK.
Great Western Electrochem Regional Prize

13:30-13:50: PDMBI-Chemically Modified Electrodes: Charge Transport Properties and
Electroanalytical Applications
Paolo Bertoncello, Swansea University, UK.

13:50-14:10: Voltammetric Behaviour and Determination of Clonazepam Using a Disposable
Screen-Printed Sensor and Its Determination in Serum and Wine
Kevin C. Honeychurch, University of the West of England, UK.

14:10-14:30: Rapid Electrochemical Assays for Biomedical Applications
Damion K Corrigan, University of Strathclyde, UK.

14:30-16:00: Refreshments, Posters, Exhibitors/Accommodation Check-In

16:00-16:20: TBA

16:20-16:40: Tunable Nanopore: Resistive Pulses and Current Rectification
Mark Platt, Loughborough University, UK.

16:40-17:00: Electrochemical ELISA for Sensitive Detection of Tumor Necrosis Factor-Alpha in
Undiluted Serum using a Modified Comb Shaped Gold Electrode Microarray
Sunil K. Arya, University of Bath, UK.

17:00-17:20: Electrochemical Detection of Iron Reduction by Epithelial and Macrophage Cells.
Harry Sherman, University of Nottingham, UK.

17:20: Close
Electrochemical Sensing

Thursday

09:00-09:50: Geoffrey Barker Medal Lecture: STM Studies in Ionic Liquids of Electrochemical Single Molecule Transistors and Molecular Wires
Richard J Nichols, University of Liverpool, UK.

10:00-10:20: Mesoporous Nitrogen Containing Carbon Material for Sensitive and Selective Electrochemical Detection of Heavy Metal Ions.
Anuj Joshi, Indian Institute of Technology Ropar, India.

10:20-10:40: Differentiation and Quantification of Cross-Interfering Gases in Air Quality Monitoring
Ronan Baron, Alphasense Ltd, UK.

10:40-11:00: Acidity in Deep Eutectic Solvents and Ionic Liquids
Sahar S. Alabdullah, University of Leicester, UK.

11:00-11:40: Refreshments, Posters, Exhibitors

11:40-12:20: Keynote: Electrochemical Defluoridation of Water Using Electroactive Copolymer Films Based on Polyaniline and Derivatives
A. Robert Hillman, University of Leicester, UK.

12:20: Close of Electrochemical Sensing Symposium
Advance Program

Electrochemistry for Fuel Cells

Thursday

Bruno S. Machado, Newcastle University, UK.

12:40-13:00: Measurement and Control of pH in Solid Polymer Electrolytes
Edward Brightman, IFPEN, France.

13:00-14:00: Lunch, Posters, Exhibitors

14:00-15:00: John-Albery Memorial Lecture: Stochastic Nanoelectrochemistry
Serge Lemay, University of Twente, The Netherlands.

15:00-15:20: Methods Of Studying Protective Coating For Bipolar Plates In Flexiplanar PEMFC
Jacek Lapinski, Imperial College London, UK.

15:20-16:00: Refreshments, Posters, Exhibitors

16:00-16:20: ZIF Derived Cathode Catalyst for Proton Exchange Membrane Fuel Cell
Naseem Iqbal, Ira A. Fulton Schools of Engineering, USA.

16:20-16:40: Assessment of Cathode Levers to Enhance High Current Density PEMFCs

16:40-17:00: Lithium-Oxygen Battery with Binary Electrolyte and Dual Mediators for Optimized Performance
James T. Frith, University of Southampton, UK.

17:00-17:20: Novel Battery Chemistries Using Electrically Conducting Polymers Synthesized from Deep Eutectic Solvents
Hani Ismail, University of Leicester, UK.

17:20: Close
Electrochemistry for Fuel Cells

Friday Morning

09:00-09:50: Faraday Medal Lecture: Single Entity Electrochemistry: An Electroanalytical Perspective
Justin Gooding, University of New South Wales, Australia.

10:00-10:20: Potassium Superoxide Batteries using Practical Carbon Supports
Filipe Braga, University of Liverpool, UK.

10:20-10:40: Study of Mixed Metal Sulfide as Potential Electrodes for Rechargeable Nickel-Iron Battery
Abdallah H. A. Abdalla, University of Sheffield, UK.

10:40-11:00: A Quantitative Tool to Predict the Phase Composition of Lithium-Sulfur Batteries
Nuria Garcia-Araez, University of Southampton, UK.

11:00-11:40: Refreshments, Posters, Exhibitors

11:40-12:00: Electrochemistry of Dioxygen in Novel Ionic Liquid and Solvent Blend Systems for Non-Aqueous Li-O₂ Batteries
Petar M. Radjenovic, University of Liverpool, UK.

12:00-12:20: Morphological Effects on High-Voltage Spinel LiNi₀.₅Mn₁.₅O₄ Cathode Materials for Lithium-Ion Batteries
Jun Wang, Haidong Liu, University of Muenster, Germany.

12:20-12:40: Identifying Solution Based Catalysts for the Lithium-Oxygen Battery
William Richardson, University of Southampton, UK.

12:40-13:00: Electrochemically Deposited HKUST-1 Electrode Coatings and Their Application in Rudimentary Redox Based Data Storage
Stephen D. Worrall, University of Manchester, UK.

13:00: Close
Plenary Abstracts

Geoffrey Barker Medal Lecture:
STM Studies in Ionic Liquids of Electrochemical Single Molecule Transistors and Molecular Wires
Richard J Nichols, University of Liverpool, UK.

John-Albery Memorial Lecture:
Stochastic Nanoelectrochemistry
Serge Lemay, University of Twente, The Netherlands.

Faraday Medal Lecture:
Single Entity Electrochemistry: An Electroanalytical Perspective
Justin Gooding, University of New South Wales, Australia.
We have exploited STM based methods for making single molecule measurements under electrochemical potential control in ionic liquid electrolytes. The electrochemical potential can be used to control the redox state of single molecule bridges and switch the electrical conductance from low to higher values. This has been referred to as the “single molecule electrochemical transistor” configuration, with the electrochemical potential “gating” the molecular conductance in the STM nano-gap configuration. Recent results from our group on gating the conductance of single molecules in ionic liquid electrolytes will be discussed including studies of viologens, redox active metal terpyridine molecular wires and pyrrolo-tetraathiafulvalene (p-TTF) molecular bridges. Mechanisms of charge transport in the STM nano-gap setup are discussed alongside the advantages of undertaking such single molecule electrochemical measurements in ionic liquids.

Figure: Electrochemical single molecule gating examined in ionic liquid electrolytes using an electrochemical STM with bipotentiostat control of the electrochemical potential of the substrate and STM tip.

References
Randomness is ubiquitous on the molecular scale, yet in most experiments this is hidden from the observer due to massive averaging. With the advent of nanoscale measurement techniques, however, stochastic behaviour becomes an increasingly dominant characteristic of electrochemical experiments. Understanding, analysing and exploiting such signals requires additional conceptual tools beyond conventional descriptions based on average fluxes and reaction rates. Here I will first discuss our theoretical and experimental results on so-called nanogap sensors, fluidic devices which allow such efficient redox cycling as to yield single-molecule sensitivity. Random fluctuations in the number of molecules in the detection volume are the dominant source of noise in these devices, and studying this noise can yield information on dynamic processes such as reversible adsorption and convective transport. I will then discuss our recent theoretical results on charge fluctuations in nanoscale bipolar electrodes.
A whole host of new electrochemical techniques have been employed to perform experiments on single cells, single nanoparticles, single features in composite materials and even single molecules. This different techniques have certain unifying features, such as the measurement being performed predominantly near-field, which allows them to be classified together as single entity electrochemistry. The majority of these studies have then used these techniques to provide fundamental mechanistic information about the behaviour of single entities as distinct from ensembles of entities. Single entity measurements of course have tremendous application in electroanalysis as detecting single entities not only means devices have the ultimate detection limit of one thing, but also the ability to detect many single entities allows analytical information to be achieved without calibration by counting.

In this presentation new approaches from our laboratory for detecting rare molecules and rare single cells will be outlined, both of which can be regarded as single entity electrochemistry measurements. In the first approach solid state nanopores combined with magnetic nanoparticles as a solution to the issue of nanopores being able to detect single molecules but with low concentrations the response times are very low. This will be illustrated via the detection of the protein, prostate specific antigen. In then second approach the ability to capture and release single rare cells will be demonstrated. This is achieved using a semiconducting electrode modified with an electrochemically cleavable unit and antibodies selective for a given cell type. By having the semiconducting electrode in depletion, the electrochemical cleavage will only occur where the electrode is illuminated. In this way, single cells can be released while leaving all other cells on the surface.
Electrochem 2016

Please refer to the separate PDFs on our website for full abstracts in each symposium