# ANION

ADVANCED NANO-ELECTROCHEMISTRY INSTITUTE OF THE NETHERLANDS

## PROGRAMME ANNUAL MEETING

### 31 OCTOBER 2025

Turingzaal - WCW Congress Center. Science Park 105, 1098XG Amsterdam

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| **9:30 – 9:45** | Walk-in and Registration |
| **9:45 – 10:00** | Welcome Words & ANION Update |
| **10:00 – 11:00** | Keynote Lecture by **Prof. Patrick Unwin** *University of Warwick* |
| **11:00 – 11:30** | Coffee Break |
| **11:30 – 11:45** | 1-Minute Pitches: Meet Our New Researchers |
| **11:45 – 12:35** | Session 1 – **Dr. Maximilian Jaugstetter** *Universiteit Twente*<br>– **Prof. René van Roij** *Universiteit Utrecht* |
| **12:35 – 14:30** | Lunch and Poster session |
| **14:30 – 15:30** | Session 2 – **Dr. Luuk Kortekaas** *Rijksuniversiteit Groningen*<br>– **Rick Kort** *Universiteit Leiden (LIC)*<br>– **Nina Chen** *Universiteit van Amsterdam* |
| **15:30 – 16:00** | Coffee Break |
| **16:00 – 16:50** | Session 3 – **Dr. Daphne Antony** *AMOLF*<br>– **Prof. Sense Jan van der Molen** *Universiteit Leiden (LION)* |
| **16:50 – 17:00** | Closing Words |
| **17:00 – 19:00** | Borrel |

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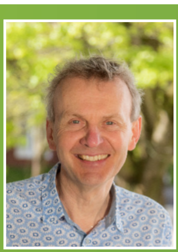
**10:00 – 11:00**



**Prof. Patrick Unwin** *University of Warwick* – **Keynote Lecture**

***"The Era of High Throughput Electrochemical Multimicroscopy"***

I shall explain why we invented scanning electrochemical cell microscopy (SECCM) and how we use it in a correlative co-located multi-microscopy strategy to reveal surface structure-activity at the nanoscale, with applications spanning energy storage materials, (electro) catalysis, corrosion and membranes. In essence, we are able to study the electrochemistry of complex interfaces as a set of simpler "single entities", including single particles. SECCM also facilitates high throughput combinatorial experiments, because experimental parameters can be varied from spot to spot. This aspect of SECCM is further enhanced with in-situ (or operando) techniques to enable smart scanning and visualization in real time.

**11:45 – 12:05**

**Dr. Maximilian Jaugstetter** *Universiteit Twente* – **Session 1**

***"Electrolyte Effects on Hydrogen Evolution: Linking Lab XPS and Synchrotron XAS at the Platinum–Water Interface"***

Electrolyte engineering involves designing electrolytes to enhance specific properties in electrochemical reactions. Notable examples include cation effects in electrocatalysis, the high capacity of structured ionic liquids, and solid-electrolyte interphase formation in batteries. We will apply our expertise in operando X-ray spectroscopy, cell fabrication, and catalyst preparation to systematically study how electrolyte engineering influences the platinum–water interface. The hydrogen evolution reaction, combined with platinum's well-defined adsorption behavior, serves as an ideal probe to reveal how measurable properties, such as water structure, ion solvation, and local concentration affect adsorption dynamics and interfacial potential gradients at the atomic scale.

**12:05 – 12:35**

**Prof. René van Roij** *Universiteit Utrecht* – **Session 1**

***"Electrochemistry from an Iontronic Perspective"***

Iontronics is concerned with the manipulation and transport of dissolved ions in electrolytes through electric fields, fluid flow, and/or concentration gradients. We will illustrate the potential relevance of iontronics to electrochemistry. Our results are largely based on numerical solutions of Poisson-Nernst-Planck-Stokes equations for diffusive, conductive, and advective transport of ions and water, combined with Butler-Volmer equations for electrochemical reactions at electrolyte-electrode interfaces. A recent example of opto-iontronic microscopy will be discussed, where light intensity as measured at attoliter scale during cyclic voltammetry of a redox reaction is interpreted through our PNPS-BV calculations. Hopefully this inspires future experiment-theory collaborations within ANION.

**14:30 – 14:50**

**Dr. Luuk Kortekaas** *Rijksuniversiteit Groningen* – **Session 2**

***"Investigating Electrochemical Reactivity at Graphite Surfaces"***

Luuk received his Ph.D. degree in 2018 from the University of Groningen under the supervision of Prof. W. R. Browne and Prof. B. L. Feringa. After a two-year Humboldt postdoctoral fellowship on stimuli-responsive adhesives in the group of Prof. Bart Jan Ravoo at the WWU Münster, he worked on developing redox-flow batteries in a Postdoctoral position at the Helmholtz Institute in Münster. In 2022, he returned to Groningen to work under the supervision of Prof. Moniek Tromp, first on the operando characterization of lithium-ion batteries in the BatteryNL project, and now on the fundamental electrochemistry behind graphite and graphene electrodes in ANION. His research interests lie with functional electrode surfaces, redox-flow chemistry, lithium-ion batteries and operando characterization thereof, as well as cell design.

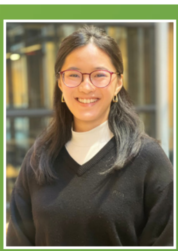
**14:50 – 15:10**

**Rick Kort** *Universiteit Leiden (LIC)* – **Session 2**

***"Understanding the Electrochemical Interface through Molecular Dynamics Simulations"***

Rick obtained his BSc in Molecular Science & Technology from Leiden University before continuing in the Leiden Institute of Chemistry (LIC) for his MSc Chemistry. He recently completed his MSc with the thesis "Cation Behaviour at the Electrode-Electrolyte Interface – The Effects of Electrode Potential and Coverage", where he investigated cations at electrochemical interfaces using density functional theory (DFT) and ab initio molecular dynamics (AIMD) simulations. Currently, Rick Kort is a PhD candidate in the Catalysis and Surface Chemistry (CASC) group at Leiden University as part of the ANION programme. His doctoral research focuses on modelling electrochemical solid-liquid interfaces, with an emphasis on bridging atomistic simulations to experimental observables from atomic force microscopy (AFM) in electrochemical environments.

**15:10 – 15:30**

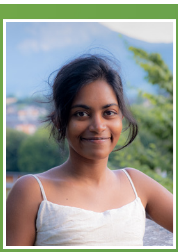


**Nina Chen** *Universiteit van Amsterdam* – **Session 2**

***"Influence of Water Content on $CO_2$ reduction in Acetonitrile on Cu Electrodes"***

Nina is a PhD student at the University of Amsterdam working with Dr. Amanda Garcia. She earned her B.A. Hons in Chemistry from Trinity College Dublin in 2022 and her MSc in Chemistry for Energy and Sustainability from the University of Amsterdam in 2024, where her master's project investigated the influence of water content on electrochemical $CO_2$ reduction in acetonitrile solutions on copper electrodes. Her current research builds on this work, exploring into the impact of morphology, cation concentration, and water content on electrochemical $CO_2$RR in organic solvents.

**16:00 – 16:20**

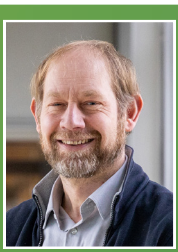


**Dr. Daphne Antony** *AMOLF* – **Session 3**

***"Unraveling the Role of Ions at Electrochemical Interfaces"***

Leo Sahaya Daphne completed her PhD at AMOLF, where she specialized in adhesion force microscopy to probe nanoscale interactions at solid–liquid interfaces. Originally trained in nanoelectronics at TU Dresden, with research experience spanning graphene devices and bio-inspired nanostructures, she developed a strong interest in how ions shape material behavior at interfaces. She is now a postdoctoral researcher, focusing on electrochemical interfaces and the role of interfacial forces in driving reactivity and energy-related processes.

**16:20 – 16:50**



**Prof. Sense Jan van der Molen** *Universiteit Leiden (LION)* – **Session 3**

***"ONEM: Microscopy of Dynamic Processes Without Influencing Them"***

We have developed a new imaging technique that combines the best of optical microscopy (damage-free imaging) with the best of electron microscopy (high resolution). Our technique, coined optical near-field electron microscopy (ONEM), is designed to study biological and chemical processes in solution, 'live' and without damage. The basic concept is as follows: We illuminate a sample from the back without damage, using a visible-light laser. In the near field just behind the object of interest (cell, protein, nanoparticle, etc.), the light intensity will be significantly lower than elsewhere. It is right there that photons are converted into electrons, in a low-work function photocathode layer, and subsequently imaged in our low-energy electron microscopy (LEEM) system. After the conversion, it is no longer the diffraction limit of the photons, but that of the electrons that matters. In this presentation, I will share our first ONEM results, presenting superresolution, plasmonic imaging and liquid cell opportunities. Specifically, I will discuss the first electrodeposition experiment imaged live in ONEM, opening an avenue for ONEM in electrochemistry research.