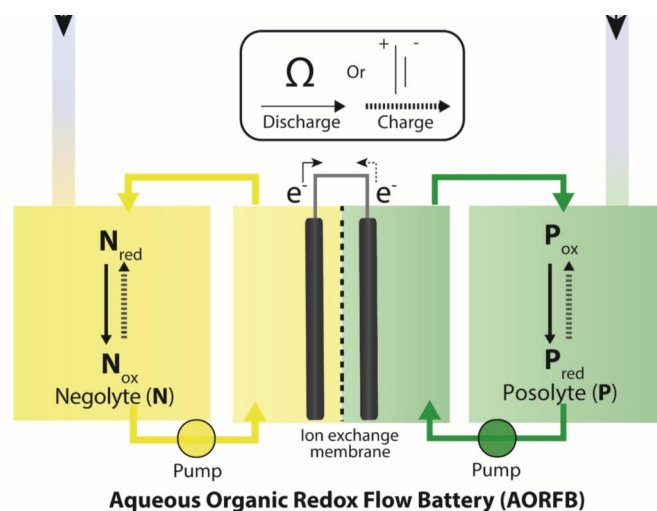
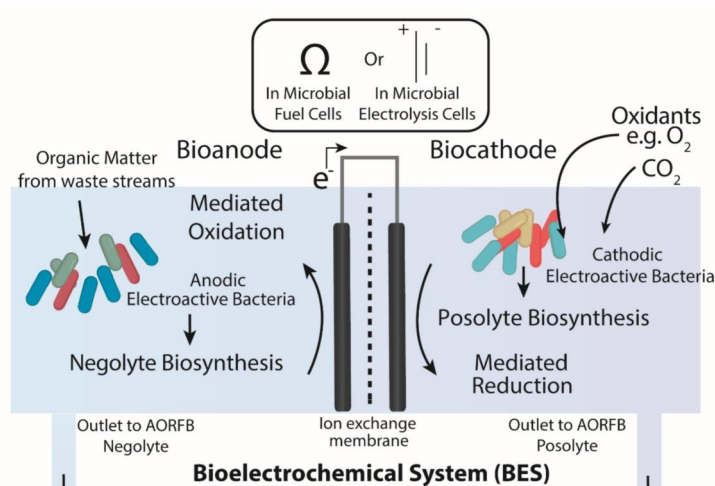


## PhD Thesis Offer in Electrochemistry 2026-2029 :

### Bioelectrochemical Production of Sustainable Redox Mediators for Redox Flow Batteries



**Figure 1:** A Microbial Bioelectrochemical System

**Figure 2:** An Aqueous Organic Redox Flow Battery System

#### Overview:

The **Institut des Sciences Chimiques de Rennes** at the **Université de Rennes** in collaboration with partners at **Nantes Université** and **Trinity College Dublin, Ireland** are recruiting a **PhD candidate in Electrochemistry** to work on the **LUMOMAT Project BioFlow**.

This unique and highly interdisciplinary project involves the development of novel and sustainable organic molecules for use in aqueous organic redox flow battery systems. These systems enable efficient long-term energy storage and delivery, but suffer from high costs to produce and modify suitable organic molecules for the battery.

In **BioFlow** we seek to develop new, biological routes towards valuable organic energy storage molecules. To achieve this, we will employ **Microbial Bioelectrochemical Systems** (Figure 1, left, above) such as Microbial Fuel Cells or Microbial Electrolysis Cells to develop organic redox mediators sustainably starting from wastewater and test them for application in **Aqueous Organic Redox Flow Battery** systems (Figure 2, right, above).

#### The Project:

The PhD candidate will work over a **3-year doctoral contract** on all project aspects, including fundamental electrochemistry, working with electroactive bacteria, interface modification, isolating and characterising redox molecules and assembling and testing redox flow battery pilots. As an international collaboration, the project will be primarily based in Rennes at the Institute for Chemical

Sciences (ISCR) in the MaCSE team (Condensed matter and Electroactive Systems), but will involve extended research visits to Nantes (Electrochemistry group at CEISAM) and Dublin, Ireland (School of Chemistry) in order to train the PhD student in relevant expertise and advance the project goals. The PhD candidate will be trained by all partners and will finish their doctorate with a strong interdisciplinary profile across the electrochemical, biological and analytical chemistry domains. The candidate will be expected to develop their own research project within BioFlow, design and execute experiments, analyse and interpret data, and produce high-quality scientific articles to disseminate their results.

### **Profile of the Successful Candidate:**

- Profile in **Chemistry**, particularly **Electrochemistry, Organic or Analytical Chemistry** with 5 years' higher education up to **Master 2 level or equivalent**. Interdisciplinary experience across two or more of these areas will be viewed as a significant bonus.
- Microbiology experience is desirable but not essential.
- Practical laboratory experience is **essential**. This includes internships or hands-on work in relevant industry roles.
- Experience in handling air-sensitive compounds and basic organic molecule characterisation is desirable.
- Good communication skills for written and oral presentation of results.
- Strong numerical skills in experimental design, data processing and interpretation of results are essential.
- Good English (at least B2 level) is **required**.

### **The Team:**

- The project is coordinated by James Behan, CNRS researcher at the ISCR.
- The thesis will be supervised by experts in bioelectrochemistry (James Behan, Frédéric Barrière) and redox flow batteries (Florence Geneste, Charlotte Bodin).
- The research visit to Nantes will be supervised by Estelle Lebègue, expert in nanoelectrochemistry and electroactive bacteria.
- The research visit to Ireland will be supervised by Prof. Paula Colavita, expert in interfacial modifications and electrochemistry.

### **How to apply:**

- Applications must be filled out online at <https://amethis.doctorat.org/amethis-client/prd/consulter/offre/3455> (please do not send documents by email).
- Applications should include: CV, Cover Letter, Academic Transcripts (for undergraduate, M1, M2 or engineering school or equivalent).
- If possible, the candidate should include a relevant, recent example of their own written scientific production: internship report, master's thesis, literature review or similar.
- Letters of recommendation can also be included with the application.

**The application process will follow equal opportunity principles as mandated by the university recruitment guidelines. We encourage applications from all interested and talented candidates regardless of their background.**