

## **Post-doctoral position offer: Multi-physical Model of Lithium Battery including Aging based on Experimental Results**

### Keywords

lithium-ion battery, LabView battery module and pack, accelerated aging, remaining useful life, multi-physical modelling, digital twin

### Context

Batteries are among the main enablers for the use of renewable energies in transportation application. To use the available resources in the best manner their lifetime still must be increased. This can be done using an adapted energy management system. For the development of a BMS digital twins bases on experimental results are required.

The postdoctoral position is part of the Horizon Europe project ENERGETICS. The postdoctoral position is funded for a duration of 12 months.

### Scientific Objectives

The focus of the postdoctoral position is on the testing of a battery module in harsh use conditions as well as the contribution to a multi-physical model of a lithium battery, based on results are obtained from aforementioned and complementary tests generated the Ph.D. student in our laboratory:

- Review of the related state-of-the-art on battery module testing,
- Collection of existing approaches for accelerated ageing tests on PHEV batteries,
- Definition and conduction of characterization use and accelerated ageing tests,
- Contribution to the development of multi-physical model allowing to predict the battery behavior and aging in different conditions of battery life based on literature results and experimental results (digital twin),
- Cooperation in elaboration of battery management system and test on the digital twin.

The selected applicant will also be expected to:

- Publish in international journals and conferences,
- Participate in project meetings, in the writing of deliverables as well as in communication and dissemination events,
- Participate in the scientific activities of the respective laboratories and universities.

### Expected qualifications

- PhD or Master's or 5-year engineering degree with several years of experience in electrical engineering, renewable energies, or a related field,
- Experience in battery testing or related topics highly encouraged,
- Good LabView knowledge,
- Experience with Python and/or Matlab programming,
- Knowledge in battery diagnostic approaches including EIS, dQ/dV or others is a plus,
- Good level of written and oral English,
- A good level of French is a plus.

**DÉPARTEMENT ENERGIE**

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Supervision

The selected postdoctoral researcher will be supervised by:

- Dr. Daniela Chrenko, Associate Professor HDR at UMLP/UTBM and FEMTO-ST,
- Dr. Alexantre Ravey, Associate Professor at UMLP/UTBM and FEMTO-ST,
- Prof. Fei Gao, Professor at UMLP/UTBM and FEMTO-ST.

Moreover he/she will contribute to the supervision of PhD and master students and lead student projects.

Application

Please send a motivation letter, a detailed CV and transcript of results to the following email addresses:

- [alexandre.ravey@utbm.fr](mailto:alexandre.ravey@utbm.fr)
- [daniela.chrenko@utbm.fr](mailto:daniela.chrenko@utbm.fr)
- [fei.gao@utbm.fr](mailto:fei.gao@utbm.fr)

Additional Information

Location: FEMTO-ST at Belfort, France

Dates: spring 2025 to spring 2026

Financial support: Horizon Europe ENERGETICS

*About the ENERGETICS project*

ENERGETICS is a research project funded by Horizon Europe 2023 to 2026 including around ten partners from different European countries. It focuses on the design of a Battery Management System (BMS), that minimizes the battery ageing and thus increases the battery lifetime and saves resources. In the project one project partner focusses on the AI approaches and UBFC/FEMTO-ST focusses on a physical description of the phenomena as well as the battery testing to create a digital twin.

*About UMLP and FEMTO-ST*

The public service UNIVERSITE MARIE ET LOUIS PASTEUR (UMLP) was created on December 1, 2024. Its legal form is National public establishment of a scientific, cultural and professional nature. Its field of activity is higher education. The UMLP gathers higher-education and research institutions.

FEMTO-ST is a joint research unit of several UBFC institutions (Université de Franche-Comté, ENSMM, UTBM) and CNRS, the French national research center. With over 750 researchers and staff, it is a leading institute in the field of engineering sciences. Its Energy department is located in Belfort, France, and hosts the largest French research group in hydrogen energy. FEMTO-ST is a partner of FCLAB, a CNRS unit dedicated to applied hydrogen energy research and transfer. The SHARPAC team of the Energy department has a strong expertise in energy storage systems like hydrogen energy and battery systems, and especially in ageing-aware diagnostics and prognostics, and in energy and power management of systems integrating them.

FEMTO-ST also includes a multi-disciplinary humanities team, RECITS, with a focus on technological change.

For more information, see <https://www.univ-fcomte.fr/> and <https://www.femto-st.fr/>.