

Scholarship for Student Position (Ref. M2ML-S-2026-11)

The Faculty of Mechanical Engineering at Silesian University of Technology (SUT) hereby announces competition for the student position (Ref. M2ML-S-2026-11). The successful applicant will participate in the research project titled: "Learning the Physics of Dendrite Growth in Lithium-Ion Batteries: An Attention Mechanism Approach for Prevention and Mitigation (DENDRITEPHASE)". The DENDRITEPHASE research project is jointly funded by the Narodowe Centrum Nauki (NCN), Poland and Fonds voor Wetenschappelijk Onderzoek Vlaanderen (FWO), Belgium. Within this project, researchers from SUT (Gliwice, Poland) and KU Leuven (Leuven, Belgium) will collaborate to investigate the mechanisms of dendrite growth in Lithium-Ion Batteries. The costs associated with the research stay of the successful applicant at SUT for the position Ref. **M2ML-S-2026-11** will be covered using funds from the grant (UMO-2023/51/I/ST11/02716) provided by the NCN.

Requirements:

1. A Bachelor's degree in science or engineering, including, but not limited to, chemistry, physics, energy engineering food technology, materials engineering, mechanical engineering, electrical engineering, biology, life sciences, or agricultural engineering.
2. Strong academic or research experience in at least two of the following areas:
 - (I) Functional and advanced materials, (II) Energy storage materials and conversion technologies (III) Machine learning and data-driven approaches (IV) Computational modeling of materials and electrochemical systems
3. Proficiency in Python, C++, or another relevant programming language.
4. Strong written and spoken communication skills in English.
5. Ability to work effectively both independently and as part of a team.
6. A publication record demonstrating the expertise described in Requirement 2. Authorship or co-authorship of peer-reviewed research articles in SCI(E)-indexed journals

Job description:

Lithium-ion batteries (LIBs), with specific energy values typically ranging from 100 to 265 Wh/g, are widely used as rechargeable mobile energy-storage devices. Yet lithium dendrite formation at the anode continues to pose a significant reliability and safety challenge. Although electrode/electrolyte interface dynamics have been studied for decades, the fundamental processes governing dendrite nucleation and growth remain incompletely understood. Investigating these metallic interfacial features requires scale-bridging analysis across multiple length scales. Density functional theory (DFT) and molecular dynamics (MD) simulations provide information about the structure and properties of the electrode/electrolyte interface at the atomic scale. These atomistic results can be incorporated into phase-field models to generate explainable descriptions of dendrite evolution at the continuum scale. The thermodynamic free-energy formulations used for lithium-battery materials should also be compared with those developed for ferroelectric and supercapacitor materials to support reliable phase-field modelling of energy-storage systems.

The project will integrate multiscale materials modelling with data-driven and generative-AI techniques to study dendrite formation and growth in LIBs. The combined results will be used to identify mechanisms and practical strategies for limiting dendrite development at solid-electrolyte interfaces.

The main tasks for the scholar:

1. Develop and apply a data-driven modelling approach for **supercapacitors and lithium-ion batteries**, and data analysis to investigate material candidates and electrochemical behaviour. (Task 1 accounts for 50% of the total work).

2. Develop an integrated results-interpretation workflow using interpretable large language models to analyse the available **electrochemical impedance spectroscopy (EIS) dataset** and generate evidence-based explanations of EIS trends and model outputs. (Task 2 accounts for 50% of the total work).
3. Share the datasets, analyses, and outcomes produced in Tasks 1 and 2 with the research team.
4. Preparation of peer-reviewed manuscripts for reputable scientific journals.

NCN call for proposals type: OPUS LAP – ST (NCN as lead agency*)

FWO call for proposals type: WEAVE (FWO as partner agency**)

Further information about the OPUS LAP/WEAVE:

* <https://www.ncn.gov.pl/en/ogloszenia/konkursy/opus26>

<https://ncn.gov.pl/en/wspolpraca-zagraniczna/wspolpraca-wielostronna/weave>

** <https://www.fwo.be/en/support-programmes/all-calls/senior-researchersresearch-teams/weave-fwo-partner/>

Form of tender submission: email (Ref. **M2ML-S-2026-11**)

Deadline for submission of tenders: 26.08.2026

Terms of Employment:

Announcement of competition results: As soon as possible

Number of position(s): 1

Place of work: Faculty of Mechanical Engineering, Silesian University of Technology, Gliwice, Poland

Duration of scholarship: 1 month

Working hours: Full time (40 h/week).

Date of commencement of employment: As soon as possible.

Additional Information:

The application should contain the following documents/information:

1. CV including the following information (list of scientific achievements, a list of publications, conference presentations, awards and distinctions for scientific activity, software and data processing skills) ;
2. Copy of the Bachelor's degree diploma or equivalent document or a document confirming the last year of Bachelor's studies;
3. Copy of the Bachelor's thesis abstract;
4. Application letter or letter of motivation (maximum 1 page)
5. Acronym for reference of this position (Reference: **M2ML-S-2026-11**).

In addition to the above documents, please prepare a document consisting of the following statement:

"I consent to the processing of my personal data for the purpose of recruitment in accordance with Art. 6 sec. 1 letter a of the Regulation of the European Parliament and of the Council (EU) 2016/679 of 27 April 2016 on the protection of individuals with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46 /EC (general regulation on data protection). "

Application document (all of the documents combined together as a single pdf file) in English should be sent electronically to one of the Co-Principal Investigators (Co-PIs) of the project - Dr. Anil Kunwar (e-mail address: anil.kunwar@polsl.pl). This document must be also sent simultaneously as a CC email to another co-PI of the project - Professor Nele Moelans (e-mail address: nele.moelans@kuleuven.be). It is recommended to include the job reference (Reference: **M2ML-S-2026-11**) in the subject of the email message.