

Scholarship for Student Position (Ref. **PFML-S-2025-5**)

The Faculty of Mechanical Engineering at Silesian University of Technology (SUT) hereby announces competition for the student position (Ref. PFML-S-2025-5). 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. **PFML-S-2025-5** will be covered using funds from the grant (UMO-2023/51/I/ST11/02716) provided by the NCN.

Requirements:

1. Masters's degree awarded in any field of science or engineering including but not limited to chemistry, physics, technology, materials engineering, mechanical engineering, etc.
2. Proven background in at least four of the following scientific areas (refer Requirement 6.): (1) Thermodynamic Tensor Modeling, (2) Multi-Physics Simulations, (3) Finite Element Method, (4) Energy conversion technology or Energy Storage Materials, (5) Phase Field Method, (6) Machine learning;
3. Programming skills in one of the following languages (e.g. Python, C++) and Knowledge of FEA with MOOSE software (at least one year experience of using the software). Experience in software app development in the applied engineering or applied science disciplines (the link to the data or code or the GUI or webapp of the software must be provided in the CV). Experienced in using Linux (Ubuntu) OS and HPC system;
4. Good command of spoken and written English language ;
5. Ability to work independently as well as work together in team.
6. Publication track record : The candidate has authored scientific research article in SCI(E) journal as a first author in original research paper. Paper should have a clear evidence of the work on interface modeling and integrated phase field-machine learning modeling.
7. International Mobility^[#] : Proven track record of research stay for a period of at least 1 week in a TOP 100 research institution^[##].

[#] - The international mobility in this context is defined as the research stay in an institution that is in a different country than the country at which the candidate has obtained his/her Master's degree.

[##] - The research institution has been ranked well within TOP 100 in at least one of following three lists: QS World Rankings, THE Ranking , ARWU Ranking.

Job description:

Lithium-ion batteries (LIBs) are characterized by their high specific energy density, typically ranging from 100 to 265 Wh/kg, making them among the most efficient and reliable mobile energy storage devices today. However, dendrite growth in the anode remains one of the most critical challenges limiting their long-term performance and safety. Despite decades of extensive research on the interfacial dynamics at the electrode/electrolyte interface, the fundamental mechanisms governing the nucleation and growth of Li dendrites are still not fully understood. The selected candidate will join the DENDRITEPHASE project team to conduct advanced computational and data-driven research on the physics of dendrite growth. The candidate will not only carry out independent research but also play an active role in mentoring and guiding other team members in advanced computational methodologies.

This includes providing training in multiphysics modeling, validating simulation results, and collaborating on joint publications.

The main tasks for the scholar:

1. Perform multi-physics simulations (phase-field computations) for the material candidates of energy storage devices (batteries, supercapacitors, and ferroelectric devices). (task 1)
2. Take an active role in mentoring and guiding other research team members in advanced computational methodologies, including providing training in multiphysics modeling, assisting with simulation setup and interpretation, and validating results to ensure methodological accuracy and consistency. (task 2).
3. Relay the data and results of task 1 to other research team members.

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. **PFML-S-2025-5**)

Closing timeline for submission of tenders: 30.11.2025

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: 6 months

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, Document related to the Requirements sections etc.) ;
2. Copy of the Masters's degree diploma or equivalent document or a document confirming the last year of Masters's studies;
3. Copy of the Masters's thesis abstract;
4. Application letter or letter of motivation (maximum 1 page)
5. Acronym for reference of this position (Reference: **PFML-S-2025-5**).

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: **PFML-S-2025-5**) in the subject of the email message.