

SureROB

Sustainable and **R**Econfigurable **RO**bots for green manufacturing

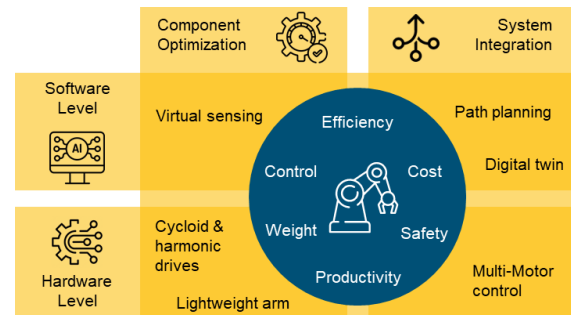


Horizon Europe Marie Skłodowska-Curie Actions – PhD Job Offer,
within the framework of HORIZON – MSCA – 2024 -DN
Sustainable and REconfigurable ROBots for green manufacturing,
on the topic **Methodology development of ML-based digital twins**,
jointly offered by **École Centrale de Lyon (FR)** and **Adaptronica (PL)**.

SureROB, i.e. **S**ustainable and **R**Econfigurable **RO**bots for green manufacturing, is a Doctoral Network funded by Horizon Europe under the Marie Skłodowska-Curie Actions (MSCA) program. The project is coordinated by the Technical University of Darmstadt and will be executed by 6 Academic Partners and 4 Industrial Partners spread across 7 Countries. The project will last for 4 years, during which the Doctoral Candidates will be employed for 3 years. The project will start on 01.01.2026 and the on-boarding of the Doctoral Candidates will take place from 07.2026 onwards.

About the SureROB project

Development of efficient, safe, green, and reconfigurable manufacturing systems requires seamless integration between software and hardware solutions, requiring cooperation between experts from different fields. The project aims to make advancements in green manufacturing systems through collaborative robots (CoBots), making them viable for SMEs. The field of robotics faces the challenge of a disconnect between experts from computer science that provide generic solutions and the end-users that work and interact with the hardware. By bridging this gap to enable the development of lightweight, efficient, and sustainable CoBots, SureROB will holistically train skilled researchers to contribute to European manufacturing. Through a well-balanced consortium of renowned academic bodies and industrial partners from seven countries, SureROB will develop and benchmark industrially feasible solutions. The focus would be not only to make the manufacturing process sustainable but also address the sustainability of manufacturing CoBots themselves. Green tools and techniques will be developed. An important target would be achieving up to 20% reduction in the weight of the robot's components (drives and arms), resulting in lower energy consumption without compromising on the system reliability and robustness. Structural and geometric optimisation of the drives and arms will be investigated to improve the dynamic behaviour and efficiency with software-based design solutions. These will be supported with vibration control strategies working in sync with optimised path planning and condition monitoring strategies. Numerical



and experimental evaluation of the developed solutions will be conducted for benchmarking them against the reference system. SureROB will address the cost and impact of existing technologies to make them economically feasible and eco-friendly, and will actively disseminate the results, engage with the public, and promote open science.

Doctoral Project Description

Project Duration	36 months
Academic partner (recruiter)	École Centrale de Lyon, France
Industrial partner	Adaptronica, Poland
Mobility	18 months in France and 18 months in Poland

Project objectives:

A promising tool that has emerged for mechanical design is the Digital Twin (DT). DTs create high-fidelity virtual replicas of products at a low computational cost, enabling a thorough design search that leads to optimal and robust designs. However, the nonlinear and non-smooth nature of some physical problems, the lack of interpretability and physics foundation of databased models, and the data scarcity at the early stages of design pose challenges for building accurate and affordable DTs. In this context, this thesis will propose a novel data-based framework for modeling DTs of robotic systems that can speed up system evaluations and improve product design. The proposed framework relies on Machine Learning (ML) techniques to infer system models based on data obtained from high-fidelity simulations. The thesis will evaluate different classes of ML methods with varying degrees of nonlinearity, non-smoothness, uncertainty, and dimensionality to identify suitable methods. Moreover, a feature engineering approach incorporates expert knowledge into the ML model by creating new inputs based on existing physical models to address ML's accuracy and consistency with the target physical system. To overcome the scarcity of data at the beginning of robotic design, a novel solution will be introduced: the use of Transfer Learning (TL) to leverage knowledge from past product generations.

Applicant requirements:

- Excellent track record,
- Fluent English (written, verbal),
- Analytical skills and outstanding problems solving abilities,
- Passion for science and technology and the motivation to undertake transnational mobility, and
- Solid background in Mechanical Engineering and Mathematics.

Eligibility Criteria

- Recruited researchers must be doctoral candidates, i.e. not already in possession of a doctoral degree at the date of the recruitment.
- Recruited researchers can be of any nationality and must comply with the following mobility rule: they must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their recruitment date.
For this particular position, the candidate must not have resided or carried out their main activity (work, studies, etc.) in **France for more than 12 months in the 36 months preceding 01.07.2026.**
- The Recruited researchers must hold a relevant master's degree or must obtain a relevant master's degree before the start of the contract.

Refer Section 1.3.2. of the MSCA Work Programme ([here](#)) for more details.

Benefits offered to the Doctoral Candidate

- Prestigious PhD programme (Marie-Curie) with a competitive salary (see [here](#)), comprising of
 - o The Living allowance, amounting to € 4010 /month. This amount is adjusted according to the country in which the candidate is recruited
 - o Mobility allowance, amounting to € 710 /month, and
 - o Family allowance (if applicable, depending on family situation), which amounts to € 660 per month.

Please note that the salary contributions described above are according to the budget categories for MSCA doctoral networks. Social security, mandatory deductions, and taxes have not been considered. The final salary received by the candidate will depend on the country of recruitment.

- Work with renowned research scientists and industrial experts,
- Exposure to multiple sectors (research labs, industry, start-ups/SMEs),
- Receive intensive training on a broad set of career-enabling skills,
- Benefit from a 3-years immersion in an industry-oriented research environment with excellent career opportunities in both public and private sectors.

Application Procedure

- The following documents would be required to successfully submit your application
- A detailed curriculum vitae (preferably in the Europass format, see [here](#))
- Complete Transcript of Records and Certificate/Diploma of your bachelor's degree
- For your bachelor's degree:
 - o If already awarded: Complete Transcript of Records and Certificate/Diploma.
 - o If currently enrolled:
 - Expected date of graduation
 - Transcript of records
- A cover letter explaining your motivation behind the selected project/s
- Contact of two referees
- Please fill out and submit your application using the application form which is available at the project [website](#).

Application Deadline: 15.01.2026

Expected Start Date: 01.07.2026

Link to Application: [Application Form](#)

For enquiries, please reach out to surerob@ims.tu-darmstadt.de.