

SureROB

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

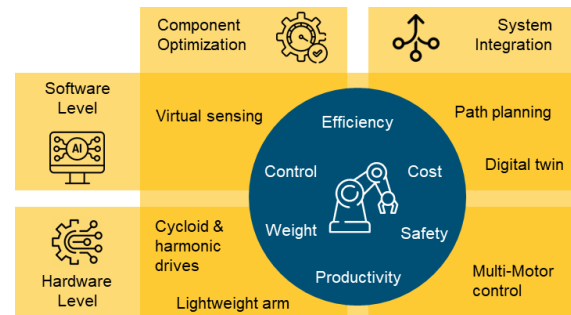


Horizon Europe Marie Skłodowska-Curie Actions – PhD Job Offer,
within the framework of HORIZON – MSCA – 2024 -DN
Sustainable and REconfigurable ROBots for green manufacturing,
on the topic **Kinematics analysis and optimisation of cycloid drives**,
jointly offered by **École Centrale de Lyon (FR)** and **Powerflex (IT)**.

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	Powerflex, Italy
Mobility	18 months in France and 18 months in Italy

Project objectives:

Kinematic joints and links are critical element in robotics. Joints must be adapted to work in severe conditions, must ensure the greatest efficiency, and work without backlash. Designing and building a lightweight kinematic joint is an academic challenge with an applicative impact. The robotic arm in kinematics point of view is a structure built with links and a joint. The main function of this mechanism is to ensure the movement of the end effector with respective velocities which need to apply torques in a very precise manner. In terms of control system, the joint should be characterized with very low backlash and high efficiency. These two elements can be obtained by using direct drive combined with cycloidal drives. The PhD project will focus on the modelling and optimization of the joint design for robotic applications. To this end, a detailed FEM and dynamic model of the cycloid gear will be achieved. The complexity of the modelling will lead potentially to a metamodeling stage in order to handle the different sources of uncertainties. The optimization will use either the 3D model or the metamodel. The optimization will be on the minimization of the mass and backlash effects, and on maximizing the joint efficiency.

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 master'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.