

ALLEGATO 1 al Decreto rettorale n. 88 del 31/07/2026

LEGEND

DOCTORAL NETWORK

Recruitment Process: Guide for Applicants



universität freiburg



AIRBUS



GKN AEROSPACE



Index

1. Introduction to LEGEND	3
2. DCs Project Description	3
2.1 DC 9 Project Description	3
2.2 DC 10 Project Description	4
3. Who can apply?	5
4. Work Conditions	6
6. Recruitment Timeline	8
7. Additional Information	8A

1. Introduction to LEGEND

We are pleased to announce the opening of 14 Doctoral Candidate (DC) positions within the LEGEND project (Leading-Edge evaluation and GENeration of Defect-tolerance in composite structures), funded by the European Commission under the Horizon Europe Marie Skłodowska-Curie Actions (MSCA) Doctoral Networks programme (Grant Agreement No. 101312790).

LEGEND is an ambitious European training network designed to prepare a new generation of engineers to understand and deal with the Effects of Defects (EoDs) in composite structures, through targeted industry-driven improvements in inspection, characterisation, and modelling techniques.

The overarching objective of LEGEND is to overcome the current limitations in characterising and predicting the EoDs in composite structures, which impact the costs and sustainability of material qualification, certification, and production practices, and could result in safety-critical oversight. LEGEND will create an interdisciplinary and inter-sectorial research and training environment where DCs will:

- Develop fast automated methods and tools for defect Identification, Classification, and Quantification;
- Develop improved characterisation methods for load regime-specific EoDs;
- Develop efficient numerical frameworks towards Qualification and Certification by Analysis, accounting for EoDs;
- Develop methods for the generation of new statistically based Defect Acceptance Criteria in industrial applications.

The LEGEND consortium is composed of 8 beneficiaries and 7 associated partners across 6 countries, including 4 RTOs and 5 industrial partners at the forefront of European transportation sector. This strong industrial participation ensures that DCs gain direct exposure to real-world applications, thereby enhancing their future employability, while advancing the synergy between academic and non-academic sectors in providing innovative engineering solutions.

For general inquiries, please contact the LEGEND Project Management Team at pm@legend-msca-dn.com. For questions related to a specific DC position, e-mail the corresponding Main Supervisor contact. Incomplete and late submissions will not be considered.

2. DCs Project Description

2.1 DC 9 Project Description

Project Title: Development of a Geometrically Representative Computational Framework for Assessing the Effects of Defects in Complex Reinforcement Architectures

Objectives: To develop a robust, non-homogenised meso-mechanical computational framework for predicting the mechanical behaviour of complex reinforcement architectures in advanced composite materials. The project will focus on the following developments: i) Develop an automated tool for the parametric generation of three-dimensional, non-homogenised meso-mechanical Representative Unit Cells (RUCs), incorporating defect representation and stochastic variations in geometric and material parameters across multiple length scales. ii) Perform high-performance computing (HPC)-enabled sensitivity and uncertainty analyses to quantify the influence of the Extent of Defects (EoD) and material variability on the probabilistic distribution of homogenised ply properties. iii) Develop a surrogate modelling framework for the rapid prediction of homogenised ply properties directly from parametric descriptors of reinforcement geometry, defects, and material variability. iv) Establish a standardised and computationally efficient multiscale framework for determining homogenised ply properties of complex reinforcement architectures, providing probabilistic material-property distributions for use in larger-scale structural analyses.

Expected Results: i) An automated high-fidelity RUC generation tool incorporating micro- and meso-scale defects together with stochastic material variability. ii) A surrogate model trained on high-fidelity finite

element simulations for rapid prediction of homogenised ply properties. iii) A computationally efficient non-homogenised meso-scale framework for the probabilistic upscaling of the effective properties of complex reinforcement architectures.

Secondments: The project will include collaborative secondments, totalling six months during the first three years, at GKN Aerospace (Sweden), the University of Porto (Portugal), and the Barcelona Supercomputing Center (Spain).

The DC will be expected to:

- Develop and implement a computational framework that links small-scale material defects to large-scale structural performance, enabling accurate prediction of how defects affect strength, stiffness, and fracture behaviour. Develop a high-fidelity, automated multiscale computational framework to quantify the effects of manufacturing defects and material variability on the mechanical behaviour of complex composite reinforcement architectures.
- Develop original scientific concepts and disseminate research outcomes through publications in peer-reviewed journals and presentations at international conferences.
- Collaborate with fellow doctoral candidates and project partners within the LEGEND Doctoral Network, exploiting synergies across the individual research projects.
- Actively participate in General Assembly meetings, network-wide training events, workshops, and secondments organised within LEGEND across Europe.
- Complete advanced doctoral-level coursework offered through the PhD School of Engineering and Architecture at the University of Enna Kore.

Hiring Beneficiary: University of Enna Kore within the Department of Engineering and Architecture.

Main Supervisor: Prof. Giuseppe Catalanotti

2.2 DC 10 Project Description

Project Title: Fast Defect Digitalisation, Virtual Allowables and Knockdown Factors for Laboratory-Scale Composite Coupons

Objectives: To develop a computational framework for determining Virtual Allowables (VA) and defect-specific Knockdown Factors (KDFs) for composite materials using laboratory-scale qualification coupons. The project will focus on the following developments: i) Develop an automated tool for generating high-fidelity finite element models of pristine and defective virtual coupons, incorporating manufacturing defects, material variability, and uncertainties in geometry and boundary conditions. ii) Perform high-performance computing (HPC)-enabled sensitivity and uncertainty analyses to quantify the influence of manufacturing defects and material variability on Virtual Allowables and defect-specific KDFs. iii) Validate the computational framework through comparison with experimental coupon data, including defect characterisation from X-ray computed tomography (CT). iv) Develop surrogate models for the rapid prediction of Virtual Allowables and defect-specific KDFs from geometric and material descriptors. v) Demonstrate the applicability of the framework through industrial benchmarking for Qualification by Analysis (QbA).

Expected Results: i) An automated framework for generating high-fidelity virtual coupon models incorporating manufacturing defects and uncertainties. ii) A validated computational methodology for predicting probabilistic Virtual Allowables and defect-specific Knockdown Factors. iii) Surrogate models enabling rapid prediction of Virtual Allowables and KDFs suitable for industrial Qualification by Analysis workflows.

Secondments: The project will include collaborative secondments, totalling six months during the first three years, at the University of Girona (Spain), the Barcelona Supercomputing Center (Spain), and Leonardo (Italy).

The DC will be expected to:

- Develop a high-fidelity and computationally efficient virtual testing methodology to predict probabilistic material allowables and defect-specific knockdown factors for composite materials by accounting for manufacturing defects, material variability, and experimental uncertainties.
- Develop original scientific concepts and disseminate research outcomes through publications in peer-reviewed journals and presentations at international conferences.
- Collaborate with fellow doctoral candidates and project partners within the LEGEND Doctoral Network, exploiting synergies across the individual research projects.
- Actively participate in General Assembly meetings, network-wide training events, workshops, and secondments organised within LEGEND across Europe.
- Complete advanced doctoral-level coursework offered through the PhD School of Engineering and Architecture at the University of Enna Kore.

Hiring Beneficiary: University of Enna Kore within the Department of Engineering and Architecture.

Main Supervisor: Prof. Giuseppe Catalanotti

3. Who can apply?

Applicants will be required to meet the general eligibility criteria of [MSCA Early-Stage Researchers](#).

MSCA Criteria for all DCs

- Applicants must not already be in possession of a doctoral degree. Researchers who have successfully defended their doctoral thesis but who have not yet formally been awarded the doctoral degree will not be considered eligible.
- Candidates must have held a master's degree for no more than six years at the date of application.
- They must not have resided, worked, or studied in the country of the recruiting Beneficiary institute for more than 12 months in the 3 years immediately prior to the date of recruitment. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention [3] are not taken into account. For international European research organisations [4], international organisations, or entities created under Union law, recruited researchers must not have spent more than 12 months in the 36 months immediately before their date of recruitment in the same appointing organisation.
The **recruitment date** is the first day of the employment of the researcher for the purposes of the action (i.e. the starting date indicated in the employment contract or equivalent direct contract).

Specific DC 9 and DC 10 Criteria

Applicants should meet the following requirements:

- Hold, or expect to obtain before the enrolment date, a Master's degree (or equivalent second-cycle qualification) in Mechanical Engineering, Aerospace Engineering, Computational Engineering, Engineering Physics, Applied Mathematics, or a closely related discipline, awarded by a recognised higher education institution.
- Demonstrate proficiency in written and spoken English at a level equivalent to **B2** of the Common European Framework of Reference for Languages (CEFR). Candidates who have not yet obtained a formal language certificate may be required to demonstrate their proficiency during the selection process or provide appropriate certification before enrolment.
- Have a strong academic background in continuum mechanics, computational mechanics, the finite element method, and the mechanics of fibre-reinforced composite materials.
- Demonstrate experience and strong interest in scientific programming, numerical methods, and/or computational modelling (e.g., Python, MATLAB, C/C++, or Fortran).

- Previous experience with finite element software, multiscale modelling, uncertainty quantification, high-performance computing, or machine learning for engineering applications will be considered an advantage.

Specific experience being prioritised for DC 9:

- Experience in computational mechanics of composite materials, multiscale modelling, finite element analysis, micro-mechanical/meso-mechanical modelling, scientific programming, and uncertainty quantification methods.

Specific experience being prioritised for DC 10:

- Experience in finite element modelling of composite structures, virtual testing, damage mechanics, defect modelling and characterisation, surrogate modelling, and computational methods for material qualification and certification.

4. Work Conditions

Contract Terms

- The Doctoral student positions are fully funded from start.
- The positions for DC 9 and DC10 are fixed-term contract appointments of **three** years.
- To sign the contract, the chosen candidate must fulfil the MSCA DN eligibility criteria.
- The MSCA DN programme offers a highly competitive and attractive salary and working conditions. The chosen candidate will receive a salary in accordance with the MSCA regulations. The MSCA DN grant offers a monthly Living Allowance (€ 3.821,53, as adapted to Italy), Mobility Allowance (€ 710,00), and Family Allowance (€ 495,00 if applicable). The salary is subject to national taxation and social security contributions.
- Doctoral studies require physical presence throughout the entire study period. A valid residence permit must be presented by the study start date; otherwise the admission may be withdrawn.

Doctoral studies require physical presence throughout the entire study period. A valid residence permit must be presented by the study start date; otherwise the admission may be withdrawn.

Recruitment Procedure

LEGEND's recruitment procedure is led by the hiring beneficiary of the specific DC and supervised by the project's Hiring Committee to ensure that all selections are open, transparent, merit-based, supportive of equal opportunities (i.e. unbiased by gender, nationality, etc.), internationally comparable, and consistent with the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

Applicants may apply for up to five (5) DC positions within LEGEND. They must follow the specific application procedure of each DC position, while ensuring they pass their respective eligibility criteria.

5.1 DC 9 and DC 10 Specific Procedure

The application should be written in English. The following documents should be uploaded as PDF-files to the application portal:

- **Curriculum Vitae** (Following the [Europass](#) template)
- **Motivation letter** (max. 2 pages)
 - A brief introduction about yourself.
 - A brief motivation as to why you are interested in this position.
- **Bachelor's and, if available, master's diplomas, transcripts, and thesis (if not subject to restrictions).**
- **Supporting documentation for merits** listed in the CV (e.g. language certificates or others).
- **Declaration of Honour for Mobility Rule** (see Annex 1)

A background check may be conducted as part of the application process.

Please note: The applicant is responsible for ensuring that the application is complete. Incomplete applications will not be considered.

5.2 Eligibility check

All applications will be checked according to the eligibility criteria listed in Section 3.

5.3 Selection procedure

The evaluation of the applications will be carried out by the DC's Evaluation Committee, composed of four members (2 internal to the hiring beneficiary and 2 from the LEGEND consortium).

The selection methods are as follows:

- a) Evaluation of the curricular path and scientific career of the applicants (APCC) - (90%);
- b) Interview (ENT) - (10%).

5.3.1 – APCC (90%)

Evaluation of the curricular path and scientific career, considering a profile that is suited to the requirements of the duties corresponding to the category covered by this competition and focusing on the relevance, quality, and currentness of the following aspects:

- Scientific performance in the areas and subareas for which the competition is open.
- Knowledge transfer
- Science and technology management and communication.

In the evaluation of the dimensions of the aspects described above, the following parameters are considered, and the following weighting factors are attributed:

- A1) Criteria for evaluating Scientific Performance (DC) (90%)
 - A1.1.) Participation in international research projects as well as scientific production, specifically, having international publications as first author in high-ranked peer reviewed journals. The list of publications must be included in the curriculum with a clear indication of the statistical analyses used, along with the candidate's role in implementing them.
 - A1.2.) Development of collaborations with international researchers and study periods abroad.
 - A1.3.) Duly certified teaching activities both in undergraduate, graduate and post-graduate courses, as well as in continuing education courses.
- A2) Criteria for Knowledge Transfer and Science and Technology Management and Communication (10%):
 - A2.1.) Ad-hoc reviewer;
 - A2.2.) Organization of scientific events;
 - A2.3.) Participation in national and international scientific meetings with peer review as well as by invitation.

The final classification of the APCC is obtained by the following formula: $APCC = (0,90 \times A1) + (0,10 \times A2)$.

5.3.2 - ENT (10%)

For the interview, the five (5) best-ranked applicants in the APCC evaluation, obtained by all elements of the Evaluation Committee, will be admitted. The committee will evaluate aspects related to the research conducted by the applicants.

The interview will be conducted in English.

5.3.3 - Final classification

The Final Classification (CF) of the Evaluation of the applicants' Curricular Path and Scientific Career (APCC) and interview (ENT) will be obtained by applying the following formula: $CF = (APCC \times 0.9) + (ENT \times 0.1)$.

Candidates who do not achieve a minimum final score of 80 points from all members of the selection panel will be automatically excluded.

5.4 Evaluation of the selection methods

Each member of the Evaluation Committee evaluates the applicants' curricular path and scientific career on a scale from 0 to 100 points, with a weighting up to the hundredths, and the classification is obtained through the weighting defined in the criteria to be evaluated.

The interview evaluation is expressed on a scale of 0 to 100 points, with a weighting to the hundredths.

5.5 Evaluation methodology

After the admission of the applicants, and before starting the voting for their final ranking in the evaluation of their scientific and curricular background, each member of the Evaluation Committee presents a written document, to be attached to the meeting minutes, with the list of the applicants in descending order of merit, duly substantiated, considering the criteria and parameters of this competition notice.

The Evaluation Committee deliberates employing reasoned roll-call voting following the selection criteria adopted and disclosed. Abstentions are not allowed.

If an absolute majority of votes is not reached after the voting explained in the previous number, or in case of a tie, the Chair's vote (Main Supervisor) will be used for the final ranking.

The interview has a maximum duration of one hour and is exclusively aimed at clarifying aspects related to the research carried out by the applicants.

The Evaluation Committee discussions will be briefed in minutes taken during its meetings, containing a summary of what occurred, as well as the votes cast by each member and respective reasoning.

After concluding the application of the selection criteria, the jury proceeds to produce an ordered list of the approved applicants with the respective classification.

The Evaluation Committee's final decision is approved by the head of the institution responsible for opening the application notice. The final decision on hiring is the responsibility of the top manager of the hiring institute.

6. Recruitment Timeline

Application Opening Date: **31/07/2026**

Application Closing Date: **31/08/2026 (23h 59m local time)**

Interview: shortlisted candidates will be invited to interviews in **September 2026**, with at least 10 days' notice.

Publication of Final Classification: October 2026

Target DC Start Date: **1st November 2026**

Following the selection of the candidate, the hiring process will commence in accordance with the institution's internal recruitment procedures (may involve additional steps to assess and verify the candidate's final compatibility with institutional requirements).

In the event that the DC position remains vacant, an additional recruitment call will be launched immediately after the publication of the 1st Final Classification. The exact dates may be subject to minor adjustments for operational reasons. All applicants will be informed accordingly through the official recruitment channels.

7. Additional Information

Data Protection and Consent Notice

By applying for this positions, applicants give their consent to circulate their application materials and personal data within authorized LEGEND consortium members involved in the recruitment process.

All data provided by the applicants will be processed in accordance with the General Data Protection Regulation (GDPR, EU 2016/679) and will be used solely for the purpose of selecting the doctoral candidates.

For questions, please contact the Main Supervisor:

Prof. Giuseppe Catalanotti

email: giuseppe.catalanotti@unikore.it

We look forward to your application!

