

Part I: General introduction

In the last decade, lightweight fibre-reinforced composites have allowed the sustainable development of modern society by, for example, enabling more efficient wind turbines and making our vehicles lighter. Unfortunately, these materials are challenging to recycle: most composite parts are still incinerated or landfilled, two very polluting practices.

The FibReLoop project is a Marie Skłodowska-Curie (MSCA) Doctoral Network that aims to promote the industrial implementation of circular economy strategies for composites. Fourteen doctoral candidates will be trained to tackle the recycling of a composite part all the way to the design and production of new recycled components. The topics include the evaluation, enhancement, and development of current and new recycling technologies; the experimental assessment of the behaviour of the recycled materials; the development of material models and design approaches for recycled composites and parts; and the implementation of recycled composites and circular economic practices into real-life industrial cases. FibReLoop involves 18 European universities and companies.

Applications are invited for fourteen PhD positions in the field of recycling of composites, leading to the award of a PhD degree. The recruited researchers will be trained for 3 years to become interdisciplinary and multi-talented experts. They will develop advanced simulation tools to predict optimal microstructures for recycled composites, manufacture these microstructures and then verify them in industrial applications. The researchers will have a unique opportunity to be trained by world-leading experts in cutting-edge technologies, supported by a strong network and extensive industry participation.

Please note that some of the positions are hosted by an industrial partner. In this case, the researcher will also be enrolled in a PhD program at a university.

Part II: Detailed description of individual positions

Title of the position: Recycling and re-using continuous carbon fibres from filament-wound Elium products

Host organization (country): KU Leuven (Belgium)

Duration: 3 years

Description

This PhD project targets to recycle and re-use continuous carbon fibre from filament-wound products, made with an Elium resin. The work will be performed in the Composite Materials Group of the Department of Materials Engineering at KU Leuven (Belgium). You will be supervised by Prof. Yentl Swolfs, Prof. Jan Ivens and Dr. Christian Breite.

The work requires a strong background in materials science, composite mechanics, and/or solid mechanics as well as a mindset for personal development. This project will be roughly 30/70 modelling/experimental research, and it is hence vital that applicants are keen for such a combination. During the appointment, two secondments are planned:

- 3 months to Arkema (France) – to extract the matrix and continuous fibres from the virgin product
- 2 months to Politecnico Di Milano (Italy) – to recycle pressure vessel specimens with microwave-assisted techniques

During this PhD project, the researcher will:

- Become an expert in filament winding, recycling and fibre characterisation;
- Gain a fundamental understanding of the failure development of composite materials, how this is affected by the microstructure and constituent properties, and how this can be predicted via models;
- Perform advanced experimental validation of the fibre break model focusing on the in-situ development of fibre breaks using synchrotron computed tomography;
- Participate in the dedicated training programme organised by FibReLoop (including technical, communication, career management and business skills) and in six-monthly project meetings;
- Write scientific papers for publication in top-level journals in materials science/mechanics;
- Present his/her research in project meetings, international conferences and outreach events;
- Work in close collaboration with supervisors while being the driving force for his/her own PhD.

Expectations and requirements

A good applicant should be an enthusiastic and self-motivated person with a mindset for personal development. He/she should meet the requirements for PhD enrolment at KU Leuven. This requires you to have minimally achieved the level of distinction and pass the language requirements (see <https://www.kuleuven.be/english/application/lang/lang-test>). He/she has obtained (or is about to obtain) good grades for a master degree in Materials Science, Mechanical Engineering, Aeronautics, or similar. Eligible applications will be assessed on the applicant's (1) academic qualifications, (2) background on materials modelling, (3) technical skills, (4) communication skills, and (5) motivation for the project. KU Leuven has an equal opportunities and diversity policy, and we welcome applications from candidates with diverse backgrounds.

The post is supported by an allowance provided by the European Commission. The EU Researcher Allowances will be used to cover both the employee's as the employer's mandatory charges. The fellows are assigned full-time with a PhD scholarship with full social security.

Candidates must fulfil the eligibility criteria:

1. You do not have a PhD degree yet at the start of your assignment.
2. You 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 date of recruitment.

This means that your nationality is not relevant for your eligibility.

Procedure

Please send your resumé and cover letter to yentl.swolfs@kuleuven.be via email. The cover letter should clearly indicate for which FibReLoop position(s) you are applying, as it is possible to apply for multiple. We kindly ask you not to include a photograph in your CV or cover letter. We are committed to equal opportunities, and by removing these details, it helps us to evaluate people on their skills and experience instead of factors that can lead to unconsciously biased decisions.

Based on the resumé and cover letter, we will invite shortlisted applicants for an interview. By default, this will be held online via Teams, but applicants who can come in person are welcome. The interview will consist of three parts and last for about 1.5 hours in total:

1. You will be asked to prepare a small task beforehand and present your approach to the task.
2. You will present a paper relevant to the PhD topic, and assess its strengths and weaknesses.
3. We will ask for clarifications about your background and gauge your motivation and skills.

For further details about this specific position or the procedure, please contact yentl.swolfs@kuleuven.be.
For general information on the PhD process at KU Leuven, please go to <https://set.kuleuven.be/phd>.

Closing date: until filled

Starting date: 1st of October 2024 the earliest and 31st of March 2025 the latest