

3D finite element modelling of off-axis cracking in
laminated composites
KU Leuven

Direct Link: <https://www.AcademicKeys.com/r?job=257569>

Downloaded On: Jul. 31, 2025 4:02am

Posted May 30, 2025, set to expire Sep. 29, 2025

| | |
|-----------------------------|--|
| Job Title | 3D finite element modelling of off-axis cracking in laminated composites |
| Department | Materials Engineering https://www.mtm.kuleuven.be/ |
| Institution | KU Leuven Leuven, Vlaams-Brabant, Belgium |
| Date Posted | May 30, 2025 |
| Application Deadline | Jun. 20, 2025 |
| Position Start Date | Oct. 1, 2025 |
| Job Categories | Graduate Student |
| Academic Field(s) | Mechanical Engineering Material/Metallurgy Engineering Mechanics Aerospace/Aeronautical/Astronautics Engineering - Other |
| Apply By Email | yentl.swolfs@kuleuven.be |

Job Description

Description:

Lightweight fibre-reinforced composites are vital in enabling more efficient wind turbines and making cars lighter. Composite structures face large safety factors, which can make them heavier and more expensive. These large factors are required due to the early damage initiation and the challenges in predicting their damage development. This project will address both aspects with a focus on off-axis cracks. These cracks are usually the first significant damage that initiates upon loading the composite in tension or bending, and are hence a key reason for the large safety factors. Despite their

3D finite element modelling of off-axis cracking in laminated composites KU Leuven

Direct Link: <https://www.AcademicKeys.com/r?job=257569>

Downloaded On: Jul. 31, 2025 4:02am

Posted May 30, 2025, set to expire Sep. 29, 2025

importance, most models for off-axis cracks are limited to 90° plies and 2D. Such models have led to a basic understanding of the initiation phase on the surface, but a very limited understanding of the propagation phase in the bulk of the material.

The key challenge of this PhD project is to develop a 3D finite element model for off-axis cracking in laminates made of unidirectional plies, and to compare the predictions to experimental observations performed by another researcher. In the long term, the improved understanding developed in this PhD project should lead to micro- and mesostructural designs that can help to delay, arrest, or prevent off-axis cracking.

The PhD will be hired in the framework of an ERC RUNNER-UP project funded by FWO (www.fwo.be). The work will be performed in the Composite Materials Group of the Department of Materials Engineering at KU Leuven (Belgium). This group has about 40 other PhD researchers, 5 active professors, state-of-the-art experimental facilities and access to a high-performance computing cluster. You will be supervised by Prof. Yentl Swolfs and Dr. Christian Breite.

The work requires a strong background in composite mechanics, materials science and/or solid mechanics as well as a mindset for personal development. This project will be purely modelling research, but you will interact with researchers who are working on experimental characterisation of off-axis cracking and the input parameters required for the model.

During this 4-year PhD project, the researcher will:

- Develop a 3D finite element modelling strategy for predicting off-axis cracking in composite laminates.
- Gain a fundamental understanding of the failure development of composite materials and how this is affected by the microstructure and ply orientation.
- Write scientific papers for publication in top-level journals in materials science/mechanics;
- Present their research at international conferences and outreach events;
- Work in close collaboration with supervisors while being the driving force for their 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)

3D finite element modelling of off-axis cracking in
laminated composites
KU Leuven

Direct Link: <https://www.AcademicKeys.com/r?job=257569>

Downloaded On: Jul. 31, 2025 4:02am

Posted May 30, 2025, set to expire Sep. 29, 2025

good grades for a master's 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/mechanical 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. This position does not have any nationality requirements or limitations.

Application process

Please send your résumé and cover letter to yentl.swolfs@kuleuven.be via email. We kindly ask you not to include a photograph in your CV or cover letter. We are committed to promoting a fair recruitment process by reducing unconscious bias.

Based on the résumé and cover letter, we will invite shortlisted applicants to prepare a modelling task. Based on the quality of this task, we will invite you 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: 20th of June 2025, or until filled

Preferred starting date: 1st October 2025, with later start dates negotiable.

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

Contact Yentl Swolfs
Materials Engineering

3D finite element modelling of off-axis cracking in
laminated composites
KU Leuven

Direct Link: <https://www.AcademicKeys.com/r?job=257569>

Downloaded On: Jul. 31, 2025 4:02am

Posted May 30, 2025, set to expire Sep. 29, 2025

KU Leuven

Kasteelpark Arenberg 44 Box 2450

Leuven, Vlaams-Brabant 2350

Belgium

Contact E-mail yentl.swolfs@kuleuven.be