PhD position in High-Resolution Mapping of Fuel Loads, Fuel Moisture and Microclimates for Next-Generation Wildfire Risk Assessment

The sGlobe lab at KU Leuven (Belgium) and PXL BIO-Research are seeking a highly motivated PhD student to work on the FireRisk project: "*High-Resolution Mapping Fuel Loads, Fuel Moisture and Microclimates for Next-Generation Wildfire Risk Assessment*".

About the sGlobe lab

The lab is part of the division Forest, Nature and Landscape of KU Leuven. We aim to improve our understanding of the effects of global change on biodiversity and the functioning of terrestrial ecosystems. We combine big data with state-of-the-art modelling techniques, fieldwork and drone imagery to extract patterns and answer ecological questions on large spatial scales. One of our key research areas is microclimate ecology, as microclimate conditions are key to understanding organismal responses to warming. More information: www.sglobelab.com

About PXL BIO-Research

PXL BIO-Research conducts practice-oriented research in risk management and ecosystem modelling. One of our key research areas is UAV-based fuel type modelling and the development of geospatial datasets for wildfire risk assessments.

About FireRisk

Wildfires have significant socio-economic and ecological impacts, posing risks to human lives, buildings, ecosystem services and biodiversity values. In Europe, areas with increased danger are being pushed north by climate change. Even though many industrialized countries have implemented fire management strategies, formal risk assessment systems are lacking in many regions, including Flanders. Pan-European initiatives are hampered by coarse spatial resolution, often underestimating local fire dynamics and overlooking the need for region-specific assessments. Without this locally contextualised accuracy, the reliable prediction of fire propagation and optimization of resource deployment remains severely constrained.

We will recruit five PhD students to meet FireRisk's core objectives:

- the development of a locally calibrated fire spread model that accounts for land management and design scenarios (**PhD 1**)
- the generation of near-real-time, high-resolution maps of fuel loads, fuel moisture, microclimate conditions, and fire weather indices for improved wildfire risk assessment and management (**PhD 2)**
- understanding how land management and landscape design influence wildfire risk and post-fire ecosystem resilience (**PhD 3**)
- the translation of scientific outputs into actionable frameworks for both operational decision-making and long-term governance (**PhD 4**)
- the enhancement of first responder training through high-fidelity 3D visualization (**PhD 5**)

Position

This PhD position, under the supervision of Prof. Koenraad Van Meerbeek and Dr. Sam Ottoy, will focus on the second objective.

Climate change is increasing wildfire risk across Europe. Yet most fire weather forecasts are based on weather observations collected at standardized meteorological stations that do not capture the strong effects of vegetation, topography, and land management on local environmental conditions. As a result, the temperatures, humidity levels, and fuel conditions that drive wildfire behaviour can differ substantially from those used in operational fire risk assessments.

We are seeking a highly motivated PhD candidate to develop next-generation fire weather products that integrate ecological field measurements, drone observations, airborne LiDAR, satellite remote sensing, and artificial intelligence. The project aims to create near-real-time, high-resolution maps of fuel loads, live fuel moisture content, microclimate conditions, and fire weather indices across Flanders.

The PhD will focus on three interconnected research themes.

First, the candidate will develop methods to map fuel loads across landscapes using a combination of airborne and UAV LiDAR data, field inventories, and satellite imagery. Building upon existing fuel mapping efforts, deep-learning approaches such as Convolutional Neural Networks (CNNs) will be used to upscale local measurements to regional scales.

Second, the candidate will quantify and predict live fuel moisture content (LFMC), a critical determinant of wildfire ignition and spread. Field measurements collected across a range of ecosystems will be combined with Sentinel-1 radar imagery, Sentinel-2 optical imagery, topographic variables, and advanced machine-learning approaches. The project will also explore the use of state-of-the-art multimodal foundation models for Earth observation to improve predictions in data-limited environments.

Third, the candidate will develop high-resolution models of microclimate temperature and relative humidity. Using extensive logger networks, UAV-derived LiDAR and multispectral data, weather observations, and satellite imagery, the candidate will create AI-based models capable of predicting local environmental conditions at unprecedented spatial detail. These microclimate predictions will subsequently be integrated into fire weather indices such as the Fire Weather Index (FWI) and the Hot-Dry-Windy Index (HDWI), enabling more realistic assessments of wildfire danger.

The project combines intensive fieldwork, drone-based data collection, geospatial analysis, machine learning, remote sensing, and ecological modelling. The resulting workflows and datasets will directly support the development of improved wildfire forecasting systems and decision-support tools for land managers and policymakers. The PhD candidate will work within an interdisciplinary team of ecologists, remote sensing specialists, fire scientists, and AI researchers and will have access to state-of-the-art UAV platforms, LiDAR systems, high-performance computing facilities, and extensive environmental monitoring networks.

General profile of the candidate

- You hold an MSc degree in a relevant field (e.g. Ecology, Biology, Bioscience Engineering, Environmental Sciences, Physical Geography, Remote Sensing or a related discipline), or you will have obtained it by the start of the position.
- You have excellent grades.
- You have a strong interest in biodiversity and ecosystem functioning.
- You have a background in terrestrial ecology and ecological modelling.

- You have solid programming skills (e.g. R), remote sensing and experience with spatial data analysis. An interest in working with UAVs is an asset.
- You are fluent in English, both written and spoken.
- You are a collaborative team player with strong communication skills.

Our offer

- A full-time PhD fellowship (4 years) following a positive evaluation after one year.
- Preferred starting date: November 2026.
- The successful candidate will be based at the division Forest, Nature and Landscape in Leuven (Belgium).
- The salary is competitive and follows KU Leuven assistant scales.
- You will receive ecocheques, a bicycle and a bicycle allowance or a full reimbursement of public transport costs for commuting. See here for full benefits including holidays and bonuses.
- Collaboration in a young and dynamic international scientific team. Work-life balance is important for us.

How to apply?

Send your application (CV and application letter) to koenraad.vanmeerbeek@kuleuven.be. The application letter should include a description of how you would approach the project and at least one reference | Application deadline: 30th of July 2026 | Notification of selection for interview: Mid-August 2026 | Interviews (online or in person): End of August 2026

More information

Prof. Koenraad Van Meerbeek | koenraad.vanmeerbeek@kuleuven.be | www.sglobelab.com

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