



Job opening

The Royal Observatory of Belgium (ROB) is looking for a scientific collaborator to contribute to Deep Learning methods for its space weather activities.

Solar flares originate in the so-called “active regions” of the Sun. These sudden energy releases emit extensive radiation in a very broad range of wavelengths from X-ray to radio. DELPHFI (DEep Learning Prediction and Hindsight of Flare Initiation) is a collaboration project between ROB and KU Leuven University, within the Brain-be 2.0 framework funded by the Belgian Science Policy Office (BELSPO). It aims at:

- improving our understanding of the mechanisms that lead to solar flares, thanks to the interpretation of the results obtained by modern Machine Learning techniques;
- demonstrating how modern Machine Learning techniques, based on the automatic extraction of active region features, can provide better flare forecasts than human operators or existing automatic methods;
- increasing the expertise of ROB in the development of Machine Learning flare predictions, and to set the ground for new operational tools and their possible extension to other kinds of eruptive events.

For the present full-time job offer, the successful candidate will also work in close collaboration with the ROB team of space weather operators and forecasters, to propose machine learning tools that can help them in their daily duties.

The selected candidate will:

- Improve the Convolutional Neural Networks (CNNs) models currently developed in the team, to optimise the solar flare prediction capabilities;
- participate in the fine tuning of the subset of solar data that is most efficient for solar flare forecast and most adapted to operational conditions. Data can indeed be taken among different sources such as solar magnetograms, EUV, UV and visible images, in different resolution and available with different latency;
- use explainable methods to interpret the results;
- contribute to the peer-review publications of the project.

The job offer is a **full-time position**. The initial contract is for **one year** and can be extended depending on mutual satisfaction and the available funding.

THE ROYAL OBSERVATORY OF BELGIUM

The ROB (<https://www.astro.oma.be/en/>) is a Belgian federal institute in the green outskirts of Brussels (Uccle). The operational directorate of Solar Physics and Space Weather (<http://sidc.be>) favours cross-fertilisation of solar fundamental research and operational space weather forecast services (ISES

Regional Warning Centre of Belgium, Solar Weather Expert Service Centre of the ESA Space Safety Program and member of the PECASUS consortium).

Social security, pension scheme and working conditions are according to Belgian contractual civil servant regulations (salary scale SW1 of the scientific personnel: a simulator is available at <https://salsim.fedweb.belgium.be/mod2-q1.php>). These include a flexible system of working hours and teleworking.

YOUR PROFILE

The selected candidate must hold a Master* in computer science with a proven experience in designing and using CNN architectures. In addition, she/he will combine a maximum of the following characteristics:

- familiarity with Machine Learning libraries like Tensorflow, Keras, PyTorch and scikit-learn;
- up-to-date knowledge and skills in other recent Machine Learning tools and techniques;
- experience with developing user-oriented software tools;
- fluent communication in written and spoken English;
- experience in Solar Physics and/or Space Weather;
- interest in bridging the AI results with their Physics interpretation;
- interest in continuing to work in a research environment after the initial 1-year contract.

HOW TO APPLY

Send your CV and a motivation letter to Dr. Laurent Dolla (laurent.dolla@oma.be), with copy to dir-rob@oma.be. Questions and requests for more information should be sent to Laurent Dolla.

The position is intended for beginning in October or November 2023. The application deadline is July 7 2023 included.

[*] If your Master degree was awarded outside of Belgium, the Netherlands and the Grand Duchy of Luxembourg, you will need a certificate to demonstrate the equivalence of your degree (see https://www.belgium.be/en/education/equivalence_of_diplomas) before we can offer you a contract.

