

**In the framework of the Marie Skłodowska-Curie Innovative Training Network (MSCA-ITN-ETN)
TRuStEE: Training on Remote Sensing for Ecosystem modElling**

Grant Agreement n. 721995

Coordinator: [Micol Rossini](#)

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Timeframe: 2016-10-01 — 2020-09-30

University/Department: University of Milano-Bicocca, Department of Earth and Environmental Sciences

We are now recruiting one PhD student at CSIC - Consejo Superior de Investigaciones Científicas (Madrid, Spain), who will be part of a network of 12 PhD students enrolled in a European network of academic and private institutions.

The TRuStEE project aims to capacitate the next generation of scientists to understand and deal with the increasing pressure of environmental change on ecosystem functioning and land-atmosphere interactions. Specifically, TRuStEE will train a new generation of scientists with complementary and interdisciplinary skills in ecosystem modelling, plant physiology, remote sensing technologies and big data analysis, addressing the specific objectives: 1) to identify essential biodiversity variables (EBVs) and the link with plant traits (PTs) and ecosystem functional properties (EFPs), inferable from remote sensing, 2) to investigate a completely new avenue for assessing vegetation photosynthetic efficiency from remote sensing measurements of canopy fluorescence, 3) to assimilate diverse remote sensing data streams with varying spatial and temporal resolution in dynamic ecosystem models and 4) to exploit new satellite missions (e.g. ESA-FLEX, ESA-Sentinels, NASA-GEDI) and Earth Observation products for the upscaling of PTs, EBVs and EFPs. The early stage researchers (ESRs) involved will strongly benefit from the network of internationally recognized scientists and private companies with relevant expertise in these topics through training courses, summer schools and secondments.

ESR position 6 – Consejo Superior de Investigaciones Científicas

Monitoring seasonal changes in Plant Traits from the combination of Landsat-8 and Sentinel-2 time series analysis: exploring the relationship between vegetation water status and water fluxes.

Host Institution

Spectroscopy and environmental remote sensing laboratory (SpecLab). The Spanish National Research Council (Madrid, Spain).

Institute description

CSIC (Spanish National Research Council) is Spain's largest public research institution, and ranks third among Europe's largest research organization. CSIC produces 20% of the national scientific output (more than 12.000 ISI paper in 2014). SpecLab is a Spectroscopy and environmental remote sensing laboratory coordinated by the research group behind this project proposal. This is a group of scientists specialized in remote sensing applications for vegetation monitoring. For over 15 years the research activities of the group have focused on estimating vegetation biophysical parameters such as moisture content, leaf area index (LAI), biomass and chlorophyll content using laboratory and field spectroscopy as well as satellite and airborne imagery (hyperspectral and LiDAR). These studies have been applied in the field of agriculture and forestry sciences and have been used to analyze significant phenomena related to climate change such as forest fires or precision agriculture.

Host Country/City

Spain/Madrid

Websites: <http://iegd.csic.es/en/research-group/multiscale-geographic-analysis-climate-change>

<http://www.lineas.cchs.csic.es/synertge/>

Start date

From October 1st 2017 the candidate will be employed at the Spanish National Research Council and enrolled in the PhD program on Geographic Information Technologies (Department of Geology, Geography and Environment) at the University of Alcalá under the supervision of Drs. Pilar Martín and David Riaño (CSIC) and Hector Nieto (IRTA).

Duration: The positions is for a period of 34 months

Project description

Foliar water content and associated water potential is a primary factor limiting plant transpiration and carbon uptake, therefore it forms a crucial link between the carbon, water and energy cycles. This study aims to investigate how vegetation canopy water content (CWC) is related to evapotranspiration through integration of available satellite data series (Landsat-5, Landsat-8 and Sentinel-2/3, MODIS) in combination with airborne and field information. The pilot study site for this project is located in Extremadura (Central-Western Spain). It is a well-established observational facility for ecosystem process studies with important infrastructure for continuous

monitoring of ecosystem fluxes and vegetation status.

The research workplan will focus on:

- Use of Radiative Transfer Models (RTM) to design vegetation indexes (VI) that are more sensitive to CWC;
- Use hyperspectral data acquired at canopy level with field and remotely piloted aircraft (RPA) mounted field spectroradiometers + airborne images to improve separation of physiological and biogeochemical properties of the ecosystem components;
- Develop a method to un-mix/disaggregate the optical and thermal responses from trees and grasses in satellite images and generate time series of reflectance factors/temperature of trees and grasses by inversion of RTM using the previously unmixed signals;
- Calibrate and validate the algorithms using a variety of past and on purpose field campaigns;
- Apply and validate existing thermal-based evapotranspiration models (TSEB, METRIC, Triangle method, etc.) with both satellite and airborne imagery;
- Evaluate spatio-temporal trends between transpiration rates and leaf/canopy water content;

In addition, the ESR activities will include:

- to participate in measurement field campaigns;
- to publish of a minimum of three scientific papers and a PhD dissertation;
- to participate in project meetings and trainings, and to present results at conferences.

Ideal candidate

Essential qualifications/competences

- Undergraduate degree in any of the following disciplines: environmental science, physical geography, bioscience, ecology or engineering.
- Masters' degree (or equivalent) in environmental sciences, earth sciences, remote sensing, ecology, geomatics, or related fields .
- Specialist skills in remote sensing or spatial information sciences obtained during undergraduate/master degrees
- Programming experience (e.g. Matlab, R, Python, or other)

Desirable qualifications/competences

- Training in ecological methods including plant identification and monitoring of plant traits
- Understanding of scaling challenges in remote sensing and ecology
- Knowledge of remote sensing calibration and validation
- Proven capability in writing scientific material including reports, papers and literature reviews

- Evidence of having undertaken experimental design
- Fieldwork experience in diverse settings
- Evidence of collaborative working

Who can apply

Applicants should meet the following eligibility criteria:

- have the background and expertise required for the position;
- be at the time of recruitment in the first four years of research career (full-time equivalent research experience*) calculated from the date on which the Master degree was obtained;
- not have been awarded a Doctoral Degree;
- not have resided or carried out his/her main activity in the country of the host institute for more than 12 months in the last three years immediately prior to the reference recruitment date;
- be proficient in both written and spoken English.

* 'Full-time equivalent research experience' is measured from the date when the researcher obtained the degree entitling him/her to embark on a doctorate (either in the country in which the degree was obtained or in the country in which the researcher is recruited or seconded) – even if a doctorate was never started or envisaged.

How to apply

To apply for the position, please email the following documents to trustee@unimib.it and to mpilar.martin@cchs.csic.es by the deadline: 31st of July 2017:

i) A curriculum vitae, including contact details, education (at University level and other), work experience, prizes/awards, language skills, etc... (max. 2 pages). The CV should reflect a representative array of achievements and qualifications appropriate to the post for which application is being made.

ii) Official academic record of undertaken courses & grades for Bachelor (and Master if required in specific criteria) degree.

iii) A motivational letter in which the applicant describes his or her motivation to pursue postgraduate studies and to conduct the research project applied for.

iv) Contact details of three referees willing to write confidential letters of recommendation.

After this first round each institute will contact successful candidates. You may be required to attend an interview.

Applications received shortly after the deadline are likely to be considered. Priority will be given to applications received before 31st of July 2017.

Salary and benefits

The Marie Skłodowska-Curie programme offers highly competitive and attractive salary and working conditions. Exact salary will be confirmed upon appointment. It consists of:

- a living allowance (= 3110 euro/month [the Marie Skłodowska-Curie rules apply a correction factor to this amount to allow for the cost of living in different countries: 1.067 to Italy, 0.988 to Germany, 1.043 to Netherlands, 0.976 to Spain, 1.000 to Belgium and 1.203 to United Kingdom])
- a monthly mobility and family allowance (= 600 and 500 euro/month depending on the family situation).

It must be noted that the living allowance is a gross EU contribution to the salary costs of the researcher. Consequently, the net salary results from deducting all compulsory (employer/employee) social security contributions as well as direct taxes (e.g. income tax) from the gross amounts. The rate indicated here is for researchers devoting themselves to their project on a full-time basis. The mobility and family allowance is a fixed amount, regardless of the country of recruitment, and may be taxable depending on the country in question. More details in Sections 5.1, 5.2 and 5.3 of the guide for applicants to H2020-MSCA-ITN-2016.

The research project is aimed at defending a thesis and obtaining a PhD degree. In addition to the individual scientific projects, this position will benefit from further continuing training, which includes summer schools and secondments (the ESRs will be seconded at least once at another partner premises), a variety of training courses as well as transferable skill courses, active participation in workshops and conferences, and exposure to SMEs and Universities from the different European countries involved in TRuStEE.

For further info, please email to trustee@unimib.it or to Pilar Martín mpilar.martin@cchs.csic.es