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SCHEDULE

CONDITIONS FOR THE OFFER OF A PHD STUDENT CONTRACT FOR A FELLOWSHIP UdL-IRTA, FOR THE AREA OF PRECISION IRRIGATION

Ref.: CPI621

Advances in the characterization of vegetation biophysical parameters in orchards for the estimation of water requirements in precision irrigation (PRECIORCHARD)

1. Scope of application

Thematic research line

In the framework of Precision Agriculture, the proposal deals with the characterization of spatio-temporal variability in orchard canopies applied to the accurate assessment of crop water requirements for precision irrigation purposes. The background is the biophysical relationship between tree transpiration and the amount of radiation intercepted by its canopy. Methodology approaches will include RGB, multispectral and thermal imaging from ground-based and aerial platforms (drone), complemented with 3D canopy modelling using active sensors (LiDAR).

Project Goals:

- I) Assess the feasibility of photogrammetry, terrestrial LiDAR and radiative transfer models (RTM) for the practical assessment of *fraction of intercepted Photosynthetically Active Radiation (fiPAR)* in a variety of orchard configurations.
- II) Benchmark, on a range of training systems, different methodological approaches for the estimation of Transpiration based on fiPAR.
- III) Integrate the within-field maps of fiPAR, together with soil variability maps (e.g. from EC_a sensors), in a geostatistical approach to delineate irrigation management zones and to identify the most representative spots within a field for point measurements (manual sampling and sensors).
- IV) Validate remotely sensed estimates of fiPAR with measurements from lysimeters and eddy-covariance, and to demonstrate the assimilation of those estimates into a decision support system.



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Supervisors:

Dr. Jaume Casadesús (Efficient Use of Water program in Agriculture, IRTA) and Dr. Alexandre Escolà (Research Group on AgroICT and Precision Agriculture - GRAP, UdL)

The place where the PhD Student contract will be carried out: IRTA – (Fruitcentre) and UdL (ETSEA) premises, with some field activities in farms within Lleida province and stays in foreign research departments.

2. Requisites for applicants

The fellowship may be requested by candidates meeting the following requisites:

2.1. Candidates must hold one of the following degrees: Agricultural, Forestry, Environmental Sciences or similar and have completed their studies leading to such an award in January 2015 or later.

2.2. A Master's in agronomy or a subject related with the project objectives.

2.3. Not to have a PhD.

2.4. Availability for immediate start and exclusive dedication to the doctorate for the duration of this fellowship.

2.5. Prior experience in matters of agricultural production systems, field and laboratory work, data processing, software programming, GIS and 3D data processing will be viewed positively. Good English skills (level B2 or higher) and driving license B required, with availability for local trips to the fields and stays up to three months in foreign research centres or universities.

2.6. Candidates must commit to follow the training program proposed by tutors, which will include advanced usage of GIS, programming in Python, mastering the workflow of remote sensing data processing.

2.7. Candidates must meet the requirements established by the Doctoral School of the University of Lleida (UdL). The principal requirement is to have 300 ECTS between degree and a master's degree in the Spanish system or equivalent.

2.8. Candidates who have been chosen for an interview with the Selection Committee, should bring –for the interview- a certified copy of the degree and/or master, as well as the academic record showing the marks of all subjects studied.

2.9. Foreign candidates who have been chosen for an interview with the Selection Committee should bring –for the interview- a certified copy and certified translation of the degree and/or master obtained at a foreign university, as well as an academic record showing the marks of all subjects studied.



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2.10. The candidate selected will have to make his/her inscription to the Doctoral School of the University of Lleida (UdL).

3. Duration

Notwithstanding the provisions of Point Nine of this offer, IRTA will subscribe with training research staff holding the Master's a temporary employment agreement linked to a specific service by virtue of which the researcher will be employed by the IRTA, with both parties assuming the contractual obligations arising therefrom and which, in any case, will be in line with the content of the application.

The duration of the PhD Student contract will be for one year, extendible to two years by yearly periods, subject to the issuance by the doctoral candidate of the report corresponding (from the student and from the Doctoral School) to the yearly period completed.

4. Outcomes

With successful completion of this fellowship, the PhD Student will achieve:

- PhD Certificate by University of Lleida
- Advanced knowledge in precision agriculture and crop water relations
- Skills in technologies such as usage of sensors in agriculture, crop modelling and remote sensing applied to agriculture.
- Capabilities in GIS, Python programming, data management, scientific writing, among others.

5. Suspension of the PhD Student contract

The suspension of the PhD Student contract on the grounds established under articles 45 *et seq.* of the Workers' Statute will not imply any extension to the duration of the PhD Student contract except for situations of temporary incapacity, risk during pregnancy, maternity, adoption or fostering, risk while breastfeeding and paternity during the duration of the PhD Student contract, which will interrupt the calculation, pursuant to the provisions of Article 11.1.b) of the Consolidated Text of the Workers' Statute Act.

6. Financial remuneration⁽¹⁾

The financial remuneration for the PhD Student contract will be €1,236,39/gross per month (€17,309.45/gross per annum) for the first and second years. For the third year, it will be €1,324.70/gross per month (€18,545,84/gross per annum), which will be subject to the corresponding withholdings, pursuant to prevailing regulations, and to the collective employment agreement of IRTA.



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IRTA will also pay the fees of the doctoral school when receiving the enrolment.

7. Applications

Interested parties should be registered at the Employment Service's website of IRTA <http://www.irta.es/en/work-at-irta/> adding his/her *Curriculum vitae*

8. Application period

The period for submitting applications opens as of the date of the offer and ends on June 13th,2021.

9. Assessment and selection

The selecting of candidates will be carried out by an *ad hoc* committee consisting of the two tutors and a third researcher appointed by them.

10. Acceptance of PhD Student contract and payment

When accepted, the applicant must sign a document undertaking to comply with all the conditions of the PhD Student contract established in these terms, and in particular, with the following:

- (a) To join the centre within one month of notification and to have exclusive dedication to the training programme proposed, in accordance with the internal rules of the centre. Failure to join could be considered to be a waiver of the right to financial aid.
- (b) To present to the tutors appointed by IRTA and UdL, each year, 30 days before the renewal date of the agreement, a report on the work carried out to date in accordance with the model to be provided by the HR Department.
- (c) To send to the tutors appointed by IRTA and UdL a copy of any publications, articles and studies which might arise from the training programme carried out and the results obtained.
- (d) To refer, in any written production arising from the training programme carried out, to the present PhD Student grant.

The non-fulfilment of any of the conditions of these terms without justification may imply the revocation of the PhD Student contract.



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11. Assessment and continuity of the PhD Student contract

Based on the report drawn up by the interested party (mentioned in Point 9 (b) of this offer), the tutor(s) must prepare therein a report based on the tasks performed by the doctoral candidate and recommend the continuity or revocation of the PhD Student contract for the forthcoming yearly period. In the event of a negative assessment, grounds must be given.

To proceed with the continuity of the contract it will be necessary as well to present a copy of the registration to a pertinent PhD course and the corresponding evaluation report from the Academic Committee of the PhD program or from the PhD School.

12. Intellectual property

IRTA and UdL are exclusive holders of the intellectual and industrial property rights which might arise as a result of the activity carried out by the candidate or technologist during the training programme, notwithstanding recognition of authorship when necessary.

The publicising of any information obtained by the candidate in the form of scientific or informative articles, presentations for meetings and conferences or any other means or format may be carried out where necessary at the initiative and with the consent of the director(s) assigned by the IRTA and UdL to each of them.

13. Incompatibilities

This PhD Student contract will be incompatible with any other activity related to the research and training purpose of the same.

14. Waiver of the PhD Student contract

In the event the beneficiary should waive their right to the PhD Student contract, they must provide IRTA and UdL with a report on the tasks performed up to the time of their experimental waiver, notwithstanding the prior notice established by legal regulations. All data obtained during the training programme will be returned to IRTA and UdL.

15. Confidentiality undertaking

The beneficiary of this contract agrees to keep any data or information to which it might have access as a result of their relationship with IRTA and UdL strictly



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confidential, whatever the form of access to such data or information and the format in which they appear, it being totally prohibited to make copies without prior consent.

The access to and processing of data of a personal nature as a result of the relationship established with the IRTA and UdL will be carried out in accordance

with the purposes established in the agreement, with the duty of secrecy continuing even after such relationship has concluded.

16. Data protection

Any data provided by candidates will be recorded in a file of IRTA in order to manage the process.

Pursuant to the provisions of the Spanish Organic Law 15/1999, of 13 December, on the protection of data of a personal nature, any interested parties may exercise their rights to and rectification before the Human Resource Department of the IRTA.

TIMING PHD STUDENT CONTRACT: CPI621	
Deadline: June 13th, 2021	Process
30 days	Publication and diffusion of the job advertisement on IRTA's website, EURAXESS Jobs, social networks and other specific recruitment places.
2 following working days	To send, for its study, the pre-selected CV which match eligibility criteria to the Selection Committee. To send an automated e-mail for those who have not been pre-selected and cannot continue the process.
10-15 following working days	Selection Committee: .Interview with preselected candidates. .To send an e-mail for those who have not been selected by the Selection Committee. .Committee Selection Agreement with the selected candidate, giving reasons for the rest to be excluded. . Notification by e-mail to the candidates who have been interviewed but not selected.
12-16 following working days	To send to IRTA all the needed official documentation in order to make the work contract and co-ordination for establishing the start of the employment.
July or September 2021	Start of employment.

(1) The financial remuneration of the PhD Student contract may not be less than 56% of the salary established for the category of Research Collaborator F of the Collective Agreement of the IRTA during the first two years, 60% in the third year and 75% in the fourth (Act 14/2011 of 1 June).