

Call for awarding one Research Fellowship for Master students

Ref. BI-MESTRANDO-IF00194

One Research Fellowship for Master students is available with **Faculdade de Ciências da Universidade de Lisboa (FCUL)**, within the scope of the Exploratory Project of the Research Program FCT 2015, Ref. IF/00194/2015, financed by National Funds through the Foundation for Science and Technology, I.P. (FCT)/MCTES, with the following conditions:

1. **Scientific Area:** Astronomy and Astrophysics

2. **Requirements for admission:**

Mandatory:

- Bachelor's degree in Astronomy and Astrophysics, Physics or related field;
- Enrollment in Master in Physics, Astrophysics & Cosmology branch, in the academic year 2020/2021;
- Fluency in spoken and written English;
- Motivation to conduct research related to the observation of young brown dwarfs and star clusters;
- Working knowledge of some of the programming languages or software used in astronomy (e.g. Python, IDL, TopCat, ds9).

If the academic degree required in this Notice as a requirement for admission to the type of fellowship in question has been obtained abroad, you must consider the mention in point 13 of this Notice regarding certificates of academic qualification.

Preferential:

- Previous research experience in the field of observational astronomy.

3. **Work Plan:**

Young star clusters, star-forming regions, and young moving groups contain objects with masses distributed over four orders of magnitude. The lower mass objects overlap in mass with giant exoplanets, with a growing body of evidence for the existence of objects with masses well below the deuterium burning limit at 12 MJup, floating freely in the clusters. The exact formation mechanism of these planetary mass objects represents one of the biggest challenges in our understanding of star and planet formation. Given the overlap in effective temperatures, these planetary-mass brown dwarfs are often considered excellent analogues for studying the atmospheres of extrasolar giant planets in wide orbits.

A large number (~60) of young planetary mass objects has been observed with the X-Shooter spectrograph on ESO's Very Large Telescope (VLT), with all data publicly available in the ESO Science Archive. The details of the work plan are as follows:

- Compilation of an updated list of young planets.
- Search of the ESO Archive for the existence of X-Shooter spectra. The spectra in the archive are already corrected for all instrumental effects, and only the telluric correction (correction for absorption by the Earth's atmosphere) is missing. The student will perform this correction using the Molecfit software, which models the atmospheric absorption at the Paranal Observatory, with the help of a standard star observed at similar times to the targets.
- Derivation of the fundamental parameters (effective temperature, spectral type, extinction, surface gravity, etc.) of the spectra by comparison with spectral models and atmospheric models.
- Search for gravity-sensitive features that can be used to separate young objects in this spectral range from contaminants in the field.
- Comparison of spectra of free-floating planetary mass objects with those that are companions to stars, to look for possible imprints of different formation channels in the spectra.
- Preparation of the spectra for publication, in collaboration with the supervisor.
- It is expected that this work will be incorporated into the student's master's thesis.

4. Legislation framework:

- 4.1. Law no. 40/2004, of August 18, amended by Decree-Law No. 202/2012, of August 27, by Decree-Law No. 233/2012, of October 29, by Law No. 12/2013, of January 29, by Decree-Law No. 89/2013, of July 9, and by Decree-Law No. 123/2019, of August 28 (Research Fellowship Holder Statute);
- 4.2. FCT Regulation for Research Fellowships, published by Regulation no. 950/2019 in the Diário da República, 2nd series, no. 241, of 16th of December, and available in the link: <https://dre.pt/application/conteudo/127238533>.

5. Place of work:

The work will be developed at CENTRA – *Center for Astrophysics and Gravitation* of FCUL.

6. Scientific supervision:

Koraljka Muzic, PhD.

7. Fellowship duration:

The fellowship is expected to begin in July 2021. This fellowship is open for three (3) months, with an exclusivity regime, possibly renewable until 31st December, 2021.

8. Monthly allowance and Social Security:

- 8.1. The fellowship amount corresponds to € 835,98 (eight hundred and thirty-five euros and ninety-eight cents), according to FCT Regulation for Research Fellowships, published by Regulation no. 950/2019 in the Diário da República, 2nd series, no. 241, of 16th of December, and available in the link: <https://www.fct.pt/apoios/bolsas/valores.phtml.pt>. It will be paid monthly by bank transfer;
- 8.2. The candidate to be hired may exercise his right to social insurance by joining the voluntary social insurance scheme, under the terms of the Statute of the Research Fellowship. The financing entities assume the costs resulting from the contributions provided for this Social Insurance, according to the Statute of the Research Fellowship.

9. Selection criteria:

Candidates will be assessed based on their *Curriculum vitae* (CV) evaluation and, eventually, on a selection interview. If the selection jury decides to proceed with the selection interview it will be held to the two (2) candidates with the highest classifications in the CV evaluation. In this case, the final classification will be obtained with a weighted average considering the following weights: 50% for the CV evaluation and 50% for the selection interview. The jury reserves the right not to select any of the candidates if there is a well-justified reason.

10. Selection Committee:

Koraljka Muzic, PhD (President), Karolina Kubiak, PhD (1st Effective Member), Professor André Maria da Silva Dias Moitinho de Almeida (2nd Effective Member), Professor António Joaquim Rosa Amorim Barbosa (1st Alternate Member) and Joana Ascenso, PhD (2nd Alternate member).

11. Publication/notification of results:

All applicants will be notified of the results of the evaluation to the email address used for sending the respective application, or by post to the applicant's address, through a final grade ordered list.

12. Deadlines:

This call for applications is open from 25th of May to 7th of June, 2021.

13. Application:

Application must be sent via e-mail to candidaturas@ciencias.ulisboa.pt, until the deadline. **The application must mention the reference "BI-MESTRANDO-IF00194", under penalty of not being considered in the present call.**

Applications must be accompanied by the following documents, sent within the deadline for applications, under penalty of not being considered in the present call (no document presented after the end of the deadline will be considered):

- Personal Data and Declaration of Consent to Receive the Results Via Email (**form below**);

- *Curriculum Vitae*, detailed and updated;
- Certificates of qualification of the required academic degrees, with final average;
- In case the PhD degree required in this notice, as a requirement for admission to the type of fellowship in question has been obtained abroad, one of the following documents must be submitted compulsorily and under penalty of exclusion from the call: (See also the note below).
 - a) Document proving the granting the recognition or equivalence or registration of the academic degree, by a Portuguese Institution;
 - b) Document proving that you have already applied for the recognition of the degree, whose request must be submitted until the deadline for apply to this call.
- Proof of enrollment in the Master in Physics, branch of Astrophysics & Cosmology, in the academic year 2020/2021;
- Motivation letter describing the previous study and research experience (if applicable), and motivation to conduct research under the mentioned topic.

NOTE:

- 1) The exhibition of proof of recognition or equivalence or registration of the degree is a mandatory condition for signing the contract;
- 2) For academic degrees obtained in foreign countries, to which was not yet granted the recognition or equivalence or the registration of the degree, it is necessary its recognition, according to the terms established in the Decree-Law no. 66/2018 of August 16, in conjunction with Ordinance no. 33/2019 of January 25.

For more information you can consult, for example, the following link of the University of Lisbon:

<https://www.ulisboa.pt/info/reconhecimento-de-habilitacoes-estrangeiras>

PERSONAL DATA AND DECLARATION OF CONSENT TO RECEIVE THE RESULTS VIA EMAIL

Full Name: _____
ID Number: _____ Valid until: ____/____/____
Nationality: _____
Complete address: _____
Postal-code: ____/____ _____

- ☐ I declare that if the selection jury chooses to communicate and or notify applicants by e-mail, I agree that such communications and or notifications are made to the email address used for submission of my application.

____/____/2021

(signature)