

CALL FOR AWARDING RESEARCH FELLOWSHIPS WITHIN PROJECT GRANTS AND R&D INSTITUTIONS

One research fellowship for a Master student

1 Research Fellowship(s) is(are) open at the **FCiências.ID – Associação para a Investigação e Desenvolvimento de Ciências**, for the project/R&D institution “Young brown dwarfs as testbeds for star and planet formation”, “PTDC/FIS-AST/28731/2017” financed by FCT under the programme 2017 Call for SR&TD Project Grants, under the following conditions:

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

2. **Requirements for admission:**

- (a) A student with the bachelor degree in the area of Astronomy & Astrophysics, Physics, or a related field, and registered in the Master program in Physics, area Astrophysics & Cosmology in the year 2020/2021.
- (b) Fluency in spoken and written English language.
- (c) Motivation for pursuing research related to observation of young stars and their variability.
- (d) Working knowledge of some of programming languages or software used in astronomy (e.g. Python, IDL, TopCat, ds9)

3. **Additional optional skills and qualifications:** It will be positively considered, but not required:

- (a) Previous research experience in the field of observational astronomy, especially if related to the field of star and brown dwarf formation.

4. **Work plan:** Young Stellar Objects (YSOs) were first highlighted by their optical variability by Joy in 1945. Nowadays the young star's variability is one of multiple signs of their early evolutionary status. Variability for active, young K- and M-type stars and brown dwarfs is an important aspect of photometric surveys in the optical and/or infrared. The large amplitude of the variations, the lack of clear long-term periods, the seemingly erratic behaviours, the various irregularities, and the colour trends observed in the long-term variations makes them excellent laboratories to study various possible scenarios of the physical mechanisms behind star formation.

The potential mechanisms causing YSO's variability include not only phenomena related to the stellar surface (e.g. intrinsic stellar pulsations, bright surface spots, atmospheric clouds, flares) but also to the stellar immediate neighbourhood (e.g. accretion from disk or obscuration by disc material). The goal of the proposed master thesis is to investigate the long-term variability in Taurus star-forming-region (SFR). Taurus SFR is one of the nearest to the Earth (~140pc), with low stellar density and without massive stars. We will use the recently available *gri*-bands multi-epoch photometry from Zwicky Transient Factory (ZTF), extended with archival data from e.g. Kepler, Pan-STARRS and HOYS-CAPS projects. Optical data will be supplemented by the mid-infrared light curves from the space mission ALL-WISE. This will be combined with analogous work in the Pleiades (120 Myr) and Hyades (600-800 Myr) open clusters, to compare the results with older regions whose objects do not host primordial disks anymore. Apart from contributing significant new insights into the variability of low-mass stars and brown dwarfs, this project will provide the prospective student with several technical competencies important for observational astronomy studies: (1) search and manipulation of large astronomical catalogues, and their cross-matching, (2) variable stars selection, (3)

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imprints of different variability mechanisms on the shapes of light curves and color changes, (4) age-variability relation.

This work is expected to be incorporated into the student's Master thesis.

5. **Legislation framework:** Research Fellowship Holder Statute, in accordance with Law 40/2004, of 18 August, in its current version and the FCT Regulation for Research Studentships and Fellowships, in its current version (available at [Regulamento de Bolsas de Investigação da FCT, I. P.](#)), and FCIências.ID Fellowship Regulation, as approved on 12th May 2020 (available at [Regulamento de Bolsas de Investigação Científica da FCIências.ID](#)).

6. **Place of work:** The work will be developed at CENTRA – Center for Astrophysics and Gravitation, at the Faculty of Science of the University of Lisbon, under the scientific supervision of Dr. Koraljka Muzic and Dr. Karolina Kubiak.

7. **Fellowship duration:** This position is initially opened for 6 months and will begin in September, 2020, or upon agreement. The fellowship contract may be potentially renewed for 6 months.

8. **Monthly allowance:** The fellowship amounts to € 798 , according to [table values](#) of the fellowships awarded directly by the FCT, IP. The fellowship holder will have a personal accident insurance and can ensure the right to social security through adherence to the voluntary social insurance scheme, if not covered by any other social protection scheme, pursuant to *Código dos Regimes Contributivos do Sistema Previdencial de Segurança Social*. The fellowship will be paid monthly by bank transfer.

9. **Evaluation and selection process:** Candidates will be assessed by the quality of their CV (50%) and the interview (50%). 2 best candidates according to the CV assessment will be invited for an interview. Interviews will be held by video-connection (Skype, Zoom). The committee reserves the right not to select any of the candidates, if a well justified motivation exists.

10. **Selection Committee:**
President: Dr. Koraljka Muzic (CENTRA, FCUL)
Member: Dr. Karolina Kubiak (CENTRA, FCUL)
Member: Prof. Dr. Andre Moitinho de Almeida (CENTRA, FCUL)
Alternate member: Dr. Antonio Amorim (CENTRA, FCUL)

11. **Publication/notification of results:** All the candidates will be notified by e-mail, sent by the call holder, with the selection meeting minutes enclosed.

12. **Deadlines:** This call for applications is open from 26 October 2020 to 6 November 2020.

13. **Application:** Applications should be sent via e-mail to kmuzic@sim.ul.pt , by attaching the following documents:

- a. Curriculum vitae;

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- b. Certificate of completion of previous degree;
- c. Proof of registration in the study cycle that confers the requested degree in this call;
- d. Motivation letter describing the previous study and research experience (if applicable), and motivation to pursue research under the mentioned topic.

14. Time limits for the appeal procedure: In case of negative decision, the candidates have 10 business days, after the date of announcement of the results of the candidates evaluation, to pronounce their disagreement in accordance with the *Código do Procedimento Administrativo*. Appeals against the final decision may be submitted to the Administration Board of FCIências.ID (fciencias.id@fciencias-id.pt) within 15 business days after the notification date

Note 1: The documents that prove the entitlement of the academic qualifications and diplomas, or the proof of registration in the academic degree or diploma requested on the call, can be dismissed during the application period and replaced by a declaration on their honour from the applicant. Their delivery is mandatory during the fellowship contractualization.

NOTE 2: Please note that - higher education degrees and diplomas awarded by foreign higher education institutions need to be recognized by a Portuguese higher education institution, pursuant to the [Decree-Law nr. 66/2018](#) (August 16) and the [Ministerial Order nr. 33/2019](#) (January 25). The presentation of the recognition certificate is mandatory for contract signature. More information can be obtained at: <https://www.dges.gov.pt/en/pagina/degree-and-diploma-recognition>.