

(BL39/2019)

## EDITAL FOR RESEARCH FELLOWSHIPS WITH RESPECT TO R&D PROJECTS AND INSTITUTIONS

### Call for a Research Fellowship for a Bachelor

Applications are open for **1 Research Scholarship for a Bachelor** within the framework of project “**FUNCTIONAL LATTICE INSTABILITIES IN NATURALLY LAYERED PEROVSKITES (FLIP) POCI-01-0145-FEDER-029454**”, financed by national funds through FCT/MCTES (PIDDAC) and co-financed by the European Regional Development Fund (FEDER), under the following conditions:

**Scientific Area:** Informatic Engineering / Physics

**Admission Requirements:** Bachelor Degree in Informatics or Physics (\*). The candidate should be knowledgeable in C++ and interface graphical libraries. Javascript for a web application might be discussed. Good knowledge of English is essential. Availability to travel abroad.

(\*) Applicants with foreign degrees shall have the degree registered or recognized/with equivalence in Portugal.

**Workplan:** The work relates to **analyzing software** required to execute tasks **7 - Local probe studies** and **8 - DFT calculations**, of the **FLIP** project mentioned above. **Work definition:** implementation of a Graphic User Interface - GUI for a C++ new scientific analyzing program PACme. PACme is a complex program, developed by the research groups working in FLIP, aimed to fit generalized Time Dependent Perturbed Angular Correlation (TDPAC) data. It is particularly used at the CTN-IST experimental infrastructure dedicated to material's science, molecular and biophysics research, actually installed and running at ISOLDE-CERN. The current version of PACme reads an ascii data file and a parameter text file as input. It generates a theoretical function that is fitted (using the minimization library MINUIT2) to the experimental data. The output consists of the final fit parameters, fit function and corresponding Fourier transform data files, as well as the respective plots (using Gnuplot). The fitting process needs often human intervention since it is a multi-parameter process with tunable physics modeling. Therefore, we aim developing a user-friendly interface, easy to input and change the fitting parameters, the whole process well integrated with an appropriate interactive graphic interface. The (heavy) calculation C++ part should be independent from the GUI and PLOT routines in order that the whole computation is fast. The current version works for MACOS and Linux but the GUI version must be cross platform (including Windows). **Benefits to the candidate:** - if software oriented - the candidate will be working on a generalized integration of a new analyzing scientific research program, while being integrated into university national research groups with international responsibilities at CERN. - if scientific oriented - the candidate can use this work as the starting point of a MSc / PhD thesis, on new material research subjects, which exploit unique ways to pin-point nanoscopic physics phenomena where there are already plenty of new data to be analyzed with PACme.

**Legislation and Regulations:** Lei n.º 40/2004, de 18 de agosto (Estatuto do Bolseiro de Investigação Científica) (*Statute of Scientific Research Fellow, approved by Law n. 40/2004, of August 18*); Regulamento de Bolsas de Investigação da Fundação para a Ciência e a Tecnologia em vigor (*Research Fellowships Regulation of the Foundation for Science and Technology, IP, in force*) (<https://www.fct.pt/apoios/bolsas/docs/RegulamentoBolsasFCT2018.pdf>); e Regulamento de Bolsas de investigação do IST (Research Fellowships Regulation of IST).

**Workplace:** Being software oriented, the work can essentially be done at the **Campus of Instituto Superior Técnico**, requiring assiduous interaction with the developers (Doctors M.B. Barbosa and J.G.M. Correia) and users (Doctors K. Lorenz and A. M. L. Lopes) of PACme via SKYPE or at **Center of Sciences and Nuclear Technologies**

**(C2TN) of Instituto Superior Técnico.** Working periods at the **CTN-experimental infrastructure at ISOLDE-CERN** are envisaged, to be defined during the work progression.

**Duration:** The research fellowship(s) will have the duration of **6** months. It's expected to begin in **March 2019** and may be eventually renewed **twice** for the same period or until the end of the project.

**Monthly maintenance allowance:** According to the values for Research Fellowships awarded by FCT in Portugal (<http://www.fct.pt/apoios/bolsas/valores>), the amount of the monthly maintenance allowance is **€745**, being the payment method an option of the Fellow by Wire Transfer/Check.

**Selection methods:** The candidates will be graded based on **a) the curricular evaluation** (70%, 0-20 scale) considering the admission requirements, and **b) motivation letter** (30%, 0-20 scale). After ordering, if necessary, an interview may be conducted as an aid to the evaluation of the candidates (in this case, the interview has a value of 25% and the curricular evaluation 75%, scale 0-20).

**Composition of the selection Jury:** Doctor João Guilherme Correia (President), Doctor Rui Henriques (Vogal), Doctor Katharina Lorenz (Vogal), Doctor Armandina Lima Lopes (Vogal, FCUP and PI of FLIP).

**Announcement/ notification of the results:** The final results of the evaluation will be publicized through a list sorted by final grade obtained posted in a visible and public place of the CTN, Bobadela, Instituto Superior Técnico, University of Lisbon. All applicants will be notified **via email** of the Final Evaluation Result.

**Application deadline and formalization:** The call is open from 26<sup>th</sup> February until the 25<sup>th</sup> March 2019.

It is mandatory to formalize applications with the submission of the following documents: B1 Form – Fellowship application (<http://drh.tecnico.ulisboa.pt/bolseiros/formularios/>), *Curriculum Vitae*, *academic degree certificate(s)* and *motivation letter*. Applications must be submitted to the email: [jgmcnet@ctn.tecnico.ulisboa.pt](mailto:jgmcnet@ctn.tecnico.ulisboa.pt) or [Joao.Guilherme.Martins.Correia@tecnico.ulisboa.pt](mailto:Joao.Guilherme.Martins.Correia@tecnico.ulisboa.pt).