

(BL130/2024)

Post-Doctoral Research Fellowships

Applications are open for one Post-Doctoral Research Fellowship, within the framework of BioMembrOS (Biomimetic Membranes for Organ Support)/Instituto Superior Técnico, 101130006, financed by European Funds through HORIZON-EIC-2023-PATHFINDEROPEN-01, under the following conditions:

Scientific Areas: Termofluidos e Tecnologias de Conversão de Energia or Ciências de Engenharia Química

Admission Requirements:

- a) to hold a PhD degree obtained in the 3 years previously to the submission of the fellowship application;
- b) to have carried out the research work that led to the PhD degree in a different entity from the host institution of the fellowship;
- c) not to exceed, with this fellowship contract, including the possible renovations, an accumulated period of 3 years in this type of fellowship, continuously or with interruptions;
- d) not to have previously held a post-doctoral fellowship from IST.

Workplan:

1) Viscosity characterization of fluids used in experiments (deionised water, plasma and animal blood). 2) Flow visualisation within specific microdevices (mimicking fibre membranes of MBO (membrane blood oxygenators)), with deionised water and/or plasma, acquiring images with a CMOS (complementary metal–oxide–semiconductor) camera mounted on a microscope, and digital image processing to quantify the mixing level based on each pixel colour intensity. 3) Measurement of flow velocities within the same specific microdevices, with deionised water and/or plasma, using micro-PIV. 4) Visualisation and characterisation of animal blood flows within the same specific microdevices, acquiring images with a CMOS camera mounted on a microscope, and digital image processing. 5) CFD modelling of the above-mentioned flows. 5) Modelling & Optimization of flows and mixing inside microdevices mimicking fibre membranes sets with recourse to relevant parameters such as mimicking fibres shapes, arrangements, number and sizes, fluids properties, mass flow rate, mass transfer rates of O₂ and CO₂, etc. 6) Modelling and optimization of parameters of the system using machine learning and artificial intelligence algorithms. 7) Assist the IST research team in the preparation of technical reports, presentations, and meetings, as well as the purchasing process of materials and services required for the development of the project according to plan.

Legislation and Regulations: Statute of Scientific Research Fellow, approved by Law nr. 40/2004, of August 18, as worded by Decree-Law nr. 123/2019, of August 28; FCT Regulation for Research Studentships and Fellowships, available on <https://www.fct.pt/apoios/bolsas/docs/RegulamentoBolsasFCT2019.pdf> and <https://dre.pt/application/file/a/127230968>.

Workplace: The work will be developed at the Laboratory of Microfluidics and Biomicrofluidics (IDMEC/LAETA) of Instituto Superior Técnico, Universidade de Lisboa, under the scientific supervision of Professor Gonçalo Silva, Professor Viriato Semião, Professor Susana Vinga and Professor Maria Norberta de Pinho.

Duration: The research fellowship will have a duration of 12 months. It is expected to begin in September 2024 and may eventually be renewed up to the maximum of 36 months, including the duration of the initial contract.

Monthly maintenance allowance: According to the values for Research Fellowships awarded by FCT in Portugal (https://www.fct.pt/wp-content/uploads/2024/02/Tabela-de-Valores-SMM_atualizacao-2024.pdf), the amount of the monthly maintenance allowance is € 1801,00 being the payment method an option of the Fellow by Wire Transfer/Check.

Selection methods:

- 1 - Curriculum and motivation letter with references evaluation (75%)

The criteria used to evaluate the candidates' curriculum, and motivation letter containing 2 or 3 references – professors' names and emails to allow contact (with a weight of 0 - 20 points) will be:

- a) Evidence of acquisition of scientific maturity and independence during the PhD (20%).
- b) Adequacy of the PhD area and previous research with the scientific areas involved in the workplan (25%).
- c) Scientific Activity in the final period of PhD or post-PhD (scientific publications and communications, projects (20%).
- d) Communication skills (motivation letter) (10%).

In addition to the above referenced requirements, candidates for the research grant must have a PhD in the scientific area of Mechanical Engineering, Chemical Engineering or related areas. Experimental and/or numerical fluid mechanics experience, as well as machine learning and optimization skills, will be valued.

2 - Eventual individual interview of candidates with the same best classification (25%).

Composition of the selection Jury: Professor Gonçalo Silva (Universidade de Évora); Professor Susana Vinga; Professor Moisés Luzia Pinto.

Announcement/ notification of the results: The final evaluation results will be communicated to all applicants by email.

Application deadline and formalization: The call is open from July 16 until August 26, 2024.

It is mandatory to formalize applications with the submission of the following documents: i) B1 Form - Fellowship application (<http://drh.tecnico.ulisboa.pt/bolseiros/formularios/>); ii) Curriculum Vitae; iii) academic degree certificate; iv) motivation letter; v) declaration on honour that the applicant does not exceed with this contract an accumulated period of three years in this type of fellowship, continuously or with interruptions, within the technological and scientific system, and that the research work that led to the PhD degree was carried out in a different entity from the host institution of the fellowship.

Applications must be submitted to the email: bolsas@drh.tecnico.ulisboa.pt