

### Post-Doctoral Research Fellowships

Applications are open for **1** (one) Post-Doctoral Research Fellowship, within the framework of “*Towards the biomimetic conversion of alkylamines with molecular metal complexes for hydrogen generation, detoxification and synthetic transformations*” at /Centro de Química Estrutural, Departamento de Engenharia Química, Association of Instituto Superior Técnico for Research and Development (IST-ID), (EXPL/QUI-QOR/1079/2021), financed by national funds through **FCT**, under the following conditions:

**Scientific Area:** Synthesis, Molecular Structure and Analytical Chemistry, (Síntese, Estrutura Molecular e Análise 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:** Inspired by Nature the project will build on the principles of natural processes for detoxification of methylamine via formaldehyde to carbon dioxide. In Nature, a group of microorganisms, methylotrophs, have the capacity to use simple organic molecules, e.g. methylamine, for energy conversion and for detoxification processes. Aqueous methylamine consequently has the potential to provide an energy source and also of enabling conversion of methylamine from e.g. wastewater streams for detoxification. The primary challenge in this project is to mimic Nature's enzymatic reactions to enable methylamine conversion to formaldehyde and ammonia. The proposed approach is to use and synthesize biomimetic copper complexes to transform methylamine into formaldehyde and ammonia. And in presence of a formaldehyde dehydrogenase mimic the in situ formed formaldehyde decomposes into dihydrogen and carbon dioxide. Copper forms a critical component of the natural enzymes enabling conversion of methylamine, and the idea is to mimic this catalytic capacity through development of synthetic catalysts. In this project we want to focus on methylamine as model system for deamination. Moreover, we will test the methods for alkylamines in general for the conversion of amines into aldehydes. In addition we will apply this reactivity for more complex synthetic applications in tandem reactions where the in situ formed formaldehyde acts as hydrogen source which is used in transfer-hydrogenation reactions. Furthermore dehydrogenative cross-coupling reactions will be performed based on amines as substrates under oxidative and reductive coupling conditions. The results will be disseminated in journals and conferences to the scientific community and results of certain interest for the public, will be communicated through press releases and social media channels. More information: <https://fenix.tecnico.ulisboa.pt/homepage/ist428147/fct-pex-project---biomalametal>

**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 Centro de Química Estrutural (Coordination Chemistry and Catalysis Group), of Association of Instituto Superior Técnico for Research and Development (IST-ID), under the scientific supervision of Dr. Martin Prechtel and Prof. Fátima Guedes da Silva.

**Duration:** The research fellowship will have the duration of 14 months. It's expected to begin in April 2022, and the fellowship is not renewable.

**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 € 1646,00, being the payment method an option of the Fellow by Wire Transfer/Check.

**Selection methods:** The selection methods will be the following: Evaluation of Curriculum Vitae (incl. track record and publication list); specific knowledge/skills about coordination chemistry & catalysis; and interview, with the respective weight of 40 (CV): 40 (specific knowledge/skills): 20 (interview).

**Composition of the selection Jury:** Dr. Martin PrechtI, Prof. João Tomé, Prof. Dr. Fátima Guedes and Prof. Dr. Alexander Kirillov

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

**Deadlines and procedures of complaint and appeal.** A complaint may be lodged from the final decision within 15 working days, or an appeal to the Executive Board of IST-ID within 30 working days, both counted from the respective notification

**Application deadline and formalization:** The call is open from 17 January until 11 February, 2022.

It is mandatory to formalize applications with the submission of the following documents: i) B1 Form – Fellowship application (<https://ist-id.pt/concursos/bolsas/> ); ii) *Curriculum Vitae*; iii) academic degree certificate; iv) motivation letter; v) 1 or 2 letter(s) of recommendation (from PhD supervisor(s) and/or post-doc supervisor(s)); vi) 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: [martin.prechtI@tecnico.ulisboa.pt](mailto:martin.prechtI@tecnico.ulisboa.pt) and [fatima.quedes@tecnico.ulisboa.pt](mailto:fatima.quedes@tecnico.ulisboa.pt)