

Call for awarding one Research Fellowship

Ref. RF-MSC-SYMBIOSES-2

One Research Fellowship (Master Degree) is available with **Faculdade de Ciências da Universidade de Lisboa**, in the project “*The secret of a winning strategy: common mechanisms in different symbioses*” (Secret Mechanisms), IF/00964/2013, financed by national funds by Fundação para a Ciência e a Tecnologia, I.P. (FCT), under the FCT Investigator Starting Grant, under the following conditions:

1. **Scientific Area:** Biological science and related areas.

2. **Requirements for admission:**

A. Admission criteria: Possession of a master degree in Biological Science or related areas, independently of the time taken to acquire it; possession of a valid driving licence;

B. Qualifications and experience: Educational background relevant for the chosen project (previous experience in lab and field work); experience in statistical analysis; experience in molecular technics (proteomics) and physiological tests applied to lichens; experience in isolation and cultivation of lichen symbionts;

C. Communication skills: Effective communication skills in English, both written and verbal, report writing skills and experience of delivering presentations;

D. Team working: Ability to work as part of a multidisciplinary research team, show enthusiasm, initiative and possess good interpersonal skills.

In respect to requirement B. it will be given preference to candidates with research experience in the field of lichens or mycorrhizas and in possession of scientific publications.

3. **Work plan**

Duration: 6 months

The lichen *Xanthoria parietina* will be collected in two different sites with different availabilities of nitrogen. The proteome will be extracted and analyzed in 8 replicates to see if mechanisms of tolerance to nitrogen can be induced through a differential expression/regulation of proteins. A methodology known for other organisms will be optimized and used for lichens.

In parallel, physiological tests will be conducted on the samples to assess their status in relation to nitrogen availability, including:

- Chl *a* fluorescence parameters (Handy Pea fluorimeter, Hansatech);
- ergosterol and chitin (HPLC);
- extra and intracellular compartmentation of N (Berthelot reaction);
- cellular membrane damage expressed as the linkage of intracellular ions (electrical conductivity);
- fungus viability (TTC triphenyltetrazolium chloride essay);
- total C and N (N and C isotopes) to observe the connections between C and N cycles;
- analysis of pigments (HPLC);
- pH measurements;
- extracellular enzymatic activity (28);
- secondary compounds production (HPLC).

Duration: 2 months

Two species of epiphytic lichens, *Xanthoria parietina* and *Parmotrema hypoleucinum* will be collected and treated in three different methods with an herbicide/antibiotic solution at specific time points (days) until the death of the photobiont. Three parameters will be monitored: algae viability by fluorescence and performance index measured by Handy PEA Fluorometer (Hansatech); fungi viability by dehydrogenase activity using the TTC reduction method; and changes in both algae e fungi enzymatic activities.

Duration: 1 month

Two species of epiphytic lichens, *Xanthoria parietina* and *Parmotrema hypoleucinum* will be subjected to a combination of nitrogen and heath stress. The chlorophyll *a* fluorescence parameters will be monitored by using the Imaging PAM Fluorometer (WALZ) in older vs. younger parts of the thalli.

Duration: 3 months

The lichens *Evernia prunastri* and *Xanthoria parietina* and axenic cultured photobionts (*Trebouxia* sp. and *Coccomyxa* sp.) will be treated under controlled conditions with different forms and doses of N for different time durations (hours or days) to:

- investigate (western blotting) how environmental stress can affect the expression of 1) stress proteins (involved in the maintenance of protein homeostasis, which includes the processes of protein folding, aggregation and chaperoning); 2) gamma-glutamylcysteine synthase (involved in the production of reduced glutathione - GSH); 3) glutathione reductase (which catalyses

conversion of glutathione disulfide to GSH); 4) H⁺ ATPase determined using western blotting techniques;

- assess of physiological parameters as plasma membrane integrity (leakage of electrolytes and presence of oxidation products, e.g. malondialdehyde), photosynthetic performance (chlorophyll a fluorescence and imaging PAM), pigment composition, changes in xanthophyll cycle (using HPLC and correlated with assimilation pigment composition of photobiont cells assessed by spectrophotometry);
- secondary compounds (HPLC);
- assess ROS production using spectrophotometric techniques, flow cytometry, and confocal microscopy with fluorescent probe (DCFH-DA).

4. **Legislation framework:** Law No. 40/2004, of August 18th, as amended and republished by Decree-Law No. 202/2012 of August 27th, by Decree-Law No. 233/2012 of October 29th, by Law No. 12/2013, of January 29th, and by Decree-Law No. 89/2013 of July 9th and Lisbon University Fellowships Regulation, published by Order (extract) No. 6977/2015 of June 23th (<https://dre.pt/application/file/67564222>).

5. **Place of work:** The work will be developed at Faculdade de Ciências da Universidade de Lisboa.

6. **Scientific orientation:** Dr Silvana Munzi.

7. **Fellowship duration:** The fellowship will have the duration of 6 months, expected to start on March 2017, with the possibility to be extended for only more 6 months.

8. **Monthly allowance:** The fellowship amount to € 980, according to Lisbon University Fellowships Regulation (<https://dre.pt/application/file/67564222>). It will be paid monthly by bank transfer.

9. **Selection criteria:** Candidates will be assessed based on their CV and other documentation, as follows:

- The selection method follows the classifications obtained adopting the following weights: 50% for curriculum evaluation and 50% for selection interview. There will be admitted to the selection interview the 3 (three) candidates with the highest classifications obtained in the curriculum evaluation.

10. **Selection Committee:** Silvana Munzi (President), Cristina Cruz (1st effective member), Teresa Dias (2nd effective member), Cristina Branquinho (1st alternate member) and Pedro Pinho (2nd alternate member).

11. **Publication/notification of results:** The final results of the evaluation will become public, through a final grade ordered list which will be posted at the entrance hall of Faculdade de Ciências da Universidade de Lisboa, C4 bldg, Campo Grande, 1749-016 Lisboa.

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.

12. **Deadlines:** This call for applications is open from 7th to 20th February 2017.

13. **Application:** Application may be sent via e-mail to candidaturas@ciencias.ulisboa.pt, with the subject "RF-MSC-SYMBIOSES-2", or personally, during office hours (9.00 a.m. to 4.00 p.m.), at the office address of Núcleo de Expediente da Faculdade de Ciências da Universidade de Lisboa, Edifício C5, piso 1, Campo Grande, 1749-016 Lisboa, until the deadline, by attaching the following documents:

- **In the case of being Portuguese citizen**, copy of identification document (ID or citizen card);
- **In the case of not being Portuguese citizen**, copy of identification document (ID card or passport) as well as residence authorization, permanent residence authorization or long-term resident status, if applicable;
- If you agree to be notified for your email address, please send obligatorily the declaration annexed to this Notice;
- Certificates of qualifications of all obtained academic degrees, with final ranking;
- Curriculum Vitae, detailed and updated, stating obligatorily the full candidate's address;
- Document of employment status, indicating the nature of the bond and functions; this document can be replaced by a declaration under honor commitment if there is any professional activity or the provision of services;
- Cover letter;
- Optionally, letters of recommendation.

DECLARATION

_____ (name of the candidate), 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.

(Date)

(Signature)