

Ref.06.18.21 – Bolseiro de Investigação / Research Associateship – Development of Optical Detected Magnetic Resonance (ODMR) techniques to assess temperature and magnetic fields on the nanometer scale using nitrogen vacancy (NV) centers in nanodiamonds

Research Centre: International Iberian Nanotechnology Laboratory - INL

Location: Braga, Portugal

Research Field: Nanophotonics

Career Stage: MSc degree

Open date for applications: June 20th 2018

Closing Date for applications: July 4th 23:00 WET – Western European Time

The International Iberian Nanotechnology Laboratory – INL (<http://www.inl.int>), was founded under an international legal framework to perform interdisciplinary research and to deploy and articulate nanotechnology for the benefit of society. INL aims to become the world-wide hub for nanotechnology addressing society's grand challenges in Aging & Wellbeing and Mobility & Urban Living and developing a Safe & Secure Society.

SR&TD project specifications:

(a) Name of the project: Intracellular Quantum Metrology Techniques for Personalized Medicines of Neurodegenerative Diseases (QUANDO).

(b) Reference number: Project reference no. 032619 (POCI-01-0145-FEDER-032619)

(c) Description:

The ambition with this project is to experimentally develop latest Optical Detected Magnetic Resonance (ODMR) techniques integrated into a high resolution fluorescence microscope, which can be used to assess temperature and magnetic field information on the nanoscale. First the technique shall be benchmarked with magnetic nanostructures fabricated by the candidate in the INL cleanroom facilities. Afterwards, the method shall be applied to biological samples provided by collaborators from the Life Science research institute ICVS.

For the first time the ODMR technique on NV centers in nanodiamonds shall be used to study intracellular properties comparing healthy and neurodegenerative e.g. Parkinson disease cells samples provided by ICVS collaborators for intracellular temperature and magnetic field assessment.

Along the project the candidate will be able to reach important technologic and scientific milestones, for which the candidate shall participate in the publication process in high impact scientific journals, thereby ideally reaching the requirements for obtaining a PhD degree in well reputed international universities.

(d) Scientific Area: Experimental Nanophotonics

Description of the functions and key primary responsibilities: The successful candidate will work on the development of an ODMR sensor based on NV centers in diamond and its applications. She/he will be assigned the following working plan:

- Design and implementation of a RF source to the sample holder of a microscope;
- Data acquisition protocol using a device control software (Labview);

- Nanofabrication of magnetic nanostructures in the INL cleanroom facilities;
- Application of the techniques on the nanofabricated samples and on cell samples provided by collaborators;
- Reporting: Participation in group seminars, conferences (posters/talks), and writing scientific reports suited for publication.

Supervision: The work plan will be developed at the INL under the scientific guidance of Dr. Jana Berit Nieder. The successful candidate will be integrated in the Ultrafast bio- and Nanophotonics Group.

Eligibility conditions, required qualifications and expertise: Candidates must comply with the following requirements:

- (a) Hold a MSc Degree in the field of Physics, Biophysics, Material Science, Optics, Photonics, Optical Engineering, Bioengineering or related;
- (b) Be a Portuguese citizen, a European Union citizen or a non-European Union Citizen residing in Portugal;
- (c) Expertise/scientific knowledge in Quantum Theory, Atoms & Molecules, Spectroscopy, Device Control, Experimental Optics, Programming (Labview, Matlab, Python or similar), Nanofabrication, Bioimaging and literature survey will be an advantage;
- (d) Fluency in English is required.

Supporting Documents

Candidates must enclose the following supporting documents in pdf format, failing which the application will not be considered for evaluation:

- (a) Cover letter;
- (b) Curriculum Vitae;
- (c) Official transcripts of all relevant academic degrees;
- (d) Copy of identification document;
- (e) For non-EU Citizens residing in Portugal, documental evidence attesting the legal right to reside in Portugal.

Selection Criteria

Candidates will be evaluated according to the following criteria:

- Curriculum vitae: 50%
- Interview(s): 50%

Selection Committee

The selection of candidates will be carried out by a Selection Committee consisting of the following persons:

- 1) **Dr. Jana Berit Nieder – Scientific Supervisor**
- 2) **Dr. Martin Garcia Lopez – Research Group Leader**
- 3) **Dr. Ricardo Ferreira– Research Group Leader**
- 4) **Patrícia Oliveira- Human Resources**

Evaluation process

The evaluation process will follow a three-stage process:

1. Candidate eligibility check:

Only full applications will be considered for evaluation. The applicant will be responsible for the data submission and validation. The application language is English.

Candidates who do not meet the eligibility requirements will not be included in the CV evaluation.

1. Curriculum Vitae evaluation:

The top four ranked candidates will be shortlisted for interview, provided however that they pass the thresholds for this stage. The threshold for the curriculum vitae evaluation, is 30 points. Candidates who do not pass the threshold will be excluded from the evaluation process.

1. Interview(s) and final assessment:

Interviews will be conducted through telephone, web conference or face-to-face meetings, as may be deemed appropriate.

A formal report will be issued by the selection committee recommending the selected candidate ranking candidates in order of preference.

Approval and formal offer.

If your application results successful, you will be offered a contract of association.

How to apply

The application is made online. Please click on the 'Apply for this job' button.

For the application to be valid, the candidate must complete all required sections of the online application form as well as submit all required documents.

What we offer

The successful Candidate will have the status of associated member of the personnel and will be awarded a contract of association with the INL.

Taking into account that the SR&TD project is co-funded by the Fundação para a Ciência e a Tecnologia ('FCT'), the successful candidate shall also have the status of 'Bolsheiro de Investigação' ('B.I.') under the applicable regulations of the FCT.

Duration of the contract

The total duration of the contract of association shall be 36 months and may be renewed based on the performance of the individual. In any case the contract cannot exceed the duration of the project. The expected starting date is August 1st 2018.

Financial Benefits

An associated member of the personnel selected and hosted in the framework SR&TD projects funded by the FCT shall be entitled to a monthly subsistence allowance in the amount of €980,00.

The INL will provide insurance cover on behalf of the associated member of the personnel against professional accidents to the extent and for the period of association with the Organisation.

Social Insurance cover of associated members of the personnel will be the responsibility of the associated member of the personnel. However the foregoing, in the event the associated member of the personnel joins the Portuguese Voluntary Social Insurance system under the terms laid down in the Portuguese Statute for Research Grant Holders, the Organisation will take on the costs provided for in said Statute.

Applicable legal and regulatory framework, taking into consideration the international status of the Organisation

The contract of association with the associated member of the personnel will be subject to the INL Staff Rules and regulations, as well as other relevant procedures.

The contract of Association shall also be supplemented by the terms and conditions of the Grant Agreement between the Organisation and the FCT governing the implementation of the SR&TD project as well as other applicable laws regulations, namely Law No. 40/2004, of 18th August (Scientific Research Fellow Statute) [according to the changes introduced by the Decree-law No. 202/2012, of August 27th, Law No. 12/2013, of January 29th, and the Decree-law No. 89/2013, of July 9th], and the Regulation for Research Fellowships of the Portuguese Foundation for Science and Technology.

Notification of results

A ranking list, after final evaluation, will be published at the INL website www.inl.int being the chosen candidate notified via email. If the first candidate refuses the offer, the Human Resources will send an offer to the second candidate on the ranking, and so on until the vacancy is filled.

We highly value the interest shown from applicants wishing to become a part of the INL experience. It is important for us to maintain good communications with candidates. No matter the outcome of the application, we always send the applicant an answer.

Equal Opportunity and Non-Discrimination Principle

INL is an equal opportunity organisation, committed to providing equal career opportunities and firmly adheres to a principle of non-discrimination in respect of gender, age, nationality, racial group, or any other possible discriminatory issues.

Helpdesk

Applicants can receive support regarding applications to this positions via e-mail: hr.services@inl.int.

The advertisement deadline may be extended at any time without previous notice taking into account the suitability and effectiveness of the recruitment process.

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