



Universidade do Minho

Centro de Física das Universidades do Minho e do Porto

NOTICE - RESEARCH SCHOLARSHIP (enrolled in Masters) - CFUM - 1 vacancy

Project PTDC/BIA-MOLI/31069/2017

A call is open for the attribution of one Research Scholarships to candidates enrolled in a Master's degree within the scope of the project "Control of Port and Douro Wines authenticity using graphene DNA sensors" (PTDC/BIA-MOLI/31069/2017) financed by the European Fund for Regional Development (FEDER), through the Competitiveness and Internationalization Operational Program (POCI), by Portugal 2020 and by the Budget of the Foundation for Science and Technology in its state budget (OE) component, under the following conditions:

Scientific Area: Engineering Physics, Biophysical Engineering and Biological Engineering

Admission requirements: To be enrolled in a Masters's course in Physics, Engineering Physics, Biophysical Engineering, Biological Engineering, or the like.

On the date of the respective hiring, candidates must prove enrollment in one of the following courses:

- Masters/Integrated Masters (in the area or area related to that requested in the notice);

Qualifications granted by foreign higher education institutions must be recognized by a Portuguese higher education institution, under the provisions of article 25 of Decree-Law No. 66/2018, of August 16, which approves the legal regime for the recognition of academic degrees and diplomas in Higher Education, awarded by foreign higher education institutions, and paragraph e) of paragraph 2 of article 4 of Decree-Law No. 60/2018, of August 3. Any formalities established therein must be completed by the date of the legal contracting act. The degree recognition must also include converting the final classification obtained in the foreign institution to the Portuguese classification scale. According to the defined scale of values, to candidates who do not comply with these provisions, the jury assigns the minimum classification (10 points) in the selection method related to the curricular evaluation component.

Eligibility of applicants: Applicants must meet the eligibility conditions provided in article 9 of the FCT Research I.P Scholarship Regulation (2019) and Research Scholarship Regulation of the University of Minho

Workplan: The successful candidate will carry out research to test and calibrate an electronic platform developed within the project to control the authenticity of Douro wines based on graphene field-effect transistors. These are functionalized



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for the detection of specific DNA sequences of the main Douro wine varieties. Graphene sensors are tested in static mode, using micro drops of a solution containing the target DNA sequences (50-mer) and dynamic mode by coupling a microfluidic device that continuously transports the molecules to be detected on the sensor's surface. DNA sequences obtained by polymerase chain reaction (PCR) from genetic material extracted from vine leaves, grapes, and wine are tested. Samples tagged with the target sequence are tested on mixtures of DNA extracted from the vine, grapes, and wine, using DNA mixtures obtained by PCR or diluted wine samples. In tests with a graphene sensor coupled to the microfluidics device, synthetic DNA is first used to detect the complementary sequence, then a sequence with a single nucleotide polymorphism (SNP), followed by multiple nucleotide polymorphisms. Finally, actual samples are tested, starting with samples marked with DNA extracted from enological products and obtained by PCR, ending the study using actual samples of must and wine. The sensor signal to be studied is the Dirac point of the transistor transfer curve or the current response for a fixed polarization of the gate voltage and the source-drain circuit.

The grantee should participate in regular group and project meetings, presenting and reporting the results. Ideally, he also present the results obtained in public, e.g., in poster form at a conference.

Applicable legislation and regulations: Statute of Scientific Research Fellows, approved by Law No. 40/2004, of August 18, in the current wording published by Decree-Law No. 123/2019 of August 28; Regulation of Research Grants of the Foundation for Science and Technology, I.P. – in force <https://www.fct.pt/apoios/bolsas/regulamentos.phtml.pt> and Research Scholarship Regulation of the University of Minho

Workplace: International Iberian Nanotechnology Laboratory (INL), on an exclusive basis, and under the scientific guidance of Prof. João Pedro dos Santos Hall Agorreta de Alpuim (INL and UM) and Dr. Marta Prado (INL).

Scholarship duration: The scholarship has a duration of six (6) months, starting in October 2021. The scholarship contract is non-renewable.

Amount of monthly maintenance subsidy: The amount of the scholarship can be found in the table of scholarships awarded directly by FCT, I.P. in the Country (<http://www.fct.pt/apoios/bolsas/valores>), corresponds to the following:

- Masters or Integrated Masters students: 835.98 euros

Other benefits: Voluntary Social Security reimbursement, corresponding to the 1st Echelon of the contributory base (for grants lasting 6 months or more) and Personal Accident Insurance.

Composition of the Selection Jury:

President: Prof. João Pedro dos Santos Hall Agorreta de Alpuim



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Effective members: Dra. Marta Prado, Dra Agnes Purwidyantri

Substitute member: Prof. Maria de Fátima Guimarães Cerqueira

Criteria and procedures for evaluation and selection: The evaluation of the applications focus on the Merit of the candidates, applying the following evaluation criteria, valued on a scale from 1 to 5 points:

B. Candidate Merit - MC (70%):

- a. A.1: Academic trajectory (which reflects the academic degree classifications, according to the reference table), with a weighting of 60%;
- b. A.2: Personal curriculum (which reflects the scientific and professional path), with a weighting of 30%;
- c. A.3: Motivation letter, with a weighting of 10%.

The **Candidate's Merit** (MC) classification is obtained by applying the following formula:

$$MC=(A1*0.6)+(A2*0.3)+(A3*0.1)$$

Candidates classified in the first 3 positions, who obtain a minimum classification of 3.5 in the MC, are admitted to the Interview phase, with the Jury proceeding to evaluate the following sub-criteria:

B. Interview - ENT (30%):

- a. The. B.1: Interpersonal skills (30%)
- b. B.2: Knowledge demonstrated in the contest area (40%)
- c. B.3: Motivation (20%)
- d. B.4: Language skills (10%)

Interview valuation is carried out according to the following levels:

- High – 5 values
- Good – 4 values
- Enough - 3 values
- Reduced - 2 values
- Insufficient - 1 value

The **Interview** classification (**ENT**) is obtained by applying the following formula:

$$ENT=(B1*0.3)+(B2*0.4)+(B3*0.2)+ (B4*0.1)$$



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Dissemination of results: The evaluation results project, based on the minutes, are sent to candidates by email within 90 working days after the deadline for submission of applications.

If the result is unfavorable to the granting of the requested scholarship, the candidates have a period of 10 working days to comment, if desired, in the context of a prior hearing to interested parties, pursuant to articles 121 and 122 of the Code of Administrative Procedure (DL n° 4 /2015 of January 7).

Complaint and appeal procedures: The final results of the evaluation are publicized through an ordered list (alphabetically, by the final grade obtained), posted in a visible and public place of the Reception Unit, as well as by email to all candidates, attaching it if, for this purpose, the minutes with the deliberations of the jury.

The selected candidate must state in writing their intention to accept the scholarship. In case of non-acceptance, the scholarship is awarded to the candidate in order of final ranking.

A complaint may be filed against the final decision within 15 working days, addressed to the Jury President. Interested parties may also present an optional hierarchical appeal addressed to the Pro-Rector for Research and Projects, Professor Dr. Filipe Vaz.

Application deadline and form of submission of applications: The call is open from 28/7/2021 a 10/8/2021.

Applications must be formalized, obligatorily, by sending an application letter accompanied by the following documents: *curriculum vitae; certificate of qualifications or declaration of the candidate; proof of enrollment in one of the courses mentioned above; motivation letter; detailed academic record.*

Applications should be sent by email to bolsas@ecum.uminho.pt, indicating the reference of the competition in Subject **(002/ECUM/CFUM – PORTGRAPHE/2021)**. Applications sent by other means are not accepted.