ANNOUNCEMENT FOR THE AWARD OF A RESEARCH FELLOWSHIP

Research Fellowship - 1 vacancy

07/ECUM/CMAT/2024-FIBCAT

A call for applications is now open for the attribution of one grant for Master's degree students, within the scope of the multi-annual funding of the Centre of Mathematics of the University of Minho (UIDB/00013/2020), hereinafter referred to as CMAT, financed by national funds through the Foundation for Science and Technology (FCT), under the following conditions:

Scientific Area: Mathematics

Recipient category: Students holding a Bachelor's degree in Mathematics, enrolled in a Master's degree course at the University of Minho

Requirement for granting the fellowship:

- The applicants may apply without prior registration in the course for which the fellowship is open. The requirement to enroll in a degree course or non-academic degree course will be verified on the date of contracting the fellowship;
- Only fellowships whose selected applicants present a valid proof of enrollment in a degree course or non-academic degree course will be contracted, according to the type of the fellowship, issued by the academic services of the Higher Education Institution, indicating, respectively, the academic year or its duration (star and term).

Candidates profile:

Candidates must

   a) hold a Bachelor's degree in Mathematics;

   b) be enrolled in a Master's programme at the University of Minho.

Applicants eligibility: Applicants must comply with the eligibility conditions laid down in article 9 of the Research Grants Regulation of the Portuguese Foundation for Science and Technology (2019).

Workplan and objectives to be achieved:

Fibre bundles between Grassmannians and Lusternik-Schnirelmann category

For positive integers k≤n, the Grassmannian Gr(k,n) is the manifold of k-dimensional linear subspaces of the n-dimensional euclidean space. In particular, Gr(2,n) is the manifold of linear planes in this

euclidean space and Gr(1,n) is the projective space of dimension n-1. Roughly speaking, a map between two manifolds is a fibre bundle if it is locally a projection. These concepts are very important in algebraic topology and differential geometry. The Lusternik-Schnirelmann is a homotopy invariant which provides a lower bound for the number of critical points of a differentiable function defined on a manifold. This invariant is completely known for the projective spaces but is unknown in general for the Grassmannians Gr(k,n) with k>1.

In this project, it is intended that the student determines a structure of fibre bundle for some examples of non-homotopically trivial maps from Gr(2,n) to Gr(1,m) where m is less than the dimension of Gr(2,n), that is, less than 2(n-2). A further objective will be to find new estimates of the Lusternik-Schnirelmann category of Gr(2,n) for some values of n.

This work will permit the student to consolidate knowledge in various domains (geometry, topology, linear algebra...) and to develop a transversal view of mathematics that will enrich his/her professional profile both in terms of research and teaching.

Applicable legislation and regulations: Research Fellowship Holder Statutes, approved by Law no. 40/2004 of August 18, in its current version published by Decree-Law no. 123/2019 of august 28; Regulation of Scientific Research Fellowships of the University of Minho (RBIC), published in "Diário da República", 2nd serie, no. 119, through dispatch no. 6524/2020 of 22-06-2020, ratified by ratification declaration no. 447/2021 of 22-06-2021 and Regulation of Research Studentships and Fellowships (RBI) of the Foundation for Science and Technology, I.P. - in force.

Host/Contracting institution and scientific supervision: The work plan will be carried out at the Centre of Mathematics of the University of Minho, located on the Gualtar Campus in Braga, under the scientific supervision of Professors Ana Cristina Ferreira and Lucile Vandembroucq.

Fellowship duration: The grant will take place for a period of 3 months, with a provisional starting date in April of 2024.

Amount of the research grant: The value stipend (Monthly Maintenance Allowance) is **990,98 euros** per month, in accordance with the stipends values published by the Foundation for Science and Technology (FCT I.P.) in the country (Annex I – Monthly Stipends Values for the maintenance allowances of the FCT Regulation for Research Studentships and Fellowships) and Annex II of the Regulation of Scientific Research Fellowships of the University of Minho (RBIC), published in "Diário da República", 2nd serie, no. 119, through dispatch no. 6524/2020 of 22-06-2020, ratified by ratification declaration no. 447/2021 of 22-06-2021, according to the applicable regulation.

Payment is made on the 23st of each month, through bank transfer to the Bank Identification Number of the fellow identified in the contractualization process.

Other components of the research grant: -

Other benefits: Reimbursement of Voluntary Social Security (Social Security contributions), corresponding to the 1st level of discounts *(for research grants with a total duration 6 months or higher)* and personal accident insurance.

Exclusivity regime: The grantee will perform the activities under exclusivity, as foreseen in article 5º of the Research Fellow Statutes and applicable regulations.

Selection panel:

President: Thomas Walter Kahl**,** Associate Professor, CMAT, University of Minho**;**

Effective member: José Joaquim Martins Oliveira, Assistant Professor, CMAT, University of Minho;

Effective member: José Luís dos Santos Cardoso, Associate Professor, CMAT, University of Trás-os-Montes and Alto Douro;

Substitute member: Carla Maria Alves Ferreira, Assistant Professor, CMAT, University of Minho;

Substitute member: Luís Filipe Ribeiro Pinto, Associate Professor, CMAT, University of Minho.

The first effective member will substitute the President of the selection panel in case of impediment, being nominate the first substitute member in the place of the first effective member.

Criteria and procedures for applications assessment and selection: The applications assessment will focus on the candidate's Merit, following evaluation criteria, valued on a scale of 1 to 5 values:

Applicant Merit - AM (100%):

  a) Academic record (reflecting the degree classification in Mathematics), weighted at 50%;

  b) Personal CV (reflecting scientific and professional career), weighted at 30%;

  c) Motivation letter, weighted at 10%;

  d) Letter of recommendation, weighted at 10%.

The final classification of the applicant's merit will be achieved through the following formula:

$$AM=(a*0,5) + (b*0,3) + (c*0,1) + (d*0,1)$$

The academic degrees and diplomas documents, or their respective recognition when awarded by foreign higher education institutions are not mandatory in the application phase, being replaced by a declaration of honor of the candidate with the contents of academic results. The documents of academic qualification or respective recognition will be required in the contracting phase and must attest facts that occurred on a date prior to the application. In situations of divergence between the

information contained in the declaration and the documentation submitted for contracting the grant, only the information contained in the latter will be consider. If the documents proving the ownership of the academic degree and diploma, or the respective recognition under the terms of Decree-Law No. 66/2018, of August 16, do not correspond to the classifications awarded in the evaluation of the academic path, which can change the candidate's ranking, the fellowship won't be contracted.

Notes: Applicants with degrees obtained abroad must present proof of recognition of qualifications in Portugal and conversion of the final classification obtained in them to the Portuguese classification scale or declaration under the terms indicated in the previous point. Candidates who do not comply with one of these provisions, the selection panel will assign "0" in the grade of the graduation and/or master course. Candidates will be evaluated on the remaining parameters.

Disclosure of results: The provisional results of applications, based in the selection panel minutes, will be send to the applicants by email until 90 working days from the applications deadline.

If case of unfavourable results, the candidates have a period of 10 working days to comment, if desired, in a prior hearing to interested parties, pursuant to articles 121 and 122 of the Code of Administrative Procedure (DL no. 4 / 2015 of January 7th).

Complaint and appeal procedures: The final results of the evaluation will be published through an ordered list (*alphabetically, by final grade obtained*), posted in a visible and public place of the host unit, as well as by email to all applicants, enclosing for that purpose, the minutes of the jury deliberations.

The selected candidate must inform its willingness to accept the grant, in writing. In case of rejection, the fellowship will be awarded to the next candidate in the ordered list of applicants.

The final decision can be contested within 15 working days, by sending to the President of the jury the corresponding claim. Interested parties may also submit an optional hierarchical appeal, in the terms of the number 3 of article 13 of Regulation of Scientific Research Fellowships of the University of Minho (RBIC).

Constitution of a selection reserve list: The applicants ranked in the next positions on the ordered list will be included in a selection reserve list, which can be used until 31/10/2024.

Application deadline and submission: The tender is open for a period of 10 working days, counting from the date of publication of the advertisement on the Euraxess portal.

Applications must be formalized by sending an application letter with the following documents:

- Copy of Identity card/citizen card/passport;

- Candidate's curriculum vitae;

- Certificate of Bachelor's degree in Mathematics with a list of the marks obtained in the respective curricular units;

- Motivation letter;

- Letter of recommendation from a professor or researcher of recognised merit in the field of Mathematics, sent directly by him/her by email to bolsas@ecum.uminho.pt, indicating the reference **07/ECUM/CMAT/2024-FIBCAT_NameSurnameCandidate**.

Applications must be sent by email to bolsas@ecum.uminho.pt, indicating the reference of the call for applications in Subject: **07/ECUM/CMAT/2024-FIBCAT**. Applications submitted by other means will not be accepted.

Fellowship contractualization: The fellowship will be attributed by signing a fellowship contract between the University of Minho and the fellow, accordingly with the contract minute (annex IV of the Regulation of Research Fellowships of the University of Minho (RBIC), published in *Diário da República, 2nd Série, no. 119*, through dispatch no. 6524/2020 of 22-06-2020, ratified by ratification declaration no. 447/2021 of 22-06-2021, as indicated in 2.4 of the FCT document: "Rules for Granting and Management of Grants within the scope of R&D projects, including infrastructure projects, the multi-annual financing program for R&D units and other FCT financing instruments (Version 2021)".

The contract may only be concluded after all the documentation required is collected, which must take place within a maximum period of 6 months [including evidences of the academic degrees or diplomas and enrolment in degree courses or non-conferring courses, depending on the type of scholarship].

Once all the documentation has been received, the contracting entity has a period of 60 working days to conclude the scholarship contract. Once received, the fellow must return the contract duly signed within 15 working days.

The activities under the fellowship contract can only began after proper authorization by the contracting entity.

Term and cancellation of fellowship contracts: Without prejudice to the other causes provided the fellowship regulations (FCT and UMinho) and in the Statute of the Research Fellow, the fellowship ends with the completion of the work plan, as well as with the expiration date for which it was granted or renewed.

At the end of the fellowship, the grantee is obliged to present a Final Report of the work carried out, in accordance with the objectives and evaluation criteria defined with the scientific advisor, within 30 days after the end of the scholarship.

The **final report** must be prepared in accordance with Annex I of the Scientific Research Fellowships Regulation of the University of Minho (RBIC), published in *Diário da República, 2nd Série, no. 119*, through dispatch no. 6524/2020 of 22-06-2020, ratified by ratification declaration no. 447/2021 of 22-06-2021.