

RESOLUTION OF THE UNIVERSITY OF SALAMANCA DATED APRIL 11, 2019, BY CONTRACT FOR 1 DISTINGUISHED JUNIOR RESEARCHER WITH REF. BEAGAL18/00090 AND PROFILE IN GEOLOGY/ EARTH SCIENCE AREA PURSUANT TO THE TERMS OF ECD ORDER 365/2018 OF 23, WHEREBY THE "BEATRIZ GALINDO" FUNDING PROGRAMME IS ANNOUNCED.

By Order of the Ministry of Education, Culture and Sport, ECD/365/2018, of 23rd March, the terms and conditions for announcing the Beatriz Galindo funding programme and awarding funding are approved (Spanish Official Gazette B.O.E of 7th April 2018). This order regulates the terms and conditions and the procedure for granting Beatriz Galindo funding to public universities, by means of a competitive contract, the purpose of which is to attract talented researchers who have conducted part of their professional career abroad, in order to encourage the engagement and training of researchers, and foster their mobility in sectors of national strategic interest, as well as to promote the quality and competitiveness of the teaching and/or research staff in Spanish Universities.

Pursuant to article 2 of the aforementioned Order, the joint funding of the recruitment of researchers who hold a PhD is eligible for subsidisation, by means of a distinguished researcher contract, in two modes: JUNIOR AND SENIOR

#### 1. Purpose

As part of this funding programme and in agreement with Article 15 of the Order ECD/365/2018, of 23 March, which describes the procedure to be followed during this second phase, the Universidad de Salamanca hereby announces, in accordance with the principles of equality, merit and ability, the recruitment of 1 distinguished junior researcher, the characteristics of which are set out in the appendix document to this announcement, for a maximum period of 4 years.

The contract is for a distinguished researcher in accordance with art. 23 of the Science Act (BOE of 2nd June 2011).

#### 2. Requirements for applicants

##### General requirements:

- Applicants must be at least sixteen years of age and must not have reached the retirement age established by Act 7/2007, of 12th April, setting out the Basic Statutes of Public Employment.
- They must possess the functional capacity required to perform the tasks of the job.
- They must not have been removed, by means of disciplinary proceedings, from the service of any of the Public Administrations, or constitutional or statutory bodies of Spain's Self-Governing Regions, nor be fully or specifically disqualified from public office by judicial resolution, to perform functions similar to those performed in the post from which they have been removed or disqualified. If the applicant is a citizen of another State, they must not have been disqualified or in an equivalent situation, or have been subjected to disciplinary proceedings or equivalent that would prevent them, in their own State, from accessing public office in the same terms.
- In the case of foreign PhD holders, effective recruitment shall be subject to their possession of the necessary authorisation to perform the duties of the post, pursuant to Act 4/2000, of 11th January, regulating the rights and freedoms of foreign nationals in Spain and their social integration.

##### Specific Requirements:

Beatriz Galindo Junior Researcher Funding:



Teachers and/or researchers must have carried out all or part of their professional career abroad and have been linked as a teacher, researcher and/or team coordinator with a foreign university or in a foreign entity recognised in their home country as an R&D/Innovation Centre.

Teachers and/or researchers must accredit that they have at least 2 years' experience in research and/or teaching abroad, after they obtained their PhD.

The length of experience held by the applicants shall be counted up to the date indicated in the Concession Resolution for the First Round of Beatriz Galindo Funding, which can be found published at the following link: <http://www.educacionyfp.gob.es/dms/mecd/servicios-al-ciudadano-mecd/catalogo/general/educacion/277089/ficha/277089-2018/Resolucion-Definitiva-Fase-1-.pdf>

Professional experience must be accredited by the teacher and/or researcher when applying for the post.

- The remaining requirements shall be as specified in the Appendix documents to this competitive contract.

Any teachers and/or researchers who have already been granted a similar kind of funding or financial assistance shall not be eligible to apply for the posts available in the University.  
(Any applicants who fail to accredit fulfilment of these requirements will be excluded from the selection process)

### 3. Procedure and deadline for submitting applications.

Anyone interested in taking part in this selection procedure must complete and submit the form available from the Electronic Headquarters of the Ministry of Science, Innovation and Universities and Vocational Training. This form will be in English and must be completed in this language, and is available on the web page:

<http://www.educacionyfp.gob.es/mecd/servicios-al-ciudadano-mecd/catalogo/general/educacion/277089/ficha/277089-2018-fase2.HTML>

Applications must be accompanied by the following documents:

- A) Photocopy of the applicant's National Identity Card (DNI) or equivalent document in the case of foreign nationals.
- B) TEACHING AND RESEARCH PROFILE
  - B1 Post-doctoral teaching experience.
    - Complete Years: \_\_\_\_
    - Details: The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced. 2.5 margins on all sides.
  - B2 Post-doctoral research experience.
    - Details: The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced. 2.5 margins on all sides.
  - B3 Working / research groups in which the researcher has participated or continues to participate. Details of the work and tasks performed in each of them.
    - The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.
  - B4 Publications
    - The attachment must be a PDF with no more than 5 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.

**B5 Additional Information**

- The attachment must be a PDF with no more than 3 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.

**C) TEACHING PROJECT**

- The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.

**D) RESEARCH PROJECT**

- The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.

**E) KNOWLEDGE TRANSFER PROJECT**

- The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.

**F) EXPLANATORY MEMORANDUM SETTING OUT THE RETURN OF THE TEACHING PROJECT, RESEARCH PROJECT AND KNOWLEDGE TRANSFER PROJECT TO THE UNIVERSITY**

- The attachment must be a PDF with no more than 4 pages DINA4, Arial 12, double spaced, 2.5 margins on all sides.

**G) CURRICULUM VITAE**

The CV should be submitted in the standardised FECyT format: <https://cvn.fecyt.es/editor/#HOME>

The uploaded file must be a PDF.

**H) ADDITIONAL DOCUMENTS.**

File with documentation to justify the applicant's merits and proven experience.

**Among the required documents, applicants must include their PhD certificate as well the date on which it was awarded.**

Original documents must be included (scanned copy or original copy of the documents) as well as their translation into English.

When the original document is in English or any other jointly official language in Spain, the English translations do not need to be signed by a sworn translator. However, any document originally in a language other than any of Spain's official or jointly official languages must be translated into English using the services of a sworn translator. Documents written originally in English do not need to be translated.

The deadline for the submission of applications begins at 08:00 on 24 April 2019 and finishes at 17:00 on 24 May 2019, peninsular schedule. The requirements must be fulfilled on the date of the application submission deadline and must continue to be fulfilled throughout the entire duration of the contract.

If at any time during the selection process, and even after this, any inaccuracy or falsehood is detected in an application or in the documentation provided by the applicant, the pertinent application shall be deemed to be defective and shall be excluded from the procedure, notwithstanding any liability the applicant might incur in this regard.

#### 4. Selection

After the deadline for applications to the Second Stage of Beatriz Galindo Funding Programme:

- Universidad de Salamanca will conduct a formal review to verify that the applicants meet the specified requirements. To this end, the Ministry will provide access to the platform through which applications are managed.

- Applications that meet the requirements will be passed onto the International Panel of Experts for evaluation. The assessment criteria are specified in article 18 of Order ECD/365/2018, of 23rd March."

#### 5. Evaluation of applications for teaching and/or research posts.

1. The Secretary General of Universities shall appoint a panel of international experts who will act as a collegiate body, evaluating the applications of teachers and/or researchers. The international panel of experts shall be composed of 10 Members, including a Chairperson and Secretary, appointed from among its members by the Secretary General of Universities, after the deadline for the submission of applications for teaching and/or research posts has passed.

The members of the international panel of experts shall be subject to the provisions of articles 23 and 24 of Act 40/2015, of 1st October, regarding the Legal Regime governing the Public Sector, in the matter of abstention and recusal.

2. International experts will be teachers and/or researchers of recognised standing and professional competence. No regime is established for substitutions within the collegiate body. The Secretary may participate and vote in the deliberations of the international panel of experts. With regard to staffing, technical and budgetary matters. The international panel of experts shall be affiliated to the General Secretariat of Universities, except with regard to service-related compensation paid by Universities. The actions and procedures of the international panel of experts shall conform to the provisions of Act 40/2015, of 1st October.

3. Applications shall be evaluated in a single stage. Applications from teachers and/or researchers will be scored between 0 and 10 points by the international panel of experts. The international panel of experts will evaluate the documentation submitted by the applicant teacher and/or researcher, in accordance with the following evaluation criteria and always in connection with the curriculum vitae of the applicant:

(a) Teacher/researcher's teaching project, up to 2.5 points.

1. Quality of the teaching project, up to 1.25 points.
2. Teaching project programme, up to 1.25 points.

b) Research Project, up to 2.5 points.

1. Quality of the research project, up to 1.25 points.
2. Research project programme, up to 1.25 points.

(c) Knowledge transfer project, up to 2.5 points.

1. Quality of the knowledge transfer project, up to 1.25 points.
2. Knowledge transfer project programme, up to 1.25 points.

d) Return to the University of the educational project, research project and knowledge transfer project, up to 2.5 points.

1. Return of the teaching project, up to 1.25 points.
2. Return of the research project, up to 0.75 points.
3. Return of the knowledge transfer project, up to 0.5 points.

4. To pass the evaluation stage, applicants must obtain at least 6 points in any of the modes. Applications that score less than 6 points will automatically be rejected. In addition, the individual score of each of the elements must be at least 50% of the maximum possible score in each of them.

5. In the event that two or more candidates achieve the same overall score, the score achieved in the individual general evaluation criteria will be used as a tiebreaker, with first place awarded to the candidate with the highest score in criterion A) or, in the case of another tie, the candidate with the highest score in Criterion B), and so on, until the end of the four criteria. If the candidates have the same individual score in all general criteria, their length of service in the centre where they work will act as the tiebreaker.

6. The international panel of experts will propose to the Chancellor's Office at Universidad de Salamanca, in its report, one post holder and as many alternates as applications for each post that scored higher than the minimum score, in order of the score obtained.

7. In the event that a teacher and/or researcher has applied for more than one post, they will be awarded the first post for which they have expressed a preference, or alternatively, the post they applied for first.

#### 6. Decision regarding the awarding of funding.

Once the International Panel of Experts has completed its evaluation, the Ministry will notify Universidad de Salamanca of its findings in order to proceed with the publication of the Resolution regarding the Awarding of Funding, and subsequently, to draw up the contracts in accordance with the provisions set out in the competitive contract announcement.

In view of the proposal submitted by the Secretary of State for Education, Vocational Training and Universities, Universidad de Salamanca will issue a provisional resolution regarding funding.

Applicants may contest the provisional resolution regarding funding within a maximum period of ten days. Once any claims have been examined, Universidad de Salamanca shall issue a final resolution, which will be published on the electronic headquarters [https://sede.usal.es/opencms/opencms/es/Tablones/Tablon\\_Oficial/Personal\\_Docente\\_e\\_Investigador/](https://sede.usal.es/opencms/opencms/es/Tablones/Tablon_Oficial/Personal_Docente_e_Investigador/) and the website of Universidad de Salamanca <https://investigacion.usal.es/es/investigacion/ayudas-beatriz-galindo-2018> which will act as notification to the interested parties, for all intents and purposes, including the means of appealing, which are described below.

A contentious-administrative appeal may be lodged against the final resolution with Salamanca's Contentious-Administrative Courts, within a period of two months starting on the date following its publication. However, applicants can choose to lodge an appeal for reversal with the Chancellor of Universidad de Salamanca, within one month from the day following the date of its publication.

#### 7. Authorisation regarding personal data and accuracy of the information submitted

1. Applications submitted for the post of teacher and/or researcher indicate the applicant's authorisation for the University to view, check, obtain or require accreditation that said applicant is up to date with their tax and Social Security obligations, either through original documents or through certificates, including electronic ones.

2. In addition, applications submitted for the post of teacher and/or researcher indicate the applicant's consent for the University to view and check the identity details included in their application, officially, by means of the Identity Data Verification System, pursuant to sole article 3 of Royal Decree 522/2006, of 28th April, which suppresses the need to provide photocopies of identity documents in the administrative procedures of Spain's Central Government and its associated or dependent public bodies.

3. By submitting their application, applicant teachers and/or researchers declare, under their own responsibility that all information included in the application provides a true representation of reality. Any incorrect or inaccurate details, or any concealment of the truth, shall lead to the rejection of the application, notwithstanding any other resulting liabilities.

#### 8. Correction of applications for teaching and/or research posts

If the documentation provided during the application period is incomplete or contains rectifiable formal errors, the applicant will be required within 10 working days to complete or rectify the application through the electronic headquarters site. Applicants should note that, under these circumstances, if they fail to do so, the application will be withdrawn, following a resolution that shall be dictated in the terms set out under article 68 of Act 39/2015, of 1st October.

#### 9. Duration of the distinguished researcher contract

1. Once the teacher and/or researcher has been selected, a distinguished researcher contract will be drawn up for the teacher and/or researcher. The duration of the distinguished researcher contract will be 4 years.

2. The contract will encompass the realisation of research and teaching activities set out in the competitive contract announcement and specified in the appendix documents.

3. Working hours, schedules, holidays, entitlements and leave shall be set out in the contract and applicable regulations.

4. Teachers and/or researchers who are hired through this process will not be able to enter into a contract with any other organisations during the period of the distinguished researcher contract unless expressly authorised to do so by the University, and provided they comply with the regime of incompatibilities as appropriate.
5. The contract may be terminated in accordance with the provisions of article 23 of Act 14/2011, of 1st June, and applicable labour regulations.
6. Any variations in the details given in the application and the conditions taken into account for the assessment and selection of applications will interrupt the deadline for signing the distinguished researcher contract and may lead to the loss of funding entitlement, and possibly to the repayment of any funding received to date.

#### 10. Renouncement and Resignation

1. The selected teacher and/or researcher will be deemed to have renounced the position awarded if, within a period of two months from the date the decision regarding the selection of teachers and/or researchers is published, they have failed to sign the distinguished researcher contract.
2. The teacher and/or researcher recruited will be deemed to have resigned from the post before the end of the contract if, following a break, they do not return to the University within the required time frame. This failure to return to the University will also constitute a breach of the conditions governing the receipt of funding.
3. Teachers and/or researchers should notify the University of their intention to renounce the position or to resign.
4. Resignation shall result in the immediate cessation of payment as of the date of resignation. Furthermore, any undue payments made might result in the requirement to refund said amounts.

#### 11. Obligations of the beneficiaries

- Perform their job in the centre affiliated to the funding programme, and comply with the University's rules of operation in terms of their working hours, role, schedules and holidays.
- Request prior authorisation from the Vice Chancellor for any temporary absence or leave. Any unauthorised absence might give rise to a loss of funding entitlement.
- Submit all required reports within the time frames set out in this announcement throughout the period in which funding is received.
- Make reference to the funding received from the Ministry of Science, Innovation and Universities and Vocational Training and to Universidad de Salamanca in any publications and other results that may arise from the research activities carried out during the period in which funding is received.
- By accepting this Funding, the beneficiary commits to complying with the rules laid down in this announcement, as well as the other obligations set out in art. 15 of the Science, Technology and Innovation Act 14/2011, of 1st June.
- In terms of industrial property rights as well as any patrimonial rights that encompass the intellectual property generated during the entire period in which the beneficiary is receipt of funding, the terms of the Patents Act 24/2015, of 24th July, shall be applicable; accordingly, these rights will be the sole and exclusive property of the University.

In the event that the University is required to return part or all of the subsidy, or this funding is not awarded, as a result of actions attributable to the successful applicant (such as inaccuracy or falsehood in their application or in the documentation provided that gives rise to a breach of the requirements for funding entitlement), this beneficiary is required to pay to the University the amount not obtained as a result of such actions, within 15 days from being required to do so.

#### 12. Monitoring

An annual monitoring report must be submitted for each of the teachers and/or researchers, which shall accredit the targets achieved.

The annual report will be evaluated by the international monitoring panel and will be designated either suitable or unsuitable, following a previous justified assessment report that will be passed onto the University. If the annual report is designated unsuitable, this will be deemed a partial breach of the purpose of the subsidy, giving rise to the termination of the contract and the beginning of the procedure to repay the part of the subsidy allocated to the year corresponding to the unsuitable annual report.

Failure to submit the annual report, having been previously required to do so in the terms set out under article 70.3 of Royal Decree 887/2006, of 21st July, which approves the Regulations of Act 38/2003 of 17 November, regulating General Subsidies, in accordance with Article 37.1(c) of the aforementioned Act, shall give rise to the beginning of the procedure to repay the funding awarded on account of a breach of the obligation to justify funding, which might be up to 100% of the funding awarded, notwithstanding any other liabilities applicable on account of having committed infractions with regard to funding.

These reports must be approved by the Director of the department.

Actions initiated by the Vice Chancellor for Research and Transfer resulting from the documentation contained in the file or those which have occurred as a result of reports from the directors of the centres affiliated to the funding programme will be classed as extraordinary monitoring and supervisory actions. The Vice Chancellor may also carry out any other checks deemed appropriate in relation to the fulfilment of the conditions of the programme and the competitive contract process.

### 13. Incompatibilities

When entering into the contract with the University, the teacher and/or researcher may not be in receipt of any other grants or subsidies financed with private or public funds with a similar purpose, or any wages or salary of a similar nature and, in general, any amount similar to wages or a salary in nature, whenever the activity developed might affect the fulfilment of the purpose of the funding received through this programme or its research purpose, or which takes place during the same working hours.

Teachers and/or researchers must notify the University if they are in receipt of other funding, subsidies, earnings or resources that finance the subsidised activities.

The contract will be subject to the rules regarding incompatibilities established in Act 53/1984 of 26 December and R.D. 598/1985 of 30th April, and must not be affected by any of the incompatibilities set out in the aforementioned regulations.

### 14. Appeals against this competitive contract process

This Resolution, which brings to an end the administrative process, can be appealed against by lodging an appeal with the Contentious-Administrative Courts of Salamanca, within a period of two months from the day following its publication.

Anyone wishing to appeal this Resolution can choose to lodge an appeal for reversal with the Chancellor of Universidad de Salamanca, within one month of the day following its publication, in which case a contentious-administrative appeal referred to above cannot be lodged until this first appeal has been expressly resolved or the appeal for reversal has been dismissed, pursuant to Articles 123 and 124 of Act 39/2015, of 1st October, governing the Common Administrative Procedure of Public Administrations.

### 15. Legal Regime

The competitive contract process shall be governed by the following regulations:

Order ECD/365/2018, of 23rd March, which approves the terms and conditions for granting and convening the Beatriz Galindo funding programme.

RESOLUTION of 18th October 2017, issued by the Chancellor's Office in Universidad de Salamanca, which publishes the delegation of the Chancellor's powers to various single-member governing bodies of this University. (BOCYL 31/10/2017).

Regulations for the application within Universidad de Salamanca of Act 39/2015, of 1st October, governing the Common Administrative Procedure of Public Administrations, and Act 40/2015, of 1st October, regarding the Legal Regime of the Public Sector. BOCYL (31st October 2016)

Statutes of Universidad de Salamanca, approved according to agreement 19/2003, of 30th January, of the Junta de Castilla y León (BOC and L no. 22, 3rd February 2003).

Act 2/2006, of 3rd May, governing finance and the public sector in Castilla y León.

Act 38/2003, of 17th November, regarding General Subsidies (B.O.E. of 18th November), and

R.D. 887/2006, of 21st July, which approves the Regulations for Act 38/2003.

Act 5/2008, of 25th September, governing Subsidies in the Region of Castilla y León.

Act 39/2015, regarding the Common Administrative Procedure of Public Administrations. (B.O.E. 2nd October 2015)

Act 40/2015, of 1st October, regarding the Legal Regime of the Public Sector. (B.O.E. 2nd October 2015)

Organic Act 6/2001, of 21st December, governing Universities (B.O.E of 24th December).

Act 14/2011, of 1st June, governing Science, Technology and Innovation (BOE 2nd June 2011).

**Single additional provision.**

References to individuals, groups or academic positions are expressed in the male gender in this document as the non-marked grammatical gender. Where appropriate, the precepts may be cited in the female gender.

Salamanca, 11th April 2019

The Vice-Chancellor for Research and Transfer



D<sup>a</sup>. M. Susana Pérez Santos  
Vicechanciller de Investigación y Transferencia





## APPENDIX

**FEATURES OF THE FUNDING PROGRAMME:** Beatriz Galindo JUNIOR Funding Programme, Ref. BEAGAL18/00090  
Teachers and/or researchers must accredit that they have at least 2 years' experience in research and/or teaching abroad, after they obtained their PhD.

**TYPE OF CONTRACT:** Distinguished Researcher (article 23 of Act 14/2011, of 1st June)

**DURATION OF THE CONTRACT:** Approximate duration of 4 years.

**WEEKLY WORKING HOURS:** 37.5 hours

**FUNDING:** The contract will be jointly financed by the Ministry of Science, Innovation and Universities and Vocational Training and Universidad de Salamanca

- 1) 35,000 euros by the Ministry of Science, Innovation and Universities.
- 2) 10,000 euros by the University (including the corresponding Social Security contributions as the employer of the recruited teacher and/or researcher).

**SALARY:** 12 monthly instalments of € 2,769.

**PLACE OF WORK:** Department of Geology

**Expected contract start date:**

**Expected contract end date:**

### **SPECIFIC REQUIREMENTS AND PROFILE OF THE POSITION**

Area of Internal Geodynamics

PhD in: Physics specialising in Geophysics or a PhD in Geophysics.

### **TEACHING PROFILE: Geophysics**

The Earth, as a complex system, is active on different temporal and spatial scales involving interactions between oceans, solid earth, atmosphere, land cover and the cryosphere. Current changes in the 'Earth system' will have a profound impact on our future living standards, e.g., energy, climate, water etc. There is interaction from micro to global 3D spatial scales and from real-time to geological time scales. Recently, the availability of satellite observations with global and uniform coverage is leading to a dramatic change in the way we understand the Earth. This observational opportunity also represents a challenge in terms of 'Big Data' processing, modelling and interpretation. Remote sensing data are, therefore, crucial to making the right decisions for the future of our planet. Current satellite data focused on the solid Earth include gravity and the magnetic field, as well as surface deformation (e.g., inSAR).

This course is aimed at geologists and geophysicists, geodesists with an interest in satellite data from both a theoretical and an applied perspective. Given the diversity of the community of geoscientists presently interested in satellite data, the contents will be adapted to the different backgrounds of the students.

### **Geophysical Prospecting and Evaluation by Satellite: 3 ECTS. Programme**

-Satellite missions: historical background. Summary of the main satellite missions (e.g. GEOSAT, CHAMP, magsat, Grace, enjoyment, Swarm etc.) related to solid Earth monitoring and imaging: on-board instrumentation, data resolution, time span.

-Measuring on a satellite: sensors and instruments. Gravity, magnetic, altimetry measurements. Data processing. Data formats, uncertainties and systematic errors.  
-Magnetic field data: from the core to the magnetosphere. Magnetic data processing, time series. Spectral separation: main field, field, crustal external field. Geodynamo, CMB topography. Magnetosphere ring current: lower mantle electrical conductivity. Ocean Tides: upper mantle electrical conductivity.

Gravity field data: from lower mantle to crust. Gravity data processing, temporary and static field. Geoid, gravity anomalies, gravity gradients. Gradiometry, data directionality. Sensitivity kernels, spherical harmonic analysis.  
-Satellite data modelling: global and regional scales. Merging satellite and terrestrial data: geomagnetic observatories, magnetotelluric and seismic tomography. Forward modelling and investment. Practical examples

### Methodology

The course is structured following an exposition-application scheme. Students should first become familiar with the basics or fundamentals of the discipline under consideration. Then, a practical example or application of the theory offers the possibility to test whether the concepts explained before have been properly understood or not, and if so, to what extent. The practical sessions will include a brief summary of the main theoretical aspects, as a short reminder, and focus on more specific concerns about how to solve the problems involved numerically and technically. The length and level of the course depends on the complexity of the practical problems to be solved. Thus, this course might be offered at an undergraduate and/or master's degree level.

### Infrastructure

Provided that data and software packages to handle and model satellite data are freely available, only a computer laboratory and standard classrooms are required

**RESEARCH PROFILE:** Geophysical prospecting from satellite data: Integrated petrological and geophysical models.

A common key to getting closer to answering fundamental open questions in geosciences is to overcome the limitations and understand the discrepancies of global Earth models based on geochemical, geophysical and geodynamic datasets. Established methods of seismic tomography, topography, gravity and electromagnetic data analysis and geodynamic modelling constrain distributions of seismic velocity, density, electrical conductivity, and viscosity at depth, all depending on temperature and composition of the rocks within the Earth. However, modelling and interpretation of multiple datasets provide a multifaceted image of the true thermochemical structure of the Earth that needs to be appropriately and consistently integrated. A simple combination of gravity, electromagnetic, geodynamics, petrological and seismic models alone is insufficient due to the non-uniqueness and different sensitivities of these models, and the internal consistency relationships that must connect all the intermediate parameters involved in describing the Earth. In fact, global Earth models based on different observables often lead to rather different, even contradictory results. A breakthrough in global and integrated imaging of the fine-scale thermochemical hydrous and rheological structure of the Earth's lithosphere and underlying mantle is needed in order to address fundamental open questions about the dynamics and evolution of the Earth.

This project will produce next generation global images of the Earth's lithosphere and underlying upper mantle. It will include thermochemical, hydrous, melt and stress distributions from a holistic perspective that integrates computational petrology and laboratory data with terrestrial (waveform tomography, surface elevation and heat flow, geoneutrinos) and new satellite (gravity, geodetic and magnetic) data within a self-consistent thermodynamic framework. To this end, we will exploit the complementary resolving power of the different Earth observations using cutting-edge forward and inverse modelling techniques modified 'ad hoc' to handle 'Big Data' at a global scale. The objective of the proposal requires an iterative, modular approach that carefully considers the different resolution and sensitivity of global datasets and the high non-linearity and interdependency of the geophysical and geochemical problems involved. This is structured into three main interconnected modules according to the integrative nature of the objective.

Module 1: Global thermochemical inversion of seismic waveforms, gravity, surface elevation and heat flow data



#### **TASKS AND ACTIVITIES:**

The candidate is expected to become a member of the Geophysics and Tectonics GIR from Salamanca University and UIC 194 from 'Junta de Castilla y León'. From that regard, he/she should have skills in the application of geophysical techniques to tectonics. Since some of the members of the UIC/GIR are already devoted to the use of some geophysical methods (potential fields and controlled source seismics), the field of expertise of the candidate should be mostly natural source (EQ and noise) seismic investigations and/or satellite geophysics. He/she should incorporate both methods in the research field of the group, providing interactions and contacts with other groups worldwide that have shown proficiency in the use of these techniques.

The candidate will start applying these techniques in the Iberian Peninsula and surrounding areas so some proven knowledge of the geology of this zone is welcome.

Also, the candidate should incorporate new subjects to the Geology degree and Geology master. In the Geology degree, the candidate should incorporate 1 ECTS to the Apply Geophysics subject, in which he/she should include the new geophysical techniques associated to satellite data. In addition, he/she should get in charge of the 3ECTS Seismology subject in the Geology and Engineering Geology Degree from 2020 onwards. At a master level, the applicant should add two new subjects to the Applied Geology planning: One devoted to advance seismology techniques and another one based on Satellite Geophysics. Both subjects will have 3 ECTS and will get incorporated to the planning also in 2020.

#### **SELECTION COMMITTEE:**

The Secretary General of Universities shall appoint a panel of international experts that will act as a collegiate body.