Advert Template

Area of University (College/School/Budget Centre): Institute of Electronics-Bulgarian Academy of Sciences
Job Title: Early Stage Research Fellow
Job Status (Full Time/Part Time and Fixed Term/Permanent): Full time
Location: Sofia
Salary (Full band or fixed point if restricted by funding): Salary defined by Marie Sklodowska-Curie Actions ITN
Job reference number:
Who to contact with enquiries: assoc. prof dr. techn. Albena Daskalova
Closing Date: 31/12/2023

Advert text

Marie Sklodowska-Curie Early Stage Research Fellow (ESR8)

Institute of Electronics-Bulgarian Academy of Sciences

The Institute of Electronics-Bulgarian Academy of Sciences is looking for one Early Stage Research Fellowswithin the Femtoscience application group/Laboratory Nonlinear and fiber optics - for the collaborative research project AIMed in the frame of the EU Horizon 2020 Marie Skłodowska-Curie Actions Innovative Training Networks H2020-MSCA-ITN-2019 " AIMed: Antimicrobial Integrated Methodologies for orthopaedic applications" European Training Network (ETN).

AIMed is an innovative ETN that aims to develop a range of materials with antibacterial properties that are suitable for use on the surfaces of orthopaedic implants. This is in response to the increasing problem of post-operative infection by antibiotic-resistant bacteria. By combining several approaches to disrupt surface biofilm formation, the materials developed by the AIMed network will eventually result in fewer surgical infections, faster recovery of patients, and greatly reduced post-operative healthcare costs. The network will develop novel peptide sequences and ways of binding them to the surfaces of polymers, ceramics and metals. A complementary approach will be the development of metal ion substituted calcium phosphate coatings which can be applied to implants by additive manufacturing techniques. The efficacy of these anti-bacterial surfaces will be further enhanced by laser processing of the material to make it unattractive to biofilms (by altering the roughness and wetting characteristics). The network will carry out a thorough investigation of the properties of the new materials to ensure that they are feasible for use in future implants. This work will include the evaluation of antibacterial action and biocompatibility using appropriate models. Training of the 15 ESRs appointed to the network will be multi-disciplinary and intersectoral, with an emphasis on the need for technology transfer from academic institutions to commercial users.

Specific to AIMed, in addition to their individual scientific projects, all ESRs will benefit from further continuing education through a dedicated training program in the various fields of expertise of the consortium members, which includes secondments, summer-schools, workshops, transferable skills courses and active participation in conferences and outreach activities.

As part of the position, the successful candidates will be enrolled as staff candidates for a PhD at the Institute of Electronics - Bulgarian Academy of Sciences.

The successful candidates should be able to:

1. Undertake research, e.g. by planning, preparing, setting up, conducting and recording the outcome of experiments, performing data analysis, desktop research etc.

2. Participate in maintaining laboratory facilities, and assist other members of the group by sharing knowledge and expertise. Collaborate with others in an interdisciplinary environment and in close collaboration with experts from biology and medicine.

3. Actively participate within the research group, communicating and presenting research at meetings, through publications and other recognised avenues as appropriate, ensuring information is communicated to internal and external partners.

4. Contribute to research publications and presentations as required.

5. Analyse and communicate complex ideas, concepts and data using appropriate methods and packages.

6. Resolve issues and support senior colleagues in devising procedures required to ensure accurate and timely reporting.

7. Generate research output and contribute to the development of independent and original ideas as appropriate.

8. Maintain and update the area of specialist knowledge, researching and critically appraising relevant literature within the area.

9. Undergo personal and professional development that is appropriate to and which will enhance performance.

Conditions of eligibility of researchers: ETNs recruit a specific type of researcher. Successful candidates:

1. MUST not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting university or company for more than 12 months in the 3 years immediately before the recruitment date. This time is measured from the date of signing the employment contract. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention are not taken into account.
2. MUST at the date of recruitment, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. 'Date of Recruitment' means the first day of the employment of the researcher (i.e. contract starting date). 'Full-Time Equivalent Research Experience' is measured from the date when the researcher obtained the degree entitling him/her to embark on a doctoral degree programme.
3. MUST have a Master's degree or equivalent in Physics,Nanotechnologies, Optics, Biophysics, Biomaterials, Materials Science, Biomedical and Tissue Engineering or a related field. (minimum classification 2:1).

English language: All courses are delivered in English. Successful candidates must demonstrate that their ability to understand and express themselves in both written and spoken English .

Applications are encouraged from all sectors of the community, reflecting the consortium's commitment to equality and diversity. Female candidates are especially encouraged to apply. Employment procedures and contracts will conform to the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers.

This is a full-time position (40 hours per week), fixed-term for 1 year and is available with start date 02. 01. 2024 to 31 December 2024.

ESRs will be paid at Marie Curie published rates. The basic annual salary will be in the region of €37,320/annum living allowance adjusted by the country coefficient and then subject to employer and employee deductions. The exact salary will be confirmed upon appointment. In addition, a mobility allowance and family allowance, depending on family circumstances, will be paid with the same adjustments and deductions as for the living allowance.

Job descriptions

Applicants must confirm and be prepared to provide evidence that they meet the Marie Sklodowska-Curie Eligibility criteria as specified above.

Position (ESR8): Ultra-short laser surface processing for enhancement of biological and antimicrobial properties of biomaterials.

(i) To develop metal ion doped/nanoparticles CaP bone substitutes with range of antimicrobial activity via a)Ultra-short laser texturing of metal ion/nanoparticles doped CaP b) Determination of ablation thresholds, analysis of ablation craters obtained under variation of different laser parametric conditions, estimation of the influence of laser radiation over the chemical structure of the doped CaP. c) Design of microstructures and textures with diverse geometrical designs d) functionalisation with Antimicrobial Peptides b) Doping of Ca salts with anti-microbial silver, zinc and copper ions; (ii) To analyze photochemical and morphological changes after laser impact of such materials. (iii) To assess the efficacy of microbial inhibition of such materials as a function of antimicrobial loading and elution profile. (iv) To assess these materials in vitro in terms of the impact on osteogenic response as a function of antimicrobial activity; (v) To investigate the role of exosome signalling and function in both the osteogenic response and antimicrobial activity; (vi) To investigate the impact of sterilisation processes on antimicrobial function (e.g., gamma irradiation); (vii) PhD thesis

Essential criteria

1. A Masters degree in Physics, Materials Engineering , Nanotechnologies or relevant discipline, or equivalent relevant research experience.
2. Knowledge of research methods and techniques within specialist field.
3. Proven ability to analyse complex information appropriately.
4. Proven communication skills, including presentation to various audiences.
5. Excellent organisational and team-working skills.
6. Proven ability to demonstrate creativity, innovation and accuracy within work.

Desirable Criteria

1. Possess serious records on biomaterial surface processing by means of ultra-fast laser treatment.
2. Strong background in ultra-fast laser physics and knowledge in laser-material interaction.
3. Knowledge of optical setups of experiments.
4. Knowledge of the processes of laser ablation and modification is a must.
5. Familiarity with computer simulations

6. Relevant laboratory experience
7. Analysis of microscopy images and large sets of data.
8. Ability to work across disciplines will be necessary.

Specific to AIMed, in addition to their individual scientific projects, all fellows will benefit from further continuing education, which includes **secondments**. In

this project, secondments will include 1 month at RBI, Croatia; 2 months at UPHF, France; 1month at UoB, UK; 1 month at INPT, France; 2 months at U. Porto, Portugal

Closing date: Friday, 31 December 2023

As well as applying to the Institute of Electronics, candidates should send **their CV with a Cover Letter to the coordinator via the projects website indicating** for which project they are applying and provide a brief motivation as to why they wish to become an ESR. **Candidates should be aware that their CV may be shared with the named beneficiaries within the consortium**, as part of the application review process, to ensure open, transparent and merit-based recruitment. In addition, candidates should provide **a supporting statement to demonstrate how they meet all of the essential criteria for each position**.

Information on the AIMed project can be found in the website www.aimed-itn.eu

For informal enquiries please contact Dr Albena Daskalova albdaskalova@gmail.com