

Alma Mater Studiorum – University of Bologna (UNIBO), Bologna (BO), Italy

Viale Risorgimento 2, 40136, Bologna (BO), Italy
Marie Skłodowska-Curie Actions, Early Stage Researcher

Deadline for applications: July 9th, 2018

Expected starting date: November 1st, 2018

Job description:

The job is a full time position for an Early Stage Researcher (ESR) in the field of road pavements and innovative construction materials. The title of the project is: **Vulnerable Users Protection with advanced paving materials (ProtectVU)**. The goals are to develop solutions for advanced paving materials (including footpaths and bicycle tracks) for the protection of users, in particular those more susceptible to falls and impact injuries and, to use recycled rubbers and impact absorption techniques to create new user friendly and green materials. The proposed paving solutions will be able to increase the safety of vulnerable road users.

Job duration: 36 months

Main research field: Pavement Engineering

Research subfield: road safety and injury prevention

Institution description:

The University of Bologna is the second largest university in Italy and one of the most active in research and technology transfer. It stands among the most important institutions of higher education in EU with 87,000 enrolled students, 2,857 Academic staff, 1,198 post-docs, 1,606 PhDs, 3,014 administrative and technicians staff units. At UNIBO, research activities are promoted, coordinated and supported by the 33 Scientific Departments. The Department of Civil, Environmental and Materials Engineering (DICAM) is equipped with a Centre which gathers 11 Labs that operate in all specific areas of Civil, Chemical, Environmental and Materials Engineering and more. Road Research Laboratory (LAS) is one of these labs and for over 75 years it has been conducting research and experimentation in the field of transportation. Traditional and cutting-edge equipment is used to analyse and characterise soil materials, aggregates, asphalt, bituminous materials as well as new materials both in the laboratory and on site. LAS's institutional objectives are university research and teaching. It is moreover an authorized agency for standards testing and certification for third parties.

Working place

The project will take place at the Road Research Laboratory (LAS) of the University of Bologna. The ESR will have access to all the lab facilities and services as well as to the local Department administrative offices.

A number of secondments in Sweden (RISE Research Institute of Sweden) are scheduled, within the research group of Dr. Viveca Wallqvist and Dr. Anders Larsson, working in the field of vulnerable road users, which includes morphological, surface, chemical and mechanical characterization techniques focusing on the development of sustainable materials for injury prevention. Other secondments are planned in the premises of a Swedish company (Svensk Däckåtervinning AB), in charge of organising the collection and recycling of all End-of-Life tyres according to the Regulation on Producer Responsibility for Tyres (1994:1236).

Project description

The individual research project will be aimed at the prevention of injuries for vulnerable road users by innovative “shock absorbing” protective urban pavement sections made of composite rubber



asphalts and/or nanocomposite rubber-based concretes. Protective urban pavement section will be based on the ability of the materials to provide an impact absorption, aiming to significantly reduce head injuries of fallen road users. The new safe pavement systems will allow to (i) reduce impact of falls by cyclist, pedestrians, disabled people while keeping functional properties as friction and rolling resistance adequate; (ii) add to the circular economy by using End-of-Life (ELT) tyres as a resource (recycling); (iii) provide suitable information for efficient formulation and formation of safe pavement systems. Furthermore, parameters as visibility and appearance will be considered.

The major tasks of the research activity are as follows.

Task 1: use recycled rubber from ELT tyres for the production of protective advanced paving materials.

Task 2: experimental characterization of paving materials to reduce head injuries for vulnerable road users.

Task 3: assess visibility and friction characteristics of the developed paving materials along with their durability, environmental impact and recyclability.

The first expected result will be the selection of ELT rubber and its full characterization. The second expected result consists in the mix design and characterization of the advanced protective paving structures. The third expected result is the development of laboratory and trial-site assessment protocol for accident prevention characteristics. Other expected result are: the assessment of recyclability of the rubber-containing material; the assessment of the working environment for the workers as well as air and water effects during the pavement service life. From this training, the ESR will acquire broad knowledge and expertise in the emerging field of innovative construction materials, with specific reference to protective concretes and asphalts.

The training will be complemented through a planned secondment at RISE Research Institute of Sweden (at months 13-14, 18-19, 25-26, 33 and 38 of the project, for a total of 8 months), where the ESR will develop protective and surface characterization of the developed mixtures, and through another secondment at SDAB (at months 32, for a total of 1 month) in order to produce ELT rubber for Green Procurement in protective urban pavements.

Marie Skłodowska-Curie Initial Training Network SAFERUP!

Urban pavements comprise almost 40% of European cities and are the main means by which the public travels every day. Urban pavements must accommodate all users in the most efficient, safe, sustainable and smart way. A key factor to increase the liveability of tomorrow's Smart Cities will be transforming the way urban pavements are perceived, designed, built, maintained and function. SAFERUP! aims at providing cities with innovative solutions that will form the future urban paved environment, by training talented researchers in the fields of: smart, recycled and durable paving materials; enhancing accessibility and safety of vulnerable users (e.g. elderly & disabled); studying user behaviour; analysing life cycles; managing wash-off water and bioremediation; producing tempered and acoustic pavements; enabling energy harvesting and self-sensing technologies. The SAFERUP! Consortium believes in this future and has created a unique team of world leading commercial and academic research engineers and scientists, with a diverse range of expertise needed to develop the novel solutions required to deliver this future and its anticipated benefits. Fifteen ESRs will undertake their PhDs in a research and training programme designed to optimise their multidisciplinary and cross-sectoral experience through secondments and a variety of SAFERUP!-wide forums. All ESRs' projects are interrelated and considerable synergies, trans-project contributions and collaborations will occur. A key focus of the training will be career planning, entrepreneurship and skills development in particular communication. SAFERUP! participants with communication expertise will develop the communication and dissemination strategy to maximise the exploitation of the developed solutions. SAFERUP! will create a new generation of professionals with multidisciplinary expertise in urban pavements and related fields appealing to employers, who will expand the social benefits of the new urban pavements well beyond the end of SAFERUP!



Candidate profile

The candidate is required to have a master degree in Chemistry, Chemical Engineering or Material Science giving access to the PhD school and NOT to hold any PhD degree. Previous research experience, (which must be no longer than 4 years), although appreciated, is not mandatory. Good oral communication skills in English is compulsory. Willingness to travel internationally for the purpose of research, training and dissemination is mandatory.

Eligibility requirements

ESR appointments are full-time fixed term for 36 months. Candidates matching the required profile will be evaluated until a successful candidate is appointed. There are strict eligibility rules associated with the recruitment of Early Stage Researchers in MSCA Innovative Training Networks.

Career: At the time of recruitment, the ESR must hold a Master degree giving access to PhD and not more than 4 years of previous research activity. A PhD degree in any field is not compatible with this ESR position.

Mobility: Transnational mobility is an essential requirement of Marie Skłodowska-Curie Training Networks. At the time of recruitment, the ESR must not have resided in Italy for more than 12 months in the 3 years immediately prior to the recruitment date and not have carried out in Italy his/her main activity (work, studies, etc.). Applicants must be prepared for a secondment for a total of 8 months in Sweden, at RISE Research Institute of Sweden, and another secondment of 1 more month in a Swedish company (Svensk Däckåtervinning AB).

Language: A good knowledge of spoken and written English is required and will be evaluated during the selection process.

How to apply

Applicant shall provide the documentation listed in the corresponding Application Form. The documents shall be sent by e-mail to both the following addresses: viveca.wallqvist@ri.se AND dicam.saferup@unibo.it. A confirmation message will be sent upon submission.

Evaluation and interview

The selection process will consist of CVs, motivation and records evaluation and an interview (additional interviews could be required). The interview to assert the skills, the motivation and the fluency in English, will take place at the host institution or, for those candidates who are not able to travel to Bologna (Italy), by internet connection. The candidates will be ranked according to both their records and the interview. The candidate at the highest ranking position will be offered the position. If, for any reason, the selected candidate will decline the offer or will fail to comply with the requirements for enrolment in the position, the one following in the list will be selected. More details on the selection process could be found on <https://site.unibo.it/saferup> and on <https://euraxess.ec.europa.eu/>.

Rights and responsibilities of researchers participating in Marie Skłodowska-Curie Actions

The European Charter for Researchers is a set of general principles and requirements which specify the roles, responsibilities and entitlements of both researchers and the employers and/or funders of researchers. The aim of the Charter is to ensure that the nature of the relationship between researchers and employers or funders is conducive to successful performance in generating, transferring, sharing and disseminating knowledge and technological development and to the career development of the researchers. It is obligatory for applicants to read and understand the detailed information regarding the rights and responsibilities of researchers engaged in a Marie Skłodowska-Curie Innovative Training Network. The European Charter for researchers can be accessed at: <https://euraxess.ec.europa.eu/jobs/charter/european-charter>.



Employment contract and remuneration

The selected candidate will be appointed under a 36-months full-time employment contract with full social security and fiscal coverage, as foreseen by the Italian national legislation. The remuneration will be compliant with the rules of the ITN-MSCA, as by the Marie Skłodowska-Curie Actions Work Programme 2016-17, 'European Union Contribution and Applicable Rates'. The gross amount per year of the allowances includes the salary (39820€), the mobility allowance (7200€) and a family allowance if eligible (6000€). These gross amounts include all compulsory deductions under national applicable legislation (taxes depend on the country of the host institution).

