HORIZON 2020
Marie Skłodowska-Curie Actions

TRUSS
Training in Reducing Uncertainty in Structural Safety

TRUSS
www.trussitn.eu

TRUSS (**T**raining in **R**educing **U**ncertainty in **S**tructural **S**afety) is a Marie Skłodowska-Curie Innovative Training Network funded by the European Union under the Horizon 2020 Programme. TRUSS is structured into taught modules combined with original and impactful research supported by secondments that will give the successful candidates significant insights and exposure to research and innovation in both academia and industry.

EARLY STAGE RESEARCHER VACANCY:
ESR 13

Project Title:

USING TRUCK SENSORS FOR ROAD PAVEMENT PERFORMANCE INVESTIGATION

Host

University of Nottingham (UNOTT)

Address

Nottingham Transportation Engineering Centre, University of Nottingham, University Park, Nottingham, NG7 2RD

Country

United Kingdom

Main Supervisor

Dr. Tony Parry

Background

It has been known for many years that road surface evenness influences vehicle fuel consumption, with smoother roads significantly improving fuel efficiency (usual estimates of up to 5% compared to 'rough' roads). More recently, it has been claimed that pavement stiffness also influences fuel economy (with varying estimates of <1 to 5%). This has been established in experiments using a limited number of instrumented test vehicles under carefully controlled conditions (e.g. steady speed, no gradient etc.) and for short test sections. What is less clear is the significance of these impacts on vehicle fleet fuel economy, under real driving conditions and at network level. This has recently gained more focus in the highway authority and research community as carbon footprinting of road maintenance plans has gained importance. Modern trucks are fitted with many sensors as standard and used to inform decisions on maintenance and driver training requirements in large fleets. However, much of the information produced could also be used in the measurement of how road condition influences performance in terms of vehicle operation. In particular, two research questions have not been sufficiently well answered: '*what is the influence of road*

pavement roughness on truck fleet fuel consumption?' and '*what is the influence of road pavement stiffness on truck fleet fuel consumption?*' **The research will provide answers to these questions to help prioritise pavement maintenance and design decisions with respect to user and environmental impacts**. In co-operation with Microlise Ltd, who collect and interpret location-referenced sensor data for truck fleet managers, the researcher will analyse truck fleet fuel consumption using data from a large number of trucks in everyday use (currently the UK fleet size sampled by the company is about 50000 trucks). TRL Ltd, experts in road condition measurement, will provide data, including evenness, stiffness and geometry, for the UK road network. The correlation between truck fleet fuel consumption and road condition for a large number of vehicles will be analysed across the network.

Objectives

To assess the impact of road condition on truck fuel consumption based on truck sensor measurements. Results will be verified by controlled measurements using a sub-set of the most modern trucks (with the most sensitive fuel sensors) on selected sections of the network and include additional measurements, such as wind speed, air temperature, etc. Finally, results will be used in carbon footprint studies of road maintenance strategies to provide information on reducing lifecycle carbon impacts through improved road maintenance planning.

Expected Results

Tools to assess impact of **road condition on truck fleet fuel consumption** including influence of road pavement roughness and stiffness, extending the system boundary of lifecycle carbon footprint of road maintenance strategies to include truck fleet fuel consumption, and truck fleet fuel consumption inventory for road maintenance life cycle analysis.

Secondment

This position involves a secondment of some months to Microlise Ltd and also to TRL Ltd. In Microlise, the researcher will gain: (a) training in truck sensor data collection, in particular with reference to fuel consumption and associated factors such as dynamic axle loads and location referencing, and gain exposure to truck manufacturers and truck fleet operators and understand their priorities with respect to fleet fuel consumption and control. In TRL, the researcher will gain: (a) training in road condition measurements of various factors including evenness, stiffness and geometry, and (b) exposure to highway authorities and understand their priorities in the area of road maintenance planning. The ESR will build and deliver the database of condition measurements required for the research study.

Specific Requirements

- At the date of closure of appointments, candidates must have obtained, or finalise within 3 months, a 4-yr Bachelor or a Masters degree in Science, Engineering, Computing or Maths, with a strong background in data analysis.
- Prior knowledge and skills in programming are desirable but not mandatory.
- We are looking for candidates with a strong motivation to pursue a career in engineering and an open mind for new approaches and a lot of team spirit. Creativity and level of

independence will be considered.

- Solid written and oral communication skills in English are prerequisites of any successful application.

Eligibility Criteria

- Researchers can be of any nationality and age.
- All recruited researchers **must be Early-Stage Researchers (ESRs).** A ESR shall, at the time of recruitment by the host organisation, **be in the first four years of their research careers** and not yet have been awarded a doctoral degree. The four years start to count **from the date when a researcher obtained the degree which would formally entitle him/her to embark on a doctorate**.
- Researchers are required to undertake transnational **mobility** (i.e. move from one country to another) when taking up their appointment. One general rule applies to the appointment of researchers: **At the time of recruitment by the host beneficiary, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host beneficiary for more than 12 months in the 3 years immediately prior to the reference date. Note that the *mobility* rule applies to the beneficiary where the researcher is recruited, and not to beneficiaries to which the researcher is sent or seconded.**
- For all recruitments, the eligibility and mobility of the researcher will be determined at the time of their (first) recruitment in the project. The status of the researcher will not evolve over the life-time of a contract.

Salary and Working Conditions

- Each position is for a period of 36 months. These positions will be available from August/September, 2015. The Marie Skłodowska-Curie programme offers highly competitive and attractive salary and working conditions. Exact salary will be confirmed upon appointment. It consists of a living allowance (= 37320 euro/year [the Marie Skłodowska-Curie rules apply a correction factor to this amount to allow for the cost of living in different countries]) + a monthly mobility allowance (= 600 to 1100 euro/month depending on the family situation).
- Furthermore, PhD tuition fees for the ESR are covered and the research project is aimed at defending a thesis and obtaining a PhD degree. In addition to their individual scientific projects, all positions will benefit from further continuing training, which includes internships and secondments (All ESRs will be seconded at least once during this period at another partner site), a variety of training modules as well as transferable skills courses, active participation in workshops and conferences, and exposure to large enterprises, SMEs and Universities from different European countries involved in TRUSS.

Application Procedure

(1) Check you meet **Eligibility criteria** and **Specific requirements for the ESR position** project/s you are applying for.

(2) Prepare the following **application documents** (in English):
   a. **A curriculum vitae**, including contact details, education (at University level and other), work experience, prizes/awards, language skills, etc… (max. 2 pages). The CV should reflect a representative array of achievements and qualifications appropriate to the post for which application is being made.
   b. **Official academic record** of undertaken courses & grades for Bachelor (and Master if required in specific criteria) degree.
   c. **A motivational letter** in which the applicant describes his or her motivation to pursue postgraduate studies and to conduct the research project/s applied for. Mention the ESR project number or numbers (in the latter indicate order of preference if any) on your motivational letter and the subject of the email.
   d. **A reference letter.**

(3) Email your application documents as attached files to: trussitn@ucd.ie **before the 1st May 2015 deadline** and mention the ESR project number/s you are applying for in the subject line.

(4) The documents provided will be used to select the best candidates. Successful candidates will be informed **before 29th May 2015**.

For more information on a position with TRUSS, please check www.trussitn.eu/vacancies or email trussitn@ucd.ie