MSCA Postdoctoral Fellowships:
Proposal writing bootcamp at FEUP
Postdoctoral Fellowship
Marie Skłodowska-Curie Actions
2nd edition

U. PORTO
FEUP FACULTY OF ENGINEERING
UNIVERSITY OF PORTO

European Commission

SUPERVISOR INFORMATION	
First and Last name	Aires Colaço
URL of supervisor webpage	https://sigarra.up.pt/feup/pt/func_geral.formview?p_codigo=519318
Department	Department of Civil and Georesources Engineering
Field(s) of research	

PROJECT PROPOSAL	
Title (optional)	Prediction and mitigation of ground borne-noise and vibrations induced by railway traffic

Brief project description

Railway transport offers many benefits to society, by providing an affordable and safe transport option and enabling sustainable economic activity across the world. However, there are still some negative impacts, which should be minimised as far as reasonably practical and economically viable. One of these is the emission of ground-borne noise and vibrations, which, although generally localised to the immediate vicinity of the railway, can have a significant impact on those affected.

Given these concerns, greater focus is being put on the effects of railway noise and vibrations in the decision-making process related to upgrading or modifying existing railway lines, building new lines, or planning other developments near railway tracks. Reliable tools are essential for predicting and monitoring the emission and impact of noise and vibrations in these contexts.

To this end, the present application aims to develop an innovative, AI-powered, user-friendly tool that provides an integrated solution for predicting ground-borne noise and vibrations induced by railway operation in large-scale urban environments. The proposed solution is a web-based GIS platform with highly enhanced computational efficiency through the incorporation of machine learning algorithms, design to assess the impact on a large number of residential buildings affected by a railway line.

The tool will be able to deal with different types of railway infrastructures (both surface and underground), rolling stock, soils, buildings and facilities with high flexibility, avoiding excessive engineering costs and large computational times. Using this tool in an early stage of design, such as an environmental impact assessment phase, would allow the delimitation of cases that require a deeper analysis, using advanced numerical models, and of those that can be immediately discarded, providing a useful framework for decision makers and technicians that, although have basic knowledge about the topic, are not experts on railway noise and vibrations.