

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : Given names :

Status (prof., assistant prof., ...):

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Geomechanics / Soil mechanics / mechanical behavior of granular materials by experimental and numerical approaches (DEM) / Numerical simulation of viscoelastic granular materials (asphalt mixtures) / Mechanical behavior of railway ballast / Numerical modeling of structures damage in civil engineering.

Two major publications in the field proposed for the PhD :

1.
2.

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD

Topic # (see list) :

Title :

Subject :

In the context of the increasing impacts of climate change on transport infrastructure, this research aims to model the behavior of road structures subjected to extreme climatic conditions, with particular emphasis on the effect of high temperatures on their durability. The study is based on a multi-scale hybrid numerical simulation approach combining Contact Dynamics (DEM/CD) and Artificial Intelligence (AI) surrogate modeling, to analyze the viscoelastic behavior of bituminous materials and to identify damage mechanisms within surface layers. Simulations will be performed using the LMGC90 code, incorporating a viscoelastic contact law calibrated from experimental data obtained within the ANR Binary project (2020–2025). This approach will enable the characterization of intergranular forces, stress distribution, and critical zones of rutting and particle detachment, with the objective of developing predictive models of wear and degradation of surface layers under extreme climatic conditions, supported by multi-scale and full-scale experimental testing.

Keywords :

Expected collaborations :

Background required from the applicant :

This topic requires competencies in numerical simulation (DEM and/or FEM), continuum mechanics, constitutive laws of construction materials, and structural modeling. Basic knowledge of the Python programming language applied on AI would be an asset. The candidate must hold a Master's degree in numerical mechanics or civil engineering.

Existence of a PDF file detailing the proposal ("yes" or "no") :

(see guidelines on the website www-csc.utt.fr)