

Polytech network form for PhD Research Grants from the China Scholarship Council

This document describes the PhD subject and supervisor proposed by the French Polytech network of 14 university engineering schools. Please contact the PhD supervisor by email or Skype for further information regarding your application.

Supervisor information	
Family name	Shahrour
First name	Isam
Email	isam.shahrour@univ-lille.fr
Web reference	http://ishahrour.com/fr/bienvenue-2/
Lab name	Laboratoire de Génie Civil et géo-Environnement (LGCgE)
Lab web site	https://www.lgcge.fr/fr/
Polytech name	Polytech Lille
University name	University of Lille
Country	France

PhD information	
Title	Use of the smart technology for the lifecycle management of the underground space
Main topics regards to CSC list (3 topics at maximum)	Smart technology, sustainable development, lifecycle manangement

Required skills in science and engineering	Geotechnical engineering or civil engineering background, information system knowledge
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Subject description (two pages maximum)

The underground space plays an important role in urban area. It hosts urban infrastructures such as those related to transport, water, energy and telecommunication. In some cities, the underground space is used as an underground city with social and economic activities. With the urban densification, this space will play a larger role. In addition, this space offers large opportunities to implement sustainable development strategies, because it provides space for efficient transport system that reduces urban traffic jams as well as for energy and water facilities.

Today, it is of a major concern to consider sustainability and lifecycle approaches in large projects. The application of these approaches to underground space requires an integrated approach that ensures share of information and stakeholders' expertise at the stage of design, construction, exploitation and renovation of underground space.

The Smart technology offers innovative way for the management of urban infrastructures, that uses the Information Technology to monitor infrastructures, collect real-time data concerning these infrastructures. Data analysis allows a better understanding of the complex behavior of these infrastructures as well as their optimal management and taking rapid actions in case of abnormal events. This technology presents large perspective; that's why a large number of cities are interested in its implementation.

The thesis proposal aims at developing the Smart Underground Space concept with an integrated approach considering both sustainability and lifecycle. This concept will enable developing a knowledge-based management of the underground space, that uses digital and social innovations to optimize the design, construction and exploitation of this space and to enhance its security. This topic is new. The development of this innovative topic will open new research area. It will beneficiate from the LGCgE experiences in both geotechnical underground constructions and smart cities. This work will be co-supervised by Dr. Hanbing BIAN (Associate Professor, University of Lille, Polytech Lille, LGCgE, hanbing.bian@polytech-lille.fr).