PhD position in

Monitoring and Modelling of Deep Excavations in Urban Environment

Department of Civil, Environmental, Land, Building Engineering and Chemistry
POLITECNICO DI BARI

The Department of Civil, Environmental, Land, Building Engineering and Chemistry (DICATECh) of Politecnico di Bari invites public applications for a 3-years scholarship for the **PhD programme in Risk, Environmental, Territorial and Building Development (DRSATE)** to carry out a doctoral research on Modelling and Monitoring of Deep Excavations in the Urban Environment.

Context of research

Urban development in cities requires heavy exploitation of underground space, entailing the execution of deep excavations from the ground surface, with potential detrimental effect on existing buildings and critical infrastructure.
In this project, a digital platform integrating mathematical models and live-stream monitoring is proposed as an early-warning system to prevent excavation-induced damage on buildings. Implementing IoT paradigms, the platform will collect measurements in near real-time, both on the retaining walls and on neighbouring structures and soil, using instrumentation installed on site, integrated with satellite-based settlement measurements. As a part of the early-warning strategy, data-driven modelling of soil-structure interaction will be concurrently executed, to provide real-time estimates of building deformations, and to assess the beneficial effect of different mitigation measures.
The research will be conducted in collaboration with Aarhus University and NGI. In particular, the candidate will work initially on the online digital platform developed by NGI called "*NGI Live*" (https://www.ngi.no/forskning-og-radgivning/digital-container/ngi-live/ in Norwegian), aiming at improving it in the course of the PhD. Also, the industrial partner Arup-Copenhagen will take part in a steering committee and share past monitoring data for validation of the developed interaction framework included in the improved platform, that will comprise both simplified analytical solutions, devised at Aarhus University, and detailed 3D FEM models developed by the candidate at Politecnico di Bari.

Candidate requirements

The ideal candidate should have a solid background in one of the areas of interest: soil mechanics, soil-structure interaction, numerical modelling and monitoring systems. Also, good mathematical and programming skills will be preferred. Good written and spoken English communication skills are required.

Additional information

For more information about the position and informal discussion please contact:
Dr. Nunzio Losacco (nunzio.losacco@poliba.it)

Application procedure

Please apply online (link 1) **before 13:00 (Italian time) of 17 July 2023** following the application process outlined in the official call of Politecnico di Bari (link 2). In particular, the applicant must also include a research proposal, consistent with the research topic: "Data-driven early-warning system enhanced by mathematical modelling for deep excavations: preventing excessive deformations in urban areas" indicated at page 11 of the call, using the official template (link 3).
The evaluation of CVs and the interviews will be held **online between 20 July and 1 August 2023**.
Templates for additional documents to be provided can be found at:
https://www.poliba.it/it/dottorato-di-ricerca-pagina/bando-dottorati-di-ricerca-xxxix-ciclo-aa-20232024

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