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International Doctoral Program in Civil and Environmental Engineering

SEMINAR

Digitizing Concrete with Nanocarbon

Prof. Jing Zhong

School of Civil Engineering, Harbin Institute of Technology, Harbin

Location:

Aula Magna
UNIPG Campus of Engineering
Via G. Duranti, 93, Perugia

Timetable:

Friday, September 4th, 2026
11.00 (CET)

Issue

Concrete is the most widely used construction material worldwide and represents a fundamental component of the built environment. However, conventional concrete remains essentially electrically passive, which limits its potential integration into smart and interconnected infrastructures. Enabling electrical transmission, sensing functions and energy storage within such a complex multiphase material is still a major challenge, closely related to the numerous interfaces existing at different scales within its internal structure.

Target

The research aims to exploit interface engineering as an effective strategy to transform conventional concrete into a multifunctional and intelligent material. Through graphene-coated aggregates and nano-engineered interfaces, the objective is to build three-dimensional conductive networks within the cementitious matrix, significantly enhancing electrical conductivity, piezoresistive sensing and mechanical performance. The same approach is further extended to porous energy-storing aggregates for the development of cement-based supercapacitors and other advanced electrical functionalities.



Professor Jing Zhong is a professor at the School of Civil Engineering, Harbin Institute of Technology. He received his PhD from Harbin Institute of Technology in 2013. His research interests include fiber-reinforced concrete, smart and functional concrete, energy-storage concrete, 3D printing of inorganic materials, carbon dioxide sequestration, and the resource utilization of solid waste. Professor Zhong has led more than 20 research projects, and he received the First Prize of the Liaoning Provincial Natural Science Award in 2023 and the Second Prize of the Heilongjiang Provincial Science and Technology Award in 2023.

He invented a centrifugal casting technique for producing ultradense graphene films, which has been successfully commercialized. He has published more than 100 SCI-indexed papers in journals including Cement and Concrete Composites, Cement and Concrete Research, Construction and Building Materials, Journal of Cleaner Production, Carbon, ACS Nano, Nature Communications, and Nano Energy.

For more info Mrs. Teresa Nocera, Ph.D. Program Secretariat (teresa.nocera@unipg.it)
Prof. Dr. Silvia Meniconi, Ph.D. Program Coordinator (silvia.meniconi@unipg.it)

