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International Doctoral Program in Civil and Environmental Engineering

SEMINAR

Concept, workflow and application of Digital Twins for the built environment

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Location

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

Timetable

Monday, October 19th, 2026
10:30 (CET)



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Abstract

Digital Twins are increasingly expected to play a key role in Civil Engineering, although their application in the architecture, engineering and construction sector is still at an early stage and lacks clear, unified practices. This seminar introduces the concept of Digital Twins and reviews their current development within civil engineering. It then presents a structured, step-by-step workflow for creating a Digital Twin of an existing asset in the built environment, illustrated through a bridge case study.

The seminar discusses practical implementation aspects, including the integration of physical and digital components, and reflects on the main challenges and opportunities. Overall, it highlights the potential of Digital Twins to support more efficient management and the broader digital transformation of civil infrastructure.



Dr Maria Pregnolato is a Civil Engineer and holds a MSc in Building Engineering and Architecture from the University of Pavia (Italy) and the Tongji University of Shanghai (China), a PhD in Civil Engineering from Newcastle University (UK) and a MSc in Strategy, Leadership and Change from the University of Bristol (UK). She is an Associate Professor in Flood Risk Management and Resilience Infrastructure at TU Delft (NL) and an Honorary Associate Professor at the University of Bristol (UK); she is also a board member of the 4TU Resilience Engineering Centre (NL) and the NERC Digital Research and Infrastructure Group (UK). Her work focuses on infrastructure resilience and risk management from natural hazards, in particular the impact of flooding to road networks, bridges and buildings. She held an EPSRC Fellowship to investigate the impact of extreme flooding to bridges, including hydrodynamic modelling and scour risk management. In recent years, she has been focusing on structural health monitoring and Digital Twins, exploring the role of sensing and digitalisation within infrastructural assets exposed to flooding and natural hazards. She has recently been awarded a Vidi Fellowship to investigate the use of digital twins for flood-prone infrastructure. She received the EGU (European Geoscience Union) Outstanding Early Career Award in 2021 for her scientific contribution in the field of natural hazards.

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