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CIVIL AND ENVIRONMENTAL ENGINEERING

DOCTORAL PROGRAM 2023-2024

Luca Caracoglia is currently a Visiting Professor in the Department of Civil and Environmental Engineering at the University of Perugia in June 2024. His permanent position is Full Professor in the Department of Civil and Environmental Engineering of Northeastern University (NU), Boston, Massachusetts, USA, where he directs the "Wind Engineering Research Group". Luca Caracoglia's research and professional interests are in structural dynamics, random vibrations, fluid-structure interaction of civil engineering structures, nonlinear cable network dynamics, wind engineering, wind energy and wind-based energy harvesting systems. He has been author or co-author of 100+ peer-reviewed journal publications and book chapters and about 140 conference proceedings / presentations in these fields. Luca Caracoglia has taught a range of undergraduate and graduate courses spanning from Statics/Solid Mechanics to Wind Engineering. He earned the NSF-CAREER Award in 2009 and was named a Fellow ASCE in 2020. He holds leadership positions in wind engineering associations and has chaired significant workshops and colloquiums. Caracoglia serves as an Associate Editor for prestigious journals and is a member of multiple editorial boards. Additionally, he received two Full Professor accreditations from the Italian Ministry of Public Instruction University and Research (MIUR) in 2019: 1) Scientific Discipline ICAR 08/B3, Civil Engineering/Structural Design, 2) Scientific Discipline ICAR 08/B2, Civil Engineering/Structural Mechanics.

Location

Campus of Engineering of University of Perugia
Via G. Duranti, 93 - Perugia

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FLOW-INDUCED VIBRATION IN CIVIL & MECHANICAL ENGINEERING

Instructor

Prof. Dr. Luca Caracoglia
Dept. of Civil and Environmental Engineering,
Northeastern University, Boston MA, USA

Course Description

The course will introduce PhD students to the discipline that studies the interaction between structural mechanics, dynamics and vibration triggered by unsteady flow over a flexible structure. This course provides the necessary background in vibrations, and next introduces the students to the basic principles that are common to the study of flow-induced vibration phenomena that are relevant to various engineering fields. The interaction between flow and moving, flexible body can lead to static or dynamic instability which can result in system failure. Calculated pressure loads significantly differ from decoupled structural system and fluid-dynamic field.

Lectures will examine how fundamentals can be applied to two engineering professional disciplines: 1) aeroelastic phenomena relevant to long-span bridge design (flutter, torsional divergence, vortex shedding), 2) energy engineering, i.e., dynamic and aeroelastic phenomena in wind turbine blades and towers.

Course Schedule (18 hours, 3 CFU)

Day 1, June 4th: 10:00 am - 1:00 pm Room 17
Day 2, June 6th: 10:00 am - 1:00 pm Room 17
Day 3, June 11th: 10:00 am - 1:00 pm Room 17
Day 4, June 13th: 10:00 am - 1:00 pm Room 17
Day 5, June 18th: 10:00 am - 1:00 pm Room 17
Day 6, June 20th: 10:00 am - 1:00 pm Room 17

For more info Mrs. Teresa Nocera, Ph.D. Program Secretariat (teresa.nocera@unipg.it)
Prof. Dr. Filippo Ubertini, Ph.D. Program Coordinator (filippo.ubertini@unipg.it)