



Introduction to Wind Science and Engineering

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Abstract

A wide range of engineering applications require simulation and estimation of loads and excitations that are random in nature as they are often associated with hazards such as earthquakes, winds, waves, etc.

In the first module, the course will introduce the audience (doctoral students) to the discipline of wind science and engineering. The lecture will provide students and practitioners with broad instruction that enables the solution of problems related to the effects of windstorms on the built environment. At the same time, the audience will be given some information on wind's beneficial effects (wind power). This module will also partially examine modeling of wind fields and atmospheric turbulence.

In the second module, the course will review theory and methods for random data (and vibration) analysis and probability for scientists and engineers; furthermore, the module will discuss aerodynamic loads, analysis methods applicable to structural systems under random wind loads. Examples will be primarily related to the field of wind engineering and structural analysis using wind loads.

In the last module, the course will introduce the audience to the field of fluid-structure interactions. Various design applications will be considered.

Date & Time

3, 5 June 2026

09:00 – 11:00

8, 10 June 2026

09:00 – 12:00

Location

Aula Riunioni 329

Dipartimento di Ingegneria Strutturale e Geotecnica

Via Eudossiana 18, Roma

Contact

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Zoom Link (for remote students):

<https://northeastern.zoom.us/my/lucanu>



Bio

Luca Caracoglia is currently a Professor in the Department of Civil and Environmental Engineering of Northeastern University, Boston, Massachusetts, USA. He joined Northeastern University in 2005. He received his Ph.D. in Structural Engineering from the University of Trieste, Italy in 2001. He is currently a Fellow of the American Society of Civil Engineers (ASCE). Luca Caracoglia's research and professional interests are in structural dynamics, random vibration, wind engineering, fluid-structure interaction of civil engineering structures, nonlinear cable network dynamics, wind energy and wind-based energy harvesting systems. He has been author/co-author of 110+ peer-reviewed journal publications and book chapters (published or in press) and more than 170+ conference proceedings/presentations in these fields. He has taught courses at the undergraduate and graduate levels in: Statics/Solid Mechanics, Structural Analysis, Steel Structure Design, Pre-stressed Concrete, Bridge Design, Wind Engineering and Wind Energy Systems. For his research, Luca Caracoglia received the NSF-CAREER Award for young investigators in 2009.