



Università
di Genova

DICCA DIPARTIMENTO
DI INGEGNERIA CIVILE, CHIMICA
E AMBIENTALE

DICCA SEMINAR SERIES 2022

HORIA HANGAN - Ontario Tech University, Faculty of Engineering and Applied Sciences

“3D, Unsteady, Non-stationary, non-Gaussian wind fields and their effects”

Abstract

During the last two decades, the wind engineering debate was dominated by the issue of non-synoptic windstorms, Hangan and Kareem, 2021. These winds are way more complex, from a spatio-temporal perspective, compared to the typical synoptic winds. They are three-dimensional (3D), unsteady, non-stationary and non-Gaussian and are dominated by vortex dynamics.

Given these complexities, we attempt to characterize them and their effects through superpositions of isolated flows and their vortex structure, instabilities, translation and turbulence. We use tornadoes, downbursts and gusts as examples. Finally, we point out to issues to be addressed such as the non-linearity of these possible superpositions, the definition of references, and further developments.

Reference: Hangan H., Kareem A., The Oxford Handbook of Non-Synoptic Wind Storms, Oxford University Press, 2021

Short bio

Dr. Horia Hangan is a Professor in the Faculty of Engineering at Western University and the Founding Director of the Wind Engineering, Energy and Environment (WindEEE) Research Institute. His research focuses on the simulation and impact of high intensity winds as downbursts and tornados, wind energy and wind turbine blade aerodynamics, wind environmental impacts, in particular in the field of atmospheric pollution-dispersion and particulate transport. In 1996, he obtained his Ph.D. in Wind Engineering at the Western's Boundary Layer Wind Tunnel Laboratory. Prof. Hangan was a faculty member with the Boundary Layer Wind Tunnel Laboratory and the Department of Civil and Environmental Engineering at Western University. In 2009, Prof. Hangan received an important grants by Canada Foundation for Innovation and by Ontario Research Fund to design and built the WindEEE Dome, a world novel facility for the study of the impact of wind systems on the antropic and natural habitat. Prof. Hangan published more than 200 journal and conference publications, such as Journal of Fluid Mechanics, AIAA Journal, ASME Journal of Fluids Engineering, ASME Journal of Solar (and Wind) Energy, Journal of Wind Engineering and Industrial Aerodynamics. He has received several awards among which the prestigious ASME Moody Award in 2010.

13/05/2022 – 4pm (CET)

Villa Cambiaso - Salone Nobile, Via Montallegro 1 (GE)

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