Università di Genova | DICCA DIPARTIMENTO DI INGEGNERIA CIVILE, CHIMICA E AMBIENTALE

THUNDERR

European Research Council

International Advanced School on THUNDERSTORM OUTFLOWS AND THEIR IMPACT ON STRUCTURES

October 4-8, 2021, Genova, Italy

Organized by:
Department of Civil, Chemical and Environmental Engineering, University of Genova, Italy

Supported by:
The International Advances School (IAS) is part of the project THUNDERR - Detection, simulation, modelling and loading of thunderstorm outflows to design wind-safer and cost-efficient structures - that has received funding from the European Research Council under the European Union's Horizon 2020 research and innovation program, grant agreement No. 741273.

Key Dates
Early registration (to attend in-person): by August 15, 2021
Late registration (to attend in person): by October 3, 2021
Online registration (to attend remotely only): until the end of the school

Venue:
The IAS will be held in person at the Department of Architecture and Design of the University of Genova
Aula Benvenuto, Stradone S. Agostino 37, 16123 Genoa
In case the health conditions due to the Covid-19 pandemic situation do not permit to meet in person, the IAS will be held remotely

1. The Thunderr project

The safety and sustainability of built environment with regard to natural actions are primary goals of engineering. Wind is the most destructive natural phenomenon. Evaluating its actions is crucial for society and its economy.
Wind climatology is often dominated by cyclones and thunderstorms. The properties of cyclones are known since the 1920s. Their actions on construction are well established since the 1960s and engineering still uses these models. Thunderstorms are complex and devastating phenomena that result in actions often more intense than cyclonic ones. Despite this awareness, there is not yet a model of thunderstorm winds and their actions on structures as that established over half century ago for cyclones. This is a major shortcoming that gives rise to unsafe and/or overly expensive works.
THUNDERR is an acronym of THUNDERstorm that expresses the Roar of the ERC project carried out at the University of Genova. It aims to detect thunderstorms, to create a database of wind records and weather scenarios, to conduct laboratory tests and CFD simulations, to formulate thunderstorm models suitable for atmospheric sciences and structural design, to improve the format of wind actions, engineering practice and codification, to make building safer and more sustainable, to bring about a profound impact on society and its economy.
On November 19, 2020, the PI of THUNDERR Prof. Giovanni Solari passed away. Prof. Maria Pia Repetto took over as scientific responsible of the project.

2. Aims and Topics

The International Advanced School will cover synoptic, mesoscale and thunderstorm meteorology, wind storms and climate changes, wind monitoring and thunderstorm detection, downburst modelling and signal analysis, laboratory and CFD simulation of downbursts, Monte Carlo simulation of wind velocity fields, fundamentals of bluff-body aerodynamics, wind loading and response of structures to thunderstorm outflows, full-scale monitoring of structures, damage induced by local storms, research and codification perspectives.

2. Lecturers (in alphabetical order)

Bert Blocken
TU/e Eindhoven, The Netherlands and KU Leuven, Belgium

Guido Buresti
Università di Pisa, Italy

Massimiliano Burlando
Università di Genova, Italy

Ashraf El Damatty
University of Western Ontario, Canada

Horia Hangan
University of Western Ontario, Canada [1]

Ahsan Kareem
University of Notre Dame, Indiana, USA

Frank Lombardo
University of Illinois at Urbana-Champaign, USA

Leigh Orf
University of Wisconsin–Madison, USA

Maria Pia Repetto
Università di Genova, Italy

Ted Stathopoulos
Concordia University, Montreal, Canada

Yukio Tamura
Chongqing University, Chongqing, China

Uwe Ulbrich
Freie Universitat, Berlin, Germany

[1] presently Canada Research Chair Tier 1 with Ontario Tech University

3. Schedule

MONDAY 04/10/2021		
Timetable	**Lecturer**	**Thunderstorm outflows measurement and modelling**
9:00-9:50	Maria Pia Repetto	Course Introduction and THUNDERR Project
10:00-10:50	Massimiliano Burlando	Wind monitoring and thunderstorm detection
11:00-11:50		Downburst modelling and signal analysis
12:00-12:50	Ahsan Kareem	Monte Carlo simulation of wind velocity fields
13:00-14:00	*Lunch Break*	
	Lecturer	**Thunderstorm outflows numerical simulation**
14:00-14:50	Bert Blocken	Fundamentals of CFD simulations
15:00-15:50		
16:00-16:50	Leigh Orf	CFD simulation of downbursts
17:00-17:50		

TUESDAY 05/10/2021		
Timetable	**Lecturer**	**Thunderstorm climatology and wind tunnel simulation**
9:00-9:50	Uwe Ulbrich	Synoptic and mesoscale meteorology
10:00-10:50		Windstorms and climate changes
11:00-11:50	Horia Hangan	Laboratory simulation of downbursts
12:00-12:50		
13:00-14:00	*Lunch Break*	
	Lecturer	**Thunderstorm outflow wind loading**
14:00-14:50	Guido Buresti	Fundamentals of bluff-body aerodynamics
15:00-15:50		
16:00-16:50	Frank Lombardo	Downburst wind loading of structures
17:00-17:50		

WEDNESDAY 06/10/2021		
Timetable	**Lecturer**	**Response of structures**
9:00-9:50	Ashraf El Damatty	Thunderstorms and transmission lines
10:00-10:50		
11:00-11:50	Maria Pia Repetto	Thunderstorm response spectrum technique
12:00-12:50	Ahsan Kareem	Gust front factor technique
13:00-14:00	*Lunch*	
	Lecturer	**Future perspectives and new results codification**
14:00-14:50	Yukio Tamura	Damage to buildings and structures by severe local storms and wind speed estimations
15:00-15:50		
16:00-16:50	Ted Stathopoulos	Non-synoptic winds on buildings: wind standards and codes of practice perspectives
17:00-17:50		Perspectives of research on the effects of non-synoptic winds on buildings

THURSDAY 07/10/2021	
Timetable	**New frontiers in research of thunderstorm outflows and their impact on structures**
9:00-13:00	Short interventions and open discussion
13:00-14:30	*Lunch*
14:30-17:50	Short interventions and open discussion

FRIDAY 08/10/2021	
Timetable	
9:00-12:30	Short interventions and open discussion
12:30-13:00	Closing remarks

4. Tuition Fees

The tuition fee to attend in person covers the registration to the school, teaching material and lunches on October 4-8, 2021. Please register here http://www.ias2021.promoest.com/

Early registration Fee (to attend in person):	€ 175 (by August 15, 2021)
Late registration Fee (to attend in person):	€ 225 (from August 16, 2021)
On-line registration Fee (to attend remotely only):	€ 50 (by October 8, 2021)

5. Accommodation

The IAS Secretariat is not responsible for hotel reservations. Please make your own hotel reservation in advance. If you need assistance for hotel choice, please contact the IAS Secretary.

International advisory board

Prof. Bert Blocken
Prof. Horia Hangan
Prof. Ahsan Kareem
Prof. Ted Stathopoulos
Prof. Yukio Tamura
Prof. Uwe Ulbrich

Local organizing committee

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