

INTERNATIONAL SUMMER SCHOOL

10 – 13 September 2024
Naples - Italy



UNIVERSITY OF NAPLES
FEDERICO II

Department of Structures for
Engineering and Architecture

Within the course of the PhD program in
*Structural & Geotechnical Engineering
and Seismic Risk*

DATES

10 – 13 September 2024

24 hours (3 CFU)

LOCATION

Federico II Conference Centre
Via Partenope, 36
80121 Naples

CHAIR

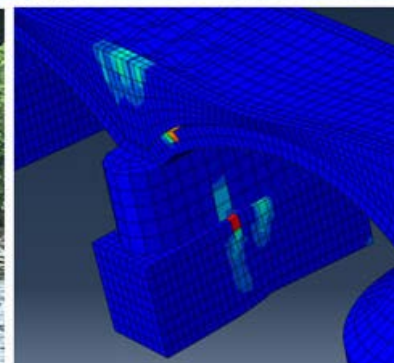
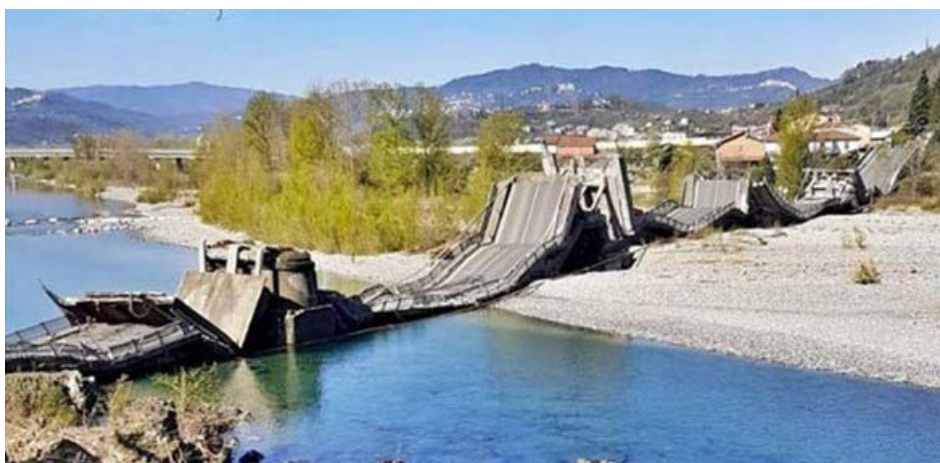
Fulvio Parisi
University of Naples Federico II

AUDIENCE

PhD students, postdoctoral
researchers, professionals,
facility managers

CONTACTS

phd.dist@unina.it



STRUCTURAL ROBUSTNESS AND RESILIENT INFRASTRUCTURE AGAINST EXTREME HAZARDS

Final Program

AIM

Civil engineering structures are increasingly subjected to extreme hazards, which are not usually considered in structural design and assessment. On one hand, such hazards have a very low probability of occurrence, and on the other, they are expected to produce huge consequences on people and property. Extreme events include but are not limited to natural events (e.g. landslides, floods, hurricanes), technological events (e.g. impact, fires, explosions), man-made events (e.g. malicious actions, human errors in design, construction or maintenance), deterioration phenomena (e.g. steel corrosion, concrete carbonation), and cascade events (e.g. natural-technological events). Climate change and strong urbanization in some areas have further exacerbated the occurrence of extreme hazards and their impact. This has significantly increased the awareness of governments and standardization bodies to develop guidelines for collapse prevention and provisions in national and international structural codes.

This *Summer School* aims at providing fundamentals of structural robustness, large-displacement inelastic response of structures, disaster risk and resilience of structures and infrastructures, as well as methods for structural design, assessment and retrofitting against extreme hazards.

LECTURERS

José M. Adam (Universidad Politécnica de Valencia, Spain)
André T. Beck (University of São Paulo, Brasil)
Robby Caspeele (Ghent University, Belgium)
Bassam Izzuddin (Imperial College London, UK)
Fulvio Parisi (University of Naples Federico II, Italy)

THEMATIC LECTURERS

Beatrice Belletti (University of Parma, Italy)
Emanuele Brunesi (EUCENTRE, Italy)
Marco di Prisco (Politecnico di Milano, Italy)
De-Cheng Feng (Southeast University, China)

REGISTRATION

Registration: <https://shorturl.at/wGHX3>

Registration fees:

- Students/Postdoc: **350 €**
- Professionals: **450 €**

Payment by **Bank transfer** to:

Dip. di Strutture per l'Ingegneria e l'Architettura - IBAN code:

IT77C0306903497100000046044

SWIFT code: **BCITITMM**

Bank: Intesa Sanpaolo S.p.A.

Deadline: **15 August 2024**

VENUE

The Summer School will be held in the *Federico II Conference Centre*, located at the seafront of Naples (Italy), in a central and panoramic area, adjacent to town's best hotels.



Castel dell'Ovo and Borgo Marinari, with its narrow streets full of bars and restaurants, are just opposite, along with the small tourist port.



The rectangular building dates to 1937 and once was the site of the University Faculty of Economics. Of remarkable effect are the colourful materials used for halls, columns, floors and staircases.



COURSE OUTLINE

Starting from forensic analysis of catastrophic failures in buildings and bridges, the course will move across several issues as follows: progressive and disproportionate collapses of structures; structural and non-structural measures for collapse risk mitigation; definitions of structural robustness; design criteria and detailing rules for structural robustness; guidelines and code provisions at both national and international levels; robustness quantification; modelling of abnormal loads due to extreme events; extreme structural behaviour during experimental tests; nonlinear structural modelling; performance limit states under extreme structural response; simplified and advanced methods for progressive collapse analysis; performance-based robustness design and assessment; scenario-based and probabilistic simulations; component-level and system-level fragility for progressive collapse risk assessment; multi-hazard design and assessment; and relationship between structural robustness and disaster resilience. Besides theoretical lectures, several case studies of structures subjected to notional local damage, specified abnormal loads or retrofitting operations will be discussed. Design classes will allow participants to deeply understand and implement methodologies and tools.

COURSE SCHEDULE

Day 1 | September 10th, 2024

- 9:00 – 9:30 Registration of participants
- 9:30 – 10:00 **Fulvio Parisi**: *Opening of the Summer School*
Welcome to the University of Naples Federico II
Presentation of Lecturers
Summer School organization and lectures
Extreme Hazards, Structural Robustness, and Disaster Resilience
- 10:00 – 10:30 Coffee break
- 10:30 – 12:00 **Robby Caspeele**: *Structural robustness and reliability in codes and guidelines*
- 12:00 – 13:30 **Fulvio Parisi**: *Progressive collapse and extreme resisting mechanisms under abnormal loads: disasters and experimental evidence*
- 13:30 – 15:00 Lunch break
- 15:00 – 16:30 **Robby Caspeele**: *Experimental assessment of membrane action in concrete elements through large-scale testing*
- 16:30 – 17:00 Coffee break
- 17:00 – 18:30 **Fulvio Parisi**: *Computational strategies and alternate load path analysis for robustness assessment*

Day 2 | September 11th, 2024

- 9:30 – 11:00 **André Beck**: *Methodologies for reliability-based and risk-based design optimization*
- 11:00 – 11:30 Coffee break
- 11:30 – 13:00 **André Beck**: *Optimal redundancy allocation in structural systems: some fundamental results*
- 13:00 – 14:30 Lunch break
- 14:30 – 16:00 **José Adam**: *Fuse-based segmentation method for robustness design of concrete buildings*
- 16:00 – 16:30 Coffee break
- 16:30 – 18:00 **André Beck**: *Risk-based cost-benefit analysis of structural strengthening systems to mitigate disproportionate collapse*

Day 3 | September 12th, 2024

- 9:30 – 11:00 **Bassam Izzuddin**: *Simplified robustness assessment framework for multi-storey buildings with application to steel-composite buildings*
- 11:00 – 11:30 Coffee break
- 11:30 – 13:00 **Bassam Izzuddin**: *Tying force method: shortcomings of existing approach and recent developments*
- 13:00 – 14:30 Lunch break
- 14:30 – 16:00 **Bassam Izzuddin**: *Exercises on simplified robustness framework and tying force method for multi-storey buildings*
- 16:00 – 16:30 Coffee break
- 16:30 – 18:00 **Fulvio Parisi**: *Scenario-based robustness assessment of buildings and bridges*
- 19:30 – Social dinner

PARTNERS



Day 4 | September 13th, 2024

- 9:30 – 11:00 **José Adam**: *Evidence from full-scale testing of concrete frame buildings*
- 11:00 – 11:30 Coffee break
- 11:30 – 13:00 **José Adam**: *Exercises and debate on monitoring systems for local failure detection of steel truss bridge, sub-assembly and concrete building to prevent progressive collapse*
- 13:00 – 14:30 Lunch break
- 14:30 – 16:00 Final session and debate on specific topics
De-Cheng Feng: *Surrogate modelling for design and simulation*
Beatrice Belletti: *Modelling and impact of corrosion in RC structures*
Emanuele Brunesi: *Modelling and impact of floor slabs and infill walls*
Marco di Prisco: *Robustness of dapped-end RC girder bridge decks*
- 16:00 – 16:30 Coffee break
- 16:30 – 18:15 Final exam and discussion of results (only for PhD students who need a certificate by the coordinator of the PhD programme)
- 18:15 – 18:30 Closure of the Summer School

DETAILS

You can periodically check the [dedicated webpage](#) also through this QRcode



ADMINISTRATIVE STAFF

Dott.ssa Immacolata Diez - immacolata.diez@unina.it


Dott.ssa Valeria Peluso - valeria.peluso@unina.it

SOCIAL EVENTS

The social dinner will take place at the [Umberto Restaurant](#) (Historic Italian venue since 1916), in via Alabardieri 30/31.

SUGGESTED ACCOMODATIONS

The following list includes some suggested accommodations in Naples. Applicants are encouraged to book their accommodation as soon as possible.

B&B/Hotel	Website	Mobile 
At home Lettieri	https://bnbathomelettieri.wixsite.com/at-homelettieri	+39.347.6533386
Bed in Naples	https://beb.it/bedinnaples/it/	+39.348.7556557
Casetta partenopea	https://www.airbnb.com/h/casettapartenopea	+39.389.8842803
Hotel Cimarosa	https://www.hotelcimarosa.it/	+39.331.4464424
Hotel Royal	https://www.royalgroup.it/royalcontinental/	
La Maisonette	http://www.lamaisonnettebb.it/	+39.329.7483282
Luna Vomere	https://abnb.me/weSRTh5BiS	+39.329.2948894
Villino Manina	https://beb.it/villinomanina/it/	+39.335.498412
Casa e Studio Gravina	https://abnb.me/aXduwgi93Eb	+39.333.4112510
Casa Valparaiso	https://air.tl/NEGiJWrz	+39.328.1569936
Charming Naples	https://www.charmingnaples.it/	+39.335.5874052