

## Background and Motivation

The tremendous impact of natural hazards, such as earthquakes, tsunamis, flooding, etc., which triggered technological accidents, referred to as natural-technological (NaTech) events, was demonstrated, for instance by the recent Tohoku earthquake and the following Fukushima disaster in 2011 or by the UK's 2015 winter floods which topped £5bn, with thousands of families and businesses that faced financial problems because of inadequate or non-existent insurance. The NaTech problem is quite relevant as up to 10% of industrial accidents, involving the release of Chemical, Biological, Radiological, Nuclear and high yield Explosives (CBRNE) substances, were triggered by natural hazards. To implement and support the Seveso II Directive 2012/18/EU which regulates the control of major accident hazards involving dangerous substances, XP-RESILIENCE intends to establish a network of individual research projects working towards

Advanced Modelling and Protection – via metamaterial-based isolators/layouts- of Complex Engineering Systems for Disaster Reduction and Resilient Communities. In this respect, this course has the aim to offer to students and scholars a clear overview of the problems and the available solutions and tools. With important experts on Resilience and Na-tech risk the course will be a unique occasion to familiarize with this hot topic and be in contact with the resilience and risk calculation community.

## Lecturers

**Jamie Padgett** is an Associate Professor at the Rice University in Houston, USA. Her research focuses on the application of probabilistic methods for risk assessment of infrastructure, including the subsequent quantification of resilience and sustainability. Her work emphasizes infrastructure portfolios such as regional portfolios of bridges or oil storage tanks exposed to multiple hazards, including earthquakes, hurricanes, or aging and deterioration..



**Keisuke Minagawa** is Associate professor in Mechanical Engineering at Saitama Institute of Technology – Department of Engineering, Japan. His main scientific interests are mainly focused on seismic isolation and passive vibration control.



**Paolo Gardoni** is a Professor and Excellence Faculty Scholar in Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. He is the Director of the MAE Center and the founder and Editor-in-Chief of the journal Sustainable and Resilient Infrastructure published by Taylor and Francis Group. Dr. Gardoni's research interests include sustainable and resilient infrastructure; reliability, risk and life cycle analysis; and ethical, social, and legal dimensions of risk.



**Marco De Angelis** Marco is a postdoctoral research associate at the University of Liverpool since May 2018. His research focuses on the efficient and rigorous uncertainty propagation through computational codes via both intrusive and non-intrusive algorithms.

He is appointed for the Uncertainty theme on the EPSRC programme grant on Digital Twins for improved dynamic design. He holds a PhD in risk and uncertainty in engineering systems from the University of Liverpool and an MSc and BSc cum laude from Roma Tre in engineering for the mitigation of natural risks.



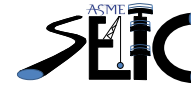
**Daniele Coritore** is Research Associate in Structural Engineering at the Roma Tre University – Department of Engineering, Italy. His main scientific interests are mainly focused on earthquake engineering, seismic risk assessment and resilience of industrial plants.



**Nicola Tondini** is Assistant professor in Structural Engineering at the University of Trento – Department of Civil, Env. and Mechanical Engineering, Italy. His main scientific interests are mainly focused on the behaviour of structural systems subjected to accidental actions, i.e. fire and earthquake.



**Edoardo Patelli** is Associate professor at the Institute for Risk and Uncertainty, University of Liverpool, UK. His main scientific interests are mainly focused on developing efficient tools for Safety and Uncertainty Quantification able to deal with scarce data and vague information and their application to safety critical systems, power networks and smart grids and decision making under uncertainty



## Course on

## Na-tech Risk Assessment of Industrial installations and mitigation strategies

Coordinate by

**Fabrizio Paolacci**

**Oreste S. Bursi**

Roma Tre University  
ASME PVPD – SETC

University of Trento  
ASME PVPD - SETC

Seminar Room of Civil Engineering

11-13 September 2019

## Course objective

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The main objective of this workshop is to familiarize Early Stage and Experienced Researchers with Na-Tech risk and resilience of industrial facilities and critical infrastructures and mitigation strategies.

## Who should attend

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Graduated students, postdoctoral researchers and practitioners.

## Course outline

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The course will intend to provide

- o Basic and advanced concepts for Na-Tech risk and resilience calculation
- o Vulnerability analysis of the most critical industrial facilities
- o Risk analysis methods of major-hazard industrial installations
- o Resilience concepts also applied to industrial facilities
- o Mitigation strategies for industrial facilities

## Course schedule

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### Wednesday 11

13.45-14.00 Registration and Opening

#### Lecture 1

14.00-15.30 **Jamie Padgett** – Rice University - Risk assessment of above ground tanks under concurrent coastal hazards Part A: Probabilistic modeling

15.30-15.45 Coffee Break

15.45-17.45 **Jamie Padgett** – Rice University - Risk assessment of above ground tanks under concurrent coastal hazards - Part B: Leveraging cyberinfrastructure

20.30 -23.30 **Social Dinner**

### Thursday 12

#### Lecture 2

8.30-10.30 **Edoardo Patelli** – University of Liverpool - Efficient Monte Carlo simulation techniques for complex and large system

10.30-10.45 Coffee Break

10.45-12.45 **Marco De Angelis** - University of Liverpool - Exotic dependency declarations in structural reliability

12.45-14.00 Lunch (by your Own)

#### Lecture 3

14.00-15.30 **Paolo Gardoni** – University of Illinois - *Regional Risk and Resilience Analysis – Part 1*

15.30-15.45 Coffee Break

15.45-17.45 **Paolo Gardoni** – University of Illinois - *Regional Risk and Resilience Analysis – Part 2*

### Friday 13

#### Lecture 4

8.30-10.30 **Keisuke Minagawa** – Saitama Int. of Technology, Japan - *Seismic Isolation of industrial facilities*

10.30-10.45 Coffee Break

10.45-12.45 **Daniele Corritore** – University of Roma Tre – Dep- of Engineering - *Traditional and innovative mitigation strategies for industrial Facilities*

12.45-14.00 Lunch (by your Own)

#### Lecture 3

14.00-15.30 **Keisuke Minagawa**- Saitama Int. of Technology, Japan - *Passive Vibration Control of industrial facilities*

15.30-15.45 Coffee Break

15.45-17.45 **Nicola Todini** – University of Trento - *The effect of fires on industrial equipment: localised fires and structural behaviour*

17.45-18.00 Closure



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## Registration

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The participation fee of 350€ includes Coffee Breaks, hot beverages, Social dinner, Wi-Fi connection, notes and slides. To register please fill the following form and e-mailing it to: [marina.cibati@uniroma3.it](mailto:marina.cibati@uniroma3.it) and [silvia.alessandri@uniroma3.it](mailto:silvia.alessandri@uniroma3.it) by **September 1, 2019**

## Course on

# Na-tech Risk Assessment of Industrial installations and mitigation strategies

Rome, September 11 - 13, 2019

### Application Form

(Please print or type)

Surname \_\_\_\_\_

Name \_\_\_\_\_

Affiliation \_\_\_\_\_

Address \_\_\_\_\_

E-mail \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

### Method of payment upon receipt of confirmation

*The fee of Euro 350,00 includes IVA/VAT tax and excludes bank charges*

*Payment will be made to Roma Tre University - Bank Account - IBAN T16Z0503403207000000300003 Copy of the receipt should be sent to the secretariat*

**IMPORTANT:** Please indicate to whom the invoice should be addressed.

Name \_\_\_\_\_

Address \_\_\_\_\_

C.F.\* \_\_\_\_\_

VAT/IVA\* No. \_\_\_\_\_

(\* Only for EU residents or foreigners with a permanent business activity in Italy.

### Only for Italian Public Companies

*I ask for IVA exemption (ex law n. 537/1993 - art. 14 comma 10).*

**Privacy policy:** I understand that data received via this form will be used only to provide information about Roma Tre University and its activities, within the limits set by the Italian legislative decree no. 196/2003 and subsequent amendments.

Complete information on Roma Tre University privacy policy is available at [www.uniroma3.it](http://www.uniroma3.it).

I have read the "Admission and Accommodation" terms and conditions and agree.

Date \_\_\_\_\_ Signature \_\_\_\_\_