

# PhD Course in Waves in Metamaterials and Periodic Structures

## Course Program

Wednesday April 12 – Room 1H – 9:00-16:00

Prof. Francesco Dal Corso

- One-dimensional mechanical wave equation
- Discrete one-dimensional systems (the monoatomic and the diatomic chains)
- Two and three dimensional discrete systems

Dr. Vinicius Fonseca Dal Poggetto

- Bioinspired hierarchical metamaterials (introduction to the Fet Open Boheme project coordinated by Unitn/Dicam/Nicola Pugno)
- Modelling wave propagation in one-dimensional periodic media
- Two-dimensional wave propagation in plate structures
- Acoustic applications of metamaterial plates

Thursday April 13 – Room 1H – 9:00-13:00

Prof. Giacomo Oliveri

- The nature of Electromagnetic Waves – Maxwell's Equations and the EM Wave Equation
- Canonical Solutions to Maxwell's Equations: Plane Waves in Homogeneous Media
- Waves and planar interfaces? The Snell's Laws
- Periodic and Quasi-Periodic Metamaterials: concept, design, implementation
- Waves and Metamaterials - the Generalized Snell's Laws
- Applications of Generalized Snell's Laws to Wave Control in EM Systems

Friday April 14 – Room 1H – 9:00-16:00

Prof. Oreste S. Bursi

- Seismic metamaterials for vibration mitigation of process plant components
- Motivation
- Metamaterial Concept
- Importance of experiments
- Modeling and machine learning
- Structural (passive) control
- Random vibration
- Optimization
- Attenuation and non attenuation zones
- Vibration mitigation of liquid storage tanks
- Vibration mitigation of small modular reactors
- Non-linear issues
- Conclusions and Outlooks

**Dates:** April 12-14, 2023

**Location:**

Department of Civil, Environmental and Mechanical Engineering. Via Mesiano 77, Trento

**Duration:** 16h in total

**ECTS:** 2

**Acknowledgments**

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In order to register to the course please send an email to [dicamphd@unitn.it](mailto:dicamphd@unitn.it)