

Workshop Program

September 29, 2022

Morning Session:

h 08.30 Fernando Fraternali, Graeme Milton and Antony Rosato: Welcoming speeches

h 8.45- 10.50 Mini-Session 1, Room 1: Sala Roccia - Chair: **Graeme Milton**

8.45 – 9.25 **Martin Wegener** (Karlsruhe Institute of Technology): ***“Recent progress on three-dimensional microstructured mechanical metamaterials”***

9.25 – 9.40 **Stephan Rudykh** (University of Wisconsin) et al.: ***“Instability-driven microstructure transformations in soft (meta)materials with tunable functions”***

9.40 – 9.55 **Vanessa Magnanimo** and **Igor Ostanin** (University of Twente): ***“Simulation-guided optimization of granular phononic crystal structure using the discrete element method”***

9.55 – 10.10 **Ornella Mattei** (San Francisco State University) and **Vincenzo Gulizzi** (University of Palermo): ***“Some recent advances in the theory of field patterns”***

10.10 – 10.50 **Muamer Kadic** (FEMTO-ST Institute, CNRS): ***“Mechanical metamaterials at micron-scale”***

h 10.50 - 11.20 **Coffee Break**

h 11.20 - 12.35 Mini-Session 2, Room 1: Sala Roccia - Chair: **Fernando Fraternali**

11.20 – 12.00 **Sébastien Guenneau** (Imperial College London, CNRS): ***“Active and passive thermal cloaking”***

12.05 – 12.20 **Keyao Song** (University of Bristol) et al.: ***“Identifying the energy threshold for multi-stable tensegrity structures” (student presentation)***

12.20 – 12.35 **Andrea Micheletti** (University of Rome Tor Vergata) et al.: ***“On prestrain-induced multistability in tensegrity metamaterials”***

h 12.35 - 14.00 **Lunch**

Afternoon Sessions:

h 14.00 - 16.05 Mini-Session 4, Room 1: Sala Roccia - Chair: **Ada Amendola**

14.00 – 14.40 **Giuseppe Saccomandi** (University of Perugia): ***“Model equations in elastodynamics”***

14.40 – 14.55 **Vittorio Zampoli** (University of Salerno): ***“Damped waves in radiating heat conductors modeled through Green-Naghdi II theory”***

14.55 – 15.10 **Cristina Gatta** (Sapienza University of Rome) et al.: ***“Shell multiscale finite element model based on TFA approach for the analysis of periodic masonry structures”***

15.10 – 15.25 **Cristina Gatta** (Sapienza University of Rome) et al.: ***“A coupled VEM-interface model for nonlinear analysis of polycrystalline composites”***

15.25 – 16.05 **Fabrizio Davi** (Polytechnic University of Marche): ***“Scintillators: a multi-scale model from continuum mechanics to gradient flows”***

16.05 – 16.40 **Coffee Break**

h 16.40 - 19.20	Mini-Session 5, Room 1: Sala Roccia - Chair: Sébastien Guenneau
<u>16.40 – 17.20</u>	Davide Bigoni (University of Trento) et. al.: <i>“Flutter instability and hyperelasticity”</i>
<u>17.20 – 17.50</u>	Marco Miniaci (University of Lille) et al.: <i>“Spectral flow of a localized elastic mode under evolving boundary conditions “</i>
<u>17.50 – 18.05</u>	Bryn Davies (Imperial College London): <i>“Asymptotic analysis of metamaterial waveguides: topological protection, homogenisation, tunability and quasiperiodicity”</i>
<u>18.05 – 18.20</u>	Bogdan Ungureanu (Imperial College London) et al.: <i>“Topological rainbow effect harvesting elastic body waves “</i>
<u>18.20 – 18.35</u>	Charles Dorn and Dennis M. Kochmann (ETH Zurich): <i>“Wave guiding in spatially graded metamaterials via ray tracing “</i>
<u>18.35 – 18.50</u>	Anna Al Sabouni-Zawadzka and Wojciech Gilewski (Warsaw University of Technology): <i>“Plate tensegrity structures of variable stiffness inspired with topology optimization – in-plane and out-of-plane deformation”</i>
<u>18.50 – 19.05</u>	Claudio Intrigila (University of Rome Tor Vergata) et al.: <i>“Design, fabrication, testing, and simulation of bistable tensegrity-like structures”</i>
<u>19.05 - 19.20</u>	Julia Motta and Ada Amendola (University of Salerno): <i>“Analytic and numerical results on the properties of solitary waves travelling on tensegrity-like lattices”</i> (student presentation)

h 17.30- 19.15	Mini-Session 6, Room 2: Sala Sole-Luna - Chair: Anthony Rosato
<u>17.30– 17.45</u>	Filipe Santos (University of Nova Lisboa) et al.: <i>“Vibration response of a building model with distributed isolation layers”</i>
<u>17.45 – 18.00</u>	Fabrizio Aloschi and Oreste S. Bursi (University of Trento): <i>“A postbuckling-based mechanical diode for the propagation of surface acoustic waves”</i>
<u>18.00 – 18.15</u>	Andrea Colombi (ETH Zurich) et al.: <i>“Enhancing vibration energy harvesting with elastic metastructures”</i> .
<u>18.15 – 18.30</u>	Francesco Trentadue (Polytechnic University of Bari) et al.: <i>“A micromechanical model for damage and hysteresis in biodegradable polymers”</i>
<u>18.30 – 18.45</u>	Francesco Trentadue (Polytechnic University of Bari) et al.: <i>“An optimization method of tensegrity structures for innovative agricultural applications”</i>
<u>18.45 – 19.00</u>	Francesco Trentadue (Polytechnic University of Bari) et al.: <i>“Stability domain of a plane metamaterial made up of a periodic mesh of shear deformable rods and cross-bracing cables”</i>
<u>19.00 – 19.15</u>	Chiara Masnata (University of Palermo) et al.: <i>“Estimating optimal parameters of tuned liquid column damper inerter (TLCDI) for base-isolated MDOF systems”</i>

h 20.00 Banquet, Sala Roccia

September 30, 2022

Morning Sessions:

h 08.30 - 11.10 Mini-Session 7, Room 1: Sala Roccia - Chair: *Fernando Fraternali*

08.30 – 09.10 Sergio Pellegrino (California Institute of Technology): *"Multi-configuration structures"*

09.10 – 09.25 Marc Serra-Garcia (ETH Zurich, AMOLF) et al.: *"Elastic structures you can talk to: Speech classification with mechanical neural networks"*

09.25 – 09.40 Parisa Omidvar and Marc Serra-Garcia (AMOLF): *"High-level synthesis of smart elastic structures" (student presentation)*

09.40 – 9.55 Xindi Yu (University of Bristol) et al.: *"In-plane elasticity of beetle elytra inspired sandwich cores" (student presentation)*

9.55 – 10.10 Mengzhu Yang (University of Bristol) et al.: *"Numerical and experimental study of non-rigid foldable origami bellows" (student presentation)*

10.10 – 10.50 Nicola Pugno (University of Trento): *"Bioinspired hierarchical materials"*

h 10.50 - 11.20 Coffee Break

h 11.20 - 13.00 Mini-Session 8, Room 1: Sala Roccia - Chair: *Giuseppe Saccomandi*

11.20 – 11.35 Antonio De Simone (Scuola Superiore Sant'Anna di Pisa) et al.: *"Mechanics and morphing of hygroscopic bilayers with applications to natural seeds and bio-inspired environmental sensors"*

11.35 – 11.55 Fernando Fraternali and Ada Amendola (University of Salerno): *"Innovative, bio-inspired seismic metaisolators"*

11.55 – 12.10 Yichang Shen and Walter Lacarbonara (Sapienza University of Rome): *"Targeted wave control in honeycomb metamaterials hosting nonlinear resonators"*

12.10 – 12.25 Reza Norouzkudiani (Scuola Superiore Sant'Anna di Pisa) et al.: *"Equilibrium and transient response of photo-actuated liquid crystal elastomer beams"*

12.25 – 12.45 Christopher J. Larsen and Michael B. Smith (Worcester Polytechnic Institute): *"Phase-field fracture without nucleation or softening"*

12.45 – 13.00 Wenfei Ji (University of Bristol) et al.: *"Preparation of nanoclay/polymer coating for flexible polyurethane foams and the improvement of mechanical performance"*

h 13.00 - 14.30 Lunch

Afternoon Sessions:

h 14.30 - 17.00 Mini-Session 9, Room 1: Sala Roccia - Chair: *Marco Miniaci*

14.30 – 15.10 Julian Rimoli (Georgia Institute of Technology): *"Discontinuous compression structures: from planetary landers to 3D lightweight metamaterials"*

15.15 – 15.30 Antonio Papangelo and Michele Ciavarella (Polytechnic University of Bari and Hamburg University of Technology): *"Leveraging on viscoelasticity and optimal topography for extreme adhesion performance"*

15.30 – 15.45 Luca Placidi (UNINETTUNO, Rome) et al.: *"A continuum formulation for elasto-plastic-damage strain gradient solids with granular microstructure"*

- 15.45 – 16.00 **Roberto Brighenti** and **Mattia Pancrazio Cosma** (University of Parma): *“Light-driven actuation of temperature-sensitive hydrogels”*
- 16.00 – 16.15 **Fabrizio Greco** (University of Calabria) et al.: *“Static and dynamic behavior of finitely deformed periodic bioinspired composite materials”*
- 16.20 – 17.00 **Antonina Pirrotta** (University of Palermo): *“Viscoelastic fractional calculus for innovative and sustainable materials”*

h 17.00 - 17.30 Coffee Break

- h 17.30 - 19.55 Mini-Session 10, Room 1: Sala Roccia - Chair: *Antony Rosato***
- 17.30 – 18.10 **Massimo Ruzzene** (University of Colorado Boulder): *“Minimal surfaces as a topological framework for acoustic and mechanical metamaterials”*
- 18.15 – 18.30 **Gianni Comandini** (University of Bristol) et al.: *“Tesla valve as acoustic metamaterial: a numerical assessment”*
- 18.30 – 18.45 **Gaetano Pavone** (Polytechnic University of Bari) et al.: *“Nonlinear static and dynamic analyses of cable-actuated v-expander tensegrity structures”*
- 18.45 – 19.00 **Daria Manushyna** (Fraunhofer LBF) et al.: *“Vibroacoustic metamaterials for vibration reduction in launcher’s composite components “*
- 19.00 – 19.15 **Enrico Babilio** (University of Naples Federico II) et al.: *“A nonlinear dynamics perspective of landslide motion through appropriate nondimensionalization and scaling”*
- 19.15 – 19.55 **Massimo Cuomo** and **Leopoldo Greco** (University of Catania): *“A variational formulation for form finding of stress adapted membranes”*

- h 18.15 - 19.45 Mini-Session 11, Room 2 – Sala Sole-Luna - Chair: *Luca Placidi***
- 18.15 – 18.30 **Michele Bacciocchi** (University of the Republic of San Marino) et al.: *“Finite element analysis of thin laminated composite nanoplates in nonlocal elasticity: conforming and nonconforming formulations”*
- 18.30 – 18.45 **Andrea Francesco Russillo** and **Giuseppe Failla** (University of Reggio Calabria): *“A dynamic-stiffness approach to the dynamics of two-dimensional hierarchical lattices”*
- 18.45 – 19.00 **Andrea Francesco Russillo** (University of Reggio Calabria) et al.: *“Dynamics of nonlocal 3D solids: a two-field finite-element approach”*
- 19.00 – 19.15 **Salvatore Capasso** (University of Salerno) et al.: *“Discrete element beam model for fluid-structure interaction” (student presentation)*
- 19.15 – 19.30 **Francesco Ascione** (University of Salerno): *“Hygrothermal durability of full scale beam-to-column adhesive joints: experimental results and modelling”*
- 19.30 – 19.45 **Nicholas Fantuzzi** (University of Bologna) et al.: *“Static and dynamic analysis of nonlinear anisotropic solids as Cosserat continua”*

h 20.00 Workshop Award Ceremony , Sala Roccia

-- End of the Scientific program --

October 1st, 2022: Trip along the Amalfi Coast