Ph.D. position @ University of Trento (Italy)

"Enhancing Self-Foldability and Shape-Morphing in Origami/Kirigami-Based Metamaterials"

within the context of the

ERC Consolidator Grant project "Self-Foldable Origami-Architected Metamaterials"

HORIZON-ERC-2022-COG (2024-2029)

PI: Diego Misseroni (webpage: https://misseroni.dicam.unitn.it/)

1 Ph.D. position (36 months) within the research activity related to the **PI ERC Consolidator Grant "SFOAM"** will be funded by and available at the University of Trento (Italy).

The financial conditions offered with this Ph.D. position are in line with those of all Italian Ph.D. schemes, designed to be compatible with the cost of living in Italy, where medical care is free and accommodation costs are reasonable.

The research group offering this position is coordinated by Prof. **Diego Misseroni** (https://misseroni.dicam.unitn.it/)

Ph.D. topic: Topological morphing of frustrated origami metamaterials

Dates: 36 months (three years) duration, starting from November 1, 2023

Research Supervisors: Under the guidance of Prof. Diego Misseroni, coordinator of the research group (https://misseroni.dicam.unitn.it/), you will have the privilege to collaborate with renowned researchers worldwide, including Prof. Glaucio H. Paulino (Princeton University, USA), Prof. Pradeep Pratapa (Madras Institute of Technology, India), and Prof. Ke Liu (Peking University, China). This global collaboration will empower you to enhance your technical skills, broaden your understanding of materials science, mechanics of materials and structures, and develop critical problem-solving abilities.

Title: Enhancing Self-Foldability and Shape-Morphing in Origami/Kirigami-Based Metamaterials

Objective: We present a captivating opportunity for the best students to work in the field of architected materials and origami-based metamaterials. The objective is to implant origami/kirigami capabilities within architected

cellular structures at different scales, paving the way for metamaterials with unparalleled mechanical performance. By combining multistability, control of localized deformation, and ellipticity loss, we aim to unlock a groundbreaking capability: self-foldability and shape-morphing induced by external stimuli. Through this innovative research, we will develop theoretical models, leveraging topological inhomogeneities in origami-based metamaterials, to achieve reprogrammable frustrate states, tunable mechanical properties, spontaneous buckling, and foldability. To advance our understanding, we will utilize Floquet-Bloch asymptotic homogenization as a powerful tool for determining a continuum equivalent to origami frustrated metamaterials. Furthermore, our investigation will involve rigorous numerical testing using both standard commercial finite element (FE) software and dedicated origami software. In summary, this research aims to create metamaterials with extraordinary mechanical properties. By integrating origami/kirigami techniques, we will unlock self-foldability and shape-morphing capabilities, enabling structures to adapt and respond to external stimuli.

Application deadline: September 4, 2023 at 4:00 PM (CET)

For application, please, refer to the website:
https://www.unitn.it/en/ateneo/1954/announcement-of-selection
read the specific pdf call for application announcement and follow carefully the instructions therein to apply.

In your application do not forget to explicitly declare that the application refers to:

- **Curriculum B**: Meccanica, Materiali, Chimica ed Energia
- **Research project Title**: B3 – Enhancing Self-Foldability and Shape-Morphing in Origami/Kirigami-Based Metamaterials
- **Reference**: Diego Misseroni

Remark: the above research project is one of the "research subjects" listed in the file "Research subjects-ICAM_2_Call_39_ENG.pdf" available on the above website.

How to express your interest:

Interested candidates with the PhD can also send an email to the **PI Prof. Diego Misseroni** (diego.misseroni@unitn.it) with subject line "**Call for a PhD position**", including their CV with the following information:

- complete personal details and contact information;
- education, qualifications and research experience.