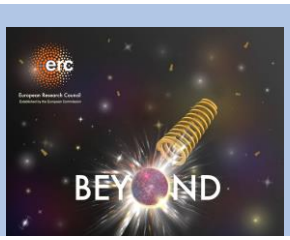

UNIVERSITÀ DI TRENTO

Electro-active materials for soft robots and wearables

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Date	**June 27, 2024**
Time	**15:30**
Room	**2R, DICAM, Mesiano**

Electro-active robotic materials are the interface between the digital world and the physical one. They produce force/motion in response to an electrical stimulus (artificial muscles) and generate electrical signals in response to physical stimuli (soft sensors). Some materials can change their bulk or surface properties responding to a digital input (electro-active and variable stiffness materials).

My work has focused on electro-fluidic artificial muscles and electro-active soft grippers. These solid-state soft devices are silent, flexible, and miniaturized. They offer a path towards highly integrated responsive materials for the next generation of intelligent robots and active wearables.

In this talk, I will first discuss the force/softness dilemma in soft robotics and how we leverage electro-adhesion on soft fingers to develop grippers that are at the same time delicate enough to pick a ripe tomato and so strong to lift 1000 times their own weight. These grippers can also grasp flexible objects such as fabric and plastic pouches. This technology is now being commercialized by the spin-off company Omnigrasp SRL and is part of two EU-funded projects.

I will then present our work on solid-state soft pumps, as a means of using fluids to decouple electrical transducers from mechanical motion, easing material and fabrication requirements. Our solid-state pumps solve the challenge of integrating fluid circulation in soft robots and wearables, replacing noisy and bulk pumps and compressors with stretchable or fiber-shaped pumps. This research has been recently awarded a 1.5 M€ ERC grant by the European Union.

The seminar is organized by the Solid and Structural Mechanics Group [D. Bigoni, F. Dal Corso, L. Deseri, D. Misseroni, M.F. Pantano, A. Piccolroaz, N.Pugno, R. Springhetti]