UNIVERSITÀ DEGLI STUDI DI TRENTO
Dipartimento di Ingegneria Civile, Ambientale e Meccanica

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AVVISO DI SEMINARIO

Si comunica che **martedì 09 Ottobre a partire dalle ore 09**
si terrà presso l'aula **1D** (via Mesiano 77) il seguente seminario

Soft, Shape Programmable Devices and Bio-Inspired Flow Sensing

Dr. James P. Wissman

Naval Research Laboratories NRL, Washington DC, USA

Biological systems achieve their rich multifunctionality through their high level of physical reconfigurability. Similarly, soft robotics and bio-inspired devices require shape programmability to enhance versatility and adaptability. Here we present several approaches to achieve rapid and reversible switching behavior under the application of electric and magnetic fields. Dielectric elastomer actuators, electrostatic rubber beams, and magnetic snapping beams are discussed as well as more recent efforts in the manipulation of liquid metal with bipolar electrochemistry. Each method is covered theoretically, implementing energy methods, and demonstrated experimentally. The theory and scaling reported here aims to facilitate the application of these technologies to robotics, microfluidics, and stretchable electronics. Next, we present a liquid flow sensor inspired by cupula structures found on a variety of fish. Our 5mm x 5mm x 1.75mm artificial cupula comprises a pair of liquid metal capacitors encased in silicone. For fabrication, a commercial 3D printer produces a mold out of a wax-like material. After casting rubber, mold structures are melted and dissolved, leaving voids for liquid metal vacuum injection. A 7.5mm x 7.5mm cross-section aqueous channel is employed at rates ≤1L/min. The experimental sensitivity of 0.05pF/mm and the parabolic capacitance versus flowrate response are compared to theory/computations.

Current and past collaborations with: Lauren Finkenauer[1], Vivek Ramachandran[2], Michael D Bartlett[3], Luca Deseri, Michael D Dickey[4], Carmel Majidi[5], Kaushik Sampath[6], Charles A. Rohde[7]. Work sponsored by the Office of Naval Research.

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Tutti gli interessati sono invitati a partecipare.

Il seminario è organizzato dal gruppo di Scienza delle Costruzioni
(D. Bigoni, L. Deseri, N.Pugno, A. Piccolroaz, F. Dal Corso, M.F. Pantano, R. Springhetti, D. Misseroni)

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