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PhD positions on electroactive polymer actuator applications for soft robotics and wearable devices at the Department of Industrial Engineering (DII), University of Trento

The Department of Industrial Engineering will soon open two PhD positions on the following topics:

1) Design and development of soft robots with integrated electrostatic artificial muscles (supervisors: profs. G. Moretti, S. Dirè, L. Fambri)

2) Development of wearable vibrotactile and acoustic interfaces based on dielectric elastomers (supervisors: profs. E. Rustighi, G. Moretti, D. Bortoluzzi)

We are looking for highly motivated, talented candidates with a strong background in the areas of mechatronics, mechanical design, or systems engineering, as well as interest and passion for multidisciplinary research at the intersection of design, modelling, and experimental prototyping/characterisation.

The two openings are part of the prestigious "Department of Excellence" grant, issued by the Ministry of Research to outstanding Italian University Departments.

The successful candidates will become part of a vibrant multidisciplinary group, with an international scientific profile, and they will have access to the experimental facilities at the Department of Industrial Engineering, including a broad variety of mechatronics and material characterisation laboratories, and advanced manufacturing facilities.

The candidates will have the opportunity to spend a mobility period of 6-9 months at international partner universities during the PhD programme.

Specific objectives of the two PhD projects are:

Project 1 (soft robots with electrostatic muscles)

- Modelling and testing of new concepts of electrostatic artificial muscles based on liquid-polymer multi-layer dielectrics
- Design, prototyping, and testing of soft robots (grippers, manipulators) based on the developed artificial muscle concepts
- Modelling and control of the developed soft robot prototypes

Project 2 (wearable interfaces based on dielectric elastomers)

- Conceptualisation, modelling and testing (including acoustic and vibration measurements) of new user interfaces (vibrotactile, acoustic communicators) based on electroactive polymers
- Design, modelling and control of smart garments integrating the developed acoustic/vibrotactile communicators.
- Testing of the garment prototypes with users in relevant scenarios (directional guidance, posture correction)

Requirements

Essential:

- Master's degree in Mechatronics/Mechanical/Systems Engineering or similar

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- A solid background in physics-based modelling, mechanics, electrostatics, analysis/design of complex systems
- A track record of project works
- Strong attitude towards problem solving and experimental activity
- Fluency in English (written and spoken)

Preferred:
- Experience with experimental activity, mechanical design, and/or data processing
- Knowledge of continuum mechanics (e.g., nonlinear elasticity), robotics, electronics, control theory, electromechanical drives, or polymeric/composite materials
- Experience with Matlab/Simulink
- Experience with CAD and/or finite element software
- Experience of scientific writing (e.g., prior involvement in scientific publications)

What/we offer to you:
- Work on cutting-edge emerging topics at the intersection of mechatronics and material science
- Work in a collaborative, multi-disciplinary research environment
- Possibility to perform independent research under the guidance of supervisors covering a broad range of expertise
- Broad offer of advanced classes/seminars in the scientific areas of mechatronics and material science
- A mobility period (6-9 months) in international research groups (with mobility allowance)
- Involvement in high-quality and peer-reviewed scientific publications
- Participation in international scientific conferences and workshops
- Flexible working time, with result-oriented assignments

Job details
- Contract: Italian PhD scholarship (20100 €/year gross salary)
- Exp. starting date: 1 November 2023
- Duration: 3 years

Enquiries
For information and enquiries please contact Dr. Giacomo Moretti (giacomo.moretti@unitn.it). Please include the string [PhD openings DII] in the title of your email.
The official application procedure will be made publicly available soon.