Politecnico di Milano

PhD in
Bioengineering

Advanced Physical Human-Robot Interfaces for Exoskeletons

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. *1200*
Number of scholarships	1
Beginning of PhD	May 1, 2017
Deadline for application	March 6, 2017

Context of the research activity	
Motivations and objectives of the research in this field	The physical interaction between the human body and a wearable robot is a critical aspect. The way the assistive forces are distributed on the human surface determine the effectiveness and comfort of an exoskeleton. However, the design of the physical interfaces is a challenging task, since the surface of the human body is not uniform and can vary in time. Furthermore, it is important to consider other aspects related with the comfort such as temperature, humidity, breathability, biological compatibility, and so on.
Methods and techniques that will be developed and used to carry out the research	The research would focus on the characterization of the human body surface and modelling of the interaction between a wearable robot and the human body, as well as the development and testing of advanced physical human-robot interfaces for an industrial exoskeleton.

Educational objectives	The candidate will acquire knowledge on human physical interaction by experimentation; understand and elaborate biophysical models; propose and analyse novel solutions for human-machine physical interfaces; and evaluate different prototypes by testing with users.
Job opportunities	Several industrial sectors (manufacturing, logistics, construction, etc.) are showing an increasing interest on assistive exoskeletons. The deep knowledge of technology and science in the area of exoskeletons will be an important skillset in the near future.
Composition of the research group	IIT-ADVR Number of PI 4 Number of Team Leaders 11 Number of Post-Docs 30 Number of PhD students 35 Number of Technicians 20 https://www.iit.it/research/lines/advanced-robotics POLIMI Number of Assistant Professors 1 Number of Post-Docs 1 Number of PhD students 10 www.nearalb.polimi.it/medical
Names of the research directors	*Darwin G. Caldwell* *Academic supervisors:* *Elena De Momi, PhD (POLIMI)* *Jesús Ortiz, PhD (IIT-ADVR)*
E-mail address, phone number and web-page	*IIT-ADVR* *Jesús Ortiz* *0039 010 71781 412* *jesus.ortiz@iit.it* https://www.iit.it/research/lines/advanced-robotics *POLIMI* *Elena De Momi* *0039 02 2399 9017* *elena.demomi@polimi.it* *www.nearlab.polimi.it/medical*
List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	1. Istituto Italiano di Tecnologia 2. Politecnico di Milano 3. Istituto nazionale Assicurazione Infortuni sul Lavoro

POLITECNICO DI MILANO

<table>
<tr><td colspan="2" align="center">Additional support</td></tr>
<tr>
<td>Housing:
financial aid per PhD student per year (gross amount)</td>
<td>Foreign students* inserire solo se rilevante
1st year: ….euros per student
2nd year.…. euros per student
3rd year: .…euros per student

(max number of financial aids available…., given in order of merit)

Out-of-town residents (more than 80 Km out of Milano)
1st year: …euros per student
2nd year: …euros per student
3rd year: … euros per student

(max number of financial aids available…., given in order of merit)</td>
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<tr>
<td>Funding for educational activities (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): funding per PhD student per year</td>
<td>1st year: 0,00 euros per student
2nd year: 0,00 euros per student
3rd year: 0,00 euros per student</td>
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<td>Teaching assistantship:
availability of funding in recognition of support to teaching activities by the PhD student</td>
<td>There are various forms of financial aid for activities of support to the teaching practice.
The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</td>
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<td>Computer availability:</td>
<td>IIT will provide a laptop to the candidate during the whole PhD period</td>
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<tr>
<td>Desk availability:</td>
<td>IIT will provide a personal desk to the candidate during the whole PhD period</td>
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