POLITECNICO DI MILANO

PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

THEMATIC Research Field: ADVANCED HUMAN-ROBOT INTERACTION AND COLLABORATION | INTERAZIONE E COLLABORAZIONE AVANZATA UOMO-ROBOT

Monthly net income of PhDscholarship (max 36 months)
€ 1250.0 In case of a change of the welfare rates or of changes of the scholarship minimum amount from the Ministry of University and Reasearch, during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	Human¿robot collaboration (HRC), which falls within the general scope of physical human¿robot interaction is defined when human(s), robot(s) and the environment come to contact with each other and form a tightly coupled dynamical system to accomplish a task. Ideally, each active component of such a system must be capable of observing and estimating the counterparts¿ contributions to the overall system¿s response through the fusion and processing of the sensory information. As a consequence, an appropriate reactive behaviour can be replicated or developed to complement and improve the performance of the collaborative partners. The main objective of this PhD theme is to enable humans and robots interact and/or collaborate in a timely, natural, and safe manner. The main topics for this PhD theme include (three positions are available on the following topics): - Control of robotic manipulation - Control of robot navigation - Human factors and ergonomics - Human-Robot interfaces - Role allocation in human-robot teams - Machine learning and visual perception - Dynamic human modelling - Estimating and predicting humans - And other HRI relevant topics. The successful candidates will have access to several fixed and mobile base robotic platforms already present in the lab, and several sensory systems for measuring and

	predicting human behaviour. The successful candidates will have the opportunity to work within several European, national, and technology transfer projects
Methods and techniques that will be developed and used to carry out the research	Research activities foresees extensive in lab experimentation at the Human Robot Interfaces and Physical Interaction (HRI^2 ¿ hri.iit.it) of the Istituto Italiano di Tecnologia, Genova
Educational objectives	- To learn scientific research methods in bioengineering, robotics and machine learning - To learn team working - To improve scientific dissemination skills
Job opportunities	- Robotic and automation companies - Agile manufacturing industry - Universities and research centres
Composition of the research group	1 Full Professors 2 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	ELENA DE MOMI

Contacts
Arash Ajoudani (IIT) *arash.ajoudani@iit.it* *Elena de Momi (POLIMI)* *elena.demomi@polimi.it*

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	625.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

IIT will provide a desk, a personal laptop and if necessary a desktop PC to the candidate during the whole PhD period