

# Politecnico di Milano

## PhD in BIOENGINEERING

**Research Title: “Unobstrusive gesture monitoring by skeleton tracking analysis and sensorized objects to early detects frailty in elderly people”**

<b>Scholarships and Financial support</b>	
Monthly net income of PhD scholarship (max 36 months)	€. 1200,00 (In case of a change of the welfare rates during the three-year period, the amount could be slightly modified)
Number of scholarships	1
Beginning of PhD	May 1, 2017
Deadline for application	March 6, 2017
<b>Context of the research activity</b>	
Motivations and objectives of the research in this field	<p>The most dramatic effect of population ageing is the increase of frail people. Frailty, cognitive and physical decline are syndromes that progress slowly but constantly over time and the actual monitoring methods are not enough to early detect meaningful changes. The research will be part of the Movecare project, funded by Horizon 2020, that integrates an existing robotic system with domotic sensors, smart objects, a virtual community and an activity center, to provide assistance, transparent monitoring and activities to the elder at home.</p> <p>This PhD research is based on the principle that gestures are the expression of motor and cognitive abilities, that can change selectively with pathologies or with ageing. Thus, the research aims at the development of a methodology that integrates a video tracking analysis with sensorized daily objects in order</p>

	to offer to the elder at home a transparent monitoring of activities typical of their daily routine. Advanced signal processing analysis will be carried out to identify early indicators of frailty.
Methods and techniques that will be developed and used to carry out the research	The candidate should help in the development and integration of the monitoring systems of the Movecare platform. Advanced processing procedures will be used to identify indicators of cognitive and physical frailty by monitoring activities of the elder daily routine. Applications will be in the better management of the elder at home. Pilot testing on elderly people will be carried out to validate the developed methodologies.
Educational objectives	The candidate will be part of the international project Movecare funded by the EU inside the Horizon2020 program. The research will be carried out by an International team with exchange periods between partners. The candidate will take part to the research meetings and to the different phases of the project, working in a EU context. Besides acquiring specific expertise on the used methodologies, and publishing the obtained results, the candidate will improve on team collaboration, deadline compliance, research reporting.
Job opportunities	The acquired expertise will open different job opportunities as researcher and/or research manager in research public/private institutions, and in instrumentation or service companies. Also companies and institutions interested in telemedicine, wearable sensors, internet of things applications will take advantage from the collaborations with a PhD with this kind of experience
Composition of the research group	Prof. Giancarlo Ferrigno Prof. Alessandra Pedrocchi
Names of the research directors	<i>Simona Ferrante</i>
E-mail address, phone number and web-page	<a href="mailto:simona.ferrante@polimi.it">simona.ferrante@polimi.it</a> , +39 02 2399 9004 <a href="http://www.nearlab.polimi.it">www.nearlab.polimi.it</a>
List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	Università degli studi di Milano, AISLAB; all partners of the Movecare consortium.
<b>Additional support</b>	
<u>Housing:</u> financial aid per PhD student per year (gross amount)	<u>Foreign students* inserire solo se rilevante</u> 1 <sup>st</sup> year 1500euros per student 2 <sup>nd</sup> year 1000euros per student 3 <sup>rd</sup> year 1000euros per student
<u>Funding for educational activities</u> (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): funding per PhD student per year	2 <sup>nd</sup> year: 1370 euros per student 3 <sup>rd</sup> year: 1370 euros per student

<u>Teaching assistantship:</u> availability of funding in recognition of support to teaching activities by the PhD student	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.
<u>Computer availability:</u>	1 <sup>st</sup> year: indicate <i>individual use or shared use</i> 2 <sup>nd</sup> year: indicate <i>individual use or shared use</i> 3 <sup>rd</sup> year: indicate <i>individual use or shared use</i>
<u>Desk availability:</u>	1 <sup>st</sup> year: indicate <i>individual use or shared use</i> 2 <sup>nd</sup> year: indicate <i>individual use or shared use</i> 3 <sup>rd</sup> year: indicate <i>individual use or shared use</i>