



# PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

**INAIL Research Field: \* DEFINITION AND IMPLEMENTATION OF INTEGRATED SENSORS PLATFORM FOR MONITORING WORKERS ACTIVITIES**

**Monthly net income of PhDscholarship (max 36 months)**

**€ 1325.0**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

## Context of the research activity

### Motivation and objectives of the research in this field

The project aims to improve the monitoring and management of biomechanical risk of workers in relation to industry 4.0 technologies. The key element of the project will be the man-machine relationship of the workers, analysed from an overall perspective. The research will involve the analysis of the state of the art with specific reference to biomechanical risk; laboratory experimentation with the use of advanced sensors, the analysis of results and the definition of guidelines for the evaluation and for the reduction of workers risk.

### Methods and techniques that will be developed and used to carry out the research

The project will be developed in collaboration with INAIL at ISPESL in Rome. The methods will include the development and analysis of a multisensory platform (integration of inertial sensors - IMU and surface electromyography - sEMG), for monitoring the execution of the work gesture with particular reference to the manual handling of the loads, repeated movements of the upper limbs and the assumption of incongruous postures. The same platform for the multifactorial analysis of movement will be studied for the analysis of particular sports gestures and the work reintegration interventions of patients with diseases that interfere with the mobility of the upper or lower limbs. The multifactorial analysis of movement will finally be proposed as a tool for evaluating the effectiveness of the various rehabilitation interventions and the optimization of recovery paths. Data analysis will be also based on machine learning / artificial intelligence



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<b>Educational objectives</b>	The PhD student will have the opportunity 1) to learn processes and approaches in a field of great actuality (i.e. occupational medicine) 2) to access INAIL laboratories as well as the Motion analysis Labs of Politecnico di Milano for experimental activities 3) to improve knowledge about guidelines for the evaluation and for the redaction of workers risk.
<b>Job opportunities</b>	The PhD student will have the opportunity to create a background and skills useful for further job applications.
<b>Composition of the research group</b>	1 Full Professors 1 Associated Professors 0 Assistant Professors 0 PhD Students
<b>Name of the research directors</b>	PROF. MANUELA GALLI, PROF FRANCESCO DRAICCHIO

<b>Contacts</b>	
Prof. Manuela Galli (POLITECNICO DI MILANO) manuela.galli@polimi.it	
Prof Francesco Draicchio (INAIL) f.draicchio@inail.it	

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

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	662.5 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
The PhD student will have a desk at INAIL (in Rome) and at Politecnico di Milano. Some training courses and activities will be planned together with the participation in national and international conference and events. Opportunities in terms of teaching activities and support to students during thesis preparation will be considered.

