

Politecnico di Milano

PhD in BIOENGINEERING

Research Title: “Pre-vascularized musculoskeletal in vitro human models”

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€. 1.200,00 (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	February 1, 2018
Deadline for application	<i>December 4, 2017</i>
Context of the research activity	
Motivations and objectives of the research in this field	Present in vitro and in vivo models for the discovery of pathophysiological mechanisms and new drugs are limited by their oversimplification or by the difference existing between different species in biological mechanisms. In this context, the research will address the development of innovative 3D in vitro models of both physiological and pathological musculoskeletal tissues, based on solely human cells. Since the structural organization of native tissues influences their function, particularly regarding the presence of a functional vascularization, it is important to reproduce vascularized, well organized tissues. To this end, bioprinting and 3D printing techniques will be exploited, which allows to fabricate 3D tissues with a predefined structure.
Methods and techniques that will be developed and used to carry out the research	In the research activity, both engineering and biological techniques will be used. In particular, biological techniques like immunostainings, confocal microscopy, cell silencing and gene expression analyses will be employed. Regarding the engineering methods,

	implementation of 3D printing and bioprinting techniques and of computational simulations for the design of the models will be performed.
Educational objectives	The PhD candidate is expected to develop high-level skills in the design and exploitation of 3D in vitro models for the study of pathophysiological mechanisms. Furthermore, he will develop abilities in revising the specific literature; in elaborating and successfully presenting data and results; in writing and successfully submitting papers to international scientific journals and conferences.
Job opportunities	The specific knowledge acquired in the study of pathophysiological mechanisms will allow the candidate to apply for and be selected for R&D positions in public and private research centers and companies.
Composition of the research group	EOC/Galeazzi: 1 Lab director, 1 Head of clinics (MD), 3 Postdoc, 1 Research Assistant Politecnico di Milano: 2 Full Professors, 2 Associated Professor, 1 Postdoc, 1 Temporary Research Assistant and 3 PhD Students
Names of the research directors	<i>Dr. Matteo Moretti and Prof. Gabriele Dubini</i>
E-mail address, phone number and web-page	Matteo.Moretti@eoc.ch Matteo.Moretti@grupposandonato.it 3472430489-0266214049 gabriele.dubini@polimi.it 02.2399.4254 http://www.labsmech.polimi.it
List of Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	EOC – Ospedale Regionale di Lugano, CH; IRCCS Istituto Ortopedico Galeazzi, Milan; Politecnico di Milano, Dept. of Chemistry, Materials and Chemical Engineering ‘Giulio Natta’, Milan
Additional support	
<u>Housing:</u> financial aid per PhD student per year (gross amount)	
<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 nd year: 1370 euros per student 3 rd 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 st year: individual use 2 nd year: individual use 3 rd year: individual use
<u>Desk availability:</u>	1 st year: individual use 2 nd year: individual use 3 rd year: individual use