



PhD in BIOINGEGNERIA / BIOENGINEERING - 39th cycle

THEMATIC Research Field: STUDY OF THE IMPACT OF ASCENDING AORTA GRAFT IMPLANTATION ON DESCENDING AORTA BIOMECHANICS

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0
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	<p>For patients with thoracic aortic aneurysms (TAA), replacement of the ascending aorta with a current standard of care prosthetic graft (polyethylene terephthalate) eliminates risk for dissection in graft-replaced regions and can thus be lifesaving. Nevertheless, accumulating evidence reveals that proximal aortic grafting can increase risk for downstream dissection, which is life-threatening. the goal of the research is testing if graft implantation produces progressive increments in adverse remodeling, and identifying (native aortic and graft) features most responsible for adverse remodeling, testing if these features are modifiable via a new class of tailored grafts.</p>
Methods and techniques that will be developed and used to carry out the research	<p>The successful candidate will:</p> <ul style="list-style-type: none"> - develop and implement algorithms for the automated reconstruction of the 3D geometry of the thoracic aorta from computed tomography (CT) and magnetic resonance imaging (MRI). - simulate the biomechanics of the aorta by using a fluid structure interaction approach in the pre-op condition and in different hypothetical post-op configuration. - compare the obtained simulation results with the actual post-op scenario; - identify potential indices to predict the remodeling of the descending aorta from the pre-op conditions and the adopted therapeutic approach. <p>The activity will be carried out at Politecnico di Milano in</p>



	The activity will be carried out at Politecnico di Milano in collaboration with Cornell Weil Medicine and Yale University.
Educational objectives	Understanding of radiologic imaging Advanced coding skills for software development Implementation of methods for advanced off-line processing of medical imaging Numerical modeling
Job opportunities	Academic researcher Clinical researcher Industrial R&D in radiologic imaging/image processing
Composition of the research group	3 Full Professors 1 Associated Professors 1 Assistant Professors 0 PhD Students
Name of the research directors	Prof. Alberto Redaelli - Emiliano Votta

Contacts	
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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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
A shared desk and computer will be given to the student for the time needed to carry out research. Short periods of teaching assistantship are foreseen during the program.