POLITECNICO DI MILANO

PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

THEMATIC Research Field: COMPUTATIONAL PREDICTION OF TAVI DEGENERATION

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	TAVI (Transcatheter Aortic Valve Implantation) is a recent non-surgical procedure for aortic valve replacement. The first available follow-up data showed that TAVI could lead to implant degeneration. The cause of this is not yet clear. In this study we aim at investigating by means of a computational analysis possible causes of degeneration, in particular the role of blood dynamcs.
Methods and techniques that will be developed and used to carry out the research	We will consider a fluid-structure interaction (FSI) modelling of blood, aortic annulus, graft stent and leaflets. Finite Elements and the library LIFEX will be employed. The simulations will be performed in real contexts, thus patient- specific computational tools will considered starting from elaboration of medical images such as MRI.
Educational objectives	The PhD student will have the opportunity to learn: - numerical methods for FSI- Finite Elements implementation and use of a FE library - study of the clinical problem related to TAVI degeneration and possibility to interact with physicians
Job opportunities	This experience will allow the PhD student to have expertise in the field of cardiovascular therapies and computational tools. This could be useful both in engineering companies which make use of computational tools and as an engineer to assist in hospitals physicians in the use of different technology in the field of cardiovascular diseases

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Composition of the research group	1 Full Professors 0 Associated Professors 1 Assistant Professors 1 PhD Students
Name of the research directors	PROF. CHRISTIAN VERGARA

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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	625.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
Educational activity as student will be aligned with the school roles. A desk will be available to work. Moreover, he will be able to teach as assistant for laboratories