



PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

THEMATIC Research Field: CREATION OF PANCREATIC PHANTOM AND SEALING DEVICES TO IMPROVE RESULTS OF PANCREATIC SURGERY

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

This project aims to develop a new generation of advanced surgery tools to minimise the occurrence of postoperative pancreatic fistula (POPF) and set up innovative surgeons' training protocols. POPF represents the main complication and cause of mortality and morbidity shortly after pancreatic surgery, and no specific tools have been developed yet to help the surgeons face POPF. This project will be carried out in close synergy between Politecnico di Milano and Istituto Clinico Humanitas. An artificial replica of the pancreas will be designed, fabricated, and utilised as a realistic phantom for testing different technical solutions to prevent POPF, as well as to develop new training practices for surgeons. Secondly, a sealing device for pancreatic tissue will be developed to avoid or reduce the POPF rate. Then, new patch/glue capable of sealing the pancreatic parenchyma/anastomosis and resisting the erosive action of pancreatic juice will be developed to avoid or reduce the POPF rate.

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

1) Literature review, 2) Characterization of the physiological and pathological pancreatic tissue 3) CAD of pancreatic phantom, 4) Tuning of the properties of the synthetic materials in order to prototype the phantom 5) Prototyping and characterization of the phantom

Educational objectives

The PhD Student will focus on how to deal with research



	in the artificial Organs design field, namely he/she will develop new theoretical and physical models which will further allow expanding knowledge about methods and new materials to be used.
Job opportunities	R&D in Companies in the field, applied research in excellence Units, or academic research.
Composition of the research group	2 Full Professors 0 Associated Professors 2 Assistant Professors 3 PhD Students
Name of the research directors	Maria Laura COSTANTINO - Alessandro Zerbi

Contacts	
Professor Maria Laura Costantino marialaura.costantino@polimi.it	
Professor Alessandro Zerbi alessandro.zerbi@hunimed.eu	

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	662.5 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The PhD Student will work at both Artificial Organs Laboratory and at Laboratory for the chemical-physical characterization of the pancreatic tissue at IRCCS Humanitas. The PhD Student And will be supplied with computational facilities and licenses