



PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

PARTENARIATO PNRR Research Field: NOVEL ENDOSCOPES FOR REAL TIME DIAGNOSTICS

Monthly net income of PhDscholarship (max 36 months)

€ 1250.0

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

Endoscopy is a diagnostic and therapeutic technique applied to hollow organs, such as the gastro-intestinal tract.

The endoscope is usually manually maneuvered by an expert, who visually analyses the images searching for suspected spots from which he/she can collect tissue samples for later biopsy.

The clinical outcome of the procedure is therefore strictly dependent to the expert ability.

This PhD project will allow introducing computer vision techniques to improve the clinical outcome of the procedure through

- 1) a 3D panoramic reconstruction of the intestinal tract analyzed;
- 2) highlighting suspicious anatomical structures which would require a deeper analysis and
- 3) alerting in case some tracts have not been analyzed.

www.nearlab.polimi.it/medical

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

The following computer vision methodologies will be developed:

- 1) Pre-processing techniques (e.g., filters)
- 2) Panoramic reconstruction
- 3) Tissue detection
- 4) Tissue segmentation
- 5) Simultaneous localization and mapping

The work will be carried out in collaboration with:



	The work will be carried out in collaboration with: University of Leeds (UK), Humanitas Research Hospital (Milan) and the Istituto Europeo di Oncologia.
Educational objectives	<ul style="list-style-type: none"> - Learning to organize and manage a research project - Programming/ robot control/ data analysis - Team-work capabilities - Student supervision and mentoring - Public speaking and outreach activities
Job opportunities	Academia (in Italy or abroad) Research centers Hospitals Industry: medical robotics, industrial robotics
Composition of the research group	1 Full Professors 1 Associated Professors 3 Assistant Professors 15 PhD Students
Name of the research directors	PROF. ELENA DE MOMI

Contacts	
Prof. Elena De Momi elena.demomi@polimi.it	

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
The PhD student will attend specific PhD courses at Politecnico di Milano according to his/her personal study plan; He/she will be able to attend summer schools and will have the opportunity to disseminate his/her research results in international conferences;



The PhD student will assist in teaching by giving practical and lab lessons and by tutoring of BSc and MSc students developing their thesis work.

The PhD student will have personal desk in the Politecnico and will be equipped with a personal computer.