



PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

PARTENARIATO PNRR Research Field: ADVANCED TECHNOLOGIES FOR POINT OF CARE DIAGNOSTICS BASED ON ELECTRONIC NOSES

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

Prompt and accurate diagnostics is crucial for early intervention and increased efficacy of treatments in many diseases. Preliminary studies showed that the analysis of the volatile organic compounds (VOCs) in biological samples (exhaled breath, urine, etc) by electronic noses may provide an accurate and effective tool for point of care diagnosis of several conditions. However, there are several technical challenges that are still preventing the e-nose technology to be deployed in the medical field. These include: physical processing of the biological specimen, sensor drift, calibration transfer to multiple devices, specific machine learning algorithms for odor fingerprint classification and clinical validation studies.

This project research is in the framework
 ?ANTHEM: AdvaNced Technologies for Human-centrEd Medicine?
 Codice PNC0000003 CUP B53C22006720001
 PIANO NAZIONALE COMPLEMENTARE (PNC) ?
 Decreto Direttoriale n. 931 del 6giugno 2022 ?
 ?AVVISO PER LA CONCESSIONE DI FINANZIAMENTI
 DESTINATI AD INIZIATIVE DI RICERCA PER
 TECNOLOGIE E PERCORSI INNOVATIVI IN AMBITO
 SANITARIO E ASSISTENZIALE?
 da finanziare nell?ambito del PNC

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

The aim of this research is to address the technical limitations listed here above by developing novel



	limitations listed here above by developing novel experimental set-ups optimized for biological samples, dedicated hardware for sensors signal conditioning and novel data processing algorithms using machine learning techniques. The research will be supervised by Prof. Raffaele Dellaca', TechRes Lab, DEIB and Prof. Laura Capelli, Laboratorio Olfattometrico, DCMC. The student will work in a joint research project involving both laboratories.
Educational objectives	The supervisor and his research group support the research development. Seminars and courses encourage an interdisciplinary approach. Laboratory activity completes the research path. Students are also encouraged to spend a period of study abroad (with availability of an additional financial support).
Job opportunities	Job opportunities include research both in academic and private institutions in Italy and abroad, and in industry. Spin-off and start-ups from research results are encouraged. Employment in this field offers various interesting opportunities.
Composition of the research group	0 Full Professors 2 Associated Professors 3 Assistant Professors 4 PhD Students
Name of the research directors	PROF. RAFFAELE DELLACA'

Contacts
<i>Prof. Raffaele Dellaca?</i> <i>raffaele.dellaca@polimi.it</i>

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 be involved in educational activities along with teaching assistantship covering topics of imaging in small animal models and bioengineering of the respiratory system. A shared desk and computer will be given to the student at the Lares for the time needed to carry out the research.

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