



# PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

## THEMATIC Research Field: DEVELOPMENT OF AN ELECTRICAL-READOUT BIOSENSOR FOR NUCLEIC ACID DETECTION

### 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

The project aims to implement and validate a point-of-care (PoC) platform, relying on a sensing and electric field actuation of nucleic acids for on-chip detection.

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

As an alternative to optical environmental sensing of nucleic acids, electrochemical approaches have been gaining increasing attention due to the label-free sensing and the easy integration of sensors within a metal-oxide-semiconductor (CMOS)-based architecture. Combining LoC approaches with integrated circuitry based on complementary CMOS will provide a promising platform for point-of-care (PoC) diagnostic devices that process microlitre samples and detect biomarkers within a fully isolated setting.

The system should be extremely sensitive, and enable quite an accurate pH readout and hence nucleic acid detection.

The candidate will become familiar with major fabrication, functionalization, and characterization technologies instrumental to producing, modifying and validating the device.

This project will be carried out in collaboration with STMicroelectronics.

#### Educational objectives

Framed by a scientifically vibrant environment, the candidate will develop mastery in research methodology, both quantitative and qualitative, and the competencies



	needed to be an effective researcher.
<b>Job opportunities</b>	Biotechnology is a fast-growing field, with an estimated yearly growth of 14 % for the next decade. Being highly research-intensive, the demand is mostly for skilled personnel in R&D. Most applications are in diagnostics and therapeutics so far, but emerging fields in nutrition, environment and green-economy are foreseen.
<b>Composition of the research group</b>	1 Full Professors 1 Associated Professors 0 Assistant Professors 0 PhD Students
<b>Name of the research directors</b>	PROFF. GABRIELE CANDIANI - MARIA LAURA COSTANTINO

<b>Contacts</b>
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<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p><b>Educational activities:</b> funding for participation in courses, summer schools, workshops and conferences.</p> <p><b>Teaching assistantship:</b> availability of funding in recognition of supporting teaching activities by the PhD student.</p> <p>There are various forms of financial of for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities within the limits allowed by the regulation.</p> <p>A <b>desk</b> and a <b>PC</b> will be given to the student for the time needed to carry out research, with</p>



accesso to HPC resources (internal and external, e.g., from CINECA).