



PhD in INGEGNERIA DEI MATERIALI / MATERIALS ENGINEERING - 40th cycle

PNRR 630 Research Field: SURFACE MODIFICATION FOR MEMS

Monthly net income of PhDscholarship (max 36 months)
€ 1500.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
<p>Motivation and objectives of the research in this field</p>	<p>The scope of the work is the development of technologies for the surface modification in MEMS silicon devices. This will open new functionalities and integration processes into existing production lines.</p> <p>The implementation of silicon based microdevices is fully in line with the topics targeted by DM n.630 Art.s 1.7 in terms of sustainability and energy transition. New materials for advanced MEMS technology accomplished the needs in the PNRR for innovation, digital transition and transformation, and sustainable mobility.</p> <p>Micro-Electro-Mechanical Systems, conceptualized in the 1960s and commercialized in the 1980s, are enabling several technologies and playing a central role in the boom of the Internet of Things. The outcomes of the proposed research aimed to produce implemented MEMS sensors will provide a contribution to such transformation.</p>
<p>Methods and techniques that will be developed and used to carry out the research</p>	<p>The research activities will include the evaluation of new materials and functionalization for the integration with MEMS technology.</p> <p>The use of electrochemical techniques and structural/morphological analyses will be part of the activities for the evaluation of the device performances. This scenario motivates doctoral multidisciplinary research in the field of silicon microdevices.</p> <p>The proposed research will gain from knowledge coming from various disciplines, from material science to microfabrication, from electrochemical processes to sensors integration, answering to the needs of innovation</p>



	and new expertise and skills for companies involved into the semiconductor industry as strategic area for our country.
Educational objectives	The educational aims are: 1) amplify supported PhD research experience and favour co-operative research experience at possible partners; 2) elevate the educational experience by creating a highly-visible center for MEMS technology and energy storage device technology.
Job opportunities	The introduction of new materials, processes and devices in MEMS technology will implement the number of applications of these devices. Job opportunities for an expert PhD in this field are expected in the private and academic sector.
Composition of the research group	1 Full Professors 2 Associated Professors 3 Assistant Professors 10 PhD Students
Name of the research directors	Prof. Luca Magagnin

Contacts
www.cmic.polimi.it/ricerca/elenco-gruppi-di-ricerca/seelab/

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	750.0 €
By number of months	6

National Operational Program for Research and Innovation	
Company where the candidate will attend the stage (name and brief description)	ST Microelectronics Via Camillo Olivetti 2 20864 - AGRATE BRIANZA (MB) www.st.com
By number of months at the company	6
Institution or company where the candidate will spend the period abroad (name and brief description)	IMEC Remisebosweg 1, 3001 Leuven, Belgium www.imec-int.com
By number of months abroad	6



Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

Confidentiality: since this is a thematic scholarship, the management of Confidential Information, Results and their publication is subordinate to the restrictions agreed upon with the funding company.

Upon acceptance of the scholarship, the beneficiary must sign a specific commitment.

Individual budget for research (tot. about 6.000 euro):

1st year: 2.000 euro;

2nd year: 2.000 euro;

3rd year: 2.000 euro

Teaching assistantship (availability of funding in recognition of supporting teaching activities by the PhD student): there are various forms of financial 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