



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 41st cycle

Research Area n. 2 - Electronics

**INTERDISCIPLINARY Research Field: LOW-ENERGY IN-SENSOR COMPUTING CONCEPTS
FOR MEMS WITH AUTONOMOUS CALIBRATION**

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

**Motivation and objectives of the research
in this field**

Interdisciplinary PhD Grant
The PhD research will be carried out in collaboration with research groups of the PhD programme in **"STRUCTURAL SEISMIC AND GEOTECHNICAL ENGINEERING"**.
See <https://www.dottorato.polimi.it/?id=422&L=1> for further information.

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

(italiano) Verranno utilizzate tecniche di data assimilation (e.g., extended o ensemble Kalman filters) accoppiate a metodi di model discovery (e.g. sparse identification of nonlinear dynamics). Tali tecniche di auto-calibrazione verranno implementate in hardware mediante circuiti capaci di calcolo in memoria (in-memory computing) caratterizzati da alto parallelismo, alta efficienza energetica e capacità di riconfigurabilità e adattamento.

(inglese) The methodology relies on techniques for data assimilation (e.g., extended or ensemble Kalman filters) coupled with methods of model discovery (e.g. sparse identification of nonlinear dynamics). These self-calibration techniques will be implemented in hardware via circuits capable of in-memory computing characterized by high parallelism, high energy efficiency and ability for reconfiguration and adaptation.



Educational objectives	The educational objectives include the acquisition and consolidation of knowledge and practical skills on circuit design, characterization and simulation.
Job opportunities	The PhD program provides a solid background for covering several professional engineering jobs in the industry, including microelectronics process experts and designers of embedded system and sensors.
Composition of the research group	2 Full Professors 0 Associated Professors 6 Assistant Professors 8 PhD Students
Name of the research directors	Prof. Daniele Ielmini

Contacts
daniele.ielmini@polimi.it

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents	--

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<u>EDUCATIONAL ACTIVITIES</u> (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences). <u>TEACHING ASSISTANTSHIP</u>: availability of funding in recognition of supporting teaching activities by the PhD student There are various forms of financial aid 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 regulations. <u>COMPUTER AVAILABILITY</u>: 1st year: Yes 2nd year: Yes



3rd year: Yes

DESK AVAILABILITY:

1st year: Yes

2nd year: Yes

3rd year: Yes

Premiality

Premialities will be recognized to the PhD candidate.

Up to 1200 euro (gross amount) after the completion of the 1st year;

up to 1800 euro (gross amount) after the completion of the 2nd year;

Up to 2400 euro (gross amount) after the completion of the 3rd year.

The premialities will be assigned provided that she/he demonstrates a significant contribution to the growth of scientific excellence, the industrial valorization of research, the networking and communication activities of the Department.