



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 37th cycle

Research Area n. 2 - Electronics

**THEMATIC Research Field: FABRICATION AND MODELING OF ADVANCED MEMRISTIVE
DEVICES FOR NEUROMORPHIC COMPUTING**

Monthly net income of PhDscholarship (max 36 months)

€ 1300.0

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 human brain is able to execute complex computing tasks with low energy consumption compared to digital computing systems. The purpose of neuromorphic engineering is to develop computing circuits with high energy efficiency by mimicking the human brain. Toward this goal, it is essential to develop a new class of memristive devices displaying neuromorphic properties, such as synaptic plasticity and neuron-like integration. The purpose of this project is the fabrication and modeling of new memristive devices with low current, linear potentiation and high scalability for advanced neuromorphic computing.

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

The activity will consist of the modeling, fabrication and characterization of memristive devices for neuromorphic computing. Fabrication methods include deposition, lithography and patterning in micro/nanoelectronics facility. Characterization techniques includes physical and electrical techniques. Numerical models will be used for the design and simulation of the devices.

Educational objectives

The doctorate activity will include attendance of academic courses, conferences, summer schools and workshops for the training of the student on the topics relevant for the research (clean room fabrication techniques,



	neuromorphic computing, device physics).
Job opportunities	The competence developed during the doctorate studies will enable access to job positions in device engineering and integrated circuit development.
Composition of the research group	1 Full Professors 0 Associated Professors 0 Assistant Professors 10 PhD Students
Name of the research directors	Daniele Ielmini

Contacts
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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	564.01 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
The PhD student will have access to a clean room facility after proper training. The PhD student will also have access to the electrical and numerical lab, where he/she will have a desk and a computer available for his/her research work. EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student per year 2nd year: euros per student (1534) 3rd year: euros per student (1534) TEACHING ASSISTANTSHIP: (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.



COMPUTER AVAILABILITY:

1st year: individual use

2nd year: individual use

3rd year: individual use

DESK AVAILABILITY:

1st year: individual use

2nd year: individual use

3rd year: individual use