POLITECNICO DI MILANO

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

Research Area n. 2 - Electronics

THEMATIC Research Field: DEVELOPMENT OF RADIATION DETECTORS WITH MACHINE-LEARNING ELECTRONICS READOUT

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	Radiation detectors are today widely used not only fundamental physics research but also in medical diagnostic and X-ray measurements applied to material studies. The processing of the detector signals by the readout electronics is fundamental to extract the features of interest of the radiation event, such as position of interaction, deposited energy and time stamp. The use of modern machine-learning (ML) algorithms applied to the detector signals allows to extract such features with high speed and good precision. Goal of this PhD is the development of radiation detectors where the signals are processed by ML algorithms embedded in the readout electronics, close to the detector, with the aim to achieve the desired performance with high efficiency in terms of hardware resources and energy budget. The PhD activity will include the experimentation of the readout system in detector applications under study in the research team.
Methods and techniques that will be developed and used to carry out the research	The detectors readout electronics, as well as ML techniques, will be developed first by use of simulators and the will be implemented in hardware by CAD design. Experimentation of developed prototypes will be tested in laboratory as well as in the target applications.
Educational objectives	The educational objectives belong to different levels from

	(i) lead the design and application of detectors and readout electronics for instruments in innovative radiation applications, (ii) learn to work in team, mentor master thesis students, self-organize, lead a research project, interact with international research partners and disseminate technical results through publications and conferences.
Job opportunities	There is a growing demand in industry and academia for PhD candidates with robust expertise in sensors and detectors, signal acquisition and software based on machine learning.
Composition of the research group	1 Full Professors 2 Associated Professors 3 Assistant Professors 15 PhD Students
Name of the research directors	Prof. Carlo Fiorini

Contacts
carlo.fiorini@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	700.0 €
By number of months	6

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

EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences).

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: Yes
2nd year: Yes
3rd year: Yes

DESK AVAILABILITY:
1st year: Yes
2nd year: Yes
3rd year: Yes