POLITECNICO DI MILANO

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

Research Area n. 2 - Electronics

THEMATIC Research Field: DEVELOPMENT OF A ELECTRONICS READOUT SYSTEM FOR A GAMMA-RAY DETECTOR USED ON RADIONUCLIDE THERAPY

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	In the framework of the EC project AIDER (Advanced Imaging DEtector for targeted Radionuclide therapy), goal of this PhD is the development of an electronics readout system for a gamma-ray detector, able to reconstruct energy, position of interaction and time stamp of the gamma-ray event interacting in the detector. The PhD activity will include the experimentation of the readout system in the final detector, in collaboration with the partners of the EC project AIDER.
Methods and techniques that will be developed and used to carry out the research	The electronics readout system will be based on readout ASICs which will acquire and filter the signals from silicon photomultipliers (SiPMs). The signals will be digitized by ADCs and then processed in a FPGA to extract time stamp, energy and position of interaction. The position of interaction will be based on the use of Machine Learning algorithms (e.g. Neural Networks), directly embedded in the FPGA.
Educational objectives	The educational objectives belong to different levels from (i) lead the design and application of readout electronics for an instrument in an innovative medical field, (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 medical instrumentation, 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

Stage and period abroad	
Institution or company where the candidate will spend the period abroad (name and brief description)	
By number of months abroad	0

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