Monthly net income of PhD scholarship (max 36 months)

€ 1300.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

<table>
<thead>
<tr>
<th>Context of the research activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motivation and objectives of the research in this field</strong></td>
</tr>
<tr>
<td>The use of Machine Learning and, in particular, Deep Learning (DL), technologies in remote sensing data processing is gaining increasing attention. To date, most of the ML algorithms have been applied to optical images. The target is to work on satellite radar (SAR) images, characterized by complex, rather than real, input variables. In particular, the attempt is to identify when DL technologies can exceed the performance of conventional DSP approaches and when conventional signal processing is the best tool for data analysis.</td>
</tr>
</tbody>
</table>

| Methods and techniques that will be developed and used to carry out the research |
| The topic of this research activity has been defined with TRE ALTAMIRA Srl. TRE was founded 20 years ago (2000) as the first spin-off company of Politecnico di Milano. After the acquisition by CLS in 2015, TRE ALTAMIRA (the name was changed in 2016) is now the world leader in InSAR applications. TRE-A is interested in assessing the impact of DL technologies in the analysis of multi-temporal SAR data-sets and in identifying the right mix between conventional DSP and DL technologies for the best processing chain. The candidate is expected to spend a significant amount of time with TRE-A technical staff, benefiting from a vast archive of SAR data (>25,000 scenes). |

| Educational objectives |
| Among the various research topic that this PhD program |
should touch, we highlight the following:


---

**Job opportunities**

The number of applications based on SAR data is growing steadily. Accordingly, the number of companies providing products and services based on radar images is increasing.

**Composition of the research group**

- 2 Full Professors
- 1 Associated Professors
- 0 Assistant Professors
- 2 PhD Students

**Name of the research directors**

Claudio Prati

**Contacts**

Prof. Claudio Prati - claudio.prati@polimi.it

Ing. Alessandro Ferretti - alessandro.ferretti@tre-altamira.com

**Additional support - Financial aid per PhD student per year (gross amount)**

<table>
<thead>
<tr>
<th>Housing - Foreign Students</th>
<th>1st year</th>
<th>2nd year</th>
<th>3rd year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1500.0 €</td>
<td>1000.0 €</td>
<td>1000.0 €</td>
</tr>
<tr>
<td></td>
<td>per student</td>
<td>per student</td>
<td>per student</td>
</tr>
</tbody>
</table>

Max number of financial aid available: 2, given in order of merit.

**Housing - Out-of-town residents (more than 80Km out of Milano)**

--

**Additional information:** educational activity, teaching assistantship, computer availability, desk availability, any other information
LIST OF UNIVERSITIES, COMPANIES, AGENCIES AND/OR NATIONAL OR INTERNATIONAL INSTITUTIONS THAT ARE COOPERATING IN THE RESEARCH: TRE ALTAMIRA; CLS - Collecte Localisation Satellites

One of the key aspects of Deep Learning and other Machine Learning technologies is the need to train the neural network with a huge amount of data. Being active since March 2000, TRE ALTAMIRA has an invaluable archive of satellite SAR images acquired by different sensors at different frequencies. This archive can pave the way to new advances and create a somewhat unique environment in which the candidate will be able to always test his/her ideas with real SAR data acquired over thousands of different areas of interest, all over the world. Such an opportunity would be extremely difficult to be replicated for anyone working in a research institute with no direct link with a space agency or a big remote sensing company.

INCREASE IN THE SCHOLARSHIP FOR STAYS ABROAD: Euro 566,36 per month, for up to 12 months

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 ASSISTANSHIP: (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