



## PhD in FISICA / PHYSICS - 37th cycle

**THEMATIC Research Field: PHOTONIC DEVICES FOR OPTICAL CONTROL OF THE LIVING CELLS FATE.**

**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**

Main research interests concern the characterization of the photo-physical/chemical/electrochemical processes occurring at the interface between organic semiconductors and living cells. The PhD fellowship is made available in the framework of the ERC Research Project LINCE ("Light Induced Cell modulation by Exogenous Organic Semiconductors", Grant Agreement No. 803621), focused on the development of light sensitive devices for optical modulation of the cellular activity. The final goal is the realization of light sensitive materials and devices able to modulate, with high efficacy and selectivity, the activity of different models of living cells, from their genesis to proliferation, from differentiation to specific functions. Project specific objectives include:

- (i) the study of biotic/abiotic interfaces through combination of different experimental techniques;
- (ii) the exploitation of the most relevant interfacial photo-physical phenomena to boost and direct cell differentiation;
- (iii) the realization of three-dimensional light-responsive architectures able to more closely resemble in vivo cellular environment and provide physical cues to spatio-temporally control maturation and differentiation processes.

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

Adopted techniques include optical and electronic characterization, photoelectrochemistry, optical and electronic microscopy, optical spectroscopy and



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|                                          | fluorescence imaging. Fundamental knowledge in cell culturing methods, cell electrophysiology and ion imaging will complete the technical portfolio of the successful candidate.                                                                                                                                                                                                                                                                                                       |
| <b>Educational objectives</b>            | The candidate will characterize hybrid interfaces between functional materials and in vitro cells. He/she will work in a multidisciplinary research team, comprising biologists, biotechnologists, material scientists, physicists and engineers, will have access to state-of-the-art facilities for bio-hybrid interfaces characterization, will be exposed to a highly supradisciplinary, international environment, will be actively involved in cutting-edge research activities. |
| <b>Job opportunities</b>                 | Professional opportunities include both academic research and industry. Recent PhD graduates were enrolled in top-level European and American research centers, as well as in the industrial sector.                                                                                                                                                                                                                                                                                   |
| <b>Composition of the research group</b> | 1 Full Professors<br>1 Associated Professors<br>6 Assistant Professors<br>3 PhD Students                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Name of the research directors</b>    | Maria Rosa Antognazza                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| 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                           | 566.36 € |
| By number of months                      | 6        |

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| Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information |
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**Educational activities per year :**

1<sup>st</sup> year: 0 euro

2<sup>nd</sup> year: 1534 euros per student

3<sup>rd</sup> year: 1534 euros per student.

Or 1022 euros per student for each year.

**Teaching assistantship:**

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:** *individual use*

**Desk availability:** *individual or shared use*