



# PhD in INGEGNERIA DEI MATERIALI / MATERIALS ENGINEERING - 39th cycle

**THEMATIC Research Field: ADVANCED RECYCLING PROCESSES FOR CIRCULAR FIBER-REINFORCED COMPOSITES**

**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

The main focus of the research project is on fiber-reinforced composite materials. The primary objective of this work is to design, set-up and optimize novel sustainable recycling processes for fiber-reinforced composite materials, enabling the recovery of clean and integer fibers (carbon, glass, other) as well as a reusable oily fraction coming from the impregnating polymer matrix. Ultimately, this research aims to open up new opportunities for the end-of-life management of fiber-reinforced composite materials within the framework of the circular economy.

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

Set-up, development and optimization of catalyst-assisted green solvolysis and microwave-assisted solvolysis processes; development of suitable approaches for fiber liberation and matrix recovery; study of the micromechanical and adhesive/interfacial properties of liberated fibers; development of chemical/physical approaches for sizing the recovered fibers; develop and optimize strategies for functionalization of the recovered oligomeric fraction; chemical, physical, and structural characterization of the recovered materials and their reprocessing for second life applications.

The research project is carried out within the framework of the Horizon EU funded project "RECREATE – Recycling Technologies for Circular Reuse and Remanufacturing of Fiber-Reinforced Composite Materials" (Grant agreement ID: 101058756), which the research group is currently



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|  | ID: 101058756), which the research group is currently coordinating. The PhD student will be expected to take part in the activities foreseen in the project and to actively interact with all the project partners, according to specific experimentation needs.   |
| <b>Educational objectives</b>            | The PhD student will acquire new knowledge and skills in materials characterization, process optimization, structure-property-process relationships, with a major focus on fiber-reinforced composites and the circular economy. The development of soft skills (e.g., team working, public speaking, project management, etc.) will also be fostered. |
| <b>Job opportunities</b>                 | Potential professional career pathways may be envisaged in the fields of: development, processing and recycling of polymeric and composite materials for various market sectors; industrial research and development; strategic consultancy.   |
| <b>Composition of the research group</b> | 2 Full Professors<br>3 Associated Professors<br>3 Assistant Professors<br>4 PhD Students   |
| <b>Name of the research directors</b>    | Prof. Stefano Turri - Gianmarco Griffini   |

| <b>Contacts</b>                                  |
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| <b>Additional support - Financial aid per PhD student per year (gross amount)</b> |    |
|---|----|
| <b>Housing - Foreign Students</b>   | -- |
| <b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>             | -- |

| <b>Scholarship Increase for a period abroad</b> |         |
|---|---------|
| <b>Amount monthly</b>                           | 700.0 € |
| <b>By number of months</b>                      | 6       |

| <b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b> |
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| <b>Educational activities</b> (funding for participation in courses, summer schools, workshops and   |



conferences) - financial aid per PhD student per year:

1<sup>st</sup> year: around 1.900 euros per student

2<sup>nd</sup> year: around 1.900 euros per student

3<sup>rd</sup> year: around 1.900 euros per student

**Teaching assistantship:** availability of funding in recognition of supporting teaching activities by the PhD student: There are various forms of financial support 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 regulation.