



# PhD in INGEGNERIA DEI MATERIALI / MATERIALS ENGINEERING - 40th cycle

**PNRR 630 Research Field: SELF-ADHESIVE PRODUCTS: CHARACTERIZATION AND PERFORMANCE IMPROVEMENTS OF ADHESIVES AND SURFACE INTERFACES**

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| <b>Monthly net income of PhDscholarship (max 36 months)</b>  |
| <b>€ 1400.0</b>  |
| In case of a change of the welfare rates during the three-year period, the amount could be modified. |

| <b>Context of the research activity</b>   |   |
|---|---|
| <b>Motivation and objectives of the research in this field</b>                          | <p>The research project refers to the mission M4C2-Dalla ricerca all'impresa (PNRR: istruzione e ricerca   <a href="http://www.governo.it">www.governo.it</a>).</p> <p>The subject of the research work is the overall performance enhancement of self-adhesive products through a) a in depth understanding of the components' interactions and b) formulation/construction hypotheses based on the findings of a). The following themes will be in the scope of the work:</p> <ol style="list-style-type: none"> <li>1) Top coating-films interactions critical factors and possible solutions</li> <li>2) paper-adhesive interactions affecting performance and wash off properties</li> <li>3) Self-adhesive formulation enhancements to obtain better performance in tack, adhesion cohesion but also wash off behaviour. Understanding the wash off reliability mechanisms and finding improvement solutions in this field will be particularly relevant to ensure containers' recyclability and ultimately to accomplish Fedrigoni Self Adhesive's sustainability vision.</li> </ol> |
| <b>Methods and techniques that will be developed and used to carry out the research</b> | <p>The research is developed in strict collaboration with Eritrama SpA, a branch of Fedrigoni self-adhesives, which has an international renowned experience in designing and formulating self-adhesives.</p> <p>The products to be analysed will be selected and developed together with the R&amp;D team of the company. Among the techniques that will be used there are: FTIR</p>   |



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|  | Among the techniques that will be used there are: FTIR and Raman spectroscopies, thermal analysis (DSC, TGA, DTA), contact angle, rheological measurements, and any other technique that might result necessary to enhance microscopic phenomena comprehension.   |
| <b>Educational objectives</b>            | <ol style="list-style-type: none"> <li>1) Understanding fundamental aspects in self-adhesion mechanisms</li> <li>2) Ability to collaborate with an industrial environment to manage complex projects</li> <li>3) Capability to support processes for innovation and technology transfer in the adhesion sector</li> <li>4) Capability to foster circular and sustainable self-adhesives market</li> </ol> |
| <b>Job opportunities</b>                 | <p>There is an increasing request of highly specialized technicians and professional figures able to:</p> <ul style="list-style-type: none"> <li>•Formulate new self-adhesives starting from deep understanding of chemical-physical fundamental mechanisms</li> <li>•Design sustainable self-adhesives products</li> <li>•Manage experimental protocols</li> </ul>                                       |
| <b>Composition of the research group</b> | <p>1 Full Professors<br/> 3 Associated Professors<br/> 3 Assistant Professors<br/> 6 PhD Students</p>   |
| <b>Name of the research directors</b>    | Prof. Giovanni Dotelli  |

#### Contacts

<https://mat4en2.cmic.polimi.it/>

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

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| <b>Housing - Foreign Students</b>                                     | -- |
| <b>Housing - Out-of-town residents (more than 80Km out of Milano)</b> | -- |

#### Scholarship Increase for a period abroad



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|----------------------------|---------|
| <b>Amount monthly</b>      | 700.0 € |
| <b>By number of months</b> | 6       |

| <b>National Operational Program for Research and Innovation</b>   |   |
|---|---|
| <b>Company where the candidate will attend the stage (name and brief description)</b>                       | Fedrigoni self-adhesives Eritrama SpA Via Senatore Simonetta 24, 20867 Caponago, MB <a href="https://selfadhesives.fedrigoni.com/">https://selfadhesives.fedrigoni.com/</a> |
| <b>By number of months at the company</b>   | 6   |
| <b>Institution or company where the candidate will spend the period abroad (name and brief description)</b> | University College of Dublin Belfield, Dublin 4, Ireland. <a href="https://www.ucd.ie/">https://www.ucd.ie/</a>   |
| <b>By number of months abroad</b>   | 6   |

| <b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>  |
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| <p><b>Confidentiality:</b> since this is a thematic scholarship, the management of Confidential Information, Results and their publication is subordinate to the restrictions agreed upon with the funding company.<br/>Upon acceptance of the scholarship, the beneficiary must sign a specific commitment.</p> <p><b>Individual budget for research</b> (tot. 5.700 euro):<br/>1st year: 1.900 euro;<br/>2nd year: 1.900 euro;<br/>3rd year: 1.900 euro</p> <p><b>Teaching assistantship</b> (availability of funding in recognition of supporting teaching activities by the PhD student): there are various forms of financial for activities of support to the teaching practice.<br/>The PhD student is encouraged to take part in these activities within the limits allowed by the regulation</p> |