



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

THEMATIC Research Field: TECHNOLOGIES FOR DISASSEMBLING OF FOOD PACKAGING MATERIALS

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	<p>Food packaging is essential and pervasive in the modern food industry, but at the same time poses important challenges when dealing with end-of-life management of the packaging materials.</p> <p>The recent Packaging and Packaging Waste Regulation (PPWR) EU imposes stringent requirements in terms of recyclability of packaging by 2030. Most of the better performing packaging materials intrinsically holds problems related to their end-of-life: developing approaches that can support Post Consumer Recycling became particularly urgent, in a framework of a correct tradeoff between food product requirement (i.e. shelf life and safety) vs. recyclable and recycled use of materials. The thesis aims to develop a disassembling process at pilot scale to prepare materials for mechanical recycling for sensitive contact applications.</p>
Methods and techniques that will be developed and used to carry out the research	<p>The PhD candidate will develop the thesis in an experimental laboratory, applying knowledge and techniques for food packaging materials research, with a special focus on design-for-recycling and packaging end-of-life problems.</p> <p>The thesis will be developed by the PhD candidate by:</p> <ol style="list-style-type: none"> 1. Studying and monitoring the evolution of the regulatory framework of recycling technologies in a perspective of closed-loop approach 2. Studying technologies for disassembling complex materials structures, exploiting physical, chemical, and



	<p>materials structures, exploiting physical, chemical, and biochemical approaches in a framework of DNSH principles</p> <p>3. Characterizing the obtained materials in terms of quality and level of contaminants, also using challenge test approaches</p> <p>4. Designing a pilot system</p> <p>5. Characterizing manufactures obtained by recycling in a pilot scale The research activity should involve the cooperation with major food packaging industries.</p>
Educational objectives	<p>The candidate will learn methodologies and techniques for:</p> <ol style="list-style-type: none"> 1. Design-for-recycling food 2. Materials characterization, mainly on transport phenomena 3. Destructive and non-destructive packaging characterization 4. Food Contact, with a special emphasis on PCR <p>The candidate will also acquire knowledge about the legal and regulatory framework of food packaging materials.</p>
Job opportunities	<p>The candidate will acquire the skills to find positions as:</p> <ul style="list-style-type: none"> •R&D specialist of food packaging for the overall food industry •Researcher in public and private research centers, such as Universities as post-doc •Public Institutions for food packaging, regulatory aspects in food industry
Composition of the research group	<p>3 Full Professors 4 Associated Professors 3 Assistant Professors 6 PhD Students</p>
Name of the research directors	<p>Prof. L. De Nardo, Prof. A. Fiorati</p>

Contacts	
<p>Telephone: 0223993161 Prof. Luigi De Nardo - luigi.denardo@polimi.it</p>	



Prof. Andrea Fiorati - andrea.fiorati@polimi.it

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	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

Confidentiality: since this is a thematic scholarship, the management of Confidential Information, Results, and their publication should be subordinated to the restrictions agreed upon with the funding company.

Upon acceptance of the scholarship, the beneficiary must sign a specific commitment.

Individual budget for research (tot. about 5.700 euro):

1st year: 1.900 euro;

2nd year: 1.900 euro;

3rd year: 1.900 euro

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