



# PhD in INGEGNERIA GESTIONALE / MANAGEMENT ENGINEERING - 37th cycle

**Thematic Research Field: LCA FOR SUSTAINABILITY IN THE COFFEE MACHINE  
INDUSTRY**

**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**

This research is going to be developed within an industrial context characterized by a strong push for product innovation. Specifically the research is supported by Simonelli Group (<https://simonelli-group.com>)

This is in fact one of the main factors by which the company has developed over time and has strengthened its position in the high end of a particularly competitive market at international level, namely that of espresso machines. The company therefore is willing to leverage innovation and related processes for competing successfully even in the future.

Within this context, research is aimed in particular at improving the product LCA through the identification, development and application to products of new technologies that can improve the performance, especially in the energy field, of espresso machines. The aim is to develop research-related activities both technologically and managerially, with a particular focus on the opportunities given by the possibility of integrating innovative concepts within different disciplines and under a system perspective.

In that sense, with regard to the technological side, the main focus will be on research and development objectives about the thermo-fluidodynamics of espresso coffee machines, including activities such as:

- research and development of new technologies for the conversion of energy into heat;



	<ul style="list-style-type: none"> <li>• research and development of new technologies (including new insulation systems and instant heating systems) for the efficient use of energy and for the use of renewable energy sources;</li> <li>• research and development of electrical systems for the conversion of energy into heat and methods for balancing generation and load (low-dispersion thermal/electric energy accumulators);</li> <li>• comparative analysis between currently used and innovative technologies, with an assessment of the performance of their applications.</li> </ul> <p>On the other side, with regard to the management issue, the objectives will cover the development and application of methodologies and processes for:</p> <ul style="list-style-type: none"> <li>• efficient management of new product development projects in line with the business plan;</li> <li>• the enhancement of technological innovations in order to maximise the return on investment in innovation, taking into account the company's business model and the potential commercial impact;</li> <li>• the evaluation of any integration opportunity of espresso machines with other machines or systems, both under the energetic efficiency and technical-economic feasibility.</li> </ul>
<p><b>Methods and techniques that will be developed and used to carry out the research</b></p>	<p>Feasibility analysis, CFD computation, energy balance equations, system engineering, LCA, BPR. The thesis will be developed in Simonelli Group SpA.</p>
<p><b>Educational objectives</b></p>	<ul style="list-style-type: none"> <li>• To manage successfully a new product development project</li> <li>• To investigate new technologies and innovative concepts applied in the field of interest</li> <li>• To conceptualize/design/assess new applications under a systemic perspective</li> </ul>
<p><b>Job opportunities</b></p>	



	The project open possibilities for candidate in several fields: R&D departments in companies, Research centres and universities, Innovation hubs.
<b>Composition of the research group</b>	1 Full Professors 0 Associated Professors 1 Assistant Professors 0 PhD Students
<b>Name of the research directors</b>	Prof. Antonio Calabrese

<b>Contacts</b>	
<i>antonio.calabrese@polimi.it</i>	

<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>	566.36 €
<b>By number of months</b>	6

<b>Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information</b>
<p>The scholarship is supported by Simonelli group (<a href="https://simonelli-group.com/">https://simonelli-group.com/</a>). The research activity will be carried out in close collaboration with the company with significant periods spent in the company for data collection, test and experimentations.</p> <p><i>Funding for educational activities: 1<sup>st</sup> year: 1200 euros per student, 2<sup>nd</sup> year: 1200 euros per student, 3<sup>rd</sup> year: 1200 euros per student.</i></p> <p><i>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.</i></p> <p><i>Desk availability: shared use</i></p> <p><i>Computer availability: individual use</i></p>