

# CIVIL AND ENVIRONMENTAL ENGINEERING

## Ateneo - Design and optimization of innovative retrofitting systems for existing buildings

<b>Funded By</b>	Politecnico di TORINO [P.iva/CF:00518460019]
<b>Supervisor</b>	FERRO GIUSEPPE ANDREA - giuseppe.ferro@polito.it
<b>Contact</b>	
<b>Context of the research activity</b>	The research program will start by studying the state of the art focusing on retrofitting systems for existing buildings and infrastructures. The research aims to develop efficient optimization tools for the optimal design of innovative retrofitting systems with a large application field. New materials will be investigated and mechanical and chemical properties will be validated by numerical and analytical simulation.
<b>Objectives</b>	<p>The research activity will cover one or more of the following ambits:</p> <ul style="list-style-type: none"> <li>• Study of the most promising deterministic and metaheuristic approaches that appeared in literature nowadays</li> <li>• Design and modelling of innovative retrofitting systems for existing buildings and/or infrastructures</li> <li>• Optimization procedures for the optimal sizing, geometry and topology of structures by code implementation (Matlab, python, etc.)</li> <li>• Development of new optimization algorithms to improve robustness and effectiveness in global optimal solutions</li> <li>• Advanced FEM modelling analysis for static and dynamic identification via refined and well-known FE software like ABAQUS or STKOopensees</li> <li>• Numerical simulations and experimental tests of innovative materials aimed to improve the structural performance of the retrofitting systems.</li> </ul>
<b>Skills and competencies for the development of the activity</b>	<p>According to the specific topic of the research activity, candidates should have a degree in civil engineering, environmental engineering and traffic or transportation engineering.</p> <p>previous basic knowledge of code implementation with MATLAB and/or Python is required as well as advanced skills related to Open Application Programming Interface for the interoperability between code and FEM software including but not limited to the work done during the M.Sc. thesis. Full papers and conference papers published or submitted before the deadline of the application will be considered.</p>