

**Call for application for research scholarships
for post-graduate international candidates**

RESEARCH PROJECT N. 1

Title

Design Criteria for Thermo-Plastic Matrix Composites (TPMC) and New Manufacturing Techniques for Powertrain Components

Scientific responsible (name, surname, role)

Cristiana Delprete, Full Professor (cristiana.delprete@polito.it)

Short description of the research activity (max 250 words)

The research activity is devoted to define new design methodologies, also related to Additive Manufacturing techniques, for lightweight TPMC powertrain components (e.g. connecting rod, piston pin, engine block, engine supports, gearbox casing, etc).

The research will be focused also on the identification of specific acceptability limits and failure criteria, as they can be different from those usually known and used.

Specific ad-hoc experimental tests of identification and numerical simulation models can be required and designed for estimating the mechanical behavior, life and reliability assessment of the components. As a matter of fact, mechanical characteristics of TPMC materials depend both on the material and on the manufacturing process, and they are not uniform in the material bulk.

In addition, the identification of parameters involved in the resistance characteristics of the material (static, high and low cycle fatigue, thermo-mechanical fatigue) has to be investigated.

Specific requirements (experiences, skills)

Basic mechanical knowledge, and in particular: Continuum Mechanics, Material Strength, Mechanical Machine Design, Finite Element Analysis

Website of the research group (if any)

Keywords (min 3, max 6)

Additive, Composite, Molding, Powertrain, Thermo-Plastic

Research Area (max 1)

- Mechanics and Aerospace