## Title

The influence of microstructure parameters on heat transfer processes in open porous materials

## **Research goal**

Research goal of the project is to study dependence of heat transfer parameters on structural features of open porous materials. Structural parameters studied, varied within the materials design procedure, are pore size distribution and constrictivity (parameter describing narrow channels of porous space). The project assumes creation of new knowledge in the area of advanced modeling and design of open-cell foam materials and their heat transfer properties.

Realization of such goal requires development of numerical models of materials in order to determine their thermal properties as a function of structural parameters such as constrictivity and pore size distribution. For determination of thermal conductivity, porous material will act as an isolated heat transferring medium, while for determination of temperature transfer efficiency porous structure will be a medium for heat and mass transfer for fluid flowing through it. Representative set of the designed structures will be manufactured with use of selective laser melting technique. Verification of heat transfer simulations will be performed in Cellular Materials Laboratory in Valladolid, Spain, where project manager will go for an internship.

Combination of knowledge in the areas of materials design and modeling with finite volume and finite element methods will allow for description and determination of the influence of constrictivity and pore size distribution on heat transfer properties of foam materials. As a result, main goal of the project will be achieved, namely determination of the influence of microstructure on processes of heat transfer in foam materials with open porosity.