## Poster abstract

The research topic consists in the definition and implementation of topological optimization algorithms. In particular, the objective is to obtain a software capable of generating the ideal form of a component, subject to different conditions of constraint and load, given an initial design domain. By means of the analytical definition of the problem, it is possible to obtain the optimal criteria. Together with the finite element method, it is possible to generate the final optimised shape. The main fields of application involved are structural, thermal and thermo-structural coupled. The materials taken into consideration are both isotropic and orthotropic and anisotropic. For long-fibre composite materials, a dedicated optimization algorithm has been developed. It makes possible to optimize both topology and fibre direction. All the algorithms obtained have been verified on different reference benchmarks. In addition, several real components have been redesigned with this method in automotive and aerospace sector.