

**Title:** *CFD Analysis of Electric Motors and Batteries for e-mobility*

**Teacher:** Jacopo Zembi

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**Indicative period:** May – July. The course will consist of 5 lessons 4 hours each, spread over 4 weeks (interested students should contact the teacher as soon as possible in order to define the lessons schedule)

**ABSTRACT.** Vehicle electrification for e-mobility demands a deep analysis of the thermal problems in order to increase vehicle efficiency and battery life and performance. An efficient thermal management of an electrified vehicle has to involve every system of the vehicle.

In the first part of the course, starting from physical and theoretical principles, we will review the fundamentals of these components. In parallel, the theory of CFD models used for the simulation of these components will be analyzed.

In the second part of the course, two case studies (a battery and an electric motor) will be analyzed with the definition of the initial and boundary conditions. Then, CFD simulations of the chosen case studies will be performed.

## **PROGRAM**

- Electric motors and batteries fundamentals
- CFD models for e-mobility
- Analysis of initial and boundary conditions
- CFD simulation of a battery case study
- CFD simulation of an electric motor case study