



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

PROPULSION AND POWERTRAINS

The development of innovative propulsion systems and cleaner, more efficient powertrains for passenger vehicles is one of the main challenges of the next decades for the EU.

The research activity in the automotive and mobility sector is facing a great challenge in the powertrain area. Electrification, hybridization, development of advanced combustion systems, use of electronic-horizon information for energy management are just some examples that involve several technological areas, and different disciplines and competencies.



Research at the University of Bologna covers a wide range of issues:

- Modeling, development and testing of hybrid, electric, and ICE-based advanced powertrain systems
- Highly-efficient combustion systems: CFD-based design, testing, modeling and control system development (4 fully-automated test cells for ICEs research and development projects)
- Electric propulsion systems: electric drives modeling, testing and control, advanced inverter technologies development, EVs concepts development
- Advanced technologies for innovative components design and manufacturing: 3D printing, virtual design, additive manufacturing, laser welding
- Energy storage systems: modeling, design and testing of innovative solutions for high-voltage batteries, BMS, and electronic components

HIGHLIGHTS

Electric and electronic components design, development and testing for HEVs and EVs applications. Modeling, testing, and control of advanced internal combustion engines and hybrid powertrain systems. Advanced laser welding technologies for high-voltage batteries.

PhD Course in Automotive Engineering for Intelligent Mobility, with the collaboration of University of Modena and Reggio Emilia and University of Parma: to train highly qualified personnel with multidisciplinary skills, able to direct the development and research, also in the industrial field, of innovative vehicles, creating a meeting point in the third level of education between mechanical, industrial, electronics, telecommunications, controls, electrical, IT, logistics and civil engineering.

[Green Mobility Research Lab \(GMRL\)](#) is a joint initiative of the University of Bologna and FEV Italy to develop new solutions for a more efficient, cleaner and safer mobility. The focus is on connectivity and the associated benefits. By exploiting the related enabled technologies, the research is oriented towards a fully predictive and optimal management of the most important features associated to mobility.