




ALMA MATER STUDIORUM  
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## BIOFUELS

*Biofuels are solid, liquid or gaseous fuels obtained from biomass. They serve as a renewable alternative to fossil fuels in the transport sector, helping to reduce greenhouse gas emissions and improve the security of supply. Bioethanol, biodiesel and biogas are examples of biofuels.*



Research at the University of Bologna includes the development and characterization of biomass crops and agricultural residues, sustainability assessment models and the optimization of conversion technologies to produce advanced biofuels.

- New lignocellulosic and oil crops, and innovative and resilient cropping systems to be developed in marginal land
- New industrial catalytic processes, operating on a laboratory or pilot plant scale, for the production and upgrading of biofuels
- Production of H<sub>2</sub> or syngas from biomass through reforming
- Logistics and conversion technologies of biomass
- Development of hybrid thermochemical/biological methods for the production of energy, biofuels and bio-materials from residual biomasses
- Cultivation of algae strains adapted to the production of biofuels
- Participation into large pre-commercial demonstration plants for the production of automotive, aviation and maritime biofuels from lignocellulosic or waste biomass
- Risk analysis, risk assessment and legal compliancy in biofuel production
- Environmental and social sustainability of advanced biofuels, including analysis of Indirect Land Use Change (ILUC) in the production of biomasses

## HIGHLIGHTS

**At the Industrial Crops Lab activities focus on** herbaceous lignocellulosic and oil crops dedicated to biorafinery, bioenergy and biofuels.

**At the Laboratory of Algal Biology** a photobioreactor systems is used for the controlled growth of algae to be transformed in plastic materials, biofuels, biomasses for gasifiers or pyrolysers, fertilizers, or for the treatment of waste water.

**At the Pyrolysis Lab** agricultural byproducts and sludge are valorized thanks to the application of small scale pyrolysis to screen process conditions and catalyst for the biomass and waste conversion.

## European Projects

**GOLD** - *Bridging the gap between phytoremediation solutions on growing energy crops on contaminated lands and clean biofuel production H2020*

**FlexJET** - *Sustainable Jet Fuel from Flexible Waste Biomass H2020*

**BECOOOL** - *Brazil-EU Cooperation for Development of Advanced Lignocellulosic Biofuels H2020*

**TO-SYN-FUEL** - *The Demonstration of Waste Biomass to Synthetic Fuels and Green Hydrogen H2020*

**SWEETFUEL** - *Sweet Sorghum: An alternative energy crop FP7*

**S2Bio** - *Delivery of sustainable supply on non – food biomass to support a “resource-efficient” Bioeconomy in Europe FP7*

**OPTIMA** - *Optimization of Perennial Grasses for Biomass Production FP7*