



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

AUTOMATION AND ROBOTICS

Automation and Robotics are key enabling technologies for the safe and rapid development of high-quality services and products in several areas ranging from manufacturing, aerospace, automotive and logistics to energy, health and agriculture.



The University of Bologna is active in the automation and robotics area in many research fields. The activity is spread across many departments, involving electric, electronics, mechanical, system science, biotechnology and psychology areas. The research of the University of Bologna covers a wide range of issues:

- Autonomous and Industrial Robotics (underwater, aerial and agriculture robotics; guidance, navigation and maneuvering; trajectory planning and optimization; visual odometry and SLAM; mobile manipulators; robotic hands and grippers; manipulation of deformable objects)
- Distributed Intelligent Systems and Cooperative Robotics (distributed optimization and control; federated learning; large-scale complex systems; collaborative robots; multi-robot decision and control)
- Advanced Control and Diagnostics in Mechatronics and Automation (advanced nonlinear control; robust control; nonlinear optimal control; system identification and estimation; thermal control for HPC; control of electric drives and power converters; control of smart mechanisms; advanced manufacturing; autonomous vehicles; diagnostics and prognostics of automatic machines)
- AI and Cognition (3D vision; depth estimation; embedded computer vision; object detection and recognition, semantic segmentation; deep learning for computer vision and robotic perception; object perception and representation; affordances and interaction)

HIGHLIGHTS

The University of Bologna is member of the [euRobotics AISBL](#), member of the “AI, Data and Robotics”, one of the European Partnerships in digital, industry and space in Horizon Europe. **Center for research on Complex Automated Systems ([CASY](#))** including a big flight room area equipped with the VICON motion capture system for indoor navigation and rapid prototyping and the **Laboratory of Automation and Robotics ([LAR](#))** with equipment for the development of new robotic prototypes, robotic platforms and several robotics anthropomorphic hands and industrial grippers.

European funded projects coordinated by the University of Bologna

FP7 [AIROBOTS](#) - Innovative aerial service robots for remote inspections by contact (2010-2013)

FP7 [SHERPA](#) - Smart collaboration between Humans and ground-aerial Robots for improving rescuing activities in Alpine environments (2013-2017)

H2020 [AIRBORNE](#) - Aerial Robotic technologies for professional search and rescue (2018-2020)

ERC Starting Grant: [OPT4SMART](#) - Distributed Optimisation Methods for Smart Cyber-Physical Systems- (2015-2021)

[WIRES](#) - Wiring Robotic system for Switchgears (2016-2018)

[REMODEL](#) - Robotic technologies for the Manipulation of complex Deformable Linear objects (2019-2023)