ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

INTERNET OF THINGS, CYBER PHYSICAL SYSTEMS AND SMART SYSTEM INTEGRATION

The current move towards pervasive digitalization and connectivity is expected to go on irreversible, until next revolution in civilization models. IoT, CPS and Smart Systems are the key technologies accompanying this process.

The University of Bologna has been **working with the major players** in this field since its start and it is now committed to contribute with its research to the next steps. The IoT industry offers data collection and connectivity solutions solving the interoperability problem at communication level. But more challenges are on the table, including energy efficiency, data reduction, information extraction from big data, security, semantic interoperability, infrastructure-less interaction with the environment.

The University of Bologna teams investigate in the following **horizontal topics** and **related applications**: Self-powering wireless devices and micro-power management; Digital platforms with ultra-low power, parallel, near-sensor processing (e.g. RISC-V architectures); Beyond-IoT architectures for semantic interoperability (e.g. W3C WoT); Beyond-IoT architectures for local and remote interaction; Device Data and Model Integration.

Agriculture, electric mobility, structural and environmental monitoring, long term home assistance are **application domains** of these emerging technologies currently addressed by the University of Bologna teams.

HIGHLIGHTS

The University of Bologna is member of the ARTEMIS-IA, Embedded & Cyber-Physical Systems R&D partners in the Key Digital Technologies Joint Undertaking. The University of Bologna can count on modern laboratories to support the activities in this field, in particular:

- The **SHM LAB**, the Laboratory of structural health monitoring equipped with prototype structures, data acquisition systems, and structure modeling & simulation platforms;
- The **Joint Lab with STMicroelectronics** focused on design with Bipolar-CMOS-DMOS technologies;
- The **MARS LAB**, the Laboratory of IoT, Web of Things and Interoperabiity of Embedded Systems

European funded projects

The University of Bologna hosts the ERC **OPT4SMART** - Distributed Optimization Methods for Smart Cyber-Physical Networks (2015-2021)

Partner in several H2020 projects:

IoT pilots **SWAMP**: Smart Water Management Platform (2017-2020)

EnABLES: European Infrastructure Powering the Internet of Things (2018-2021

ECSEL **NextPerceptios**: Next generation smart perception sensors and distributed intelligence for proactive human monitoring in health, wellbeing, and automotive systems (2020-2023).

Moreover the University of Bologna successfully participated in the ECSEL calls as linked third party of IUNET: **CONNECT** (2017-2020); **AI4DI** (2019-2022); **Arrowhead Tools** (2019-2022) and **Progressus** (2020-2023).