

Alma Mater Studiorum
Università di Bologna

Industry 4.0@UNIBO

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University of Bologna



a multicampus and multidisciplinary University in the Emilia-Romagna Region

5 campuses in 120 x 30 km

1.086.134,88 m² overall surface area

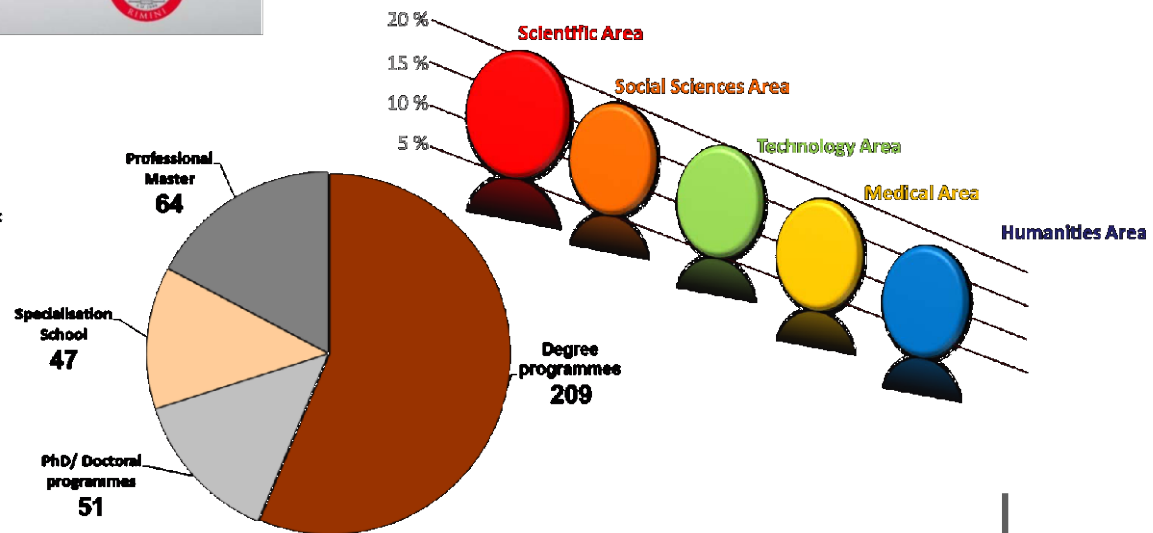
33 Departments

11 Schools

5.853 permanent staff*

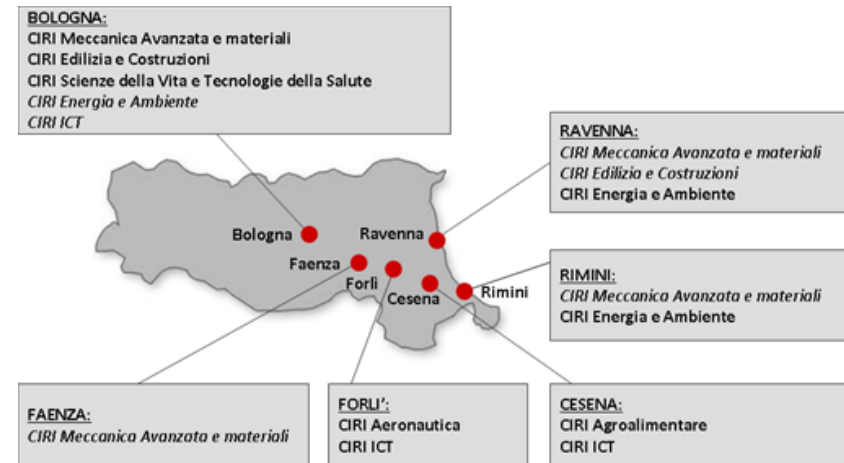
84.744 students*

out of which **5,826** International students



Projects and fund raising Industry 4.0

- Wide network of industrial collaborations through the **Interdepartmental centers of industrial research**
- UNIBO participation to **BI-REX**
- **Industry 4.0 related projects**
 - **European projects (70 M€)**
 - FP7 – H2020
 - ARTEMIS - ENIAC - ECSEL
 - ERANET - JTI
 - **National Projects (8 M€)**
 - **Regional Projects (7,2M€)**





IoTwin EU project

<http://www.iotwins.eu>

Distributed and Edge-based Industrial Twins for SMEs: a Big Data Platform

To *lower the barriers* for *edge-enabled and cloud-assisted intelligent systems* and services based on big data for domains of *manufacturing and facility management*

Barriers:

- AI solutions require mastering *complex and rapidly evolving tools and techniques*,
- Access to *very large sources of curated data and significant computational resources*
- *Latency and reliability requirements, adequate degree of data privacy*
- Investments in infrastructure at server/edge side



IoTwin: concept and ambition

Ambition

- **Reference architecture** for distributed and edge-enabled digital twins
- Implementation, deployment, integration, and experimental in-the-field evaluation in 12 test-beds
 - Anomaly detection and prediction
 - Production optimization
 - Facility management
- Creation of added value services and business models

Hierarchical organization and inter-working of digital twins:

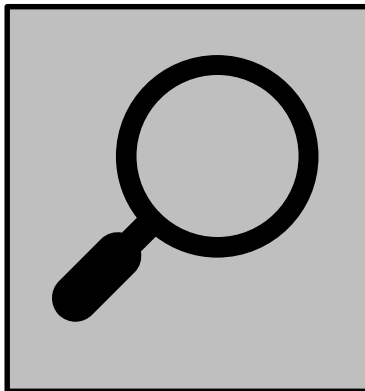
- IoT twins
- Edge twins
- Cloud twins



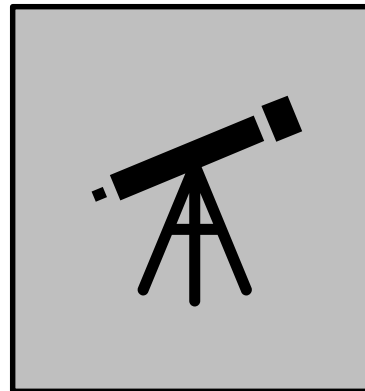
AI for industry 4.0

The main role of AI in industry4.0 is the capability of creating models

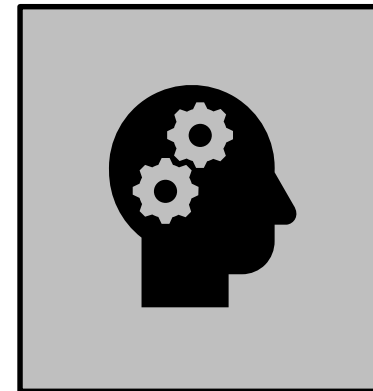
**DESCRIPTIVE
MODELS**



**PREDICTIVE
MODELS**



**PRESCRIPTIVE
MODELS**



Merging data driven insights and human expert knowledge