



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

SKELETAL HEALTH AND DISEASES

*Addressing the burden of
osteoarticular diseases: toward an
effective and sustainable care by
advancing the state of the art.*

Osteoarticular conditions are the most common cause of severe long-term pain and physical disability, and encompass a spectrum of conditions, including osteoarthritis, rheumatoid arthritis, osteoporosis, bone cancer, and low back pain.

The research of the University of Bologna applies biological and biomechanical tools, through a multidisciplinary approach, to the most common and impacting osteoarticular conditions, as:

- **Paediatric orthopaedics and rare diseases:** genomic profile and phenotypic features of collagenopathies and muscle diseases
- **Bone cancer:** genomic and metabolomic profile of sarcomas, drug resistance, biomarkers (miRNAs, exosomes) photodynamic therapies, tumor microenvironment in sarcomas and bone metastases, biomarkers, clinical impact of gut microbiome
- **Articular implants:** tribology of devices, advanced imaging (radiostereophotogrammetry, dynamic MRI), objective measurement of results by gait analysis and wearable devices, infection
- **Tissue engineering and regenerative medicine:** biocompatibility, surface modifications by chemico-physical approaches, platelet derivatives, advanced therapies
- **3D printed orthotics** and implants for foot diseases and bone reconstruction
- **Inflammation and articular damage:** genomic profile of hand osteoarthritis, biomarkers in rheumatic diseases, chondrocyte damage in osteoarthritis
- **Osteopenia and osteoporosis:** pathophysiology of osteopenia and prevention of fractures

HIGHLIGHTS

The excellence of the University of Bologna lies in the skeletal health and disease lies on the close link with the **Istituto Ortopedico Rizzoli (IOR)**, a leading European center for orthopaedic science and care. Research facility of IOR include 15 laboratories, covering the spectrum of orthopaedic science and an in vivo facility for experimental surgery, a platform for genomic data analysis, and an advanced microscopic imaging platform are also available. Orthopaedic rare disease and bone cancer biobanks, together with several collections of serum and tissue material, are fully integrated with clinical information.

Excellence in the field is reflected in the participation to the **European Reference Network (ERN)** on Rare Bone Disorders [ERN-BOND](#) and in a number of EU funded projects, e.g. IMI-2, [ITCC-P4](#) - ITCC Pediatric Preclinical POC Platform, H2020 [FURTHER](#) and [MCDS-Therapy](#).