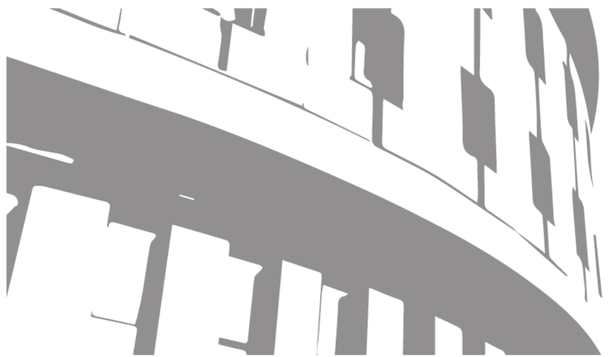

RIZZOLI-RIT DEPARTMENT

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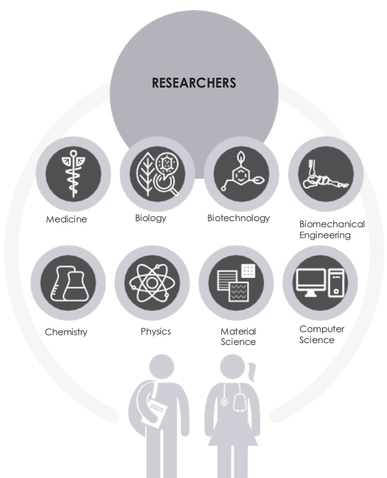
# RIZZOLI-RIT
## RESEARCH, INNOVATION & TECHNOLOGY
## ORGANIZATION

*Il moto è causa d'ogni vita*

# 1 THE DEPARTMENT

The Research, Innovation & Technology Department (RIT) of the IRCCS Istituto Ortopedico Rizzoli (IOR) is engaged in biomedical research and part of the Emilia-Romagna High Technology Network. Founded in 1896, IOR is a public research and teaching hospital specializing in the study and care of musculoskeletal conditions. With the aging of the European population, musculoskeletal diseases are becoming a greater burden every year. Musculoskeletal conditions are the second greatest cause of disability and have the 4th greatest impact on the overall health of the world population. RIT is aware of the huge burden of musculoskeletal diseases and is committed to increase knowledge to be translated and effective solutions to improve the care of patients with motor disabilities. The financial support of RIT is ensured through public and private funding that sustain the development of technological solutions for healthcare. RIT strongly collaborates with the University of Bologna and the National Council for Research, thereby amplifying its potential through a continuous contamination of know-how, high-tech resources, and manpower. Collaboration with industries is also well-developed through the Emilia-Romagna High Technology Network.

The RIT community includes an interdisciplinary team of staff scientists from different backgrounds: human and veterinary medicine, biology and biotechnologies, biomechanical engineering, chemistry, physics, material science and computer science supervising an equal number of PhD students and postdocs.

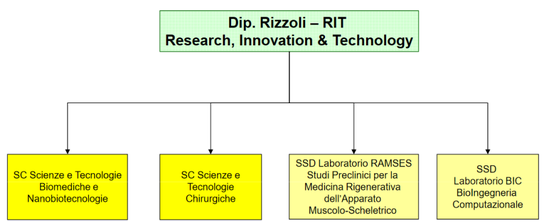



# 2 MISSION AND VISION

The **mission** of RIT is to develop processes and products for the prevention of disabilities and the recovery of motion in patients with musculoskeletal conditions.
The **vision** of RIT is twofold:

- To increase knowledge on musculoskeletal pathophysiology through high tech tools;
- To transfer such knowledge to healthcare services also in collaboration with industry in order to prevent and treat orthopaedic diseases.

# 3 ORGANOGRAM




# 4 FACILITIES

- Biocompatibility and bioactivity, in vitro and in vivo;
- Histology, morphometry, and microdensitometry;
- Optical, fluorescence, confocal (time-lapse, spectral, multiphoton, ultraresolution) and ultrastructural microscopy;
- Biomechanical, kinematic, and tribologic assays;
- Functionalization and evaluation of implant devices;
- Molecular biology, immunoenzymatic assays, genomics, and proteomics
- Immunophenotyping and cell cultures on standard, dynamic, and 3D models (bioprinting and microfluidics);
- Isolation and characterization of exosomes;
- Bioprinting, 3D printing;
- Computational analyses;
- eHealth;

# 5 THEMES

**Models and diagnostics**
Advanced models of disease (3D cell cultures, tissue on-a-chip, bioprinting, microfluidics). Live-imaging, confocal and electron microscopy. Isolation and characterization of exosomes (liquid biopsy). Single cell analysis isolation and characterization.

**Therapeutics**
Models of cell therapies for regenerative medicine. In vitro and ex vivo chorionallantoid membrane in vivo assay.

**Implant materials and surgical technologies**
In vitro and in vivo assays of biomaterials and medical devices. Biocompatibility (safety), bioactivity, and therapeutic efficacy assay (proof-of-concept studies). Personalized solutions for tis- sue defects. Bone substitutes and custom-made devices. Decellularized matrices and electrospinned polymeric scaffolds. Decellularized nerve grafts.

**Computational sciences for healthcare**
Computer assisted surgery. Biobanking. Wearable devices. Wellness assessment by wearable devices. Finite elements analysis of musculoskeletal function. 3D printing.