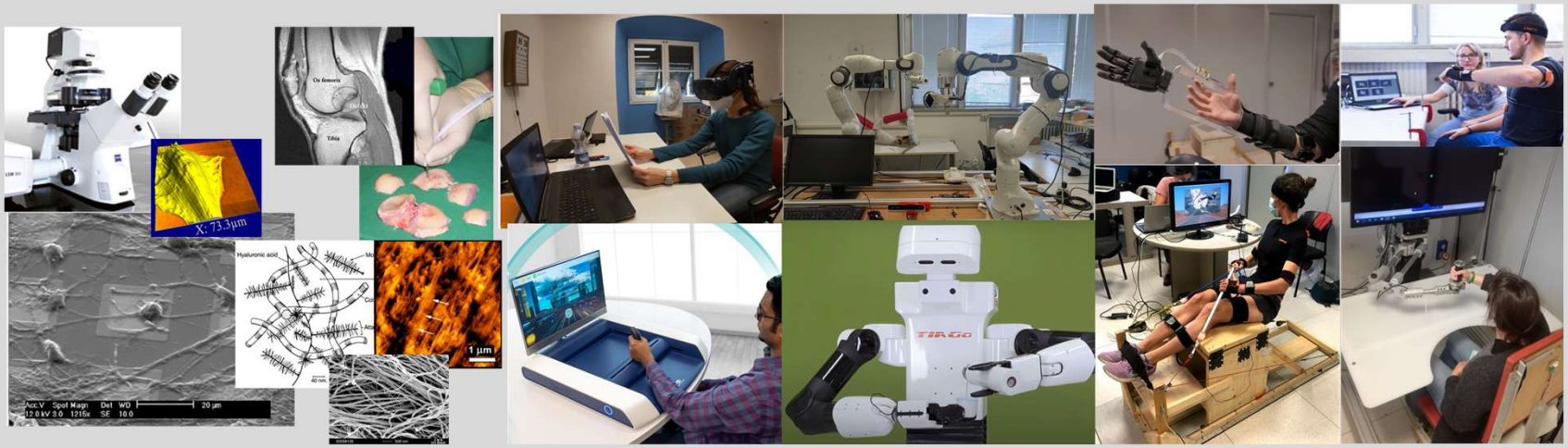
Università di Genova | DIBRIS DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

Department of Computer Science, Bioengineering, Robotics and Systems Engineering

Director: prof. Sergio Martinoia

Università di Genova | **DIBRIS** DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

Laboratorio di Bioingegneria



Dalla Ricerca di Base alla clinica

Sviluppo di nuove tecnologie per la diagnosi, terapia, riabilitazione ed assistenza

Dal 2015 come Laboratorio (Infrastruttura di Ricerca) riconosciuto da Regione Liguria

Dal 2025 come infrastrutture regionali di ricerca come:

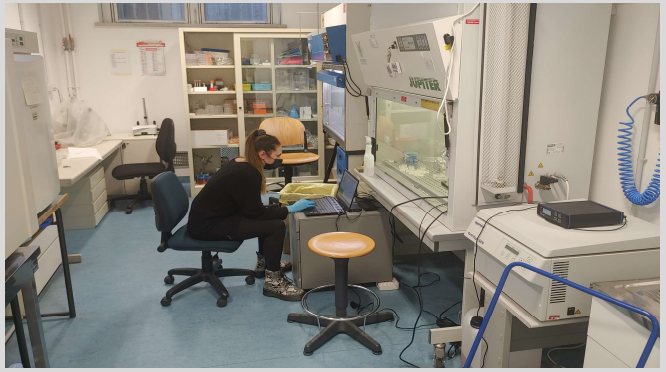
BeBrains - Bioengineering, E-health, Biomaterials, Rehabilitation, Assistance, Innovation, Neuroscience Solutions
RAIA -Robotica, Intelligenza Artificiale, e Automazione – Infrastrutture e Servizi per la Società e le Imprese

Università di Genova | **DIBRIS** DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

who: ~20 permanent academic staff
~ 40 PhD students and postDocs
where: via Opera pia / viale Causa

- robotics/automation
- computer science
- bioengineering
- Mechatronics (DITEN)

chemical lab (synthesis, characterization)



Cell culture lab (primary cultures, cell lines, neurons from human iPSCs)

what:
– basic and applied research
– technology transfer
– education and training

mechatronic facility (fast prototyping, additive manufacturing)

Università di Genova

DIBRIS DIPARTIMENTO
DI INFORMATICA, BIOINGEGNERIA,
ROBOTICA E INGEGNERIA DEI SISTEMI

The Bioengineering Lab

Università di Genova | **DIBRIS** DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

- *in vitro* structural and functional characterization of biomolecules, cells and biological tissues at the micro- and nano-scale
- development of molecular and cell pattering techniques
- development of biomimetic scaffolds for “organ on a chip” devices
- development of nanoengineered materials for targeted and controlled release of drugs

Equipment/instruments

Processing

- plasma treatment
- spin coater
- micro-encapsulation unit
- Electrospraying/Electrospinning Unit
- 3D Bioprinting

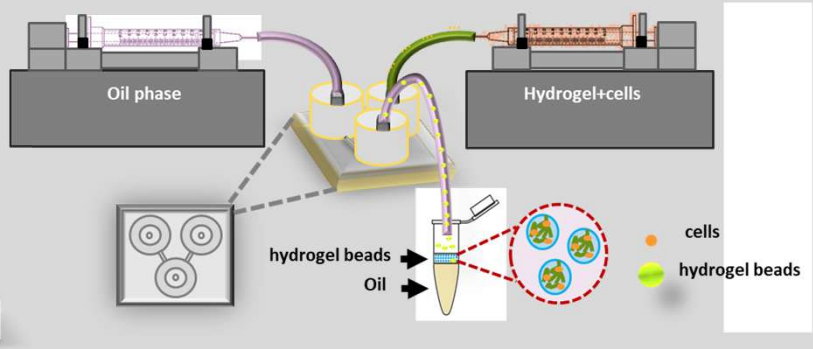
Characterization

- UV-VIS NIR spectro-photometer
- QCM
- optical fluo microscopes (ultrmicro – Genoa Instr)
- scanning probe microscopes SPM

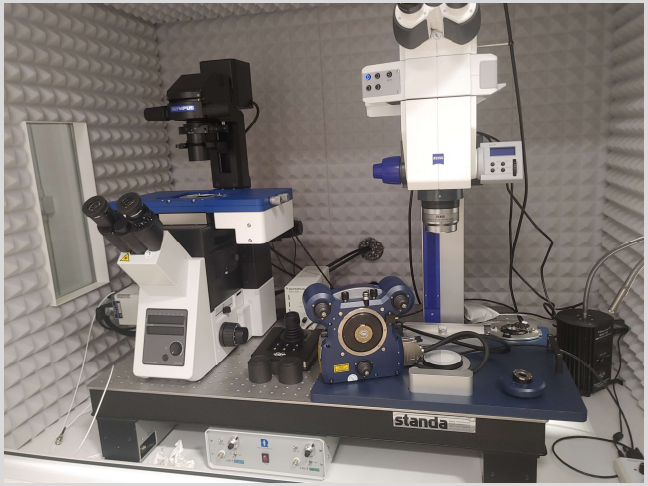
Services

- surface analysis (topography, tribology, interactions, nanomechanics)
- development of AFM based sensing/clinical diagnostic assays

Microfluidics



Nanowizard 4 XP AFM



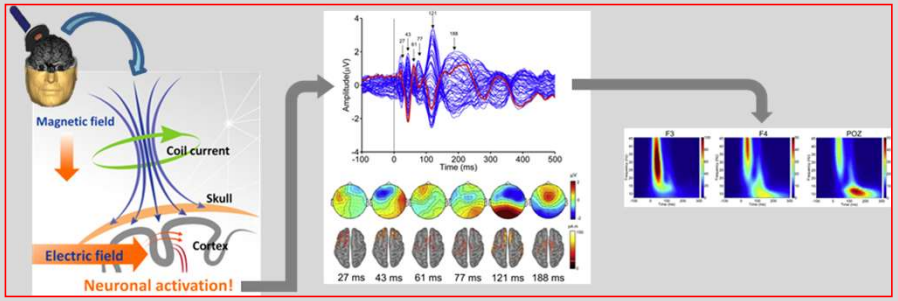
JPK BIOAFM

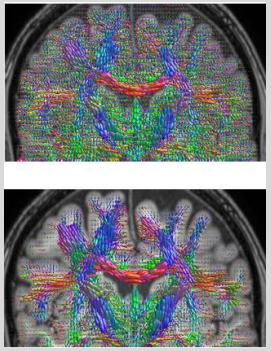
Università di Genova | **DIBRIS** DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

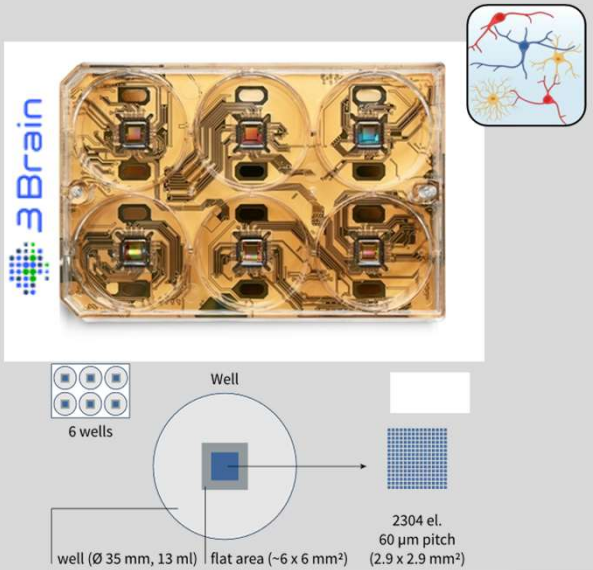
- **neuro-electronic interface**
- **brain-on-a-chip and 3D neuronal networks**
- **(neuro)electroceutical**
- **neuroprosthetics**
- **computational neuroscience and advanced data analysis tools**

Equipment/instruments

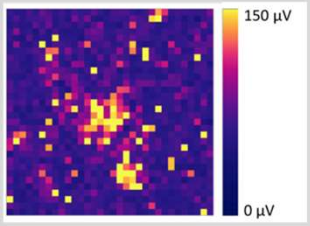
- Systems for *in vitro* electrophysiology (microelectrode arrays)
- System for *in vivo* electrophysiology (microelectrode arrays)
- Systems for *human* electrophysiology (EEG)








Single channel activity



Network activity

Services

- *In vitro* neurotoxicology tests for personalized medicine
- Medical Image Processing and Analysis (structural and functional imaging).
- *Neural* data analysis

Università di Genova | DIBRIS DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

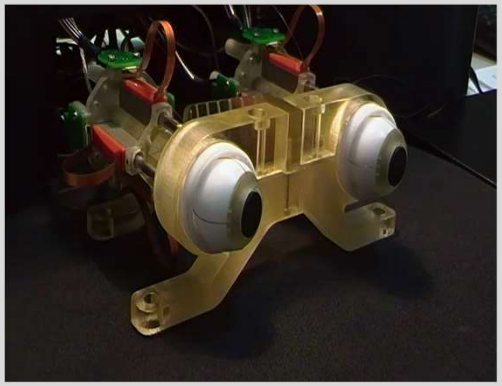
Equipment/instruments

- 2 robot Franka-Emika
- 1 robot umanoide BAXTER
- Development and test set-up for tactile sensors
- Development systems for mechatronic systems

Services

- Control of robot manipulators
- Control of Human-Robot interaction
- Control architectures for robots
- Tactile sensor technologies (hw/sw)
- Mechatronics

- Technologies for collaborative robots capable of safe and smooth adaptation to humans and objects for assistance and collaboration
- **touching robots**
- **robots touching**



Human-robot social interaction: Solutions

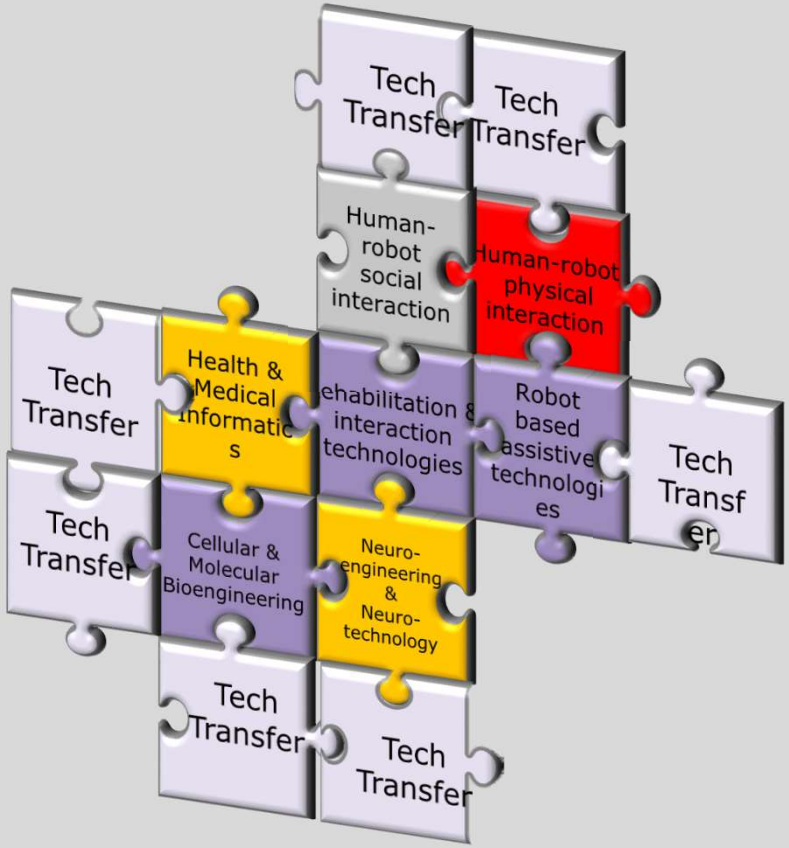
Formazione

Laurea in Ingegneria Biomedica
500 studenti (~25% fuori regione)
Laurea Magistrale in Bioengineering
120 studenti (~35% fuori regione)
Laurea Magistrale in Robotics Engineering
70 studenti (30 internazionali: European Master in Advanced Robotics (EMARO+ JMARO)

dal 2022: **Master in Medical Technology and Digital Health**
Per studenti del corso di Laurea in Medicina e Chirurgia

Dottorato di Ricerca in Bioengineering and Robotics
10 borse/anno

La rete: industria



Spin off

- ScreenNeuroPharma
- Healthropy
- Germina
- Teseo

Contratti/consulenze/collaborazioni

- ESAOTE (Genova, Italy)
- Liguria Digitale (Genova, Italy)
- MOVENDO s.r.l. (Genova, Italy)
- ILLO s.r.l (Genova, Italy)
- SWHARD (Genova, Italy)
- Singular Perception (Genova, Italy)
- 3Brain AG (Switzerland, Genova, Italy)
- ETT Spa (Genova, Italy)
- Sitem srl (Genova, Italy)
- Centro Ricerche FIAT (Torino, Italy)
- LEONARDO (Genova, Italy)
- GraalTech (Genova, Italy)
- COMAU Robotics (Torino, Italy)
- Genova Robot s.r.l. (Genova, Italy)
- Humana Vox srl (Genova, Italy)
- Corticale (Genova, Italy)
- Genoa Instr. (Genova. Italy)
- ……..

Università di Genova | DIBRIS DIPARTIMENTO DI INFORMATICA, BIOINGEGNERIA, ROBOTICA E INGEGNERIA DEI SISTEMI

Obiettivo strategico: fare rete con strutture sanitarie

Laboratori congiunti/convenzioni esistenti

Laboratorio congiunto UNIGE con IRCCS Policlinico San Martino (LisTech Lab – dal 2023)

- Neurotech
- CompTech

Laboratorio congiunto UNIGE (con DIMA) con IRCCS Istituto Giannina Gaslini (MedCompTech – dal 2025)

- Neurotech
- CompTech

Laboratorio congiunto con Ospedale Santa Corona di Pietra Ligure (dal 2022)

- The Italian Spinal Cord Laboratory (S.C.I.L.): sviluppo di sistemi per riabilitazione ed assistenza di pazienti con lesioni del midollo spnale

Laboratorio congiunto con Centro di servizio di Ateneo di simulazione e formazione avanzata (SIMAV)

- Joint lab for Emerging Technologies in Simulation (JETS): hardware and software technologies applied to medical simulation