

SCIENTIFIC AND TECHNICAL SERVICES

UPC

Universitat
Politécnica de Catalunya
BarcelonaTech

MWC BARCELONA 2026



UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH



Generalitat
de Catalunya



Cofinançat per
la Unió Europea



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COMPUTATION AND CALCULATION

- JFF COMPUTER CLUSTER - CTTC
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- inLab FIB



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JFF COMPUTER CLUSTER - CTTC



ABOUT US

The JFF Computer cluster has a total capacity of 3144 cores. This computing power is distributed as follows:

JFF2 Cluster: It has 128 nodes of 2 AMD Opteron Quad Core processors with 16 Gigabytes of RAM. The nodes are connected to an Infiniband DDR 4X network interconnect with latencies of 2.6 microseconds and a bandwidth of 20 Gbits / s. A total of 1024 colors.

JFF3 Cluster: It has 40 AMD Opteron 2 nodes with 16 cores for each CPU connected with 64 Gigabytes of RAM and an Infiniband QDR 4X network interconnect between nodes with latencies of 1.07 microseconds and a bandwidth of 40 Gbits / s. A total of 1280 colors.

JFF4 Cluster: It has 21 nodes of 2 Intel Xeon with 20 cores for each CPU connected with 192 Gigabytes of RAM and an Infiniband FDR 10X network interconnection between nodes with latencies of 0.7 microseconds and a bandwidth of 56 Gbits / s. A total of 840 colors.

EQUIPMENT

- JFF2 cluster
- JFF3 cluster
- JFF4 cluster

RATES (IVA not included)

Usage of the computer cluster | 0,025 € / core per hour



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RDLAB

ABOUT US

The Rdlab from the Computer Science department at the UPC has an exclusive service to support high - performance research computing.

The main services that we offer are:

- High Performance Computing (HPC) cluster with CPU and GPU support for research-intensive simulations and calculations.
- Execution of high-capacity simulations for national, European and technology transfer projects in the areas of Computer Science (Big Data, AI, Graphics and VR, Bioinformatics, Biomedicine...).

EQUIPMENT

- High-performance cluster. Parallel file system with more than 200TB.
- More than 1000 execution cores with compute nodes of up to 64 cores, 256Gbytes of RAM and CUDA support for single (GTX3090/4090 blower) and dual (K20, K40, V100...) precision GPUs.
- Job and Execution Control Slurm Queue Manager - Dedicated Infiniband Data Network and 10Gbit Ethernet.
- JupyterHub support and interactive computing.

RATES (IVA not included)

Usage of the computer
and cloud cluster

0,025 € / core per hour



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ABOUT US

The mission of inLab FIB is to innovate and transfer knowledge to society in the field of ICT, through the development of human talent and the carrying out of multidisciplinary R+D+i projects.

The inLab FIB enjoys extensive experience of more than 30 years developing multidisciplinary ICT R&D projects, both in competitive projects (whether national or European projects) and in contracts with companies or public administration.

Many of these projects are currently in operation and have made it possible to provide new solutions that have improved the competitiveness of the company or public administration by differentiating the services offered to customers.

Information on all projects developed in recent years can be found in inLab FIB projects.

EQUIPMENT

- 2 TIAGO Steel PAL Robotics robots.
- 2 WAM manipulator robots.
- 2 KINOVA Gen3 Ultra Lightweight manipulator robots.



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INLAB FIB (II)



SERVICES

- **DATA SCIENCE AND BIG DATA:** Data management and analysis, Dashboarding and data visualization, predictive and classification models and advanced artificial intelligence (Deep Learning).
- **SMART MOBILITY:** Management of new mobility concepts, advanced traffic and mobility data processing, vehicle fleet management through real-time routing algorithms, micro, meso and macroscopic simulation of traffic, air quality prediction, analysis and improvement of intermodal and transport processes, machine learning algorithms to make traffic predictions.
- **KNOWLEDGE ENGINEERING AND SERVICES:** Data representation, information modeling and processing, requirements engineering, information systems, web technologies, Software as a Service, Internet of Things, innovation and research projects in knowledge management.
- **CYBERSECURITY:** Computer security (audits, forensic analysis, network monitoring), development of malware and electronic fraud detection systems, application security, training and awareness on cybersecurity.
- **MODELLING, SIMULATION AND OPTIMIZATION:** Digital twin - Feasibility studies and/or improvements of systems and processes through the use of modeling, simulation and optimization techniques applied to logistics and processes of the agri-food industry.



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INDUSTRY 4.0

- CD6 Laboratory
- Electromagnetic Compatibility Laboratory - GCEM
- Additive Manufacturing Laboratory - CIM
- Subtractive Manufacturing Laboratory - CIM
- Metrology and Calibration Laboratory
- Digital Lab
- Acoustics and Vibration Laboratory - CATMech
- Fluids Laboratory - CATMech
- Materials and Structures Laboratory - CATMech
- Dronlab
- I4 TechLab



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CD6 LABORATORY



ABOUT US

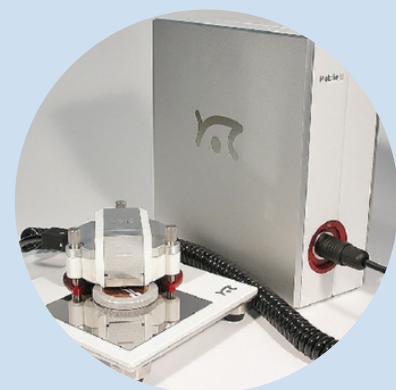
CD6 is an R&D center of the Universitat Politècnica de Catalunya, which operates in the field of optical and photonic engineering. CD6's activity is focused on applied research in the following areas: Optical Metrology, Visual Biophotonics, Optical Design, Color and Spectral Technologies, and Non-Destructive Optical Testing.

The CD6 has a team of 40 people with complementary experience (Optics and photonics, electronics, mechanics and software). This multidisciplinary combination helps to develop fully operational prototypes and develop solutions for industry, medicine, smart cities, etc.

Research at CD6 is focused on supporting innovation and entrepreneurial projects. The results have led to the creation of eleven spin-off companies that manufacture and market new products worldwide in different sectors and with leading global customers.

EQUIPMENT

- Hyperspectral camera.
- UV-VIS-IR spectrophotometer.
- Optical profilometer.



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CD6 LABORATORY (II)



RATES (IVA not included)

Hyperspectral camera	130 € / h
Liquid crystal tunable filter	140 € / h
UV-VIS-IR spectrophotometer	130 € / h
Radiometer - Photometer	135 € / h
Telespecter - Colorimeter	130 € / h
Polarimetric camera	165 € / h
Spectroscopic ellipsometer	130 € / h
Atomic force microscope	130 € / h
Contact profilometer	130 € / h
Optical profilometer	205 € / h
Spectroscopic reflectometer	130 € / h
Mechanical workshop	40 € / h
Electronic workshop	45 € / h



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ELECTROMAGNETIC COMPATIBILITY LABORATORY - GCEM



ABOUT US

At the Electromagnetic Compatibility Laboratory, we design and test electronic systems to reduce interference generation and increase immunity. We work on all phases of the development of equipment, systems and facilities, from initial design advice to final verification in the laboratory of the proposed solutions.

The aim of the laboratory is to support the development of equipment, systems and facilities.

EQUIPMENT

- Anechoic chamber equipped for emissions testing and radiation immunity.
- Shielded chamber equipped for conducted and transient emissions and immunity tests, and ESD.

RATES (IVA not included)

Electromagnetic
Compatibility Tests (EMC)

250 € / h



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ADDITIVE MANUFACTURING LABORATORY - CIM



ABOUT US

In the Pilot Plant, located on the South Campus of the UPC in Barcelona, we have additive manufacturing equipment for the professional range of 3D printing of polymers, either with selective laser sintering (SLS), stereolithography (SLA) or fused filament fabrication (FFF).

These technologies could be used to manufacture prototypes, tools, pre-series or even definitive parts. Consequently, they are highly functional.

RATES (IVA not included)

SLS technology	0,85 € / cm ³
SLA technology	1 € / cm ³
FDM technology	0,50 € / cm ³



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ADDITIVE MANUFACTURING LABORATORY - CIM (II)



EQUIPMENT

- RICOH AM S5500P. SLS technology. 550 mm x 550 mm x 500 mm printing volume. PA12 material.
- 3D Systems Vanguard HS. SLS technology. 320 mm x 280 mm x 400 mm printing volume. PA12+GF, PP, TPU materials.
- 3D Systems SLA-7000. SLA technology. 500 mm x 500 mm x 500 mm printing volume. Material similar to epoxy resin ABS.
- BCN3D Systems W27. 4 units. FDM technology. 400 mm x 300 mm x 210 mm printing volume. PLA, ABS, TPU, PETG, PA12, PA12+GF, PP materials.
- BCN3D Epsilon W50. 4 units. FDM technology. 400 mm x 300 mm x 400 mm printing. PLA, ABS, TPU, PETG, PA12, PA12+GF, PP materials.



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SUBTRACTIVE MANUFACTURING LABORATORY - CIM



ABOUT US

CIM UPC has computer numerical control (CNC) machining and electric discharge machining (EDM) equipment at the service of research groups and companies that need to manufacture prototypes, presses, tools or samples to test materials.

The materials that can be worked with are mainly plastic and metals and include aluminium, steel, titanium and bronze, among others.

EQUIPMENT

- HAAS VF 3ss. 3-axis machining center. Ranges of 1016 mm x 508 mm x 635 mm. Maximum turning speed: 12,000min⁻¹.
- DMG 50 EVO. 5-axis machining center. Ranges of 500 mm x 400 mm x 400 mm. Maximum turning speed: 18,000min⁻¹.
- ONA UE 250. Wire EDM. Ranges of 350 x 250 x 200.

RATES (IVA not included)

CNC technology	35€ / h
Wire EDM	35€ / h



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METROLOGY AND CALIBRATION LABORATORY



ABOUT US

The UPC Metrology and Calibration Laboratory was founded on the UPC's Vilanova i la Geltrú campus in 2003. In 2005, ENAC certified the laboratory with ISO 17025 for dimensional area calibrations (Accreditation number: 152 /LC10.110).

The laboratory serves companies to improve the quality of their products through the task of calibration and consultancy. In addition to the calibration services, the laboratory collaborates in research tasks together with the SARTI research group.

RATES I (IVA not included)

Outer diameter cylindrical patterns	30,84 €
Inner diameter cylindrical patterns	38,57 €
Complete king's foot	40,80 €
Unique mouthpiece king foot	40,80 €



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METROLOGY AND CALIBRATION LABORATORY (II)



RATES II (IVA not included)

Rectangular pattern blocks. From 0.5 to 100mm	27,58 €
Two contact outdoor micrometer with $E = 0,001$ mm	40,80 €
Two-contact outdoor micrometer with $E \geq 0,01$ mm	34,20 €
Mechanical and electronic comparators $E \geq 0,001$	38,57 €
Measurements of tools, templates and parts	variable
Two contact indoor micrometer with $0,001 \text{ mm} \leq E < 0,01$ mm	40,80 €
Two contact indoor micrometer with $E \geq 0,01$ mm	34,20 €
Indoor / outdoor feeler	34,20 €
Indoor / outdoor threads	29,14 €



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DIGITAL LAB

ABOUT US

The Digital Lab is a space with digital manufacturing technologies. It is equipped with a set of machinery controlled through computers and CAM programs to produce virtual and physical objects through the use of additive manufacturing, subtractive manufacturing, 3D printers, a laser cutter and CNC milling machine, a water jet cutter and cutting plotters for making models and prototypes in different materials.

The Digital Lab has a workspace format where creativity and inventiveness are empowered and developed, through the use of digital manufacturing tools and collaborative workspaces. It also incorporates a consultancy service for engineering projects, using advanced digital manufacturing technologies or product design and continuing education for professionals and entrepreneurs in this area.



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DIGITAL LAB (II)

RATES I (IVA not included)

Hardness tests	45 € / h
Scanning an object with the David SLS-2 scanner - Self-service	45 €
Scanning an object with the David SLS-2 scanner - Service	60 €
Scanning an object with the Academia 20 scanner - Self-service	70 €
Scanning an object with the Academia 20 scanner - Service	120 €
Desktop milling machine	20 € / h
Large milling machine	25 € / h
3D printing FDM-HQ/PVA/Carbon Fiber/nylon/though	4,53 € / h
3D printing FDM-SQ/PLA. PETG	3,64 € / h
3D printing SLA-SQ/Eng. Resin	12,83 € / h
Machining in Numerical Control machines	50 € / h



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DIGITAL LAB (III)

RATES II (IVA not included)

Machining in conventional machines - tools	45 € / h
Silhouette Cameo Cutting Plotter - Service	24 € / h
Silhouette Cameo Cutting Plotter - Self-service	12 € / h
Measurement service by MMC of parts	50 € / h
Service joining parts by welding	45 € / h
Laser cutting - Self-service	48 € / h
Laser cutting - Service	60 € / h
Water jet cutting - Self-service	48 € / h
Water jet cutting - Service	60 € / h
Thermal treatments	45 € / h



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ACOUSTICS AND VIBRATION LABORATORY - CATMECH



ABOUT US

The CATMech Acoustics and Vibration Laboratory has an area of 300 m² with equipment to carry out applied research in the field of acoustics and vibrations.

The facility allows research to be undertaken to advance in the theoretical and experimental study of noise and vibration control.

EQUIPMENT

- Sistemes d'adquisició de dades per a soroll i vibracions de diferents tipologies.
- Bancs excitadors.
- Cambra anecoica.
- Banc de proves de superestructura ferroviària.
- Sistemes d'excitació de superestructura ferroviària.



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ACOUSTICS AND VIBRATION LABORATORY - CATMECH (II)



RATES (IVA not included)

Road characterization and vibrations in the environment	150 € / h
Rail characterization: track testing to understand the behavior of the track and the vibration of the surrounding environment	150 € / h
Development of vibration propagation modeling	150 € / h
Design of aerodynamic shapes and noise control	150 € / h
Development of mathematical models for any problems related to noise and vibrations	100 € / h
Acoustic power measurement. Acoustic design. Development of acoustic maps	150 € / h
Field measurements and computational models. Measurements in a semi-anechoic chamber	150 € / h
Vibration measurements and analysis of vibration transmission to buildings. Design of vibration isolation solutions	150 € / h



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FLUIDS LABORATORY CATMECH

ABOUT US

The CATMech Fluids Laboratory has an area of 500 m² with equipment to carry out applied research in the field of fluids, hydraulics and pneumatics.

CATMech's Fluids Division facilities offer technology advisory services and support for companies and academia from pre-design to numerical simulation and experimental testing.

EQUIPMENT

- Wind tunnel.
- Physical variable measurement chains (mechanical/fluid-dynamic).
- Data acquisition and processing systems.
- Hydraulic and pneumatic pressure groups up to 130 kW of installed power.
- Test benches for hydraulic components (pumps, valves, motors and cylinders).
- Test bench for mobile and agricultural machinery (mini backhoes, shovels, agricultural tractors, etc.).

RATES (IVA not included)

Computational simulations of hydraulic and pneumatic systems and real-scale experiments

400 € / h

Computational simulations of vehicle aerodynamics

100 € / h



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MATERIALS AND STRUCTURES LABORATORY - CATMECH



ABOUT US

The CATMech Materials and Structures laboratory has 250 m² with equipment to carry out applied research in the field of the mechanics of solid continuous media. The equipment makes it possible to manipulate and test materials and structures of real dimensions under static and dynamic mechanical actions. It also has two large-format 3D concrete printers.

The aim is to carry out all kinds of static and dynamic tests on large-format prototypes to determine their behavior, including strength of materials, theory of structures, and advanced manufacturing processes in the construction industry.

EQUIPMENT

- Electromechanical presses MTS Exceed 300 kN and MTS Insight 10 kN.
- Load frame up to 250 kN with static and dynamic actuators 50 kN, 100 kN and 250 kN.
- Data acquisition and processing systems.
- Modal analysis.
- Olympus Omniscan.
- Extensometry equipment and optical interrogator.
- Large-format concrete 3D printers.



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MATERIALS AND STRUCTURES LABORATORY CATMECH (II)



RATES (IVA not included)

1 hour technician for sample preparation	50,67 € / h
Design and testing at real scale of advanced structures with smart systems and new resistant materials of high added value	300 € / h
Destructive and nondestructive (ultrasound) tests to mechanically characterize materials (yield limit, elastic modulus, etc.)	100 € / h
Loading frame with actuator system	163 € / h
Mechanical studies and testing of structural elements and/or materials in the construction field	100 € / h
Mechanical tests (on joints, beams, panels, etc.) of all types of materials	100 € / h
Printing of concrete items with large-format 3D printers	400 € / h
Smart solutions for materials, structures and construction systems with added value	100 € / h
Test time on MTS Exceed 300 kN machine	167,46 € / h
Test time on MTS Insight 10 kN machine	141,28 € / h
Use of sustainable materials with added value in advanced construction systems for architectural applications	100 € / h



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DRONELAB

ABOUT US

Dronlab is a drone research laboratory to integrate advanced automatism, logistics and communications. This is the only flight space for drones in Spain. It will enable the validation of any type of professional application or technology development related to drone-based logistics, automatic operation and the exploitation of 4G, 5G and internet of things (IoT) communications. The laboratory is situated on a 90 m x 45 m site with a maximum height of 15 m.

The aim of this facility is to make available to the research community a sensorized flight space with access to 5G-6G communication networks.

EQUIPMENT

- Flight space enclosed with netting
- High capacity vehicles
- 4G baseline communication
- NB-IOT based communication
- Terrestrial SDN/NFV facilities
- Signal generation and analysis facility



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I4 TECHLAB

ABOUT US

The Industry 4.0 laboratory, I4TechLab, consists of a research and development space structured around a flexible, automated production cell composed of a set of conveyor belts with up to seven product handling stations for manipulating the products that allow the movement of objects using conveyor trays, on which various products (boxes, buckets, parts, etc.) can be transported.

The facilities and services offered aim to promote the digital transformation of industrial processes through the implementation of Industry 4.0 architectures, and the deployment of solutions linked to automation, analytics and visualization, which interact to perform tasks related to monitoring, modelling, prediction, optimization and decision support throughout the entire production process.

EQUIPMENT

- Devices, networks and IoT platforms
- Edge architectures of industrial computing
- Smart control of industrial processes
- Augmented reality applications
- Management of production using digital twins and cyberphysical systems



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I4 TECHLAB (II)

RATES (IVA not included)

Technology integration services
(OT / IT integration)

28 € / h ; 210 € / day

Training services:
Intelligent manufacturing

50 € / h

Training services:
Equipment control

75 € / h

Hardware services, associated with the
design, testing, and verification of equipment
(Sensor systems for Industry 4.0)

15 € / h ; 120 € / day

Software services, associated with the research,
experimentation, and validation of Industry 4.0
technologies based on AI (Optimal control of industrial
production)

20 € / h ; 110 € / day



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ARTIFICIAL INTELLIGENCE

- Advanced Network Architectures Lab
- IOC Robotics Laboratory
- IRI Perception and Manipulation Laboratory
- IRI Fuel Cell Control Laboratory
- IRI Computational Robotics Laboratory
- IRI Mobile Robotics Laboratory
- IRI Mechatronics Workshop



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ADVANCED NETWORK ARCHITECTURES LAB

ABOUT US

The Advanced Network Architectures Laboratory supports the activities of the CRAAX research group, formally created in 2009 when it was recognized as an official research group by the Generalitat de Catalunya.

The main objectives of this laboratory are high quality research, student training and technology transfer.

Research activities carried out in the laboratory, usually in close collaboration with industry, set the right stage for PhD candidates to engage in real, close-to-market, potentially high-impact, innovative research.

SERVICES

- Authentication of IoT devices and users in highly dispersed and mobile environments
- Predictive Maintenance tool for complex ICT systems
- System modeling tool (digital twin)
- Cloud continuum management system



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ADVANCED NETWORK ARCHITECTURES LAB (II)

EQUIPMENT

- **Management of edge/cloud environments:** Service optimization tool that allows the distribution of the different tasks within the set of resources between the device and the cloud.
- **Authentication of users and IoT devices:** Blockchain-based tool that allows authentication of users and IoT systems, particularly useful when working in highly mobile environments.
- **Modeling by digital twin:** A tool that facilitates the modeling of systems, currently defined in a preliminary phase by humans.
- **Smart City Testbed:** Allows the development and evaluation of services deployed in an emulated Smart City environment.
- **Predictive Maintenance:** Tool that allows advanced detection of AI-based attacks.



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IOC ROBOTICS LABORATORY

ABOUT US

The IOC robotics laboratory has robots, drones, mechanical hands, specific sensors, vision cameras, software programs and "haptic" devices in order to carry out research and testing in all the robotic projects that are developed at the center.



SERVICES

- Robot-human interaction. Task and movement planning. Dexterous grip and manipulation. Co-working robots ("cobots").
- Teleoperation and haptic systems. Computer vision.
- Robot control and programming. Simulation of robotic systems. Industrial applications of robotics.
- Sensory perception and integration systems.
- Service robotics. Robot task and motion planning, robot programming, specific applications of service robotics, dexterous manipulation.



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IOC ROBOTICS LABORATORY (II)

EQUIPMENT

ROBOTS

- 2 Stäubli TX90 robots, one mounted on a rail
- 2 Kuka LWR robots mounted on mobile platforms
- A bi-arm omnidirectional mobile robot (with two UR robots as arms)
- An ABB Yumi robot
- A PAL Tiago robo

DRONES

- DJI Phantom 2 Vision+
- Parrot AR.Drone 2.0

DEXTEROUS MECHANICAL HANDS

- Schunk SAH
- Schunk SDH
- 3 Allegro hands

SPECIFIC SENSORS

- Magnetic trackers
- Sensorized gloves
- Touch sensors

VISION

- 2D – 3D cameras
- 3D projector
- VR Oculus Rift

SOFTWARE

- Motion planning and simulation software

HAPTIC DEVICES

- Phantom Omni
- Phantom Premium 1.5/6DOF
- Phantom Premium 1.5/6DOF High force



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IRI PERCEPTION AND MANIPULATION LABORATORY

ABOUT US

The Perception and Manipulation Laboratory occupies 142 m² on the second floor of the FME, and part of it houses a full-scale model of a small apartment (35 m²). Two TIAGo PAL mobile single-arm robots inhabit the apartment, but are occasionally taken out to experiment elsewhere. There is also a handling area equipped with four collaborative manipulator robots (two WAM and two KINOVA robots), and workstations are distributed along the perimeter. Next to the laboratory, with a direct view through a window, is the scientific-technical support office. The laboratory is also equipped with commercial and self-developed clamps, detection devices and augmented reality systems. The lab also hosted the Humanoids Lab Initiative in the past, and we still maintain 15 small humanoid robots for educational or promotional purposes.

EQUIPMENT

- 2 robots TIAGO Steel PAL Robotics.
- 2 manipulator robots WAM.
- 2 manipulator robots KINOVA Gen3 Ultra Lightweight.

SERVICES

- Rapid experimental setup.
- Standardized software tools.
- Expertise in robot control and perception algorithms.



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IRI FUEL CELL CONTROL LABORATORY

ABOUT US

The Fuel Cell Laboratory at the Institute of Robotics and Industrial Informatics (IRI) has five test stations, provided with oxygen, hydrogen, nitrogen and synthetic air. Depending on the type of experiment, each station is designed with a specific functionality. The laboratory is equipped with a monitoring system that controls the necessary safety conditions based on electrical failure alarm management, automatic air extraction and routines for safe shutdown of test stations in case of emergency.

The laboratory is used to test and validate controllers for fuel cell-based systems, hydrogen systems and other electrochemical devices used for energy storage.

EQUIPMENT

- **Workstation 1:** It is used to characterize simple single cells as well as low and medium-power fuel cell stacks.
- **Workstation 2:** is based on a 1,200 watts fuel cell and is used to connect electrical converters and energy storage systems to validate control strategies and levels of hybridization.
- **Workstation 3:** Its main element is a climate chamber, which controls relative humidity, temperature and oxygen concentration.
- **Workstation 4:** It is built on a vertical panel and has all the components of a standard automotive system based on fuel cells. It is primarily used to validate fault-tolerant control monitoring systems.
- **Workstation 5:** It is based on a 100-watt fuel cell and metal hydride hydrogen storage tanks, so it is a portable demonstration-focused station.



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IRI COMPUTATIONAL ROBOTICS LABORATORY

ABOUT US

The Computational Robotics Laboratory was created to investigate the computational and implementation aspects that arise in the design, construction, and control of advanced robotic systems. Among these systems we can highlight parallel robots, anthropomorphic robotic arms, intelligent prostheses, biomechanical support systems for movement or rehabilitation, or other robots of various topology that, due to having sensory capacity and of sufficient adaptation, they can interact with humans in an agile and safe way.

The activity of the laboratory focuses on the analysis and construction of robotic prototypes to validate positional analysis algorithms, collision detection, characterization of the configuration space, calculation of singularities, obtaining workspaces, kinematics and direct or inverse dynamics, or planning and optimal control of trajectories.

EQUIPMENT

- The prototyping workshop (or maker lab)
- Manipulator robots, parallel and mobile.



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IRI COMPUTATIONAL ROBOTICS LABORATORY(II)

SERVICES

- **COMPUTATIONAL KINEMATICS:** Problems of positional analysis, characterization of the space of configurations, calculation of singularities, and obtaining the working spaces of a complex mutisolid system. Continuation, pruning and bisection, or algebraic-geometric methods for solving these problems. Methods based on the geometry of distances. Applications to the positional analysis of biomolecules.
- **DYNAMIC ANALYSIS AND SIMULATION:** Methods for obtaining dynamic models of general multisolid systems. Algorithms for obtaining accurate simulations that can take into account the collisions of systems with their environment. Applications to robotic and biomechanical systems.
- **MOTION PLANNING:** Algorithms for finding feasible motions between two given configurations of a multisolid system, taking into account the kinematic, dynamic, and non-collision constraints of the system, as well as the limited motor capacity, or boundaries imposed by the finite resistance of the manufacturing materials. Obtaining energetically efficient trajectories in order to achieve long periods of autonomy in these systems. Calculation of minimum time trajectories.
- **MOTION CONTROL:** Control strategies that stabilize systems, either around a reference state, or along a planned trajectory. Optimal, nonlinear, and robust control techniques for multisolid systems with closed chains and singularities.



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IRI MOBILE ROBOTICS LABORATORY

ABOUT US

The Mobile Robotics Laboratory is an experimental area mainly dedicated to practical research with mobile robot devices.

The lab includes two service robots for urban robotics research based on Segway platforms, a dual mobile manipulator arm custom-built by the company PAL Robotics, a 4-wheel mobile robot for uneven outdoor terrain, a fully automated electric vehicle, 3 Pioneer robots, three autonomous aerial robots (from 500gr to 5Kg payload) and a large number of smaller robots, sensors and cameras. The laboratory is also equipped with an aerial test area (14x7m²) which includes an Optitrack positioning system of 20 IR cameras.



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IRI MOBILE ROBOTICS LABORATORY (II)

SERVICES

- Development of computer vision techniques, augmented reality, deep learning with applications in autonomous driving, human motion analysis, medical image processing, etc. 3D scanning of objects and people.
- Development of software and hardware for interaction between robots and humans with assistive applications, manufacturing, etc. Includes management of ethical aspects.
- Development of software and hardware to automate industrial processes, including the application of artificial intelligence techniques.

EQUIPMENT

- Barcelona Robot Lab (10,000 m² pedestrian area to deploy robots in a real and controlled urban setting)
- Robot IVO
- Robots Tibi and Dabo
- Optitrack indoor testbed
- Robot Teo



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IRI MECHATRONICS WORKSHOP

ABOUT US

The IRI Mechatronics Workshop supports the design, construction and maintenance of electrical, electronic and mechanical devices and prototypes for research projects carried out at the Institute of Robotics and Industrial Informatics (IRI) and in other external entities. The workshop's current rapid prototyping equipment includes a laser cutter for organic materials (CO2), a laser cutter for metallic materials (fiber), several 3D printers and a workbench for electronic design.

The aim of this workshop is to construct prototypes, design parts, and maintain and support mechanical and electronic components in the context of research and development projects.

EQUIPMENT

- The prototyping workshop (or Maker Lab)
- Laser cutters



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COMMUNICATION AND SYSTEMS

- ISI Laboratory
- NanoSat Lab
- AntennaLab
- Communication Circuits and Systems Laboratory - SINAPSI



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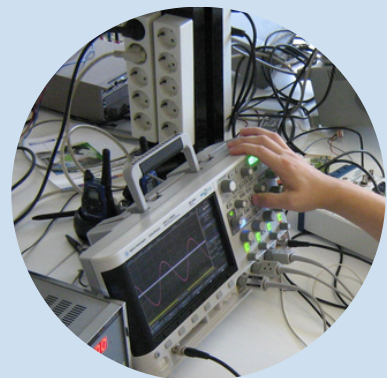
ISI LABORATORY

ABOUT US

Search for new sensors and measurement methods based on variations in electrical impedance and electronic interfaces for the conditioning and processing of signals and energy to power them. The emphasis is on macrosensors based on low-cost technologies, autonomous and intelligent sensors, sensor networks, analog signal processing, data acquisition systems, design of measuring instruments and instrumentation systems, spectroscopy and electrical impedance tomography, reduction of interference and noise in instrumentation, measurement of physiological parameters with non-invasive methods and biotelemetry. Technology transfer in sensors and measurement systems for engineering and medicine.

EQUIPMENT

- HP4291A Impedance Analyzer
- HP4191A Impedance Analyzer
- R & S ZVL3 Network Analyzer
- R & S SMB 100A Function Generator



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ISI LABORATORY (II)

RATES (IVA not included)

Schematic design and printed circuit board (PCB)	34,03 € / h
Physical performance of PCB	57,84 € / h
Welding and assembly of components	69,74 € / h
Electronic prototype assembly	60,81 € / h
Characterization of materials with measurements with HP4294A impedance analyzer	62,60 € / h



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NANOSAT LAB

ABOUT US

The facilities of the UPC NanoSat Lab have been designed to carry out environmental qualification tests (vibrations, and vacuum and thermal cycling), in a clean environment (Class 8 clean room) for the integration of payloads , subsystems and small satellites.

Outside the clean room, there are helmholtz coils and an air pad for carrying out the attitude control system pots.



EQUIPMENT

- Vibration table
- Vacuum chamber
- Helmholtz coils

RATES (IVA not included)

Thermal, vacuum, and
vibration environmental tests

1.350 € / day



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ANTENNALAB

ABOUT US

The AntennaLab group was consolidated at the scientific level and in terms of facilities in the 1980s. It achieved significant national and international scope in the 1990s. Currently, its members include 6 permanent professors, 3 postdoctoral Ramon y Cajal fellows, 8 doctoral research grantholders and up to 30 students pursuing their PhD or master's degree. The group shares scientific projects, facilities and support structure. A continuing policy to combine efforts has led to the laboratory being equipped with measurement, characterization and microweld devices from 100 MHz to 75 GHz and an anechoic chamber with a roll-over azimuth positioner system, with a 5 meter distance between the antenna under test (AUT) and the probe. The chamber is operative from 1 GHz to 40 GHz and has dimensions of 8 x 8 x 10 m³. Since 1980, the work of the Antenna Lab has led to 102 international publications in indexed journals, 208 conference papers and 35 doctoral theses.

The aim of the facility is on promote research and training in the area of antennas, communications systems and electromagnetic visualization, to advance scientific knowledge and meet industry needs.

SERVICES

- Numerical methods.
- Antenna design.
- Antenna measurements and diagnostics.
- Integration of treatment systems.



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COMMUNICATION CIRCUITS AND SYSTEMS LABORATORY - SINAPSI

ABOUT US

The Communication Circuits and Systems Laboratory enables the design, manufacture and testing of electronic circuits and systems in general, and communication circuits and systems in particular, including wireless communications.

It has high-performance equipment, with the capacity to analyze analog and digital systems, and radiofrequency systems up to 20 GHz.

EQUIPMENT

- 20-GHz Vector Signal Generator
- 26.5-GHz Vector and Spectrum Signal Analyzer
- 12-GHz 40-Gsa/s Oscilloscope
- 30-GHz Spectrum Analyzer
- 20-GHz Network Analyzer
- 330-MHz Pulse/Pattern generator
- 120-MHz Pulse Function Arbitrary Generator
- Logic Analyzer
- Precision Source/Measurement Unit
- DC Power Analyzer
- Nano-Volt and micro-Ohm meter
- Stereo Microscope
- Milling Machine
- Reflow oven
- Soldering station



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COMMUNICATION CIRCUITS AND SYSTEMS LABORATORY - SINAPSI (II)

SERVICES

- Design, manufacture and testing of printed circuit boards (PCB) with through-hole (TH) and surface mount technologies (SMT).
- Design, manufacturing and testing of electronic and communication systems.
- Design, manufacturing and testing of radiofrequency systems, software-defined radio, and 5G communications.
- Systems engineering, system integration, embedded systems and programmable devices.
- Sensor networks, internet of things (IoT), smart sensors for Industry 4.0, e-health monitoring.

RATES (IVA not included)

Characterization, testing, and validation of
electronic and communication systems

60,81 € / h

Design and manufacturing of printed
circuit boards (PCB)

47,42 € / h

Assembly of electronic
prototypes

60,81 € / h



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CONSTRUCTION AND INFRASTRUCTURE

- Laboratory of Technology of Structures and Materials - LATEM



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LABORATORY OF TECHNOLOGY OF STRUCTURES AND MATERIALS - LATEM

ABOUT US

The Laboratory of Technology of Structures and Materials (LATEM) is a leading national and international center for innovation and experimentation in building structures and materials.

The laboratory has a 230 m² test slab with a maximum test length of 20 m. It has facilities for cyclical and fatigue tests, an area for concrete production and a chemical laboratory.

LATEM supports research on the analysis, design and durability of structures (concrete, steel and others), the restoration and conservation of historical structures, and the study of materials. It has produced recognized research and promoted innovation and sustainability for over 25 years, which has made it a center of excellence.

EQUIPMENT

- Instron 8803 dynamic servohydraulic machine of +/- 500 kN
- Instron 8505 dynamic servohydraulic machine of +/- 1000 kN
- Bruker D2 Phaser desktop diffractometer
- Load frame
- HPLC



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LABORATORY OF TECHNOLOGY OF STRUCTURES AND MATERIALS - LATEM (II)

RATES (IVA not included)

X-ray diffraction	118,31 € / h
HPLC	59,78 € / h
Testing time on an Instron 8505 machine	167,46 € / h
Testing time on an Instron 8803 machine	141,28 € / h
1 hour technician for sample preparation	50,67 € / h
1 hour, 2 technician for sample preparation	101,34 € / h
Loading gantry	163 € / h



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