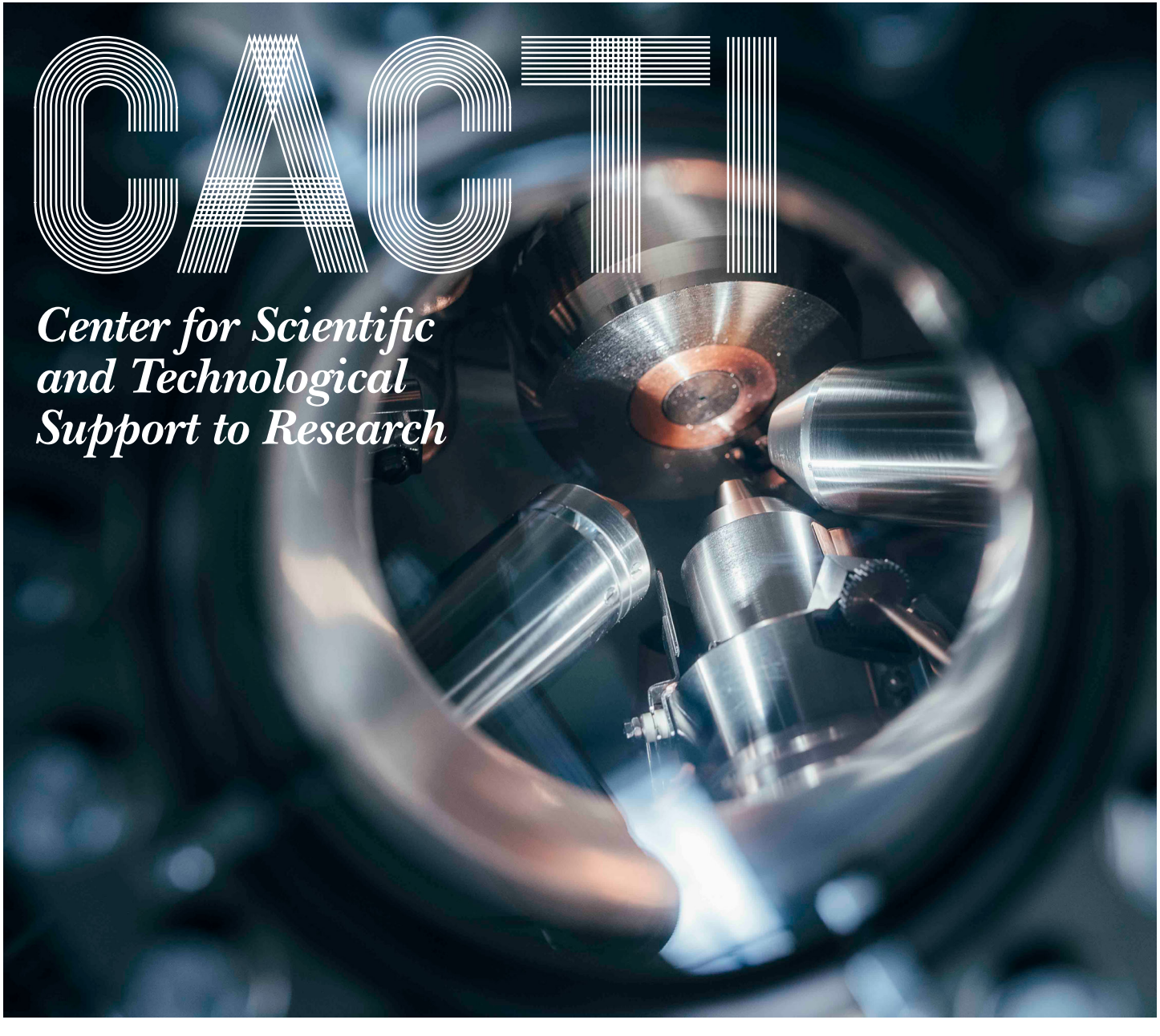


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Relacións Institucionais

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# *Center for Scientific and Technological Support to Research*

The Center for Scientific and Technological Support to Research (CACTI) was created in 1991 as a response to the needs for specialized research resources. This initiative was the first in the region and the pioneer, since then in the incorporation of unique and singular technological offers, not only in the region but also in the country.

Over time, the center has grown in equipment and personnel. The CACTI has two locations: the largest and the widest range of services is located at the Vigo Campus and the other one is located at the Ourense Campus. The highly qualified and specialized technical staff working at the CACTI is responsible for the operation and use of the equipment, as well as to support and assist users.

The great technological potential is available to researchers from the University of Vigo, as well as from other universities, public organizations, companies and entities to provide support for both, basic and applied research, in a wide range of scientific fields. The Center's aim is to contribute to scientific and technological development, improving the quality of life, encouraging economic development, transferring knowledge and cooperating with society.


# *Index*

# *Structural Determination, Proteomics and Genomics*

## *Technicians*

Manuel Marcos García
Sonia Escudero Martínez
Berta Covelo Rodríguez
Nieves Atanes Blanco
Paula Álvarez Chaver
Ángel Sebastián Comesaña Calvo

## *Offer*

In this service we perform experiments aimed at finding out the structure of the constituent molecules of the samples provided to us. To achieve this goal, the first necessary information is to know the elemental composition of these molecules.

- Mass spectrometry allows to determine the mass of a molecule with sufficient accuracy. Therefore, the possible combinations of atoms that form the molecule are reduced to a very limited number.
- Single-crystal X-Ray diffraction analysis allows to determine the unambiguous 3D-structure of a crystalline solid forming a single crystal.
- Nuclear magnetic resonance allows to obtain information about how the atoms are bonded and/or their spatial arrangement in samples of amorphous solids, oils or liquids.
- Proteomics studies the structure of the proteins present in a sample. The difference between the proteins that are expressed in a cell in their normal state and those that are expressed in an altered state, gives information about the metabolic pathways that are modified by the alteration. It also helps to design strategies to mitigate or correct this effect.
- Genomics studies the composition and structure of nucleic acids (DNA and RNA) by means of other types of techniques such as: PCR, capillary electrophoresis etc.

## *Key words*

Mass spectrometry, single-cristal X-Ray diffraction analysis, RMN, proteomics and genomics.

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# *Nanotechnology and Surface Analysis*

## *Technicians*

Carmen Serra Rodríguez

Tatiana Padín Gómez

Paula Barbazán Martín

## *Offer*

Non-destructive chemical, topographic (low and high resolution), nanomechanical and wettability analysis on surfaces of materials or solid substances of organic or inorganic origin.

- Chemical analysis: elemental and molecular composition, determination of the chemical environment, depth profiling, 2D chemical mapping and 3D chemical reconstruction.
- Topographical analysis: surface metrology, topographical features, roughness quantification, critical dimensions, thicknesses, 3D solid reconstruction, reverse engineering and surface replication.
- Nanomechanical analysis: mechanical properties, hardness, modulus of elasticity and adhesion.
- Wettability analysis: contact angle measurement and surface free energy.

## *Aplications*

Leaves, woods, soils, ashes, polymers (chiral structures in high resolution), industrial plastic parts, metals, semiconductors, RAM, liquid crystals, ceramics, biocompatible materials (stents, implants), shark skin, surface replicas, surgical material, biosensors, nanomaterials (NP, NTC, QD), drug-carrying nanoparticles, pigments, minerals, fabrics, fibers (paper and plastic), industry (packaging, automotive, paints, vinyls, connecting rods, sensors, microcomponents, sandwich panels), among many others.

## *Key words*

Surface analysis, XPS, TOF-SIMS, AFM, STM, profilometry, nanoindentation, contact angle tensiometry.

## *Contact*

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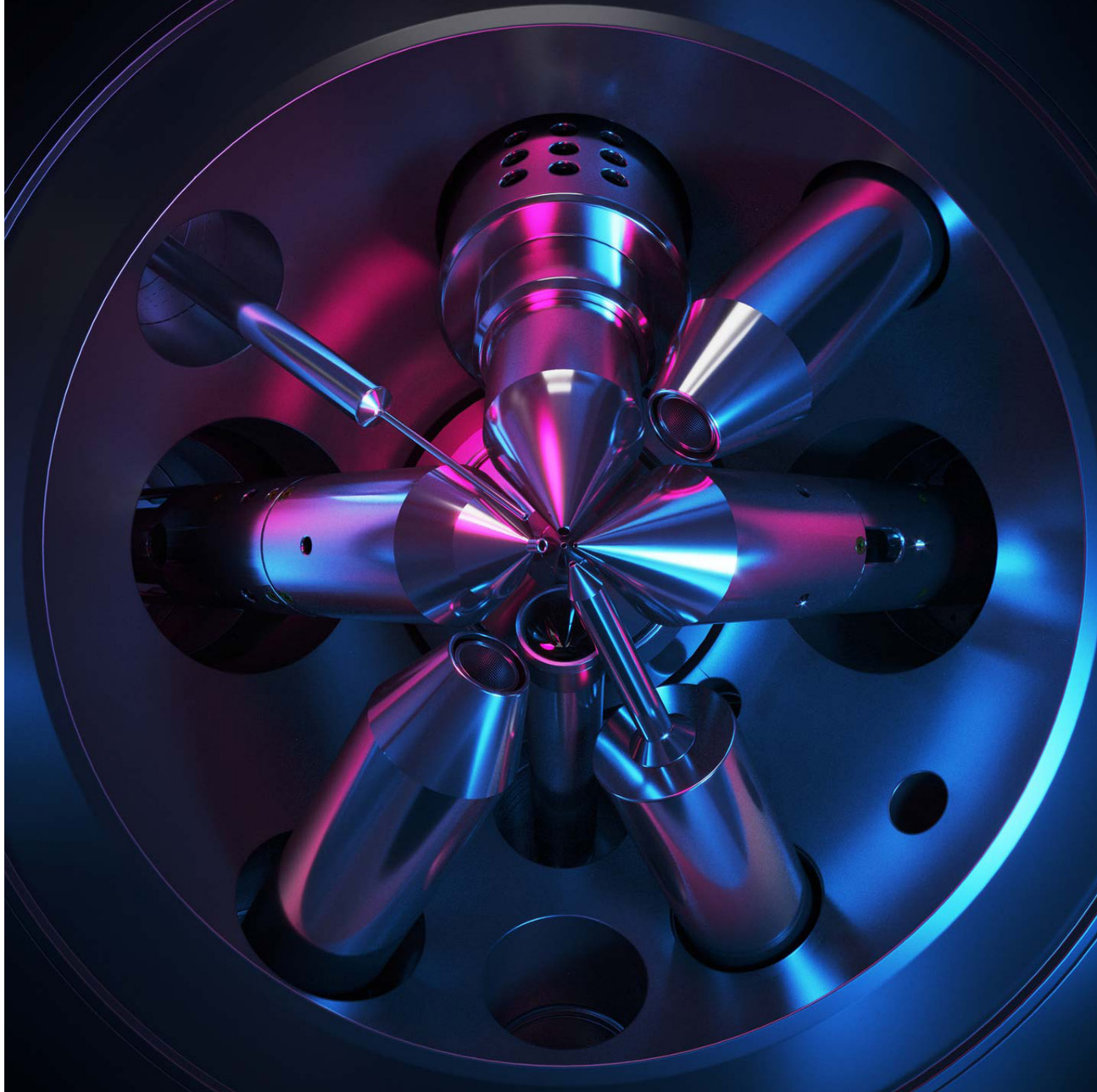


# *Electron Microscopy*

## *Technicians*

Beatriz Rivas Murias
María Inés Pazos Garrido
Catalina Sueiro López
Daniel Carlos Cernadas Fraga

## *Offer*

- Scanning electron microscopy: characterization of biological samples and materials by obtaining images of surface microstructures reaching nanometer resolutions. It is accompanied by elemental microanalysis characterizations.
- Transmission electron microscopy: characterization of biological samples and materials by obtaining images of ultrastructures reaching nanometric resolutions. It is accompanied by elemental microanalysis characterization.
- Fluorescence and confocal microscopy: imaging based on autofluorescence or fluorescence labeling of biological microstructures and materials of interest reaching micrometer resolutions.

## *Key words*

SEM, TEM, fluorescence and confocal.

## *Contact*

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# *Food Safety and Sustainable Development Service (Vigo)*

## *Technicians*

Jorge Millos Alfeirán
Alberto Acuña Couñago
Estefanía López Silva
Jesús Estévez Sío
Rosa M Lomba Pérez
José Gómez Sieiro
Vicente Rodríguez López

## *Offer*

The food safety and sustainable development service of Vigo offers a versatile range of analyses, among which we can include elemental, isotopic, molecular and physical quantitative and/or qualitative determinations in different matrices (chemical, biological and geological)... It is equipped with instrumental techniques divided into the following coordinated units that allow the requested compositional determination.

- Materials characterization unit: XRD, FTIR, Raman, Coulter, TGA, DSC.
- Elemental and isotopic analysis unit: AE-CHNS, AE-CN, AE-IRMS, HS-IRMS, TOC/TN.
- Chromatography unit: GC-MS, GC-FID, HPLC-DAD/F/IR, HPLC-Ms/Ms.
- Elemental and isotopic atomic spectrometry unit: FAAS, ETAAS, HV-AAS, ICP-OES, Q-ICPMs, MC-ICPMs, TOF-ICPMs.
- Nutrient analysis unit: CI,FIAS-color, colorimetry and other parameters.
- Isotopic analysis unit: AE-IRMS, HS-IRMS, MC-ICP-MS, CRDS.
- X-Ray spectrometry unit: WDXRF.
- Core analysis unit: ITRAX (XRF and others), MSCL (density, P-wave, color and others).
- Radiochemical techniques unit: CCL, CCS, beta and gamma isotope manipulation cabinets.

## *Key words*

ICP-OES, ICPMs, DRX, FTIR, Raman, HPLC, GC, WDXRF, ITRAX, MSCL, CCL y CCS.

## *Contact*

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# *Food Safety and Sustainable Development Service (Ourense)*

## *Technicians*

Cristina Pérez Novo

Sandra Gil Casal

## *Offer*

- Surface analysis (BET): provides surface area data and porosity measurements on a wide range of materials (pharmaceuticals, ceramics, cements, soils, zeolites, paints and coatings, catalysts, medical implants, electronics, cosmetics, etc).
- Chromatography: separation, identification and determination of chemical and biochemical compounds.
- GC-MS: analysis of drugs, pesticides, pharmaceuticals, volatile organic compounds, fatty acid methyl esters...
- Ion chromatography
- Amperometric detector: monosaccharides, polysaccharides, aminoglycosides, antibiotics, sialic acids, etc.
- Conductivity detector: anion analysis in drinking water, mineral water, beverages, etc.
- Elemental analysis: determination of C, H, N and S content in solids and non-volatile viscous liquids.
- ICP-MS spectrometry: most of the elements and isotopes of the periodic table can be detected at very low levels. Quality control, toxicological analysis, characterization of raw materials...
- Atomic spectroscopy (MP-AES): quantification of more than 60 metallic elements in liquid and solid samples at macro and trace levels. Quality control, environmental, agriculture and food...
- Mass spectrometry unit - TOFF: academic and biopharmaceutical studies, relative and absolute quantification of any type of molecule, multiresidue analysis, pharmaceutical industry...

## *Key words*

BET, gas chromatography, ion chromatography, elemental analysis, ICP-MS, MP-AES and mass spectrometry-TOF.

## *Contact*

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Ourense Campus

# *Remote Sensing*

## *Technician*

Ramiro Álvarez Clavero

## *Offer*

- Creation of orthophotos and 3D terrain models.
- Thermographic inspection and reporting.
- DGPS, LIDAR and hyperspectral surveying and mapping.
- Unmanned aircraft flights.
- Training.
- Generation of digital terrain models and orthomosaics from drone flights.
- Algorithm generation, digital image processing and classification (satellite, airborne and UAS).

## *Aplications*

Photogrammetry, aerial photography, filming and surveys, satellite remote sensing, near object remote sensing, topography, cartography, thermographic surveys, R&D, location, navigation, tracking, weather, climatology, microclimatology, localized weather forecasting, environmental monitoring, agronomy, hydrology, forestry studies, parks and gardens, wind energy, industry and mining, solar energy.

## *Key words*

Ortophotos, 3D models, DGPS, LIDAR, hyperspectral, drones and training.

## *Contact*

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# *Technical Assistance and Calibration Service, SATYCEL*

## *Technicians*

Fernando González Muiños

Marcos Troncoso Pontes

## *Offer*

- Calibration and repair of fixed and variable volume pipettes from 1µl to 10 ml.
- Calibration and repair of precision and analytical balances.
- Development of systems and automation of tools for laboratory use.
- Repair of electronic equipment, covering a wide range of equipment in both scientific and technological fields.
- Cleaning, repair and adjustment of magnifying glasses and microscopes.
- Repair of vacuum equipment.
- Verification of spectrophotometers.
- Temperature control in baths, ovens, autoclaves, etc.
- Temperature and humidity control in chambers.

## *Key words*

Calibration, repair, automation and verification.

## *Contact*

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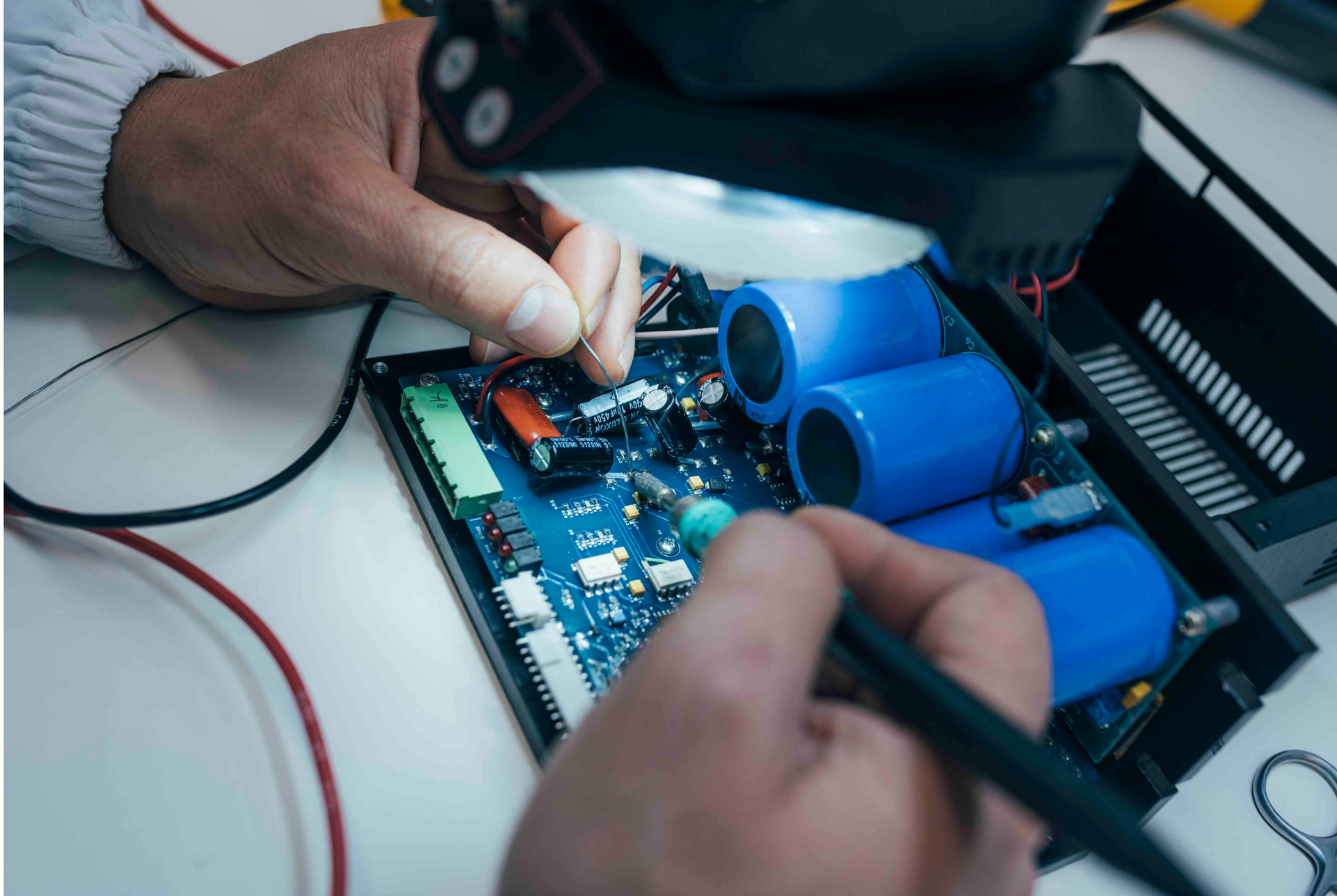

# *Mechanical Workshop*

## *Technicians*

Antonio Souto Casas

Damián Pino Rodríguez

## *Offer*

- Design and manufacture of parts, prototypes and projects related to research:
  - Fluid conduction elements.
  - Vacuum parts.
  - Antenna supports.
  - Calorimeters.
  - Marine research equipment.
  - Corrosion reactors.
  - Immobilizers and traps.
  - CNC machining of parts for the aerospace sector.
  - Design and construction of custom welded metal structures:
    - Laboratory tables.
    - Storage cabinets.
    - Shelves.
    - Welding of parts for subsequent re-machining.
- Repair, adaptation and maintenance of laboratory equipment such as repair of motor shafts or manufacture of obsolete parts for old equipment.
- Test specimens according to the standards. Such as resilience, traction, fatigue...
- 3D printing of algae, foraminifera, phytoplankton, boxes, test tools, prototypes...

## *Key words*

Design, manufacture, repair, adaptation and maintenance.

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