

ACTIVITY REPORT

2022

CICbiomaGUNE MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

 EXCELEXIA
MARIA
DE MAEZTU
07/2018-06/2022

ACTIVITY REPORT

2022

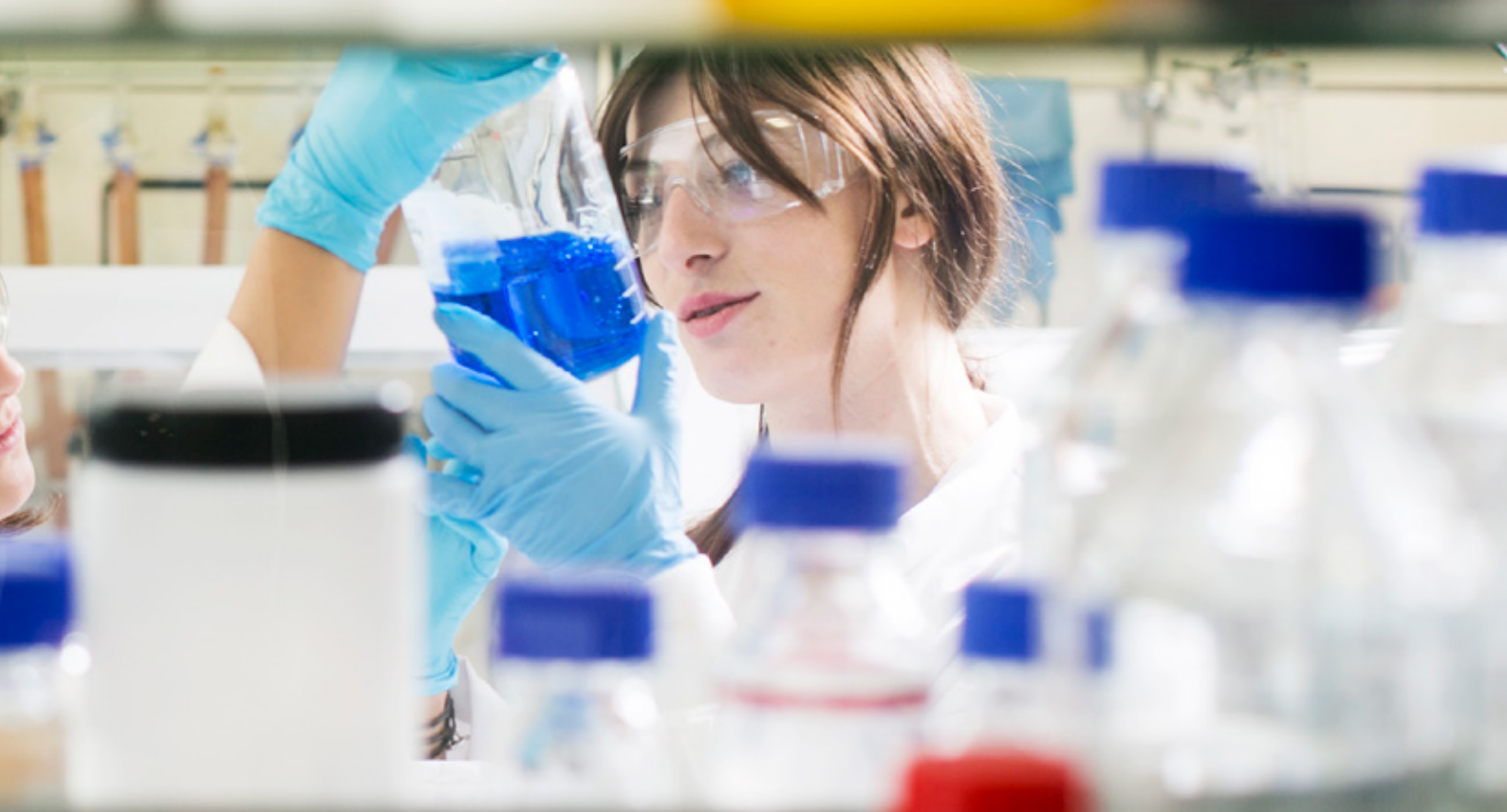
CIC biomaGUNE

Cover Picture Credits: Nerea Pascual Frías (Carbon Bionanotechnology Lab), Winner of the 1st Prize of the 2022 CIC biomaGUNE Scientific Photo Contest.
Description: Calcium imaging of induced pluripotent stem cell derived neurons at 20X magnification.



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Directors' Message



The report of CIC biomaGUNE for 2022 highlights significant accomplishments in research and scientific leadership. We are delighted to showcase remarkable results in research, technological developments, resource utilization, and expertise, all of which reflect the dedication and proficiency of our researchers, platform managers, and support teams. CIC biomaGUNE's unwavering progress, in terms of both quality and quantity, has firmly positioned it as a renowned and well-established research center specialized in biomaterials.

The volume of R&D activity at CIC biomaGUNE has shown continuous growth, as evidenced by the number of grants and industrial contracts awarded **(48 new projects: 7.1 M€ granted in total)**. Our researchers have demonstrated exceptional quality and impact in scientific output, with **120 articles** published in high profile journals, and over **10,200 citations**. Among these articles, 49% were led by CIC

biomaGUNE researchers, 70% involved international collaboration, 61% national collaboration, and 17% internal collaboration.

From a **knowledge & technology transfer** perspective, CIC biomaGUNE has also achieved significant progress, as reflected in the **increased funding from private sources, which reached 25% in 2022**. Through our strategic program,



Anna Llanes Pallàs, General Manager (left). **José M. Mato**, Director General (middle). **Aitziber L. Cortajarena**, Scientific Director (right).

we implemented various initiatives aiming at fostering collaboration with the private and clinical sectors, amplifying technology transfer efforts, and attracting industrial funding. This resulted in **32 agreements, service contracts and research contracts** with industrial or external partners. Additionally, we **launched a new company** and **promoted the validation of 4 technologies**, 3 of which are currently seeding the creation of spin-offs.

During 2022, **2 new patent families** were initiated, **7 trade secrets** deposited, and **1 patent** was **granted**. Additionally, **4 licenses** were **signed** for the exploitation of CIC biomaGUNE's intellectual property rights.

CIC biomaGUNE has gradually built up a network of partnerships with leading research centers and universities around the world, aiming at high-quality research and outstanding academic programs, supported by our successful participation in European and other International Programs. In 2022, **30 EU and International collaborative projects** were active, **9 coordinated by CIC biomaGUNE researchers**.

Within the competitive framework of Horizon Europe, 3 projects started in 2022: **1 ERC Proof of Concept Grant** was launched, which adds to the 8 previously granted **ERC grants** and **2 EIC Pathfinder** projects were initiated.

International recognition of academic excellence is also reflected by **prestigious awards**, including the Research Excellence Award from the Spanish Royal Society of Chemistry, awards to entrepreneurial initiatives, and the recognition of one group leader as Highly Cited Researcher.

It is also noteworthy that our researchers globally served in **27 Editorial Boards** of prominent international Journals. In 2022, our researchers played a key role in organizing or co-organizing **16 International conferences and workshops**.

CIC biomaGUNE has an average workforce of **160 people**, with a balanced gender distribution, **58% of our staff being women**, as well as an international profile with over **31% of our staff coming from foreign countries**. We maintained a balanced gender distribution for PhDs, postdocs and Research Fellows in 2022, as well in management positions, including the General Manager and the Scientific Director.

In terms of training, we had an average of **27 postdoctoral researchers** and **47 predoctoral researchers**, with **11 PhD theses successfully completed**.

In line with our commitment to scientific dissemination and outreach, in particular for promotion of STEAM careers in young girls and visibility of women in science, we organized and

participated in more than **37 outreach activities**. CIC biomaGUNE's visibility has been increased through fruitful efforts on social media and public communication, while our work was featured in **280 media impacts**.

Last but not least, with our commitment to sustainable development, CIC biomaGUNE Strategic Plan encompasses 10 out of the 17 **United Nations Sustainable Development Goals (SDGs)** and foresees the implementation of sustainability measures to ensure ethics, transparency, compliance and respect for the environment.

Aitziber L. Cortajarena, Scientific Director

Anna Llanes Pallàs, General Manager

José M. Mato, Director General



IN TERMS OF TRAINING,
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RESEARCHERS AND
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RESEARCHERS, WITH 11
PHD THESES COMPLETED.



Presentation

The Center for Cooperative Research in Biomaterials- CIC biomaGUNE, member of the **Basque Research and Technology Alliance (BRTA)**, is a non-profit research organization created to promote scientific research and technological innovation at the highest levels in the Basque Country following the BioBasque policy, to help create a new business sector based on biosciences.



Located in the Science and Technology Park of Gipuzkoa (Donostia-San Sebastián), the activity of CIC biomaGUNE is conducted by an average of **11 international and dynamic research groups**, which develop high-level research at the interface between chemistry, physics and biology, with particular emphasis on the properties of nanostructures and biomaterials, and their applications in biomedicine.

The scientific strategy of the Center for the 2017-2021 period has been structured around **three main research priorities**: Biofunctional Nanomaterials, Molecular and Functional Imaging, and Tissue Engineering & Regenerative Medicine. Since 2022 the area of Tissue Engineering & Regenerative Medicine has been redefined to better suit the new Strategic Program and enhance the current capacities of the Center. In this respect, we have renamed this area as Synthetic Bioengineering, which is envisioned to create a stronger connection between the previously established priority areas, with an approach that will bridge the gap between *in vitro* and *in vivo* studies.

The main research lines focus on the design, preparation, and characterization of biofunctional nanostructures and custom biomaterials and their evaluation in *in vitro* and *in vivo* settings, to understand biological processes and develop biomedical tools. These applications include diagnostic, therapeutic, theranostic, or multimodal imaging, to better understand diseases, and ultimately apply them in clinical diagnosis and therapy.

To carry out this ambitious program of research, the Center counts with a unique research infrastructure, equipped with advanced nanoscience, chemistry, biochemistry, cell biology, and molecular imaging facilities, including fully equipped research laboratories, **Technological Platforms** and the **Molecular Imaging Facility**, selected as a Singular Scientific and Technical Infrastructure (ICTS) by the Spanish Government and one of the **most complete preclinical imaging research infrastructures in Europe**.

CIC biomaGUNE started its activity in December 2006. In the course of fifteen years, with an average critical mass of around 160 people, the Center has obtained national and international recognition as a scientific leader and knowledge builder in the field of biomaterials. Among other achievements, our activity has resulted in the generation of knowledge (publications, patents, PhD theses) the internationalization of research through collaboration with international bodies and institutions, as well as opening our facilities to the scientific community and the industrial sector.

In 2018 CIC biomaGUNE earned the accreditation as a "María de Maeztu Unit of Excellence", the highest recognition of scientific excellence in Spain awarded by the Spanish State Research Agency (AEI). The center counts with additional certifications and recognitions such as the Seal of Excellence in Human Resources "HR Excellence in Research", UNE 166002 for RD&I Management and the AAALAC accreditation for the care and use of animals in science.

At a Glance

2022 ORGANIZATION

RESEARCH GROUPS

1. Glycotechnology
2. Biomolecular Nanotechnology
3. Soft Matter Nanotechnology
4. Bionanoplasmonics
5. Carbon Bionanotechnology
6. Heterogeneous Biocatalysis
7. Regenerative Medicine & Disease Models
8. Radiochemistry & Nuclear Imaging
9. Magnetic Resonance Imaging
10. Molecular & Functional Biomarkers

MOLECULAR & FUNCTIONAL IMAGING FACILITY

1. Radiochemistry
2. Nuclear Imaging (PET/SPECT/CT)
3. Magnetic Resonance Imaging (MRI)
4. Image Analytics
5. Animal House

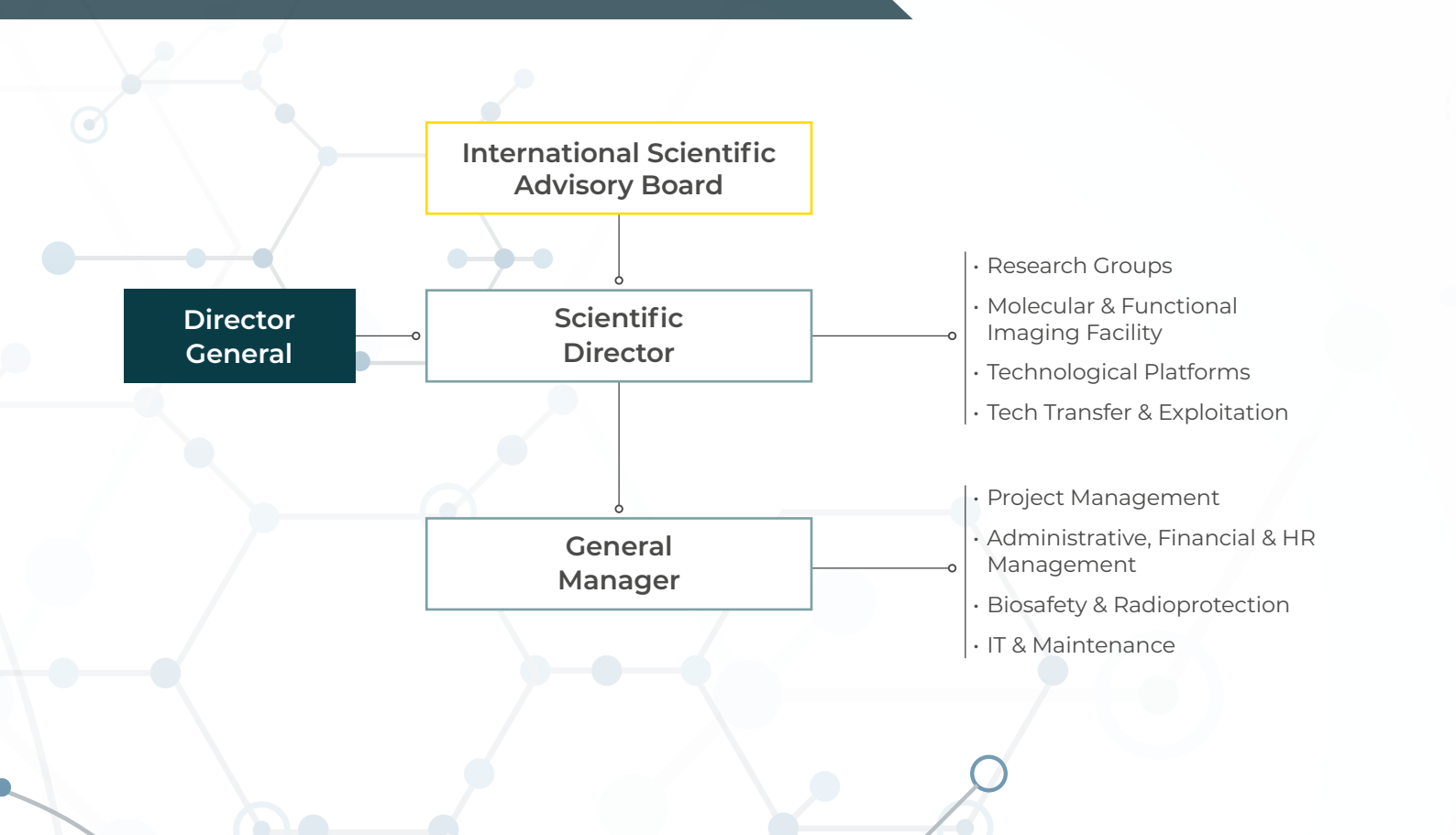
TECHNOLOGICAL PLATFORMS

1. Nuclear Magnetic Resonance
2. Electron Microscopy
3. Mass Spectrometry
4. Surface Analysis & Fabrication
5. Colloidal Nanofabrication
6. Optical Spectroscopy

SUPPORT

1. Directorate
2. General Management
3. Administration, Financial & HR Management
4. Project Management
5. Tech Transfer & Exploitation
6. Biosafety & Radioprotection
7. Information Technology
8. Maintenance





STAFF

GENDER DISTRIBUTION

153.47

AVERAGE STAFF FTE
(58% women, 42% men)

28

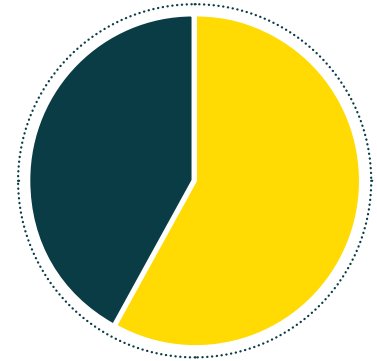
NATIONALITIES REPRESENTED
(31% of staff born outside Spain)



42%



58%



SCIENTIFIC OUTPUT

120

Scientific Publications

10,240

Citations

10

Average Impact Factor

78%

1st Quartile

37%

1st Decile

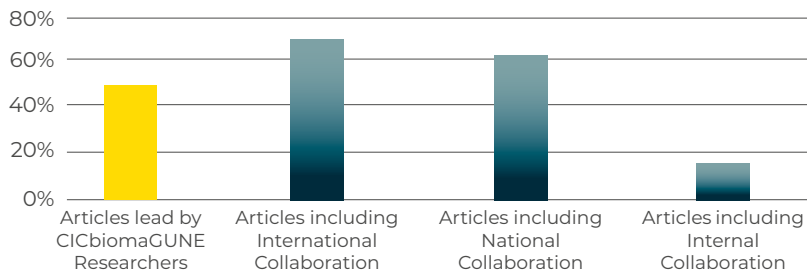
107

HIRSCH Index

81%

Open Acces (gold or green)

PUBLICATIONS LEADERSHIP & COLLABORATIONS



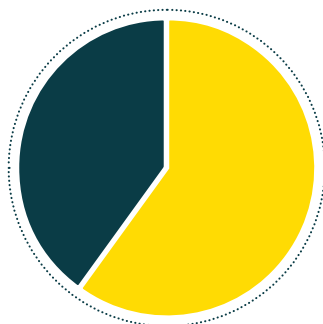
GENDER DISTRIBUTION ON CIC BIOMAGUNE PUBLICATIONS 1ST AUTHORSHIP



40%



60%



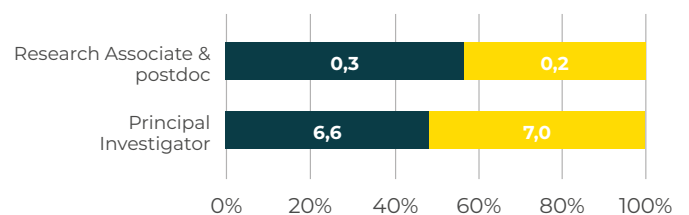
AVERAGE ARTICLES CORRESPONDING AUTHORSHIP PER CATEGORY



Women



Men



2022 BUDGET

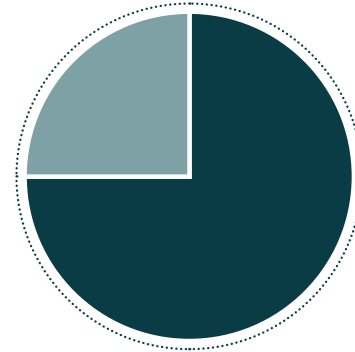
15,676,654€

TOTAL BUDGET

19%	16%	14%
Basque Government	Spanish Government	European Commission
26%	25%	
Base Funding	Private Funding	

PRIVATE-PUBLIC FUNDING

PRIVATE FUNDING 25% PUBLIC FUNDING 75%



TECHNOLOGY TRANSFER

2	1	7	
New Patent Families	Granted Patents	Trade Secrets	
4	32	4	1
Licensed Patents & Other IP Rights	Agreements, Services & Research Contracts	Ongoing Valorization Projects	New Companies Created

TRAINING & CAREER DEVELOPMENT

11	71	111	38	48
Completed PhD Theses (64% women, 36% men)	Ongoing PhD Theses (66% women, 34% men)	Incoming Research Stays (59% women, 41% men)	Outgoing Research Stays (37% women, 63% men)	Seminars (33% women speakers, 67% men speakers)
264	3	13	190	151
Internal Scientific & Technology Trainings (65% women participants, 35% men participants)	Organized Workshops & Conferences	Co-organized Workshops & Conferences	CIC biomaGUNE employees participated to Workshops & Conferences (61% women, 39% men)	CIC biomaGUNE employees delivered oral & poster contributions to Workshops & Conferences (66% women, 34% men)

DISSEMINATION & PUBLIC ENGAGEMENT

37	280	47,955	3,139	4,350
Outreach activities (25 of which aimed to promote STEAM careers in young girls and improve visibility of women in science)	Media Appearances	Web Visits	Twitter Followers	LinkedIn Followers

SUSTAINABILITY, COMPLIANCE & SOLIDARITY

ENERGY CONSUMPTION

Electricity

2,521,772 Kwh, which represents 400,275 Kwh less than in 2021.
Equivalent to 100 tCO₂eq

Gas

277,522.59 Kwh, which represents 251591,41 Kwh less than in 2021.
Equivalent to 51 tCO₂eq

COMMITMENT TO THE SUSTAINABLE DEVELOPMENT GOALS

At CIC biomaGUNE, we have incorporated 10 of the 17 Sustainable Development Goals (SDGs) approved by the UN in September 2015 into our strategic programme.

AWARDS & RECOGNITIONS

CIC BIOMAGUNE ACCREDITATIONS

- **AAALAC Accreditation to CIC biomaGUNE's animal facilities** CIC biomaGUNE received the AAALAC accreditation in 2015 for the first time, and the accreditation was renewed in 2018 and 2021.
- **Maria de Maeztu Unit of Excellence** accredited by the Spanish State Research Agency (Ministry of Science, Innovation and Universities).
- The Molecular & Functional Imaging Facility renewed its recognition as **Singular Scientific and Technical Infrastructure** (ICTS in Spanish).
- **Certification** of CIC biomaGUNE RD&I management system according to **UNE 166002:2021** standard.
- Seal of Excellence in Human Resources "**HR Excellence in Research**" from the European Commission since 2021.

AWARDS

- **Fernando López Gallego** awarded with the **Young Researcher Award** at the Research and Innovation Awards 2021 of the Government of Castilla-La Mancha, [19/04/2022](#)
- **Luis M. Liz-Marzán** awarded with the **Collège de France Medal**, [17/05/2022](#)
- **María de los Ángeles Ramírez** awarded with the **2021 ISGS PhD Thesis Award Prize** for her work conducted between the laboratories of Dr. Galo Soler Illia and Dr. Sergio Moya, [15/07/2022](#)
- **Jordi Llop** awarded with the **Toribio Echeverria Prize** in the field of Business Ideas/Projects for the VENTIPET initiative, [19/07/2022](#)
- **Ana Isabel Benítez Mateos** awarded with the **UPV/EHU Extraordinary Doctoral Award** for her PhD thesis, [10/08/2022](#)
- **Aitziber López Cortajarena** awarded the **Research Excellence 2022 Award** from the Spanish Royal Society of Chemistry, [07/10/2022](#)
- **Javier Plou Izquierdo** **Honourable Mention in the 2022 Award of the Spanish Royal Academy of Doctors** for his PhD Thesis, [30/11/2022](#)
- **María de los Ángeles Ramírez** obtained the San Martin National University (Argentina) **Best Thesis Award in Exact & Natural Sciences and Engineering** 2019-2021, [01/12/2022](#)

ACADEMY MEMBERSHIP AND HONORARY DEGREES

- **Luis M. Liz-Marzán** cited by Research.com as **#1 Materials Science Scientist in Spain** and **#72 Worldwide**. [08/04/2022](#)
- **Luis M. Liz-Marzán** appear in the **Highly Cited Researchers** list published by Clarivate Analytics (former branch of the Thomson Reuters agency dedicated to intellectual property and science), [18/11/2022](#).

BEST TALK / POSTER

- **Lydia Martínez Parra** awarded with the **Best presentation/poster Award** in the EMIM 2022, [18/03/2022](#)
- **Lydia Martínez Parra** awarded with the **Best Poster Award** in the ChemOnTubes 2022, [29/04/2022](#)
- **David Vila Liarte** awarded the **1st Prize Oral Award** at Gold 2022, [20/07/2022](#)
- **Cristina de la Encarnación Bermúdez** received the **Best Oral Communication Award** in the 7th Barluenga Lectureship Symposium 2022, [27/10/2022](#)
- **Laura Fernández Méndez** received the **Best Abstract Award** at the CIBERES Congress, [24/11/2022](#)

EMBO FELLOWSHIPS

- **Laura Fernández Méndez** received an "EMBO Fellowship to co-finance travel for the presentation of her work, [24/11/2022](#)
- **Marina Piñol** received an EMBO Fellowship to co-finance travel for the presentation of her work, [24/11/2022](#)
- **Irati Aiestaran Zelaia** awarded an EMBO Fellowship to co-finance travel for the presentation of her work, [24/11/2022](#)

Organization



GENERAL ASSEMBLY

PUBLIC ADMINISTRATIONS

bioef

Basque foundation for
health innovation and research

Basque Foundation
for Health Innovation
and Research



Provincial
Council of
Gipuzkoa

Bizkaia
foru aldundia
diputación foral

Provincial
Council of
Bizkaia

EUSKADIKO
PARKE
TEKNOLOGIKOAK **Parke**

Technology
Parks Network

ematen za zabal dezagu

Universidad
del País Vasco Euskal Herriko
Unibertsitatea

University of the
Basque Country

COMPANIES

BTI



Curium
Pharma

CURIUM™
LIFE FORWARD

Oncomatryx

ONCOMATRYX

Industrial Química
del Nalón, S.A.

 **Química del Nalón**

Mondragon
Corporation





**INTERNATIONAL
SCIENTIFIC
ADVISORY BOARD**



Prof. Monica Olvera de la Cruz

Department of Chemistry
Northwestern University, USA.



Prof. Aránzazu del Campo

INM – Leibniz Institute for
New Materials, Germany.



Prof. Itamar Willner

Institute of Chemistry
The Hebrew University
of Jerusalem, Israel.



Prof. Samuel I. Stupp

Institute for BioNanotech-
nology in Medicine
Northwestern University, USA.



Prof. Peter Seeberger

Max Plank Institute of
Colloids and interfaces,
Germany.



Prof. Patrick Couvreur

Université Paris-Sud,
France.

RESEARCH GROUPS

The main research lines focus on the design, preparation, and characterization of biofunctional nanostructures and custom biomaterials and their evaluation in *in vitro* and *in vivo* settings, to understand biological processes and develop biomedical tools. These applications include diagnostic, therapeutic, theranostic, or multimodal imaging, to better understand diseases, and ultimately apply them in clinical diagnosis and therapy.

GLYCOTECHNOLOGY

Niels Reichardt
Principal Investigator

Sonia Serna
Research Associate

The Glycotechnology Laboratory carries out projects in basic and applied glycoscience, focusing on carbohydrates, with untapped potential to provide innovative solutions to important social challenges, such as personalized medicine, pharmaceutical products, food, and biomaterials. The group applies carbohydrate synthesis, materials science, and molecular biology to the design of tools, probes, and devices to elucidate the role and to exploit the potential of sugars and glycomimetics for cancer immunotherapy and diagnostics, immune lectin targeting, vaccine development, and improved vector design for gene therapy.



BIOMOLECULAR NANOTECHNOLOGY

Aitziber López Cortajarena
Principal Investigator (Ikerbasque Professor)

Valery Pavlov
Associated Principal Investigator

Ivan R. Sasselli
*Research Associate (Fellow Gipuzkoa)
until 09/2022*

Aitor Manteca
Research Associate (Fellow Gipuzkoa)

The group is at the forefront in engineering biomolecule-based functional nanostructures and bioinspired materials for biotechnology and biomedicine (ERC CoG). Using a combination of protein and nanomaterial engineering, the group creates versatile platforms for constructing protein-based hybrid functional nanostructures and self-assembled biomaterials via bottom-up approaches, from nano- to macro-scale. By combining biomolecular engineering and bioconjugation, molecular hybrids are produced with nanoparticles, nanoclusters, or organic compounds, endowing biomolecules with novel functions. This work includes the development of functional nanostructures and biomaterials for applications in biological therapies, sensing, bioelectronics, catalysis, lighting, and data storage, among others.



SOFT MATTER NANOTECHNOLOGY

Sergio Moya
Principal Investigator

The Soft Matter Nanotechnology Laboratory makes use of elements of soft matter, mainly polyelectrolytes, hybrid materials for biomedical applications are developed. Recent interests include the design of carriers for gene therapy based on engineered polyamines and supramolecular interactions, for applications in cancer therapy. Carriers are also developed to facilitate transport of oxygen for photodynamic therapy of cancer. The study of the physicochemical properties of the fabricated materials and their biological fate is a key aspect of the group's research strategy, using advanced spectroscopic and imaging tools to understand how materials functionality is affected by biological environments.



BIONANOPLASMONICS

Luis M. Liz-Marzán
Principal Investigator
(Ikerbasque Professor)

Isabel García
Research Associate (CIBER-BBN)

Dorleta Jiménez de Aberasturi
Research Associate
(Ikerbasque Fellow) until 12/2022

Óscar F. Silvestre
Research Associate
Fellow Gipuzkoa) until 09/2022

Malou Henriksen-Lacey
Research Associate

The group focuses on the biomedical applications of plasmonic nanomaterials, including chemical methods for the synthesis of colloidal metal nanoparticles with tailored morphology, surface chemistry, and optical response, as well as their directed self-assembly and applications in biosensing, diagnostics and therapy, mainly based on plasmonic effects.

One of the current central topics of the group (ERC AdG) is the development of realistic three-dimensional cell/tissue models, supported by 3D-printed hydrogel scaffolds with embedded plasmonic nanoparticles, which allow the real-time detection of disease biomarkers by optical methods, including SERS. Such hybrid materials have been recently patented as platforms for the evaluation of drug efficacy in realistic *in vitro* models, toward applications in personalized medicine.



CARBON BIONANOTECHNOLOGY

Maurizio Prato

*Principal Investigator (Ikerbasque
Professor & AXA Chair)*

Focuses on the design and synthesis of tailored carbon nanostructures (fullerenes, carbon nanotubes, graphene, and carbon nanodots) for the development of functional interfaces with enhanced performance in medicine, energy, biosensing, and diagnostics (ERC AdG). The group seeks to transfer the properties of these new materials into applications, including spinal cord repair, innovative immunotherapies, selective biosensors, MRI contrast agents, water splitting, and reduction of carbon dioxide into useful chemicals.



HETEROGENEOUS BIOCATALYSIS

Fernando López Gallego

*Principal Investigator (Ikerbasque
Professor)*

The Laboratory of Heterogeneous Biocatalysis applies multi-enzyme systems to synthetic, environmental, medical, and analytical chemistries, by harnessing the exquisite selectivity of enzymes, to develop sustainable and efficient chemical processes. The group aims to open new paths toward cell-free synthetic biology and *in vitro* metabolic engineering (ERC CoG). The main inspiration driving this research is the spatial organization found in living organisms, which are mimicked to fabricate *ex vivo* systems supported on solid materials. To address this goal, the group interfaces chemistry and biology utilizing multidisciplinary tools that involve molecular biology, enzymology, and materials chemistry.

REGENERATIVE MEDICINE & DISEASE MODELS

Ander Abarrategi

*Junior Group Leader (Ikerbasque and
Ramón y Cajal Fellow)*

The Regenerative Medicine Laboratory uses biomaterial based approaches to boost knowledge in stem-cell biology, both in physiological and pathological contexts. For this aim, we generate bioactive and cell-laden 3D structures potentially useful for regenerative medicine and disease modelling studies.

The understanding of bone tissue is the core of our research. Briefly, we design, characterize and test different kinds of implantable devices to gain insight into specific tissue formation processes. From this information we define and modulate relevant mechanisms in the context of tissue regeneration and tissue pathology.

RADIOCHEMISTRY & NUCLEAR IMAGING

Jordi Llop

Principal Investigator

The group focuses on the development of innovative radiochemistry and application of positron emission tomography (PET) and single photon emission computed tomography (SPECT) tracers, toward understanding biological, physiological, and pathological processes in oncology, neurology, pneumology, infection and cardiovascular diseases. Specifically: (i) innovative radiochemical strategies to obtain positron emitter-labeled tracers, covering various molecular modalities (small molecules, peptides, proteins, antibodies/antibody fragments and nanoparticles) and radionuclides (^{11}C , ^{13}N , ^{18}F , ^{64}Cu , ^{89}Zr , ^{124}I); (ii) investigate the mechanism underlying high-incidence diseases, by combined imaging modalities; (iii) develop and evaluate new theranostic agents.

MAGNETIC RESONANCE IMAGING

Pedro Ramos

Principal Investigator (Ikerbasque Professor)

The Magnetic Resonance Imaging (MRI) Laboratory works on the development of MRI-based methods for the definition of early imaging biomarkers of disease, aiming at advanced diagnosis and treatment of vascular and neurodegenerative disorders of the central nervous system. Using animal models, longitudinal imaging approaches and image analytics, genetically induced or disease-related changes on the phenotype, metabolism, function and connectivity of the brain are studied. Focus is also given to the design of theranostic nanomaterials that reach disease targets across the Blood Brain Barrier for effective treatment of neurological diseases.

MOLECULAR & FUNCTIONAL BIOMARKERS

Jesús Ruiz Cabello

Principal Investigator (Ikerbasque Professor)

Susana Carregal

Research Associate (Ikerbasque and Ramon y Cajal Fellow)

Ermal Ismalaj

Research Associate (Fellow Gipuzkoa)

The group focuses on cardio-pulmonary and vascular diseases, such as atherosclerosis and pulmonary hypertension, using functional and molecular imaging and systems biology approaches. Particular interest is put into nanotechnology-based applications for early diagnosis and monitoring new therapeutic approaches in vascular diseases. We investigate metabolic changes associated with vascular cell growth and proliferation, the structure and function of the right ventricle, and cardiovascular coupling signals. Current activity focuses on developing new biomarkers for flow imaging and participating in a clinical trial with pulmonary hypertension patients.

DIRECTORATE AND MANAGEMENT

DIRECTORATE

- **José M. Mato**, *Director General*.
- **Aitziber L. Cortajarena**, *Scientific Director*.
- **Luis M. Liz- Marzán**, *María de Maeztu Scientific Director*.
- **Anna Llanes Pallàs**, *General Manager*.

They are in charge of defining the structure of CIC biomaGUNE, coordinating the scientific strategy, supervising the organizational units, managing the available space and human resources and prioritizing infrastructure acquisition and renewal and ensuring adequate use of available economic resources.

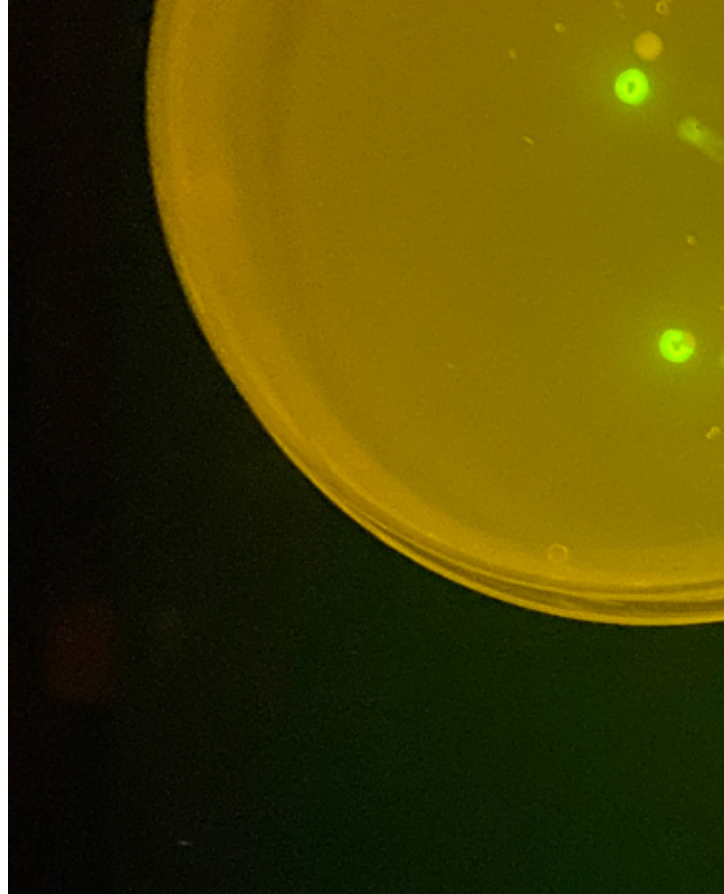
MANAGEMENT AREA

The General Manager is responsible for supervising the activity of the departments of administration & human resources, project management, computing & communications, biosafety&radiation protection, and maintenance.

ADMINISTRATION

- **Sheyla García Medel**, *Administration & HR Manager*.
- **Elizabeth Noguera Olaechea**, *Finance & Control Manager*.

This department is responsible for the management of finances, accounting, administration, and the human resources of the Center.





RD&I UNIT

- **Cristina Díez García**, *Project Manager*.
- **Marcos Simón Soria**, *Technology Transfer Manager*.

A dedicated office to support and strengthen the capacities of the Center, in terms of attracting funding from various Research Programs, in particular, international ones, strengthening links between academic and industrial environments, and promoting the transfer of research results to society and industry, especially to the biotechnology sector.

BIOSAFETY & RADIOPROTECTION

- **Paola Ferreira Cabeza**, *Biosafety & Radioprotection Manager*.

Dedicated to establish safe working conditions for all CIC biomaGUNE's personnel by promoting good laboratory practices. The service is also in charge of the appropriate operation of the Center's Radioactive Facility.

COMPUTING & COMMUNICATIONS

- **Mikel Gonzalez Lacunza**, *IT Manager*.

The IT service is in charge of supporting the staff of the Center with setting up and maintaining computer-related equipment, software, data storage, e-mail servers, as well as the website and other social media.

MAINTENANCE

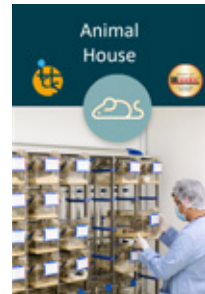
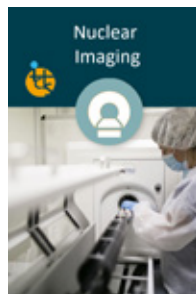
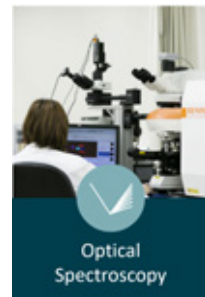
- **Álvaro Ruiz Fernández**, *Maintenance Manager*.

This department takes care of the preventive, predictive and corrective maintenance of all facilities at CIC biomaGUNE.



RESEARCH FACILITIES

All the research lines, framed within the strategic research program of CIC biomaGUNE, are strongly supported by the Molecular & Functional Imaging Facility and the Technological Platforms, which constitute a major strength of the Center.





THE MOLECULAR &
FUNCTIONAL
IMAGING FACILITY
AND THE
TECHNOLOGICAL
PLATFORMS
CONSTITUTE A
MAJOR STRENGTH
OF THE CENTER.

MOLECULAR & FUNCTIONAL IMAGING FACILITY

Designed, built and equipped to tackle longitudinal and multimodal pre-clinical projects and to develop applications in the areas of Preclinical Molecular and Functional Imaging and Nanomedicine.

The research-oriented preclinical imaging facility offers state-of-the-art imaging resources in: (i) radiochemistry (dual particle-high current cyclotron capable to routinely produce ^{18}F , ^{11}C and ^{13}N ; versatile synthesis boxes housed in shielded hot cells; and state-of-the-art analytical equipment including radio-HPLC, radio-GC, radio-TLC, and gamma spectrometry); and (ii) small-animal imaging including PET and SPECT (both as hybrid systems with CT) and a trimodal PET-SPECT-CT, optical imaging and high field Magnetic Resonance Imaging (MRI, 7.0 and 11.7 T). The MRI unit and the Nuclear Imaging unit sandwich a dedicated animal housing area,

which holds since 2015 accreditation by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC) and is prepared to house up to 800 mice and 400 rats in individually ventilated cages, with an experimental area specifically devoted to perform longitudinal studies. The animal house is complemented with microsurgery areas for animal preparation. Four workstations and a data storage system in the Terabyte scale enable image reconstruction, processing, quantification and archiving. Personnel with extensive scientific background and experience in handling and operating specific equipment, technologies, methodologies or experimental animals complete the scientific-technical staff.

The Facility is currently integrated in the "Distributed Biomedical Imaging Network" (ReDIB, www.redib.net), recognized by the Spanish Government as a Singular Scientific and Technical Infrastructure (ICTS).

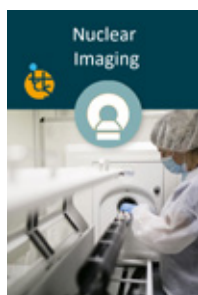


RADIOCHEMISTRY PLATFORM

Vanessa Gómez-Vallejo, *Platform Manager*.

The platform is equipped with an IBA Cyclone 18/9 cyclotron able to accelerate protons (18 MeV) and deuterons (9 MeV) and is equipped with 7 targets for the routine production of $[^{18}\text{F}] \text{F}^-$, $[^{18}\text{F}] \text{-F}_2$, $[^{13}\text{N}] \text{-NH}_4^{+}$, $[^{15}\text{O}] \text{-O}_2$, $[^{11}\text{C}] \text{-CO}_2$ and $[^{11}\text{C}] \text{-CH}_4$. It also has a solid target for the production of ^{89}Zr and ^{64}Cu . The radiochemistry laboratory equipped with 5 shielded hot cells housing versatile automatic synthesis, suitable for the production (synthesis, purification and quality control) of PET and SPECT radiotracers. The facility has specially designed modules for:

- Synthesis of $[^{11}\text{C}] \text{CH}_3\text{I}$ / $[^{11}\text{C}] \text{CH}_3\text{OTf}$ from $[^{11}\text{C}] \text{CO}_2$ / $[^{11}\text{C}] \text{CH}_4$ and subsequent methylation reaction.
- ^{18}F -fluorination by nucleophilic and electrophilic substitution.
- Radiotracer synthesis using microfluidics technology.
- Chelation reactions using radiometals (^{68}Ga , ^{67}Ga , ^{64}Cu , ^{89}Zr , etc.). The quality control lab, sited into the production lab, is equipped with state of art equipment to perform the complete quality control of the synthesized radiotracers, including radio-HPLC, radio-GC, radio-TLC, and gamma spectrometry.



NUCLEAR IMAGING

Unai Cossío, *Platform Manager*.

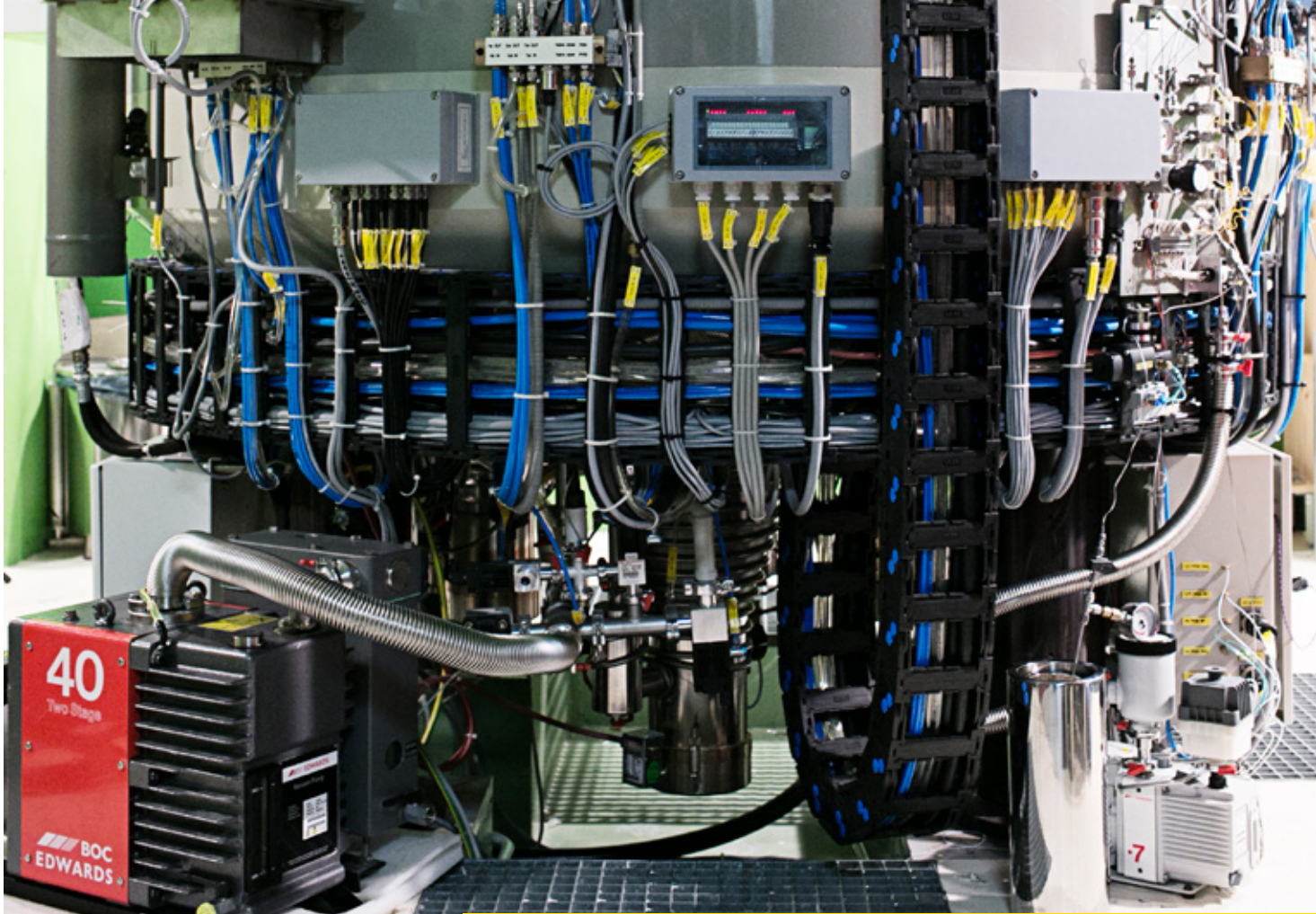
Equipped with autoradiography, PET and SPECT (both as hybrid systems with CT) and a trimodal PET-SPECT-CT. Four workstations and a data storage system in the Terabyte scale enable image reconstruction, processing, quantification and archiving.



MAGNETIC RESONANCE IMAGING (MRI)

Daniel Padró, *Platform Manager*.

Equipped with instrumentation to conduct advanced imaging and spectroscopic experiments applied to biological samples including small rodents, samples or tissue extracts and cell cultures is available. CIC biomaGUNE provides the instrumentation and the expertise to carry out a wide range of MRI and MRS experiments, and is equipped with surgery rooms for animal preparation and implementation of surgical models. Ancillary equipment is also available: anesthesia systems, MRI-compatible physiological monitoring systems, infusion pumps, and temperature regulation systems. Equipment available: MRI 7T/30 cm (70/30 USR), MRI 11.7T/16 cm (117/16 USR).



PRE-CLINICAL IMAGE ANALYTICS

Unai Cossío, *Platform Manager*.

The Image Analytics service takes care of processing all the outgoing multimodal images obtained within the Molecular Imaging Unit (PET, SPECT, CT, and MRI). Working on different operating systems, we carry out co-registration, segmentation, and quantification of multimodal images. The combination of all multimodal imaging techniques confined in the Imaging Unit with a reliable image analysis process offers a complete and powerful Imaging facility to researchers. Four workstations and a data storage system in the Terabyte scale enable image reconstruction, processing, quantification and archiving.



ANIMAL FACILITY

Ainhoa Cano, *Platform Manager*.

The MRI Unit and the Nuclear Imaging Unit sandwich a dedicated animal housing area, which holds accreditation of the **Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC)** since 2015 and is prepared to house up to 960 mice and 234 rats in individually ventilated cages, with an experimental area specifically devoted to perform longitudinal studies. The animal house is complemented with microsurgery areas for animal preparation.

TECHNOLOGICAL PLATFORMS

Managed by specialized Platform Managers, provide technical and scientific support to the research activities conducted at CIC biomaGUNE. They include the following state-of-the-art research infrastructures:



Nuclear Magnetic
Resonance

NUCLEAR MAGNETIC RESONANCE (NMR)

Daniel Padró, *Platform Manager*.

Equipped with a **500 MHz NMR** spectrometer, it provides essential service for the characterization of molecules with biological activity, from complex glycans to molecules used in the design of nanostructures for biomedical applications.



Electron
Microscopy

ELECTRON MICROSCOPY

Marco Möller, *Platform Manager*.

Equipped with **SEM-EDX, TEM – 120 keV and 200 keV**, it offers techniques to study nanoparticles and biological or soft polymer materials (cryo-TEM) at the micrometer and nanometer scale to determine the materials dimensions, shape and composition.



Mass
Spectrometry

MASS SPECTROMETRY

Javier Calvo, *Platform Manager*.

The platform is equipped with state-of-the-art mass spectrometers of different ionization sources such as **electrospray, ICP, and MALDI**. These instruments, equipped with high-resolution analyzers, allow for structural analysis and characterization ranging from small organic molecules to complex biomolecules and nanomaterials, as well as elemental absolute quantification by ICP/MS. Additionally, high-resolution liquid and gas chromatography systems (**UHPLC** and **GC**) are available in order to improve the analysis of complex samples.



SURFACE ANALYSIS AND FABRICATION

Desiré Di Silvio, *Platform Manager*.

Equipped with **XPS, 3 x AFM, sputtering system**, it focuses on the analysis of materials at the surface level, including spectroscopic and microscopic techniques especially suited to surfaces. The platform offers also service for the deposition of thin layers with controlled manufacture at the nanoscale.



COLLOIDAL NANOFABRICATION

Ana Sánchez-Iglesias, *Platform Manager*.

Within the priority area of biofunctional nanomaterials and nanomedicine, colloidal synthesis plays an essential role. This platform provides knowledge, training and service for the manufacture of nanoparticles with a wide variety of compositions and morphologies.



OPTICAL SPECTROSCOPY & IMAGING

Irantzu Llanera, *Platform Manager*.

Judith Langer, *Platform Manager*.

Equipped with **2 x Fluorescence Confocal microscopes** (1 of them equipped with multiphoton laser), **Epifluorescence microscope** for live cell imaging, **2 x Confocal-Raman microscopes**, **Dark field microscope**, **UV-VIS-NIR, FT-IR and Raman spectrometers**, **UV-NIR Fluorimeter**, **Flow Cytometer**, **Spectropolarimeter (CD)**, **Dynamic Lyght Scattering**, **Differential Scanning Calorimeter**, **Monolith MST** this platform offers a wide variety of techniques for the spectroscopic characterization of biomaterials and biosurfaces. Also included are optical microscopy techniques (confocal fluorescence, Raman, etc.), to investigate biofunctional materials and the interaction of nanomaterials with cellular systems of diverse complexity.



Human Resources & Equality

HUMAN RESOURCES

Several actions directed towards the attraction and retention of scientific talent have been implemented, in particular regarding the recruitment of PhD students and postdoctoral researchers. Such actions have additionally been supported by external funding from specific HR calls.

We have worked on the definition of a **Career Plan** at CIC biomaGUNE and started working on

developing a **performance appraisal system**. In 2021 we obtained the **seal of "Excellence in HR in Research"** from the European Commission (EC). The Human Resources Strategy for Researchers - HRS4R - is an initiative of the EC to encourage research institutions to implement the European Charter for Researchers and the Code of Conduct for the recruitment of research staff.



EQUALITY

CIC biomaGUNE formalized in 2020 a journey and a commitment to equality that has been developing since the beginning of the activity and that it intends to maintain over time.



Our commitment stems not only from legal compliance but also from the opportunity represented by being able to generate a consensus that allows us to deepen and improve our culture, based on shared values and made explicit through our R&D&I Policy and other directives that we have been adopting over the years.

The Equality Committee, together with the Direction of the Center, has been working on the equality plan of CIC biomaGUNE, which aims at **ensuring equality, equal recruitment policies, reconciliation between work and private life** and engaged with the organization of multiple outreach activities and actions aimed at **promoting**

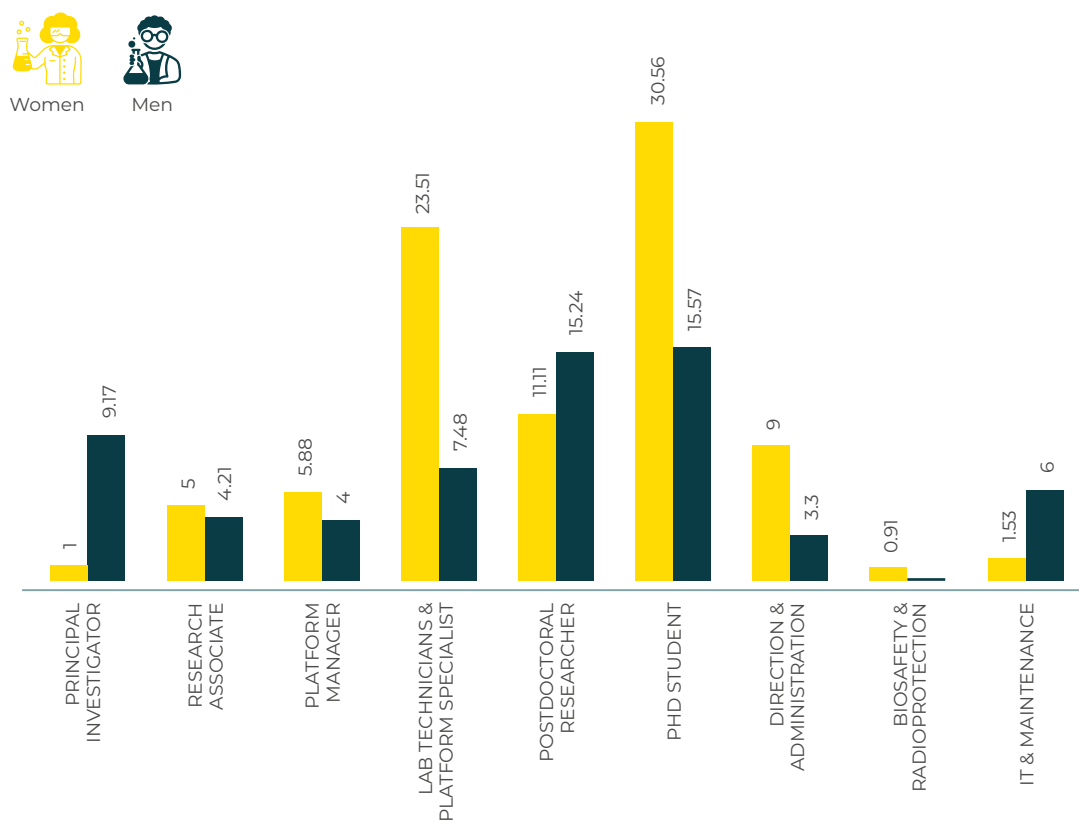
scientific-technological vocation among girls and the figure of women in science.

Since 2020 CIC biomaGUNE has put in place specific measures to **support labour flexibility which have favored the work-life balance.** This has resulted in a reduction in both requests for childcare leave and reductions of working hours for legal guardianships, avoiding the consequent damage of a loss of income. In 2021 we approved the **protocol of prevention and action against workplace, sexual or gender-based harassment** and in 2022 we have developed an **inclusive language guide.**

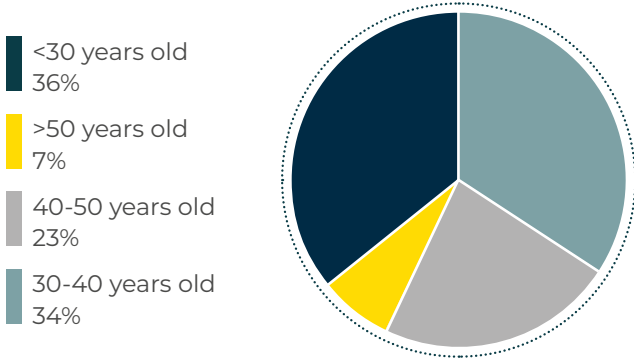
The table below provides the distribution of CIC biomaGUNE's personnel during 2022 in FTE.

POSITION	 %	 %	TOTAL	%
Principal Investigator	1	10%	9.17	90%
Research Associate	5	54%	4.21	46%
Platform Manager	5.88	60%	4	40%
Lab Technician/Platform Specialist	23.51	76%	7.48	24%
Postdoctoral Researcher	11.11	42%	15.24	58%
PhD Student	30.56	66%	15.57	34%
Direction and Admin	9	73%	3.3	27%
Biosafety and Radioprotection	0.91	100%	0	0%
IT and Maintenance	1.53	20%	6	80%
	88.5		64.97	
			153.47	100%

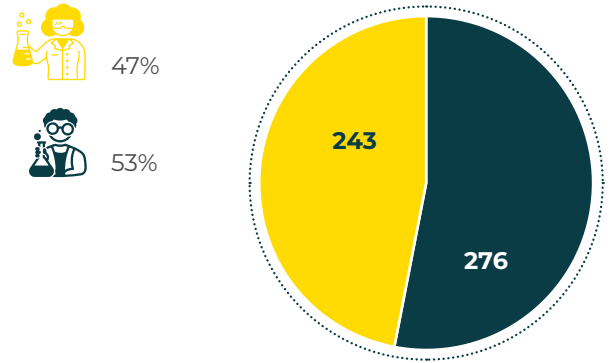
STAFF DISTRIBUTION BY POSITION



AGE DISTRIBUTION



APPLICANTS TO SELECTION PROCESSES



SELECTED / HIRED CANDIDATES



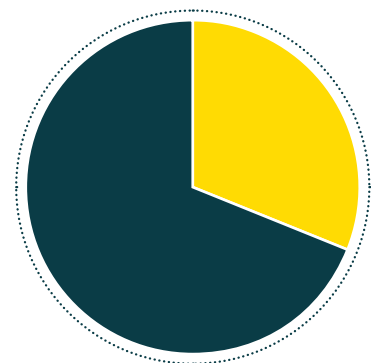
COUNTRIES

CIC biomaGUNE is a **multicultural organization**, people from **28 different countries** work at CIC biomaGUNE and **31% of employees were born outside Spain**.

COUNTRY	TOTAL	COUNTRY	TOTAL
Albania	1	Italy	20
Argentina	3	Lebanon	1
Austria	1	Lithuania	1
Bolivia	1	Mexico	4
Brasil	1	Peru-Italy	1
China	2	Philippines	1
Chipre	1	Poland	1
Colombia	1	Portugal	2
Denmark	1	Russia	1
France	2	South Africa	1
Germany	5	Spain	141
Greece	1	Ukraine	2
India	4	USA	2
Iran	1	Venezuela	1

NATIONALITY

Spain 69% Other 31%



2022 Funding

The **total budget** for 2022 has amounted **15,676,654 €**, 75% of which came from public sources and 25% from private sources.

CIC biomaGUNE building.

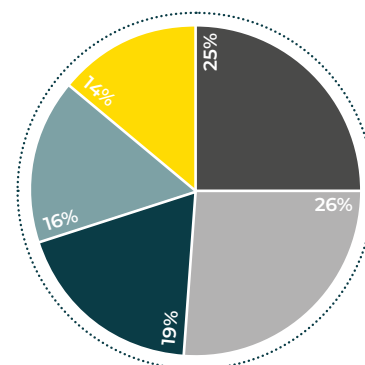
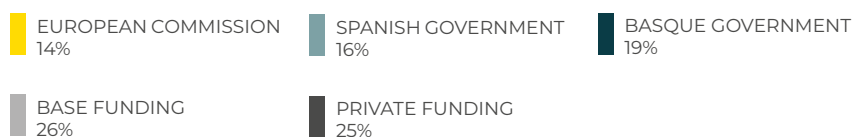


2022 BUDGET

TOTAL BUDGET

15,676,654€

2022 BUDGET FUNDING SOURCES



LAUNCHED PROJECTS

48 new projects (from competitive funding sources) have been launched in 2022 **with a total contribution of 7,119,308 €.**

From the new launched projects, we highlight **1 ERC project** and **2 EIC projects** (Pathfinder Open & Pathfinder Challenges) funded under Horizon Europe.

FUNDING SOURCES	TOTAL PROJECTS	TOTAL FUNDING (€)
European Research Council (ERC)	1	150,000
European Commission	2	750,153
Spanish Research State Agency (AEI)	13	2,066,923
Carlos III Health Institute (ISCIII)	2	95,480
Basque Government	20	3,362,578
Ikerbasque	1	-
Gipuzkoa Provincial Council (DFG)	7	494,174
La Caixa Foundation	1	100,000
KU Leuven	1	100,000
	48	7,119,308

 LIST OF FUNDED PROJECTS STARTING IN 2022


European Research Council
Established by the European Commission

PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Aitziber L. Cortajarena	ERC-2022-PoC Proof of Concept Grant	150,000.00	2022 - 2024	Nano-Imaging – Nano-Biological Contrast Agent Platform for MRI Imaging



PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Aitziber L. Cortajarena / Valery Pavlov	EIC Pathfinder OPEN 2021	349,647.00	2022 - 2026	iSenseDNA _Computation driven development of novel vivo-like-DNA-nanotransducers for protein structure identification
Sergio Moya	EIC Pathfinder CHALLENGES 2021	400,506.00	2022 - 2026	CROSSBRAIN _Distributed and federated cross-modality actuation through advanced nanomaterials and neuromorphic learning



PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Aitziber L. Cortajarena	Proyectos de prueba de concepto (PDC 2022)	138,000.00	2022 - 2024	ProIMAGE _Valorization of a novel platform for the development of non-toxic, targeted, protein-based MRI Contrast Agents
Aitziber L. Cortajarena	Proyectos Estratégicos Orientados a la Transición Ecológica y a la Transición Digital (TED 2021)	170,200.00	2022 - 2024	ProPEL _Conductive protein and peptide based materials for sustainable bioelectronics
Fernando López Gallego	Proyectos Estratégicos Orientados a la Transición Ecológica y a la Transición Digital (TED 2021)	175,932.75	2022-2024	CEBIOPUS _Chemo-enzymatic methods to fabricate and recycle circular by design polyurethane from biobased starting materials
Ander Abarrategi	Proyectos de Generación de Conocimiento (PID 2021)	175,450.00	2022-2025	CARTITOBONE _Physiological and pathological relevance of cartilage-to-bone transdifferentiation
Fernando López Gallego	Proyectos de Generación de Conocimiento (PID 2021)	163,350.00	2022-2025	BIOCOMPLASUP _Biocatalytic composites for upcycling monomers from plastic chemical depolymerization: creating synthetic microenvironments to spatially organize resting cells and isolated enzymes
Jesús Ruiz-Cabello	Proyectos de Generación de Conocimiento (PID 2021)	387,200.00	2022-2025	THERANOPH _New theranostic approaches in Pulmonary Hypertension: interventions in lifestyle
Valery Pavlov	Proyectos de Generación de Conocimiento (PID 2021)	181,500.00	2022-2025	SynthAntiClust _Development of new methods for synthetic modification of antibodies using atomic nanoclusters and their uses



PI (FELLOW)	CALL	AMOUNT (€)	PERIOD
Jordi Llop (Claudia Esposito)	Ayudas para contratos predoctorales para la formación de doctores 2021	100,860.00	2022-2026
Luis Liz Marzán (Kyle Van Gordon)	Ayudas para contratos predoctorales para la formación de doctores 2021	100,860.00	2022-2026
Niels Reichardt (Vicente Oliver)	Ayudas para contratos predoctorales para la formación de doctores 2021	100,860.00	2022-2026
Pedro Ramos (Iratí López de la Písa)	Ayudas para contratos predoctorales para la formación de doctores 2021	100,860.00	2022-2026
Maurizio Prato (Silvia Collavini)	Juan de la Cierva – Formación 2020	52,600.00	2022-2024
Susana Carregal Romero	Ayudas para contratos Ramón y Cajal (RYC 2020)	219,250.00	2022-2027



PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Jordi Llop / Jesús Ruiz Cabello	Proyectos de desarrollo tecnológico en salud 2021 (DTS) (AES 2021)	95,480.00	2022 - 2023	DTS21/00008 _Gases radio-perfluorados como marcadores de ventilación para tomografía por emisión de positrones
Pedro Ramos	Redes de Investigación Cooperativa Orientadas al Resultado en Salud (RICORS) 2021 (AES 2021)	-	2022-2024	RICORS-ICTUS _Enfermedades Cerebrovasculares



PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Maurizio Prato	IKERBILERAK 2022-1	9,317.00	2022	ChemONTubes 2022 _International Meeting on Chemistry of Carbon Materials
Niels Reichardt	IKERBILERAK 2022-2	3,382.00	2022	Glycobasque _5th Glycobasque Meeting
Fernando López Gallego / Niels Reichardt / Sergio Moya	Azpitek 2022	426,785.00	2022-2023	QTOF _Proyecto de adquisición de un espectrómetro de masas de alta resolución con analizadores de tipo movilidad iónica, cuadrupolo y tiempo de vuelo y equipado con un cromatógrafo de alta resolución
Aitziber L. Cotajarena / Luis Liz Marzán / Maurizio Prato	Azpitek 2022	451,568.00	2022-2023	XPS _Proyecto de adquisición de espectroscopía fotoelectrónica de rayos X de alta resolución
Pedro R. Cabrer	Elkartek 2021	773,389.00	2022-2023	bmG21-2 _Desarrollo de herramientas y protocolos efectivos para transporte y liberación de fármacos por diferentes rutas de administración



PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Niels Reichardt	Elkartek 2022	938,771.02	2022-2023	bmG22-1 _Terapias avanzadas basadas en Glicobiología para el tratamiento de cáncer y enfermedades infecciosas
Aitziber L. Cortajarena	Ayudas a proyectos de investigación y desarrollo en salud 2022	21,298.29	2022	NKTPH _Papel de las células NK humanas en el trasplante autólogo de precursores hematopoyéticos en el tratamiento del cáncer
Aitziber L. Cortajarena	Ayudas a proyectos de investigación y desarrollo en salud 2022	18,443.28	2022	Nueva estrategia terapéutica en glioblastoma a través del silenciamiento de la vía de TGF-β
Ander Abarategi	Ayudas a proyectos de investigación y desarrollo en salud 2022	10,446.27	2022	Fragilidad 3 _Validación de un patrón molecular para el diagnóstico y estratificación de la fragilidad
Jesús Ruiz-Cabello	Ayudas a proyectos de investigación y desarrollo en salud 2022	51,854.53	2022	FIBROTERA _Enfoque terapéutico integral para la fibrosis basado en nanobiología
Jesús Ruiz-Cabello	Ayudas a proyectos de investigación y desarrollo en salud 2022	-	2022	Metabolismo, salud y envejecimiento: el efecto de restricción de la nutrición con un análogo de glucosa
Jordi Llop	Ayudas a proyectos de investigación y desarrollo en salud 2022	10,653.09	2022	Identificación y caracterización funcional y clínica de nuevos genes implicados en la progresión y la quimiorresistencia del cáncer gástrico
Sergio Moya	Ayudas a proyectos de investigación y desarrollo en salud 2022	28,123.81	2022	CART _Aplicación de nano-compuestos como sistema de entrega no viral para el desarrollo de terapias CAR-T
Maurizio Prato	Estrategia IKUR 2022 (NEURO)	57,000.00	2022-2024	NANONEURO _Activadores y sensores de circuitos neuronales
CIC biomaGUNE	Programa Investigo (IKER 2022)	463,524.88	2022-2023	Incorporación de 2 plazas de investigadores postdoctorales y de 10 plazas de técnico
Aitziber L. Cortajarena (Gunnar Kloss)	BIKAINTEK 2022 - Ayudas para la incorporación de personal investigador	56,022.00	2022-2024	ChiroSense _Biosensor quiróptico ultrasensible basado en nuevos dímeros de nanopartículas
Dorleta Jiménez de Aberasturi / Malou Henriksen (Uxue Aizarna)	Ayudas nuevas y renovaciones para el Programa Predoctoral de formación de personal investigador no doctor curso 2021-2022	21,000.00	2022	Smart hybrid inorganic-organic multifunctional bioinks and their application in 3D printing of disease models
Dorleta Jiménez de Aberasturi / Malou Henriksen (Uxue Aizarna)	Ayudas nuevas y renovaciones para el Programa Predoctoral de formación de personal investigador no doctor curso 2021-2022	-	-	-
Fernando López Gallego (Daniel Andrés)	Ayudas nuevas y renovaciones para el Programa Predoctoral de formación de personal investigador no doctor curso 2021-2022	21,000.00	2022	Fabrication of heterogeneous biocatalysts for the reduction and amination of beta-ketoesters
Aitziber L. Cortajarena (Maite Larrarte)	Becas Ikasiker 2021-2022	-	2022	Montaje y puesta en marcha de una estación microfluídica de gotas para evolución dirigida de proteínas
Ivan Coluzza (Marina Pérez Diego)	Becas Ikasiker 2021-2022	-	2022	Diseño de coberturas inteligentes para el control de la corona proteica de nanopartícula

CALL	PI (FELLOW)	PERIOD
Ikerbasque Research Fellow 2022	Jesús Ruiz-Cabello (Susana Carregal)	2022-2027

PI (FELLOW)	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Aitziber L. Cortajarena (Aitor Manteca)	Programa Fellows Gipuzkoa de atracción y retención de talento 2022	40,000.00	2022 - 2023	FLUIDEVOPRO_Sistemas de cribado y selección microfluídica para evolución dirigida de proteínas
Jesús Ruiz-Cabello (Ermal Ismalaj)	Programa Fellows Gipuzkoa de atracción y retención de talento 2022	50,000.00	2022 - 2023	MIMA_Agentes de Imagen Molecular para el estudio de Enfermedades Cardiacas
Maurizio Prato	TXEKINTEK / EKINTZAILE 2022	65,000.00	2022 - 2023	RECONNECT_Therapeutic Rewiring of Spinal and Nerve Injuries using Carbon Nanotubes
Maurizio Prato	Valorización de Cartera Biotecnológica 2021	-	2022 - 2022	Implantes para regeneración de médula espinal
Dorleta Jiménez de Aberasturi	Programa de Red guipuzcoana de Ciencia, Tecnología e Innovación 2022 - I+D	100,000.00	2022 - 2023	PULMOMODEL_Diseño de Biotintas Inteligentes para su aplicación en Impresión 3D de Modelos Pulmonares personalizados
Jesús R. Cabello	Programa de Red guipuzcoana de Ciencia, Tecnología e Innovación 2022 - Inversión	97,216.00	2022 - 2023	UIM_BMG_Proyecto de Ampliación de la infraestructura de la Unidad de Imagen Molecular en CIC biomaGUNE
Pedro Ramos	Programa de Red guipuzcoana de Ciencia, Tecnología e Innovación 2022 - Gipuzkoa NEXT	141,958.00	2022 - 2023	MIELIMAGEN_Envejecimiento saludable y Neurodegeneración: desvelando el papel de la mielina en el declive cognitivo mediante neuroimagen

PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Jordi Llop	Caixa Research Validate 2022	100,000.00	2022 - 2024	PET_Lung ventilation markers for Positron Emission Tomography

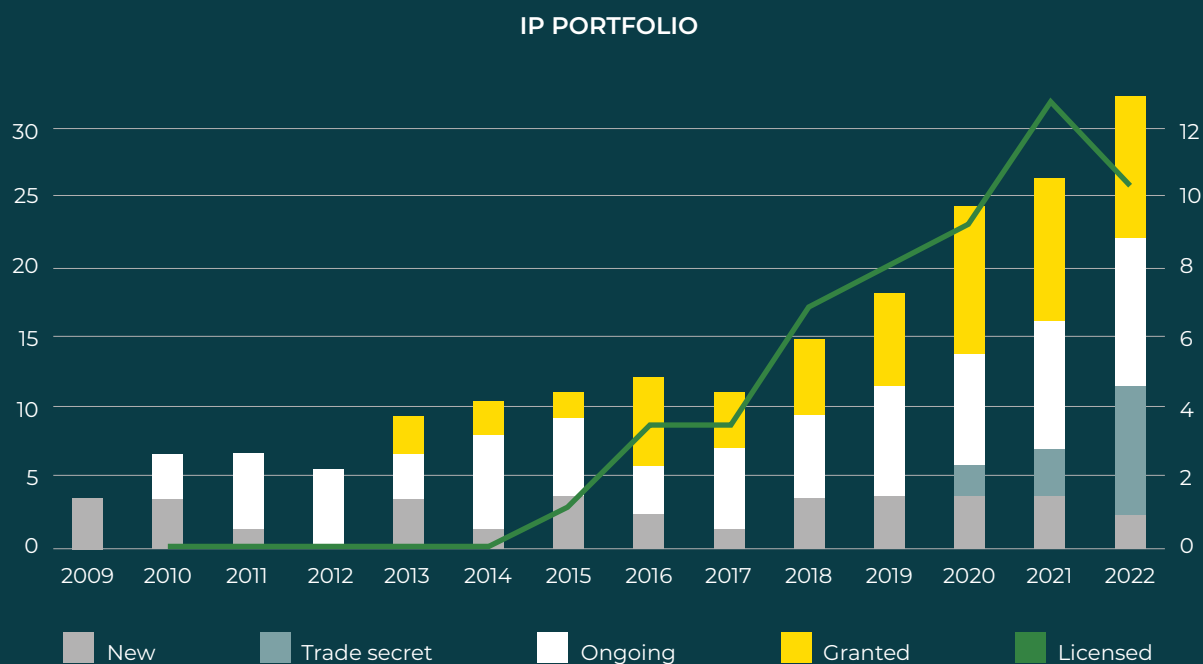
PI	CALL	AMOUNT (€)	PERIOD	FULL TITLE
Luis Liz Marzán	KU Leuven Internal Call 2021	100,000.00	2022 - 2026	OPTOMAT_Optical binding of nanoparticles outside the photon beam: creation of primeval optical matter

Knowledge & Technology Transfer

Effort devoted by our researchers with the support of the Technology Transfer Unit in 2021 resulted in **2 new patent families**, **7 trade secrets**, **1 granted patents** and **4 licenses for exploitation** of CIC biomaGUNE intellectual property rights. Moreover, a total of **32 Research Contracts, Services and Collaboration Agreements** were signed with companies or other RD&I institutions.

PATENTS

The generation of patents is one of the instruments that indicate the transfer of knowledge from CIC biomaGUNE to Society and to business development. The graph below shows the evolution over the years:





2022 PRIORITY PATENT APPLICATIONS

MULTIFUNCTIONAL HYBRID CELLULOSE NANOCRYSTALS-GOLD NANOPLATFORM AND USE THEREOF IN MEDICINE

S. Moya et al. IT 102022000011450

31/05/2022

SYSTEMS AND METHODS FOR SELECTIVE SHAPE TRANSFORMATION OF 3D-PRINTED MATERIALS

Luis Liz-Marzán, Dorleta Jimenez de Aberasturi et al. US63/395,645

05/08/2022

2022 GRANTED PATENTS

METAL NANOCCLUSERS SCAFFOLDS

Aitziber López-Cortajarena and Antonio Aires. US11377475

05/07/2022

AGREEMENTS, SERVICES & RESEARCH CONTRACTS

CIC biomaGUNE develops joint research activities in collaboration with different types of organizations and companies, including spin-offs, SMEs, large companies and research organizations. This research activity has a sharp focus on innovation, to which CIC biomaGUNE contributes with scientific knowledge. Joint projects under development include privately funded research activities as well as research contracts and consultancy services.

During 2022, besides several technical services provided by our Technological Plataforms, the following agreements and services **with public and private partners were signed.**

16
Collaboration
Agreements

10
Service
Contracts

6
Research
Contracts

SPIN-OFFS & COMPANIES

Asparia
Glycomics In 2016, CIC biomaGUNE researchers and private investors joined efforts to set up **Asparia Glycomics**, a spin-off company specialized in the production and marketing of reagents, reference standards, kits and software, intended for glycan analysis in clinical diagnosis and for quality control of biopharmaceuticals.

The business initiative markets the leading technology developed by CIC biomaGUNE's Glycotechnology Laboratory, directed by Niels C. Reichardt, to quantify and identify glycans more accurately and faster than existing solutions on the market. Asparia Glycomics offers unique, stable, isotope labeled glycans as internal standards, custom made quantification software and reagents for glycan analysis by mass spectrometry.

Asparia Glycomics' line of work is based on the development of its own technology that can be useful for the diagnosis and prognosis of cancer, diabetes or autoimmune diseases such as rheumatoid arthritis, among others.

The products and technology developed by the Glycotechnology Laboratory, reviewed and validated by the CIC biomaGUNE Development Unit are aimed at researchers, academia and pharmaceutical companies around the world.

Since 2020 and after a change of management, the company has been able to break even and has established a position as a reliable provider of cutting-edge glycan analysis and synthesis projects for leading biotech companies and academic researchers worldwide.

HYLE
ZITEK Incorporated in September 2022, HYLEZITEK is a company 100% owned by CIC biomaGUNE specialized in the provision of services related to research, innovation and development in

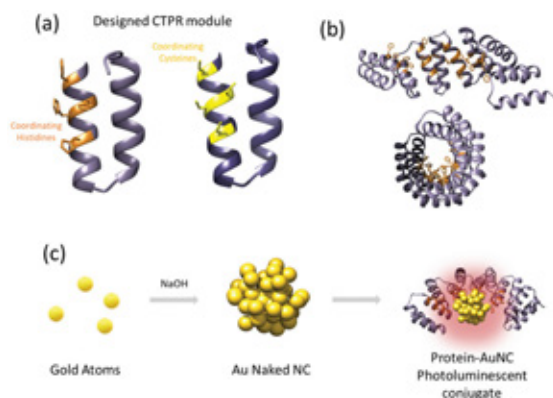
biomaterials including the development of longitudinal and multimodal studies in the preclinical field, as well as the development applications in the areas of Preclinical Molecular and Functional Imaging and Nanomedicine.

Scientific Output

In 2022, **120 research articles** have been published in international scientific journals with an **average impact factor** of **10**. CIC biomaGUNE scientific production has received **10,240 citations** in 2022.



HIGHLIGHTS



TUNING THE OPTICAL PROPERTIES OF AU NANOCCLUSERS

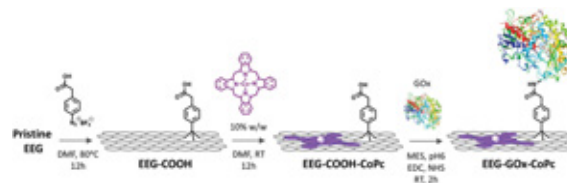
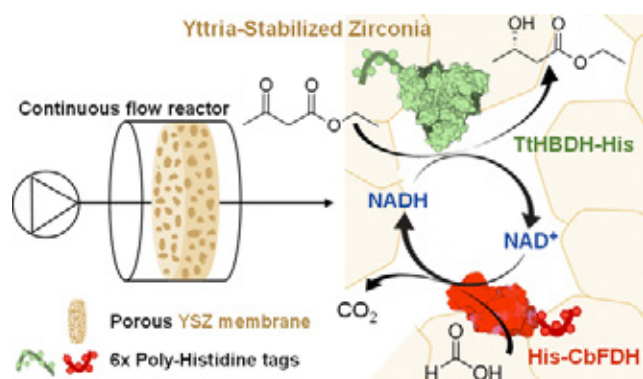
Lopez-Martinez, E; Gianolio, D; Garcia-Orrit, S; Vega-Mayoral, V; Cabanillas-Gonzalez, J; Sanchez-Cano, C; Cortajarena, AL.

Adv. Opt. Mater. **2022**, *10*, 2101332

DOI: 10.1002/adom.202101332

Gold nanoclusters (AuNCs) are nanomaterials with interesting photoluminescent properties that can be endowed with biomolecular recognition and biocompatibility when stabilized with proteins. The interplay between the optical features of AuNCs and the function added by the protein makes them perfect candidates for generating hybrid protein-inorganic nanomaterials. Focusing on protein stabilized-AuNCs, hitherto most of the work has covered the use of natural proteins for in situ growth of AuNCs. However, the exploitation of design proteins for such endeavors enables fine-tuning of the photoluminescent assets of AuNCs. In this work, rational protein engineering of modular protein scaffolds is applied for capping of non-emissive, non-passivated naked AuNCs, resulting in a fast and easy method for the synthesis of customizable and emissive protein-AuNC nanomaterials. Tuning of the photoluminescent properties of the final hybrid module is obtained by appropriate choice of the coordination residues grafted on the same protein scaffold.

The effects of ligands and coordination bonds are studied using time-resolved photoluminescence and X-ray absorbance spectroscopies, shedding light on the mechanisms behind the emerging properties of these hybrid materials. Moreover, the described versatile strategy opens new avenues for the synthesis of on-demand photoluminescent hybrids for a wide spectrum of optical applications.



SELECTIVE COIMMOBILIZATION OF HIS-TAGGED ENZYMES ON YTTRIUM-STABILIZED ZIRCONIA-BASED MEMBRANES FOR CONTINUOUS ASYMMETRIC BIOREDUCTIONS

Andrés-Sanz, D; Diamanti, E; Di Silvo, D; Gorauskis, J; López-Gallego, F.

ACS Appl. Mater. Interfaces **2022**, *14*, 4285–4296

DOI: 10.1021/acsami.1c20738

Scalability, process control, and modularity are some of the advantages that make flow biocatalysis a key-enabling technology for green and sustainable chemistry. In this context, rigid porous solid membranes hold the promise to expand the toolbox of flow biocatalysis due to their chemical stability and inertness. Yttrium-stabilized zirconia (YSZ) fulfills these properties; however, it has been scarcely exploited as a carrier for enzymes. Here, we discovered an unprecedented interaction between YSZ materials and His-tagged enzymes that enables the fabrication of multifunctional biocatalytic membranes for bioredox cascades. X-ray photoelectron spectroscopy suggests that enzyme immobilization is driven by coordination interactions between the imidazole groups of His-tags and both Zr and Y atoms. As model enzymes, we coimmobilized in-flow a thermophilic hydroxybutyryl-CoA dehydrogenase (TtHBDH-His) and a formate dehydrogenase (His-CbFDH) for the continuous asymmetric reduction of ethyl acetoacetate with insitu redox cofactor recycling. Fluorescence confocal microscopy deciphered the spatial organization of the two coimmobilized enzymes, pointing out the importance of the coimmobilization sequence. Finally, the coimmobilized system succeeded insitu, recycling the redox cofactor, maintaining the specific productivity using only 0.05 mM NADH, and accumulating a total enzyme turnover number of 4000 in 24 h. This work presents YSZ materials as ready-to-use carriers for the site-directed enzyme in-flow immobilization and the application of the resulting heterogeneous biocatalysts for continuous biomanufacturing.

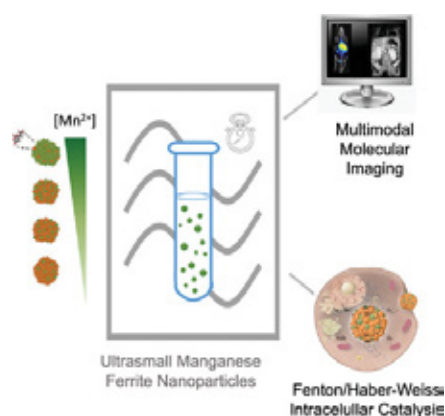
BIORESPONSIVE, ELECTROACTIVE, AND INKJET-PRINTABLE GRAPHENE-BASED INKS

Silvestri, A; Criado, A; Poletti, F; Wang, F; Fanjul-Bolado, P; González-García, MB; García-Astrain, C; Liz-Marzán, LM; Feng, X; Zanardi, C; Prato, M

Adv. Funct. Mater. **2022**, *32*, 2105028.

DOI: 10.1002/adfm.202105028

With the advent of flexible electronics, the old fashioned and conventional solid-state technology will be replaced by conductive inks combined with low-cost printing techniques. Graphene is an ideal candidate to produce conductive inks, due to its excellent conductivity and zero bandgap. The possibility to chemically modify graphene with active molecules opens up the field of responsive conductive inks. Herein, a bioresponsive, electroactive, and inkjet-printable graphene ink is presented. The ink is based on graphene chemically modified with selected enzymes and an electrochemical mediator, to transduce the products of the enzymatic reaction into an electron flow, proportional to the analyte concentration. A water-based formulation is engineered to be respectful with the enzymatic activity while matching the stringent requirements of inkjet printing. The efficient electrochemical performance of the ink, as well as a proof-of-concept application in biosensing, is demonstrated. The versatility of the system is demonstrated by modifying graphene with various oxidoreductases, obtaining inks with selectivity toward glucose, lactate, methanol, and ethanol.



ULTRASMALL MANGANESE FERRITES FOR *IN VIVO* CATALASE MIMICKING ACTIVITY AND MULTIMODAL BIOIMAGING

Carregal-Romero, S; Miguel-Coello, AB; Martínez-Parra, L; Martí-Mateo, Y; Hernansanz-Agustín, P; Fernández-Afonso, Y; Plaza-García, S; Gutiérrez, L; Muñoz-Hernández, MdM; Carrillo-Romero, J; Piñol-Cancer, M; Lecante, P; Blasco-Iturri, Z; Fadón, L; Almansa-García, AC; Möller, M; Otaegui, D; Enríquez, JA; Groult, H; Ruíz-Cabello, J.

Small **2022**, *18*, 2106570

DOI: 10.1002/smll.202106570

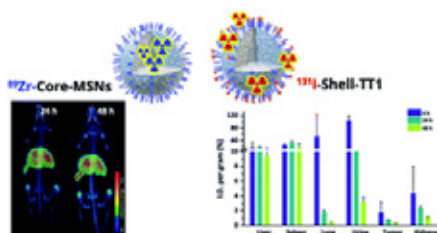
Manganese ferrite nanoparticles display interesting features in bioimaging and catalytic therapies. They have been recently used in theranostics as contrast agents in magnetic resonance imaging (MRI), and as catalase-mimicking nanozymes for hypoxia alleviation. These promising applications encourage the development of novel synthetic procedures to enhance the bioimaging and catalytic properties of these nanomaterials simultaneously. Herein, a cost-efficient synthetic microwave method is developed to manufacture ultrasmall manganese ferrite nanoparticles as advanced multimodal contrast agents in MRI and positron emission tomography (PET), and improved nanozymes. Such a synthetic method allows doping ferrites with Mn in a wide stoichiometric range ($Mn_xFe_{3-x}O_4$, $0.1 \leq x \leq 2.4$), affording a library of nanoparticles with different magnetic relaxivities and catalytic properties. These tuned magnetic properties give rise to either positive or dual-mode MRI contrast agents. On the other hand, higher levels of Mn doping enhance the catalytic efficiency of the resulting nanozymes. Finally, through their intracellular catalase-mimicking activity, these ultrasmall manganese ferrite nanoparticles induce an unprecedented tumor growth inhibition in a breast cancer murine model. All of these results show the robust characteristics of these nanoparticles for nanobiotechnological applications.

CORE VS. SURFACE LABELLING OF MESOPOROUS SILICA NANOPARTICLES: ADVANCING THE UNDERSTANDING OF NANOPARTICLE FATE AND DESIGN OF LABELLING STRATEGIES

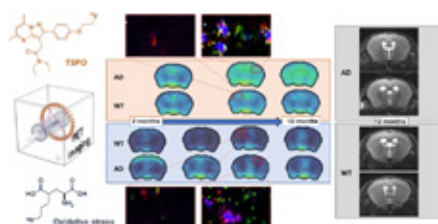
Ramírez, MdIA.; Martínez-Villacorta, Á.M; Gómez-Vallejo, V; Andreozzi, P; Soler-Illia, G; Llop, J; Moya, SE.

Nanoscale Adv., **2022**, *4*, 2098-2106.

DOI: 10.1039/D1NA00719J



Despite great interest in the use of silica mesoporous nanoparticles (MSNs) in drug delivery little is known on their biological fate. Positron emission tomography (PET) studies of radiolabelled MSNs face a major difficulty due to the degradation of the MSNs during circulation as it is difficult to assign activity values to either the MSNs or their degradation products. Here, a PET study is conducted using two strategies of labelling. MSNs are either radiolabelled in the core by complexation with silanols from the MSNs with ^{89}Zr , or on the MSN coating through attachment of ^{131}I radiolabelled Lin-TT1 (AKRGARSTA), a homing peptide for targeting cancer tissue. Results from the biodistribution of MSNs with the two labels are compared, obtaining meaningful information on the fate of MSNs. While MSNs accumulate in liver and spleen, MSN degradation products ^{89}Zr or silicate bearing the radioisotope, are found in the bones and probably in lungs. A partial detachment of the peptide from the surface of the MSN is also observed. This work highlights the importance of choosing an appropriate labelling strategy for nanoparticles since core or surface labelling may result in different particle biodistribution if the labelled component degrades or the label detaches.



LONGITUDINAL EVALUATION OF NEUROINFLAMMATION AND OXIDATIVE STRESS IN A MOUSE MODEL OF ALZHEIMER DISEASE USING POSITRON EMISSION TOMOGRAPHY

Rejc, L; Gómez-Vallejo, V; Joya, A; Arsequell, G; Egimendia, A; Castellnou, P; Ríos-Anglada, X; Cossío, U; Baz, Z; Iglesias, L; Capetillo-Zarate, E; Ramos-Cabrer, P; Martin, A; Llop, J.

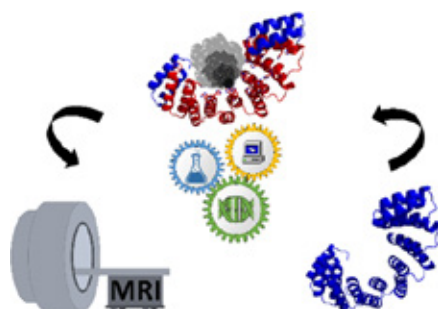
Alzheimer's Research & Therapy **2022**, *14*, 80

DOI:10.1186/s13195-022-01016-5

Validation of new biomarkers of Alzheimer disease (AD) is crucial for the successful development and implementation of treatment strategies. Additional to traditional AT(N) biomarkers, neuroinflammation biomarkers, such as translocator protein (TSPO) and cystine/glutamine antiporter system (Xc⁻), could be considered when assessing AD progression. Herein, we report the longitudinal investigation of [18F]DPA-714 and [18F]FSPG for their ability to detect TSPO and Xc⁻ biomarkers, respectively, in the 5xFAD mouse model for AD.

PET studies showed a significant increase in the uptake of [18F]DPA-714 and [18F]FSPG in the cortex, hippocampus, and thalamus in 5xFAD but not in WT mice over time. The results correlate with A β plaque deposition. Ex vivo staining confirmed higher TSPO overexpression in both, microglia/macrophages and astrocytes, and overexpression of xc⁻ in non-glial cells of 5xFAD mice. Additionally, the results show that A β plaques were surrounded by microglia/macrophages overexpressing TSPO. MRI studies showed significant tissue shrinkage and microstructural alterations in 5xFAD mice compared to controls.

TSPO and xc⁻ overexpression can be assessed by [18F]DPA-714 and [18F]FSPG, respectively, and correlate with the level of A β plaque deposition obtained with a PET amyloid tracer. These results position the two tracers as promising imaging tools for the evaluation of disease progression.



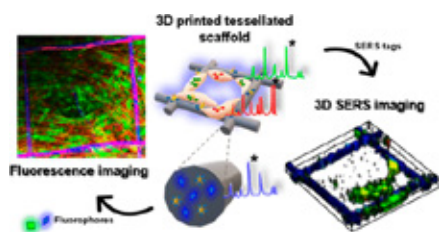
ENGINEERED PROTEIN-DRIVEN SYNTHESIS OF TUNABLE IRON OXIDE NANOPARTICLES AS T1 AND T2 MAGNETIC RESONANCE IMAGING CONTRAST AGENTS

Aires, A; Fernández-Afonso, Y; Guedes, G; Guisasaola, E; Gutiérrez, L; Cortajarena, AL.

Chem. Mater., **2022**, *34*, 10832–10841.

DOI: 10.1021/acs.chemmater.2c01746

Iron oxide nanoparticles (IONPs) have become one of the most promising nanomaterials for biomedical applications because of their biocompatibility and physicochemical properties. This study demonstrates the use of protein engineering as a novel approach to design scaffolds for the tunable synthesis of ultrasmall IONPs. Rationally designed proteins, containing different number of metal-coordination sites, were evaluated to control the size and the physicochemical and magnetic properties of a set of protein-stabilized IONPs (Prot-IONPs). Prot-IONPs, synthesized through an optimized coprecipitation approach, presented good T1 and T2 relaxivity values, stability, and biocompatibility, showing potential for magnetic resonance imaging (MRI) applications.



SERS AND FLUORESCENCE-ACTIVE MULTIMODAL TESSELLATED SCAFFOLDS FOR THREE-DIMENSIONAL BIOIMAGING

Lenzi, E; Jimenez de Aberasturi, D; Henriksen-Lacey, M; Piñeiro, P; Muniz, AJ; Lahann, J; Liz-Marzán, LM.

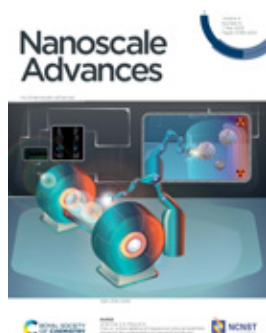
ACS Appl. Mater. Interfaces **2022**, *14*, 18, 20708–20719

DOI: 10.1021/acscami.2c02615

With the ever-increasing use of 3D cell models toward studying bio-nano interactions and offering alternatives to traditional 2D *in vitro* and *in vivo* experiments, methods to image biological tissue in real time and with high spatial resolution have become a must. A suitable technique therefore is surface-enhanced Raman scattering

(SERS)-based microscopy, which additionally features reduced photocytotoxicity and improved light penetration. However, optimization of imaging and postprocessing parameters is still required. Herein we present a method to monitor cell proliferation over time in 3D, using multifunctional 3D-printed scaffolds composed of biologically inert poly(lactic-co-glycolic acid) (PLGA) as the base material, in which fluorescent labels and SERS-active gold nanoparticles (AuNPs) can be embedded. The combination of imaging techniques allows optimization of SERS imaging parameters for cell monitoring. The scaffolds provide anchoring points for cell adhesion, so that cell growth can be observed in a suspended 3D matrix, with multiple reference points for confocal fluorescence and SERS imaging. By prelabeling cells with SERS-encoded AuNPs and fluorophores, cell proliferation and migration can be simultaneously monitored through confocal Raman and fluorescence microscopy. These scaffolds provide a simple method to follow cell dynamics in 4D, with minimal disturbance to the tissue model.

COVER PAGES



Core vs. surface labelling of mesoporous silica nanoparticles: advancing the understanding of nanoparticle fate and design of labelling strategies.

Ramírez, MdA.; Martínez-Villacorta, Á.M; Gómez-Vallejo, V; Andreozzi, P; Soler-Illia, G; Llop, J; Moya, SE.

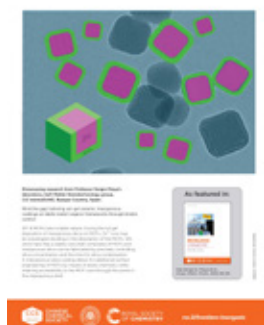
Nanoscale Adv. **2022**, *4*, 2098-2106



Template-assisted self-assembly of achiral plasmonic nanoparticles into chiral structures.

Vila-Liarte, D; Kotov, NA; Liz-Marzán, LM.

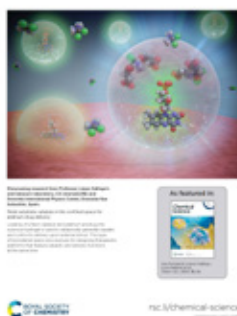
Chem. Sci. **2022**, *13*, 595-610



Mind the gap! tailoring sol-gel ceramic mesoporous coatings on labile metal-organic frameworks through kinetic control.

Bindini, E; Ludtke, T; Otaegui, D; Moller, M; Haddad, R; Boissiere, C; Moya, SE.

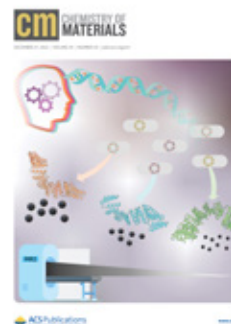
Inorg. Chem. Front., **2022**, 9, 221-230



Metal substrate catalysis in the confined space for platinum drug delivery.

Velasco-Lozano, S; Castro, SA; Sanchez-Cano, C; Benítez-Mateos, AI; López-Gallego, F; Salassa, L.

Chem. Sci. **2022**, 13, 59-67

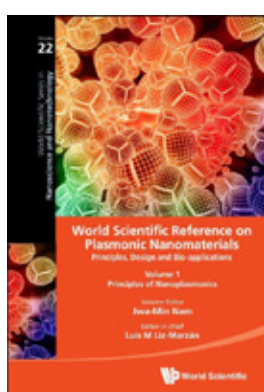


Engineered Protein-Driven Synthesis of Tunable Iron Oxide Nanoparticles as T1 and T2 Magnetic Resonance Imaging Contrast Agents.

Aires, A; Fernández-Afonso, Y; Guedes, G; Guisasola, E; Gutiérrez, L; Cortajarena, AL.

Chem. Mater. **2022**, 34, 10832-10841

EDITED BOOKS & BOOK CHAPTERS



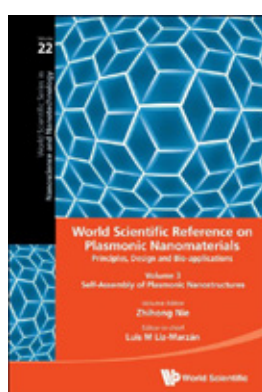
World Scientific Reference on Plasmonic Nanomaterial.

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ISBN: 978-981-123-513-9

Liz-Marzán, LM



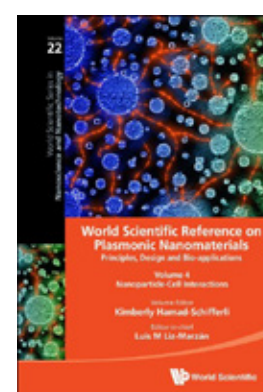
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World Scientific, 2022.

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Liz-Marzán, LM



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World Scientific, 2022.

ISBN: 978-981-123-513-9

Liz-Marzán, LM



World Scientific Reference on Plasmonic Nanomaterial.

Liz-Marzán, LM

CHAPTER 8

Synthesis and Functionalization of Anisotropic Silver Nanoparticles.

Zhuo, X; Kumar, V; Chow, TH; Wang, J; Liz-Marzán, LM.

World Scientific Reference on Plasmonic Nanomaterials.

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Plasmonic Nanoparticles: Synthesis and (Bio) functionalization, World Scientific, 2022, pp. 349–396

ISBN: 978-981-123-513-9



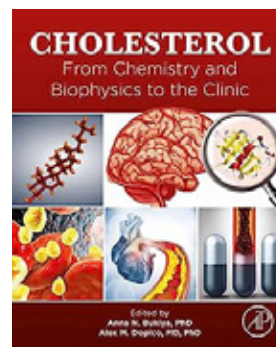
World Scientific Reference on Plasmonic Nanomaterial.

VOLUME 5

Plasmonics in Diagnostics and Therapy, World Scientific, 2022.

ISBN: 978-981-123-513-9

Liz-Marzán, LM.



CHAPTER 20

Familial hypercholesterolemia

Jebari-Benslaiman, S; Galicia-García, U; Larrea-Sebal, A; Uribe, KB; Martín, C; Benito-Vicente, A. Cholesterol: From Chemistry and Biophysics to the Clinic,

Academic Press, 2022, pp. 501-524

ISBN: 978-0-323-85857-1

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- ▲ Berastegui, N; Ainciburu, M; Romero, JP; Garcia-Olloqui, P; Alfonso-Pierola, A; Philippe, C; Vilas-Zornoza, A; San Martin-Uriz, P; Ruiz-Hernández, R; Abarrategi, A; Ordoñez, R; Alignani, D; Sarvide, S; Castro-Labrador, L; Lamo-Espinosa, JM; San-Julian, M; Jimenez, T; López-Cadenas, F; Muntion, S; Sanchez-Guijo, F; Molero, A; Montoro, MJ; Tazón, B; Serrano, G; Diaz-Mazkarian, A; Hernaez, M; Huerga, S; Bewicke-Copley, F; Rio-Machin, A; Maurano, MT; Díez-Campelo, M; Valcarcel, D; Rouault-Pierre, K; Lara-Astiaso, D; Ezponda, T; Prosper, F. **The transcription factor DDIT3 is a potential driver of dyserythropoiesis in myelodysplastic syndromes.** *Nat. Commun.* **2022**, *13*,7619
- ▲ Chortarea, S; Kuru, OC; Netkueakul, W; Pelin, M; Keshavan, S; Song, Z; Ma, B; Gómes, J; Abalos, EV; Luna, LAVd; Loret, T; Fordham, A; Drummond, M; Kontis, N; Anagnostopoulos, G; Paterakis, G; Cataldi, P; Tubaro, A; Galiotis, C; Kinloch, I; Fadeel, B; Bussy, C; Kostarelos, K; Buerki-Thurnherr, T; Prato, M; Bianco, A; Wick, P. **Hazard assessment of abraded thermoplastic composites reinforced with reduced graphene oxide.** *J. Hazard. Mater.* **2022**, *435*,129053
- ▲ Aires, A; Fernández-Afonso, Y; Guedes, G; Guisasola, E; Gutiérrez, L; Cortajarena, AL. **Engineered Protein-Driven Synthesis of Tunable Iron Oxide Nanoparticles as T1 and T2 Magnetic Resonance Imaging Contrast Agents.** *Chem. Mater.* **2022**, *34*,10832-10841
- ▲ Navarro-Palomares, E; García-Hevia, L; Galán-Vidal, J; Gandarillas, A; García-Reija, F; Sánchez-Iglesias, A; Liz-Marzán, LM; Valiente, R; Fanarraga, ML. **Shiga Toxin-B Targeted Gold Nanorods for Local Photothermal Treatment in Oral Cancer Clinical Samples.** *Int. J. Nanomed.* **2022**, *17*,5747-5760
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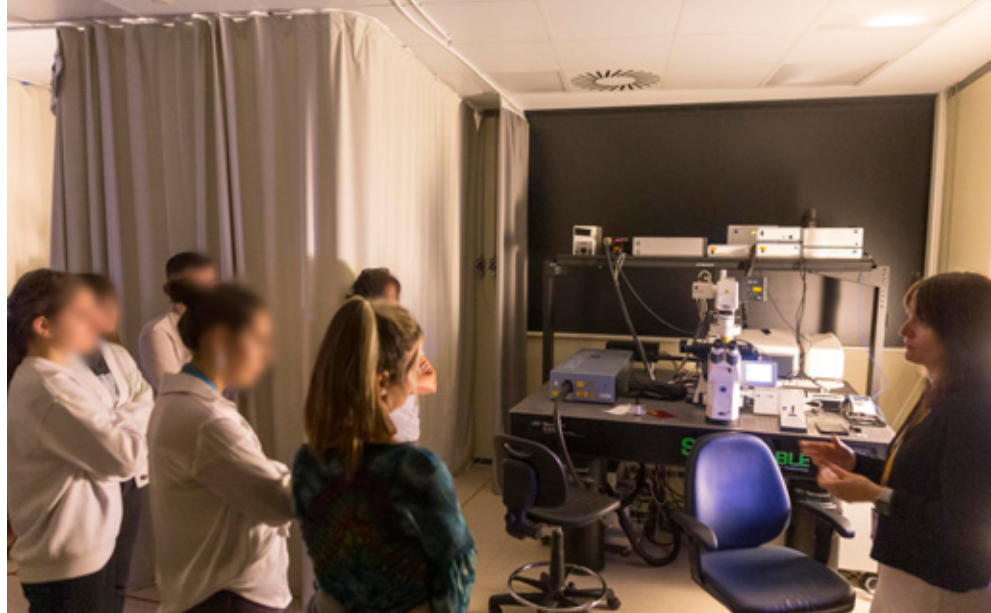
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Training & **Career Development**

In 2022 there have been **82 active PhD tesis**, **11** of them defended during the year. Our researchers performed **38 secondments** at collaborating institutions, and we hosted **111 stays** of visiting **researchers**. CIC biomaGUNE has organized **48 seminars**, **3 workshops/conferences** and our researchers have participated as co-organizers of **13 international conferences**.



STUDENTS BENEFIT FROM INTERNATIONAL TRAINING AND ARE EXPOSED TO DIFFERENT RESEARCH AREA.



POSTDOCTORAL PROGRAM

Postdoctoral researchers are hired at CIC biomaGUNE for periods of 1-5 years. During this time, postdoctoral researchers broaden and deepen their research skills and boost their career perspectives so they can become independent

research scientists. Researchers gain training-through-research, by means of individual personalized projects under the guidance of a group leader and receive hands-on-training for developing scientific skills and transferrable skills.

PhD PROGRAM

The objective of CIC biomaGUNE's PhD Program is to provide PhD students with top quality multidisciplinary training at the interface between biology, chemistry, nanobiotechnology and materials science. The students benefit from international training and are exposed to different research areas. The training program offers weekly lectures by leading scientists, technical training courses on a broad range of scientific techniques and instrumentation, opportunities for short stays at renowned international research institutions, as well as complementary training in soft skills to prepare doctoral candidates to become highly qualified, autonomous and skilled professionals. The joint training of PhD candidates fosters closer ties and cooperation between research groups and researchers of the institutions involved.

In partnership with the University of the Basque Country (UPV/EHU), CIC biomaGUNE participates in the following Doctoral programs:

SYNTHETIC & INDUSTRIAL CHEMISTRY

MOLECULAR BIOLOGY & BIOMEDICINE

APPLIED CHEMISTRY & POLYMERIC MATERIALS


MEDICINE & SURGERY BIOMEDICAL RESEARCH

CO-SUPERVISED PhD SCHEME

Since 2016, CIC biomaGUNE is running a program of co-supervised (and co-funded) PhD theses, in collaboration with other research institutions, technology centers and enterprises in the Basque Country. In 2022, 30 PhD theses were co-directed with the following institutions:


 **UPV - EHU**

 **CIC bioGUNE**

 **POLYMAT**
Basque Center
for Macromolecular
Design & Engineering

 **BIOFISIKA**
Basque Center
for Biophysics

 **IIS BIOCRUCES**

 **ACHUCARRO**
Basque Center
for Neuroscience

 **IIS BIODONOSTIA**

 **CIC nanoGUNE**

 **TECNALIA**

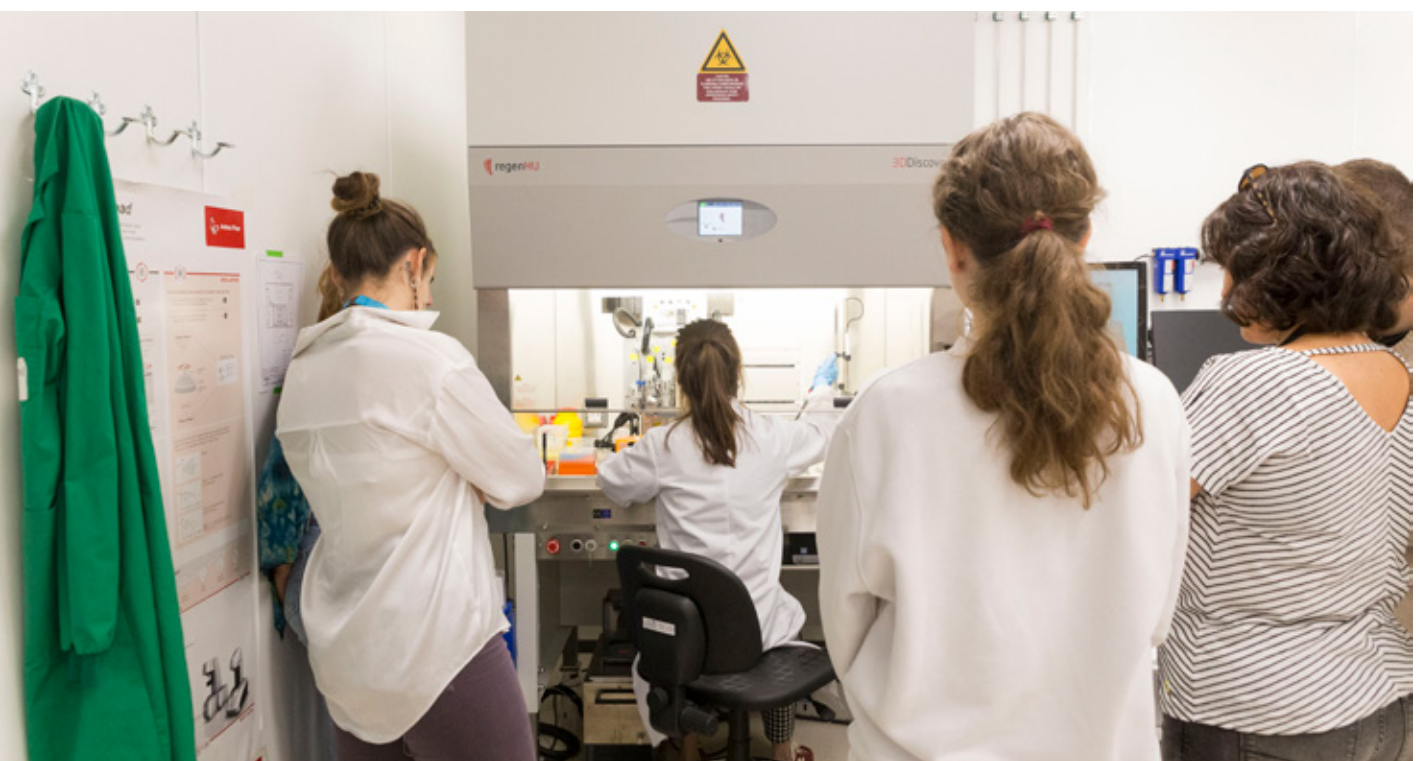
 **DIPC**
Donostia International
Physics Center

 **GAIKER**

 **CIDETEC**

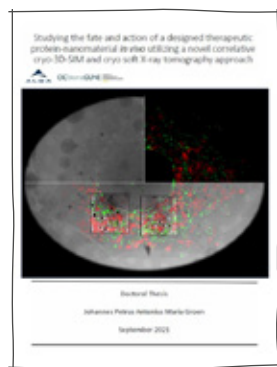
INDUSTRIAL PhD SCHEME

CIC biomaGUNE has agreements with industrial partners to conduct industrially oriented PhD research projects.



COMPLETED PhD THESES

During 2022, **11 students** obtained their **PhD** at CIC biomaGUNE.

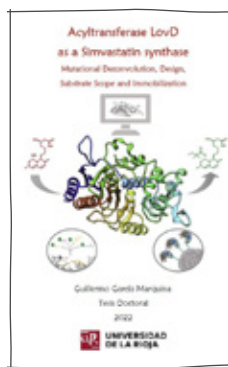


JOHANNES GROEN

Studying the fate and action of a designed therapeutic protein-nanomaterial *in vivo* utilizing a novel correlative cryo-3D-SIM and cryo soft X-ray tomography approach.

Supervisors: Dr. Eva Pereiro (ALBA-CELLS) & Prof. Aitziber L. Cortajarena (CIC biomaGUNE)

Defense Date: 14/01/2022

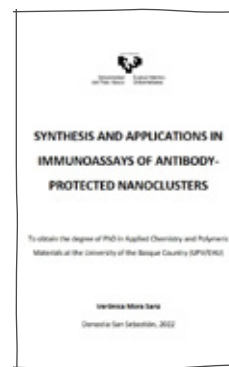


GUILLERMO GARCÍA MARQUINA

Acyltransferase LovD as a Simvastatin synthase: Mutational Deconvolution, Design, Substrate Scope and Immobilization.

Supervisors: Dr. Fernando López Gallego (CIC biomaGUNE) & Dr. Gonzalo Jiménez Osés (CIC bioGUNE)

Defense Date: 04/03/2022

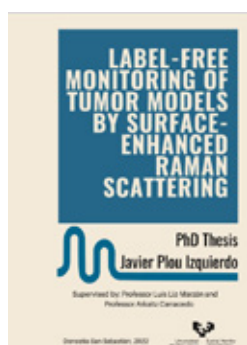


VERÓNICA MORA SANZ

Synthesis and applications in Immunoassays of antibody-protected nanoclusters.

Supervisors: Dr. Valery Pavlov (CIC biomaGUNE) & Dr. Nerea Briz (TECNALIA)

Defense Date: 18/03/2022



JAVIER PLOU IZQUIERDO

Label-Free Monitoring of Tumor Models by Surface-Enhanced Raman Scattering.

Supervisors: Prof. Luis Liz-Marzán (CIC biomaGUNE) & Dr. Arkaitz Carracedo (CIC bioGUNE)

Defense Date: 13/05/2022



ELISA LENZI

Surface-Enhanced Raman Scattering (SERS) Bioimaging of Complex 3D Cellular System.

Supervisors: Prof. Luis Liz-Marzán (CIC biomaGUNE) & Dr. Dorleta Jiménez de Aberasturi (CIC biomaGUNE)

Defense Date: 17/06/2022



ELENA LÓPEZ MARTÍNEZ

Supramolecular protein assemblies for organization of functional components and molecules at the nanoscale.

Supervisors: Prof. Aitziber L. Cortajarena (CIC biomaGUNE)

Defense Date: 17/06/2022



▲ ANGEL MANUEL MARTÍNEZ

Translocation and biological fate of engineered nanomaterials with biomedical applications and for nanosafety evaluation.

Supervisors: Dr. Jordi Llop (CIC biomaGUNE) & Dr. Sergio Moya (CIC biomaGUNE)

Defense Date: 17/06/2022

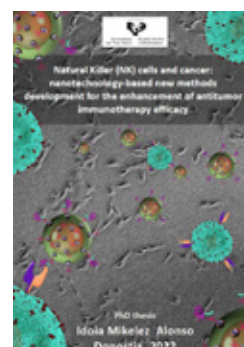


▲ PILAR CASTELLNOU ARENAS

Synthesis of positron emitter-labelled amino acids: Application to the investigation of metabolic preferences and vulnerabilities in a mouse prostate cancer model.

Supervisors: Dr. Jordi Llop (CIC biomaGUNE) & Dr. Arkaitz Carracedo (CIC bioGUNE)

Defense Date: 14/07/2022



▲ IDOIA MIKELEZ ALONSO

Natural killer (NK) cells and cancer: nanotechnology-based new methods development for the enhancement of antitumor immunotherapy efficacy.

Supervisors: Prof. Aitziber L. Cortajarena (CIC biomaGUNE) & Prof. Francisco Borrego (IIS BIODONOSTIA)

Defense Date: 06/10/2022



▲ ELENA SANZ DE DIEGO

Assessing the parameters modulating transducing capacity of magnetic nanoparticles based on ac magnetometry for bio sensing.

Supervisors: Prof. Aitziber L. Cortajarena (CIC biomaGUNE) & Dr. Francisco J. Terán (IMDEA NANOCIENCIA)

Defense Date: 13/10/2022



▲ CRISTINA SIMÓ COSTA

Radiolabelling, monitoring and preclinical evaluation of urease-powered nanomotors as potential theranostic agent for bladder cancer.

Supervisors: Dr. Jordi Llop (CIC biomaGUNE) & Dr. Sergio Moya (CIC biomaGUNE)

Defense Date: 18/11/2022

TRAINING INITIATIVES FOR UNDERGRADUATE STUDENTS

MASTER'S FELLOWSHIP PROGRAM

CIC biomaGUNE has agreements with several universities (which are the degree-grating bodies) in different Master's programs.

Additionally, in partnership with the **University of the Basque Country (UPV/EHU)**, CIC biomaGUNE researchers participate in the following MSc courses by providing lectures and direction of master thesis:

- **Molecular Biology & Biomedicine**
- **Nanoscience**
- **Chemistry & Polymers**

The **Master's Fellowship Program** was launched in 2019 with the support of the Maria de Maeztu grant. The program aims at offering scholarships to highly qualified master students to carry out their Master's Project. Since then 5 fellowships have been granted.

SUMMER RESEARCH PROGRAM

During the summer period, undergraduate students with a background in Chemistry, Biology and Materials Science are hosted at CIC biomaGUNE's laboratories. The undergraduates work alongside pre- and post-doctoral researchers and receive high level training while working on a research project, but also by attending weekly group meetings and seminars. At the end of the traineeship, the students are required to prepare a short report and a presentation summarizing their research and results.

The **Summer Research Program** was launched in 2019 with the support of the Maria de Maeztu grant. The program aims at offering scholarships to highly qualified students in their second and third years of study, to carry out research stays at CIC biomaGUNE during summer. Since 2019, 15 fellowships have been granted. Unfortunately, due to the coronavirus outbreak, it was not possible to host any summer fellows in 2020.

VOCATIONAL TRAINING PROGRAM

CIC biomaGUNE has agreements with **CPES, CESA, BHIP, Don Bosco, CEBANC** and **Colegio Inmakulada Ikastetxea**, Centers for Intermediate and Superior level vocational training in the fields of Chemistry or Biosciences to host training internships of students.

Several training placements take place every year at different laboratories of the Center.

Selected undergraduates are mentored and supervised by postdoctoral researchers or PhD students and receive hands-on training.



RESEARCH SECONDMENTS

In the framework of different national and international projects, CIC biomaGUNE has established collaborations with international institutions to **second** and **host research stays of**

PhD students and postdoctoral researchers. During 2022, our researchers performed 38 secondments at collaborating partners and we hosted **111 stays** of visiting researchers.

FUNDING SOURCES	2017	2018	2019	2020	2021	2022
Research stays from CIC biomaGUNE	19	11	23	16	12	38
Research stays to CIC biomaGUNE	92	84	110	86*	97	111
· Experienced						
· Researchers Visiting	1	2	12	10	7	21
· Professors						
· Erasmus placements	7	2	8	1	6	4
· Summer placements	6	6	15	-	17	7
· Vocational Training	5	3	5	8	6	6

* Many of the visits in 2020 were interrupted due to the pandemic situation.



SEMINARS & INTERNAL TRAINING

CIC biomaGUNE runs an annual program of scientific seminars, which includes:

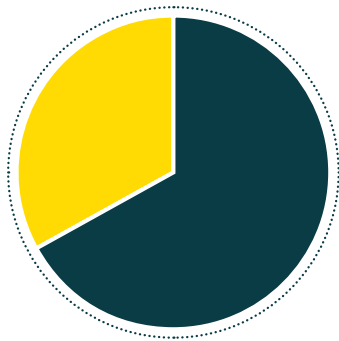
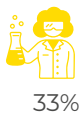
- I. **International seminars** delivered by internationally recognized researchers of varying scientific backgrounds and fields
- II. **Postdoctoral seminars** delivered by selected postdoctoral fellows to share progress in each of our laboratories to the rest of the Center
- III. **PhD seminars** delivered by PhD students of the Center
- IV. **Training seminars** delivered by CIC biomaGUNE's PIs or Platform Managers, aimed at strengthening the technical training program and soft skills training.

These actions aim at discussing recent developments, fostering internal and external interactions and paving the way toward future collaborations and contributing to the career development of our researchers. Altogether, these programs contribute to the career development of our researchers. During 2022, **48 Seminars** and **264 Internal Scientific & Technology Trainings** have been delivered with a total of **1521 participants** reached.



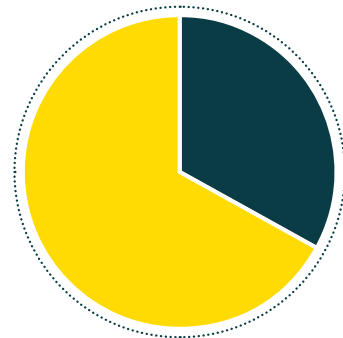
48

**INVITED
SPEAKERS**



1521

**TRAINING
PARTICIPANTS**



TRAINING TYPE

NUMBER OF EVENTS

CIC biomaGUNE Seminar	23
Open Group Seminar	1
PhD Seminar	2
Postdoctoral Seminar	9
Soft Skills Seminar	12
Christmas Lecture	1
Internal Scientific & Technology Trainings	264

 SEMINARS

- 11/01/2022
How to Talk and Write About Your Research.
Prof. Luis M. Liz-Marzán, CIC biomaGUNE.
- 12/01/2022
Magic from Magic-Sized Clusters: Reversible Isomerization and Centimeter-Length Hierarchical Self-Organization.
Prof. Richard Robinson, Cornell University.
- 19/01/2022
Computational design of Au(III)/CTPR protein complex as biocatalyst for (3+2) cycloadditions.
Dr. Giulia Magi Meconi, CIC biomaGUNE.
- 26/01/2022
Modulating the Conformational Plasticity of Tetraspanin CD81 by Ligand Binders and its Implication in Cellular and Viral Processes.
Cristina Risueño, CIC biomaGUNE.
- 02/02/2022
Mapping and using the extracellular matrix to reveal its role as a cell regulator.
Prof. Alejandro Mayorca-Guiliani, University of Copenhagen.
- 09/02/2022
In Vivo Cell Reprogramming: from Proof-of-Principle towards Applications in Tissue Regeneration.
Dr. Irene de Lázaro, Harvard University.
- 09/02/2022
Radiochemistry Platform - Radiochemistry: the key step in Nuclear Imaging.
Dr. Vanessa Gómez Vallejo, CIC biomaGUNE.
- 16/02/2022
SARS-Cov-2 on a Chip: Harnessing Viral Antigens Arrays and Machine Learning for Making Better Diagnosis, Analysis, and then Vaccine.
Hee-Sool Rho, CIC biomaGUNE.
- 23/02/2022
Pathogenesis of kidney stone disease and the possible therapeutic opportunity.
Prof. Chanchai Boonla, Chulalongkorn University.
- 28/02/2022
XPS Course.
Prof. Sefik Suzer, Bilkent University of Ankara.
- 09/03/2022
Biomaterials in tissue regeneration, cancer dormancy and metastasis.
Dr. Amaia Cipitria, Biodonostia Health Research Institute.
- 10/03/2022
(Some) funding opportunities for young researchers after their PhD.
Dr. Cristina Díez García, CIC biomaGUNE.
- 16/03/2022
Cell-free systems to explore and expand the heterogeneous biocatalysis scope.
Dr. Mercedes Sánchez-Costa, CIC biomaGUNE.
- 23/03/2022
Exploring the Clinical Potential of SERS-based Raman Imaging to Improve Cancer Outcomes: Regulatory Concerns and Alternative Solutions.
Dr. Cristina Zavaleta, University of South California.
- 19/04/2022
MRI platform at CIC biomaGUNE: how can we help you?.
Dr. Daniel Padró, CIC biomaGUNE.
- 04/05/2022
Bringing nanosolutions closer to the clinic. Study of fibrosis in patients, *in vivo*, and in 3D models.
Prof. Ana V. Villar, University of Cantabria.

- 05/05/2022
Label-Free Monitoring of Tumor Models by Surface-Enhanced Raman Scattering.
Javier Plou, CIC biomaGUNE.
- 10/05/2022
The Development of a Medical Device: From the Idea to the Market.
Dr. Rigoberto Pérez Alejo, NOXtec Development S.L.
- 11/05/2022
Overcoming the lack of functionality in bioresorbable polyesters: Towards bioactive polymeric devices for biomedical applications.
Dr. Aitor Larrañaga, POLYMAT (UPV-EHU).
- 18/05/2022
Biological Fate of Nanomaterials studies in Nanotoxicity and Nanomedicine research.
Dr. Sergio Moya, CIC biomaGUNE.
- 01/06/2022
Harnessing nuclease biology for the development of diagnostic and therapeutic strategies.
Prof. Frank Hernández, SOMAprobes.
- 03/06/2022
Growth factor microenvironments in stem cell engineering.
Dr. Manuel Salmerón-Sánchez, University of Glasgow.
- 07/06/2022
Mass Spectrometry Platform - Soft ionization and high-resolution mass spectrometry. Technical aspects and applications.
Dr. Javier Calvo, CIC biomaGUNE.
- 09/06/2022
Surface-enhanced Raman scattering (SERS) bioimaging of complex 3D cellular systems.
Elisa Lenzi, CIC biomaGUNE.
- 15/06/2022
Nanotechnology applied in Molecular Imaging, for the diagnosis and treatment of the diseases of the Central Nervous System.
Dr. Pedro Ramos-Cabrer, CIC biomaGUNE.
- 16/06/2022
Genealomics, single cell lineage tracing of blood cell production through next generation sequencing.
Dr. Leïla Perié, Institut Curie.
- 14/07/2022
Harnessing Machine Learning for Nanomaterial-based Surface-Enhanced Raman Scattering (SERS) Sensing and Diagnostics.
Prof. Xing Yi Ling, Nanyang Technological University.
- 20/07/2022
The Medical Biophysics Centre in Santiago de Cuba: research and innovation in the Cuban context.
Prof. Juan Carlos García Naranjo, Medical Biophysics Center.
- 27/07/2022
Hassle free computations and analysis for predictive medicine.
Dr. Rahul Kumar, CIC biomaGUNE.
- 03/08/2022
Synthesis, radiolabeling and preclinical evaluation of multi-functionalized nanosystems for boron neutron capture therapy (BNCT).
Dr. Krishna Reddy Pulagam, CIC biomaGUNE.
- 20/09/2022
Repeating repeats: novel protein structural assemblies through repeat protein crystal contact modifications.
Dr. Mantas Liutkus, CIC biomaGUNE.

- 21/09/2022
Reticular Nanoscience: Bottom-Up Assembly Nanotechnology.
Prof. Stefan Wuttke, BC Materials.
- 26/09/2022
Animal Unit Platform from CIC biomaGUNE.
Ainhoa Cano, CIC biomaGUNE.
- 05/10/2022
Quantification methods in PET.
Prof. Pablo Aguiar Fernández, CIMUS Universidade de Santiago de Compostela (USC).
- 13/10/2022
Stress Management Workshop.
Skills 4 Science, Skills 4 Science.
- 13/10/2022
Working with and building startups in a global world.
Dr. Alex Aarris, Independent advisor.
- 09/02/2022
In Vivo Cell Reprogramming: from Proof-of-Principle towards Applications in Tissue Regeneration.
Dr. Irene de Lázaro, Harvard University.
- 19/10/2022
3D SERS Sensing and Imaging of Cancer Models within Plasmonic Scaffolds.
Dr. Clara García-Astrain, CIC biomaGUNE.
- 25/10/2022
Turning infrared into visible light with molecular devices.
Dr. Philippe Roelli, CIC nanoGUNE.
- 26/10/2022
Breaking sensitivity and specificity limits in functional and microstructural MRI.
Dr. Noam Shemesh, Champalimaud Centre for the Unknown.
- 09/11/2022
From worms to patients: learning from *C. elegans* survival strategies to treat neurological diseases.
Dr. Francisco Pan-Montojo, LMU Klinikum der Universität München.
- 15/11/2022
Supramolecular Architectures for Artificial Photosynthesis: The Quantasome Vision.
Prof. Marcella Bonchio, University of Padova.
- 16/11/2022
Tiny atoms and small molecules: when size mismatches ego.
Dr. Ermal Ismalaj, CIC biomaGUNE.
- 17/11/2022
Nuclear Imaging at CIC biomaGUNE: A General View.
Dr. Unai Cossio, CIC biomaGUNE.
- 23/11/2022
The respiratory air-liquid interface in breathing dynamics and inhalative drug delivery.
Prof. Jesús Pérez Gil, Complutense University of Madrid.
- 13/12/2022
Cor pulmonale heterogeneity and disease trajectories.
Prof. Jesús Ruiz-Cabello Osuna, CIC biomaGUNE.
- 14/12/2022
Electrochemical Biosensors for Personalized Medicine.
Dr. Gabriel Ortega, CIC bioGUNE.
- 15/12/2022
You Are (Not) A Fraud: A Scientist's Guide to the Imposter Phenomenon.
Dr. Marc Reid, University of Strathclyde.



CIC BIOMAGUNE
SEEKS TO ENHANCE
ITS NATIONAL AND
INTERNATIONAL
VISIBILITY AND
REPUTATION BY
ORGANIZING
CONFERENCES,
WORKSHOPS AND
SEMINARS.

SCIENTIFIC WORKSHOPS / CONFERENCES

CIC biomaGUNE seeks to enhance its national and international visibility and reputation by organizing conferences, workshops and seminars that share knowledge about the latest research and advances in the field of biomaterials.

▲ The following events have been organized during 2022:

- **ChemOnTubes Meeting, Organizer: Maurizio Prato & Alejandro Criado (CIC biomaGUNE),** *Donostia-San Sebastián, April 24-28*
- **4th CIC biomaGUNE PhD Day, Organizer: CIC biomaGUNE,** *Donostia-San Sebastián, October 27-28*
- **5th Glycobasque Meeting, Organizer: Niels Reichardt (CIC biomaGUNE),** *Donostia-San Sebastián, November 18-19*

▲ Our researchers have also chaired or co-organized a number of international symposia as listed below:

- **6th Meeting on Pulmonary Hypertension Research, CIC biomaGUNE co-organizer: Jesús Ruiz-Cabello,** *Madrid, March 3-4*
- **17th European Molecular Imaging Meeting in cardio vascular and pulmonary imaging | EMIM 2022 CIC biomaGUNE chairman: Jesús Ruiz-Cabello,** *Thessaloniki, March 14-18*
- **ACS Award in Colloid Chemistry Symposium in honor of Molly Stevens at ACS Spring National Meeting, CIC biomaGUNE Co-Chair: Luis M. Liz-Marzán,** *San Diego (EEUU), March 20-25*
- **NanoTech Poland 2022, CIC biomaGUNE member of the Internacional advisory committee: Luis M. Liz-Marzán,** *Poznan (Poland), June 1-3.*

- **Carbohydrate summer school in biomedical Glycoscience, CIC biomaGUNE co-organizer: Niels Reichardt, Jaca, June 8-10**
- **Spanish Biophysical society Meeting 2022, CIC biomaGUNE co-organizer: Aitziber L. Cortajarena, Bilbao, 20-21 June 2022**
- **The Thinking Institute at the University of Vigo, CIC biomaGUNE Chair: Luis M. Liz-Marzán, Vigo, July 4-5**
- **2nd International Conference on Sustainable Materials and Technologies for Bio and Energy Applications, SMTBEA- 2022, CIC biomaGUNE member of the Scientific advisory committee: Luis M. Liz-Marzán, Poznan (Poland), July 13-15**
- **9^a Reunión Ibérica de Coloides e Interfases, RICI 9, CIC biomaGUNE member of the Scientific committee: Luis M. Liz-Marzán, Santiago de Compostela, July 15-18**
- **International Soft Matter Conference 2022, CIC biomaGUNE member of the Committee: Luis M. Liz-Marzán, Poznan (Poland), September 19-23**
- **Symposium “Self-assembled and smart stimuli responsive nanomaterials for diagnosis and therapeutics” in the XX del MRS Brazil, CIC biomaGUNE co-organizer: Sergio Moya, Iguazu (Brasil), September 25-29**
- **E-WISPOC 22, European-Winter School on Physical Organic Chemistry, CIC biomaGUNE Co-organizer: Maurizio Prato, Ischia (Napoli, Italy), September 26-30**
- **XV CIBERES Training Conference 2022, CIC biomaGUNE co-organizer: Jesús Ruiz-Cabello, Madrid, November 24-25**

▲ The participation of CIC biomaGUNE personnel to events is summarized below:

192

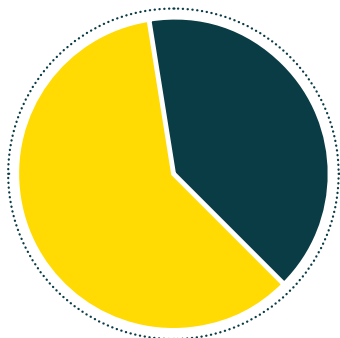
**ATTENDANCE TO
CONFERENCES**



60%



40%



154

**ORAL & POSTER
CONTRIBUTIONS**



64%



36%



Dissemination & **Public Engagemnet**

One of the **strategic objectives** of CIC biomaGUNE is the **communication and dissemination of knowledge** within and beyond the academic community.

Our commitment toward dissemination and outreach has been strengthened, in particular to promote **STEAM careers in young girls and visibility of women in science** (see detailed list of activities at QR).

During **2022**, **37 outreach activities** were organized including open-doors/visits by high-school and university students, **25** of these **activities aimed to promote STEAM careers** in young girls and improve visibility of women in science.

Activities includes the active participation in the following annual events: International Day of Women and Girls in Science – Emakumeak Zientzian (together with 17 Basque research Centers), Pint of Science, Inspira, Innovation Week, among others.

CIC biomaGUNE
Outreach





Emakumeak Zientzian



Since 2017 CIC biomaGUNE participates together with CIC nanoGUNE, the Materials Physics Centre (CFM CSIC-UPV/EHU), the Donostia International Physics Center (DIPC), Biodonostia, UPV-EHU, Tecnun-School of Engineering, CEIT, POLYMAT, Eureka Science Museum and Elhuyar in the **EMAKUMEAK ZIENTZIAN** event on the occasion of the celebration on February 11 of the "International Day of Women and Girls in Science". These organizations have come together to commemorate this day celebrating a series of events that aim to make visible the activity of women in science, break with the typically male roles attributed to scientific-technical activities and encourage the choice of scientific careers among girls and teenagers. The activities organized included: Activities for **5th elementary grade** students, colloquiums about **past and present women scientists**, **women and science exhibition**, practical workshops for retired women, seminars by women scientists on **Career development outside academia** who gave their view on switching career from academia to industry, prospects, and outcomes, **YouTube videos** on laboratory experiments, etc.

International Day of Women and Girls in Science



Women researchers from CIC biomaGUNE participate every year in the 'Women and Girls in Science' campaign organized by the Basque Technology Park Network on the occasion of the celebration on February 11 of the "International Day of Women and Girls in Science". This campaign aims to make visible the female talent working in companies and centers of the Technology Parks of the Basque Country.

From top to bottom, from left to right; Clara García Astrain, Postdoctoral Researcher. Eleftheria Diamanti, Postdoctoral Researcher. María Regato Herbella, PhD student. Silvia Vázquez Díaz, PhD student. Irantzu Llanera, Platform Manager. Núria Alegret Ramón, Postdoctoral Researcher. Susana Carregal Romero, Associate Researcher.

Pint Of Science



This initiative brings Science to local pubs, thereby breaking down the barriers that separate science from society. CIC biomaGUNE researchers have taken active part in the organization of the Pint of Science event in San Sebastián during 7 editions.



Inspira



The **INSPIRA project** is a pioneering project in the Basque Country for the promotion of the scientific-technological vocation (STEAM: Science, Technology, Engineering, Arts and Maths) among girls.

The mentors accompany students during a period of two months with the following aims:

- Provide new references of nearby women technologists.
- For boys and girls to discover the STEAM professions.
- Raise awareness of the need for the development of the country to occur between men and women.
- Sensitize and guide on the career in technology.
- Make visible and value women technologists.



Encounter of Scientific Lives



CIC biomaGUNE participates in the "Encuentro de Vidas Científicas" organized by Eureka! Zientzia Museoa, located in the Gipuzkoa Science Park. This activity is directed to 4th elementary grade and bachelor students with the aim of boosting scientific vocations. The objective is to create a space where students can speak, ask questions and exchange opinions directly with various professionals from different scientific and technological fields. Thus, students who have in mind to study science related studies, are able to find out about future employment opportunities, ask questions about what it means to enrol to certain studies, detect possible difficulties to be encountered, etc.



BERRIKUNTZAREN ASTEA
SEMANA DE LA INNOVACIÓN
INNOVATION WEEK

"Donostia WeekINN" Innovation Week



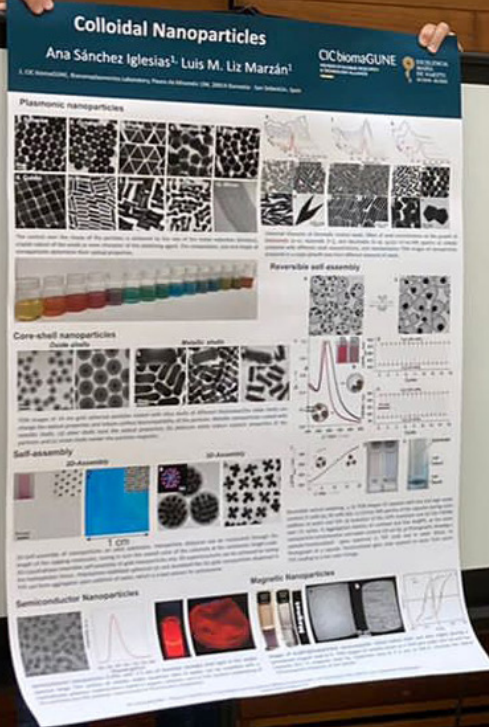
CIC biomaGUNE participates since 2016 at the Innovation Week, Donostia WeekINN, an initiative of the San Sebastián city council, whose objectives are:

- To raise awareness about the importance of innovation.
- To train and bring knowledge, share, learn, etc.
- To recognize and make visible different organizations from the city that have an orientation towards Innovation.

INNOVATION TEK

CIC biomaGUNE

CbiomaGUNE
 CENTER OF BASQUE RESEARCH
 TECHNOLOGY ALLIANCE



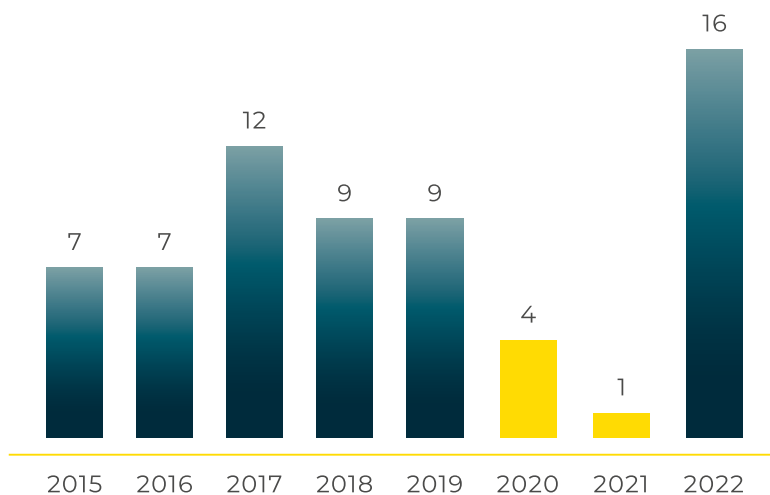
OPEN DAYS & VISITS

CIC biomaGUNE regularly receives visits from high-school and university students who come to have a closer look at our activity. These visits typically include a lecture about biomaterials in the context of life sciences, an open discussion with CIC biomaGUNE researchers, and a guided tour to six technical facilities/laboratories (Nanoparticle synthesis platform, Confocal Microscopy, Radiochemistry platform, Molecular Imaging Facility, Scanning Electron Microscopy,

Atomic Force Microscopy). The program of visits is run by **Ana Sánchez-Iglesias with the support of Marco Möller, Daniel Padró, Desiré di Silvio, Irantzu Larena, Judith Langer, Unai Cossío and Vanessa Gómez** with the support from other Platform Managers as well as PhDs, Postdocs and Principal Investigators. This activity has been severely hindered by the pandemic situation in 2020 and 2021 but fully reestablished in 2022.

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UNDERGRADUATE & HIGH SCHOOL VISITS





COMMUNICATIONS

CIC biomagUNE is committed to disseminating research results and other news, not only to the scientific community but also to the general public. Our presence at social media has remained with an increase of the number of followers/connections.

MEDIA RELATIONS

MODALITY	IMPACTS
Written Media	49
Online Media	33
Specialized Online Media	184
Expo	2
Radio	10
TV	2
Total Media Appearances	280

WEB & SOCIAL MEDIA

MODALITY	2022	2021	2020	2019
Web visits	47,955	55,142	60,447	36,715
Twitter Followers	3,139	2,726	2,047	1,827
LinkedIn Followers	4,350	3,368	2,643	1,755
Facebook Followers*	-	235	208	165
Facebook Likes*	-	208	184	151

**due to a problem with the facebook account there is no available data for 2022.*



RECYCLING OF COMPUTERS IN COLLABORATION WITH IZT WITHIN THE DIGILAGUN INITIATIVE.

Sustainability Compliance & **Solidarity**

CIC biomaGUNE Strategic Plan includes a commitment to 10 of the **17 United Nations Sustainable Development Goals (SDGs)** and foresees the implementation of sustainability measures to ensure ethics, transparency, compliance and respect for the environment with the following aims:

- ▲ To promote a more efficient use of our energy and resources, consistent with caring for and improving the environment and people's quality of life.
- ▲ To promote change towards an activity that is socially committed and that fosters values of inclusion, equality and sustainability.
- ▲ Implement actions aimed at compliance and anti-fraud policies.

CONTRIBUTION TO SDGs

SUSTAINABLE DEVELOPMENT GOALS



Research conducted at CIC biomaGUNE is aligned with Horizon Europe, the Spanish Science, Technology and Innovation Strategy, the 2030 Basque Strategy for Science, Technology & Innovation and aims at contributing to good health and well-being.



Measures contemplated in our equality plan contribute to:

- ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making
- end all forms of discrimination



- Work conducted at CIC biomaGUNE contributes at increasing the number of people who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.
- Dissemination and outreach actions aimed at promoting scientific-technological vocation among girls and the figure of women in science contribute to:
 - eliminate gender disparities in education and ensure equal access to all levels of education and vocational training
 - substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship



- Scientific Research activities upgrade the technological capabilities of industrial sectors encouraging innovation and contribute to increasing the number of research and development workers and public and private research and development spending.
- Activities to promote technology transfer and entrepreneurship at CIC biomaGUNE contribute to creativity and innovation, and promotion of sustainable economic growth.
- Measures contemplated in our equality plan and the protocol of prevention and action against workplace, sexual or gender-based harassment contribute to:
 - achieve full and productive employment and decent work for all women and men and equal pay for work of equal value
 - promote a safe and secure work environment



Activities to promote technology transfer enhance scientific research and upgrade the technological capabilities of industrial sectors encouraging innovation and contribute to increasing the number of research and development workers and public and private research and development spending.



- Measures contemplated in our equality plan contribute to empower and promote the inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status.
- Subcontracting services to special employment centers promotes the social inclusion of all people, regardless of their conditions and circumstances.



Actions to promote waste selective collection will contribute, with a view to 2030, to a substantial reduction in the generation of waste by means of prevention, reduction, recycling and reuse policies.



Actions carried out in the responsible energy consumption have contributed to reducing the environmental impact (reduction of greenhouse gas emissions) of the Centre's activity and to improving the energy efficiency of the building.



The Anti-Fraud Protocol, the Protocol for dealing with conflicts of interest and the Code of Ethics contribute to substantially reduce the forms of corruption and bribery that can occur at CIC biomaGUNE and to create an effective, accountable and transparent institution at all levels.



Our Research Program is conducted in collaboration with regional, national and international agents. We aim at fostering external cooperation and knowledge sharing by integrating our knowledge and research infrastructure within international consortia and networks.

ENERGY CONSUMPTION

2022 electricity consumption: 2,521,772 Kwh, which represents 400,275 Kwh less than in 2021. Equivalent to 100 tCO₂eq.

2022 gas consumption: 277,522.59 Kwh, which represents 251,591 Kwh less than in 2021. Equivalent to 51 tCO₂eq.

ENERGY CONSUMPTION	2020	2021	2022
Electricity consumption (Kwh)	2,754,190	2,922,047	2,521,772
Gas consumption (Kwh)	439,065	529,114	277,523

RECYCLING AND RESPONSIBLE CONSUMPTION MEASURES

In 2022 we have launched three environmental awareness campaigns:

- 1. Recycling of plastic caps** together with Foundation SEUR. The "Caps for a new life®" project which involves the recycling of plastic caps to help children with serious health problems.
- 2. Recycling of coffee capsules** in collaboration with KAFEAeco, a local recycling company that seeks to facilitate the recycling of all coffee waste and to create with it a range of eco-friendly products.
- 3. Recycling of computers** in collaboration with IZT. The Digilagun initiative aims, on the

one hand, to extend the life of computers in order to reduce the ecological footprint and, on the other hand, to contribute to reducing the growing digital divide in society. To this end, IZT clean the computers discarded for professional use and prepare them for appropriate personal use. With the help of different social agents, they will put these computers in the hands of people who cannot afford to buy a personal computer.

We have also promoted the subcontracting of certain services (marketing/caterings) with special employment centres, that promote the employment of workers with disabilities.

COMPLIANCE AND ANTI-FRAUD

In 2022 we have:

- Signed an Institutional Declaration on zero tolerance against fraud.
- Developed an Anti-Fraud Protocol.
- Developed a protocol for dealing with conflicts of interest.
- Updated of the CIC biomaGUNE Code of Ethics.
- Established an ethical channel that facilitates the communication, among others, of suspicions of fraud.

Institutional
Declaration
against fraud



Ethical
Channel



SOLIDARITY

CIC biomaGUNE, in solidarity and support of the Ukrainian people, promoted a specific plan to help the victims of the conflict. On the one hand, a collection point was set up to collect

food, sanitary material, medicines and personal hygiene products, and on the other, two Ukrainian researchers displaced by the war were hired for 6 months.

ACCREDITATIONS



FUNDING



ACTIVITY REPORT 2022

CIC biomaGUNE

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