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USC UNIVERSIDADE DE SANTIAGO DE COMPOSTELA CAMPUS VIDA

CiQUS

Centro Singular de Investigación en **Química Biolóxica** e **Materiais Moleculares**

Annual Scientific Report 2023

Research Center of the Galician University System 2023-2027 (ED431G 2023/03)

Promote technological development, innovation and high-quality research

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Foreword

Dear colleagues,

In the following pages, you will find a detailed summary of CiQUS milestones and activities corresponding to year 2023. It has been a particularly intense period, marked by evaluation and accreditation processes, and the launch of the new Strategic Plan for 2023-2027. CiQUS has continued its steady progress in terms of scientific production, and contribution to the advancement of knowledge, technology transfer, gaining grants, fundraising, talent attraction and so on.

In 2023 we worked intensively on designing and defining a new Strategic Plan for 2023-2027. A key document that defines the strategy and roadmap to guide CiQUS' progress and advancement in the upcoming period, and that will guide a new leap forward in our national and international positioning as a leading multidisciplinary research center. The **overall objective of CiQUS research activity will be the discovery and development of new advanced molecular materials and disruptive chemical technologies, with applications in the fields of health & biomedicine and sustainability**.

To ensure the viability of this objective, it has been necessary to address a slight restructuring of the center's scientific priorities and thematic organization. While we will keep and reinforce with new lines the three vertical thematic areas –Biological and Medical Chemistry, Functional Materials of Technological Interest and Synthetic Technologies for Sustainable Development–, a new cross-disciplinary thematic area focused on Computational Chemistry and Data Science has been established.

In terms of organization and governance and, specifically referring to external advisory boards, during 2023 CiQUS renewed part of the composition of its ESAB, upon concluding the third appointment period of some of its members. We would like to take advantage of these lines to express our enormous gratitude to professors Luis Oro (University of Zaragoza), Miquel Pericàs (University of Rovira i Virgili) and Avelino Corma (ITQ) for their invaluable support, advice and help over the years to promote progress and recognition of our center. CiQUS Governing committee approved in November 2023 the appointment of professors Paolo Samori (University of Strasbourg), Rosario Fernández (University of Seville) and Eva Hevia (University of Bern), guaranteeing with these additions not only the outstanding recognition of the ESAB members, but also knowledge diversity, international character and the gender balance within the committee. Additionally, during 2023, the governing committee of CiQUS also approved the creation of the Industrial Advisory Committee (IAB) of CiQUS, made up of representatives of the business world and experts in innovation and entrepreneurship. This is a new advisory body that was created with the aim of participating in the definition of the center's strategy in terms of transfer and cooperation with the industrial environment.

With regard to evaluation processes, 2023 was a very busy year for CiQUS. In terms of internal evaluation, at the beginning of the spring, the ESAB of CiQUS carried out the third on-site Quadrennial Evaluation since the creation of the Center, assessing the quality and impact of the activity carried out by the center as a whole as well as researchers and individual research groups, in the 2019-2022 period. The general report includes excellent comments regarding the performance of the groups that make up the CiQUS scientific team, and very useful advices to further promote the impact and visibility of our results and the improvement of our international positioning. In terms of external evaluation, on the one hand, CiQUS presented a new application within the framework of the call for accreditation for Centers of Excellence Severo Ochoa and Unidades María de Maeztu 2023. Unfortunately, although it was evaluated again very positively, and our score was very close to the threshold, we finally did not get the accreditation. On the other hand, at the end of 2023 the CiQUS presented the corresponding request in the framework of the call for the granting of accreditation of excellence for research centers of the Galician SUG. This call included an exhaustive evaluation process by an external commission appointed by the Ministry of Education, Science, Universities and Vocational Training of the Xunta de Galicia. The result of this evaluation, published in the spring of 2024, placed CiQUS in the first position among the accredited centers, improving both the score and the position in the ranking with respect to the 2019 call

(1st place, compared to the 2nd place achieved in 2019). The summary report of the evaluation highlights the great progress of CiQUS in recent years, with an increased prestige at national and international level, a high number of projects at the frontier of knowledge, a top-quality scientific production, a high level of funding, and a remarkable incorporation of excellent junior researchers. They also highlighted the standards in terms of the organization of the center. This accreditation as a CIGUS Center ensures funding for the maintenance of the basic structural operation of the center in the period 2024-2027.

In terms of economic income, in 2023 CiQUS reached a record result in fundraising, with the number of projects that will start this year over to 11 million euros. In the framework of international funding, CiQUS received a new ERC Starting Grant (Dr. Manuel Souto, €1.5 M) and 1 EIC Transition Open (Dr. Javier Montenegro, €2.5 M), which represents to date the first and only EIC Transition project in Galicia. At the national level, the success achieved by CiQUS researchers in the new call for Knowledge Generation Projects is particularly noteworthy, obtaining 12 projects for a total amount of around 2.75 million euros, in addition 8 of them are associated with the corresponding pre-doctoral contracts, and a CaixaResearch project from the call for Health Research 2023 of the "la Caixa" Foundation, awarded to Javier Montenegro (€0.90 M).

As for the competitive public calls for HR, up to 31 CiQUS members were selected as beneficiaries of different programs, these include 4 Marie Curie postdoctoral grants (MSCA-IF), one of which with a start date of 2024. Thus, the CiQUS continues leading the position among the research centers of Galicia.

Finally, in terms of scientific production, in 2023 it should be noted that 33% of the annual research articles were published in JCR journals with an IF higher than 9, including contributions in reference journals such as Advanced Materials, Chem, Advanced Functional Materials, ACS Nano, Angewandte Chemie International Edition, etc. which also involved relevant international collaborations. With regard to technology transfer, two new international patents led by researchers from CiQUS were granted. Likewise, CiQUS continued to promote open access (90% of its publications were in open access during 2023), and strengthening its commitment to scientific culture, public education and specific initiatives aimed at gender equality.

Overall, we are extremely glad, and sometimes even overwhelmed, by the impressive progress of the center, that is clearly among the best research centers in chemistry in Spain.

Thank you for your time and interest for reading the 2023 CiQUS Scientific Report. We hope you find the information it contains valuable.

Santiago de Compostela, September 2024

José Luis Mascareñas

CiQUS Scientific Director

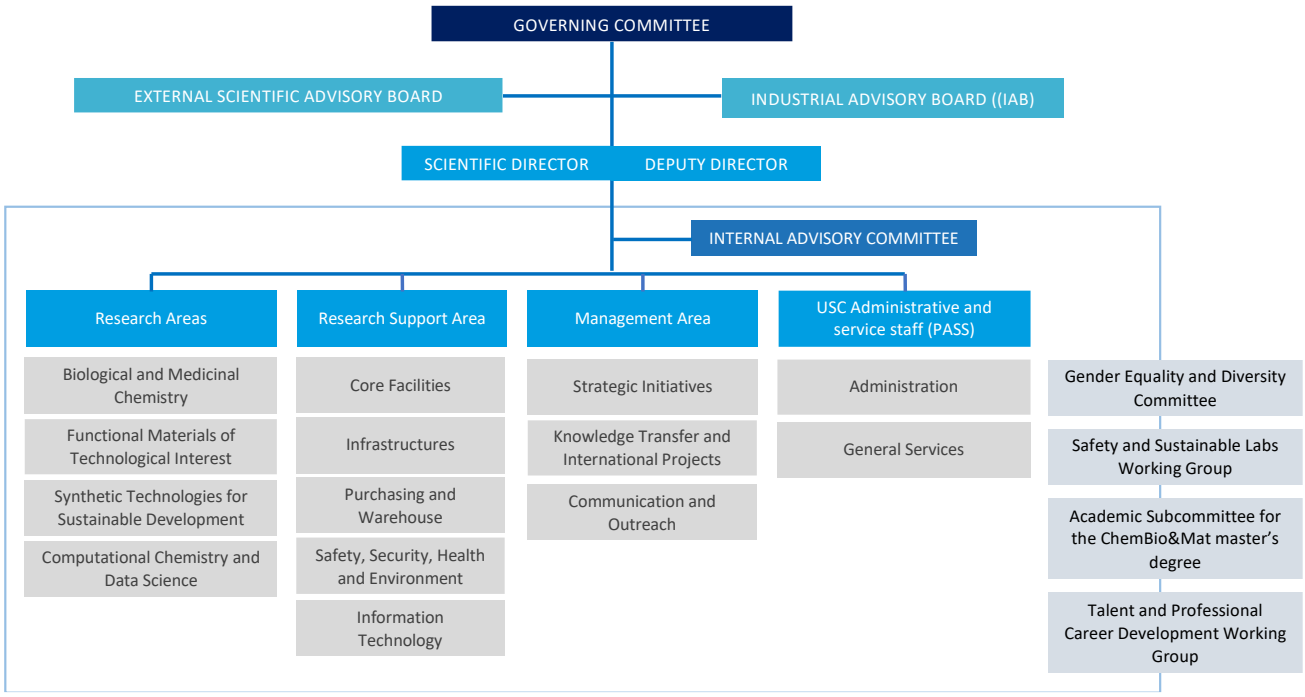
Dolores Pérez

CiQUS Deputy Director

1. ORGANIZATION

1.1. Organizational Chart

The structure of CiQUS is implemented as per the organizational chart shown below.



Organizational Chart at CiQUS

1.2. Description and composition (December 31, 2023)

GOVERNING COMMITTEE

President: Antonio López Díaz, *Rector of the USC*

Vice-president: María del Pilar Bermejo Barrera, *USC Vice-rector for Scientific Policy*

Members: Javier Ferreira Fernández, *USC Manager*

Juan Manuel Garrido Fernández, *Representative of the USC Governing Council*

Cecilia Sierra Rey, *USC Social Council President*

José Alberto Díez de Castro, *General Secretary for Universities | Xunta de Galicia*

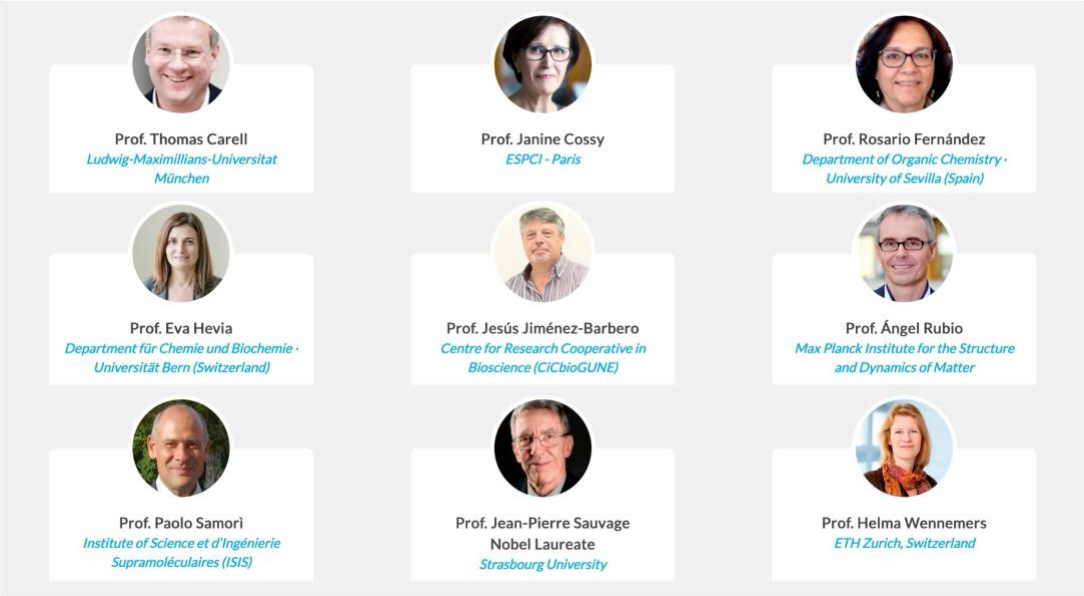
Carlos Juan Closa Montero, *CSIC Vice-President for Organization and Institutional Affairs*

José Luis Mascareñas Cid, *CiQUS Scientific Director*

María Dolores Pérez Meirás, *CiQUS Deputy Director*

Changes affecting the composition of the CiQUS Governing Committee in 2023 were the incorporation of Prof. M. Pilar Bermejo as Vice-president after her appointment as USC Vice-rector for Scientific Policy, and the designation of Prof. Juan Manuel Garrido Fernández as USC Governing Council, replacing Prof. M. Pilar Bermejo former USC Governing Council representative.

EXTERNAL SCIENTIFIC ADVISORY BOARD (ESAB)



CiQUS ESAB Members

The CiQUS ESAB issued the Third Quadrennial Assessment Report of the activity and research performance of CiQUS and its research groups for the period 2019-2022, in April 2023. The evaluation was carried out on site, in Santiago de Compostela from 19 to 21 April 2023 and was attended by the following ESAB members: *Prof. Jesús Jiménez-Barbero (CiQUS ESAB President), Prof. Luis Oro, Prof. Miquel Pericàs, Prof. Janine Cossy and Prof. Helma Wennemers*. The organized programme included working sessions at the CiQUS, meetings with CiQUS Directors, an on-site visit at the CiQUS building, visiting core facilities and research labs.

The CiQUS ESAB members carefully analyzed in detail the corresponding annual scientific reports of the period as well as the specific information provided by CiQUS PIs, which had been previously requested. All CiQUS ESAB members had previously received all these reports by email. Additionally, they held interviews with several CiQUS PIs, Junior Scientist and *Ramón y Cajal* Researchers and as well as some meetings with members of the CiQUS Governing Committee.

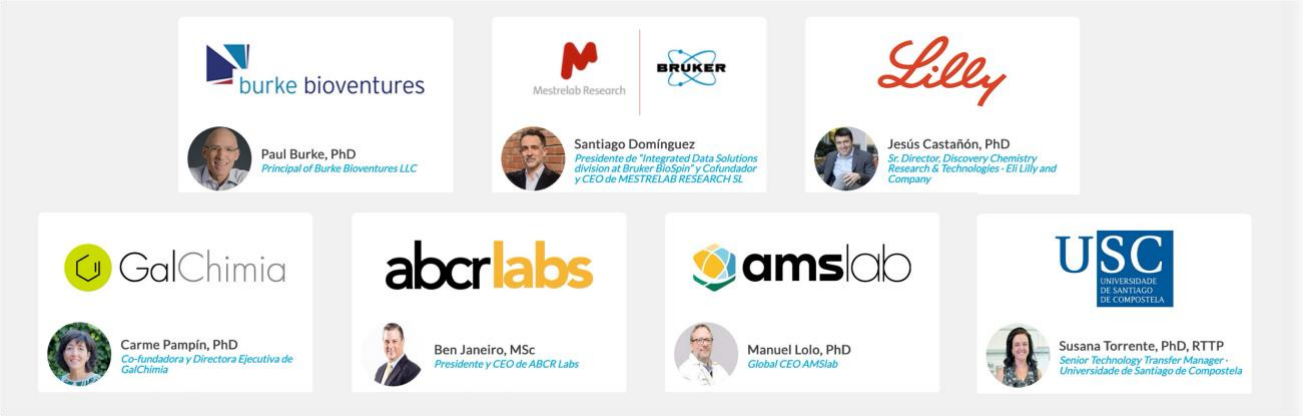
CiQUS ESAB Members and CiQUS Directors during the meeting for the 3rd Quadrennial Assessment hold in Santiago

The overall evaluation report resulted, in general, in excellent comments and very useful advice for CiQUS improvement.

On the other hand, in 2023 CiQUS renewed part of the composition of its ESAB, upon concluding the third appointment period of some of their initial components [Prof. Luis Oro (University of Zaragoza), Prof. Miquel Pericàs (University of Rovira i Virgili) and Prof. Avelino Corma (ITQ)]. CiQUS Governing committee approved in November 2023 the appointment of three new CiQUS ESAB members: Prof. Paolo Samori (University of

Strasbourg), Prof. Rosario Fernández (University of Seville) and Prof. Eva Hevia (University of Bern). Currently, 44% of ESAB's members are women and 78% work in foreign institutions.

INDUSTRIAL ADVISORY BOARD (IAB)



CiQUS IAB Members

CiQUS Governing Committee approved in November 2023 the creation of the *Industrial Advisory Board* (IAB), made up of representatives of the business world and experts in innovation and entrepreneurship. This is a new advisory body that was created with the aim of participating in the definition of the center's strategy in terms of transfer and cooperation with the industrial environment. At this moment, the members of the CiQUS IAB are Paul Burke (Principal of Burke Bioventures), Santiago Domínguez (President of Integrated Data Solutions Division at Bruker BioSpin and Co-funder & CEO of Mestrelab Research SL), Jesús Castañón (Discovery Chemistry Research & Technology Senior Director at Eli Lilly), Carme Pampín (Co-funder and Executive Director of GalChimia), Ben Janeiro (President and CEO at ABCR Labs), Manuel Lolo (Global CEO at AMSlab) and Susana Torrente (as USC AVTE representative).

DIRECTORS

Scientific Director: José Luis Mascareñas Cid

Deputy Director: María Dolores Pérez Meirás

- **Scientific Director**: *Prof. Dr. José Luis Mascareñas Cid*, Full Professor of Organic Chemistry (full-time).

Professional profile: José Luis Mascareñas (Allariz, oct 1961) completed his PhD at the USC in 1988. He was a postdoctoral fellow at Stanford University (USA) under the supervision of Prof. Paul Wender (1989-1990). He became permanent professor in 1993 and full professor in 2005, at the USC.

He has been a visiting scholar at Harvard University (USA) and a visiting scientist at the University of Cambridge and the MIT. As independent researcher, he has published over 250 articles, the majority of them in the most relevant chemistry journals, 10 book chapters, and 23 patent applications. He has supervised 45 PhD theses, delivered over 200 invited lectures, most of them in international forums, and raised over 5 million Euros in competitive grant calls in the last 5 years. Many students from the group have received relevant awards, and many of them have started relevant academic careers. Thus, Dr. Elena Pazos, now professor in the University of Coruña, has gained a prestigious ERC starting grant in 2019. In 2014, Prof. Mascareñas received and **ERC Advanced Grant** for his project METBIOCAT (http://metbiocat.eu/) and, more recently, an **ERC Proof of Concept** (antiCSC, 2020). His international prestige has been recently recognized by his appointment as scientific president of the Burgenstock conference in 2025.

His current research splits between a synthetic programme aimed at discovering novel methods based on metal catalysis, and a chemical biology programme focused on the development of synthetic tools for biological

intervention. The Spanish Royal Society of Chemistry awarded him the Organic Chemistry Award (2009) and **Gold Medal** (2015). In 2016, he was appointed as member of the European Academy of Sciences. He was appointed as Scientific Director of CiQUS in February 2014, being his appointment renewed in September 2019 and in November 2023, respectiveley.

- **Deputy Director**: *Prof. Dr. María Dolores Pérez Meirás*, Full Professor of Organic Chemistry (full-time).

Professional profile: Dolores Pérez (Ferrol, 1964) completed her graduate studies at the USC with Honours and obtained her PhD in 1991, under the supervision of Prof. E. Guitián and L. Castedo. She was awarded a MEC-Fullbright fellowship to conduct postdoctoral training at the University of California at Berkeley (1992-1993) in the group of Prof. K. Peter C. Vollhardt, and later she was a visiting scientist in the group of Prof. S. L. Buchwald at MIT (1996). She joined the faculty of the USC as Assistant Professor in 1995, became an Associate Professor of Organic Chemistry in 2000 and Full Professor in January 2019.

She has published over 80 articles in high impact journals, 5 book chapters and supervised 12 PhD theses. Her current research interests are focused on the discovery of new metal-catalyzed reactions of synthetic interest, the further development of aryne chemistry and its application in the synthesis of complex polycyclic conjugated systems and nanographenes. She has been Director of the Organic Chemistry Department (2004-2006), and associate to the Vice-rector of Research an Innovation at the USC (2006-2010). In 2010, she was appointed as Commissioner Director of CiQUS, being responsible for the establishment and operation of the center until 2014, when she was appointed as Deputy Director. From September 2017 to June 2018, she was also Commissioner of the USC Rector for Campus Vida and for the Coordination of the Singular Research Centres Network.

The functions and competences of the CiQUS Governing Committee, the CiQUS ESAB and the CiQUS Directors are set out in the CiQUS Internal Regime Regulations, which last version was approved by the USC Governing Council in October 29, 2021.

INTERNAL ADVISORY COMMITTEE

It is an advisory board representative of the main research areas at CiQUS, currently constituted by CiQUS PIs Juan R. Granja, Antonio Fernández-Ramos, Pablo del Pino, María Giménez and Diego Peña. The committee provides advice to the Directors (José Luis Mascareñas and Dolores Pérez) on some key decision-making processes, and is involved in the elaboration, implementation, and monitoring of the CiQUS Strategic Plan.

RESEARCH AREAS

The CiQUS scientific team is currently organized into 18 research groups. Our new Strategic Plan for 2023-2027, a key document that defines the strategy and roadmap to guide CiQUS' progress and advancement in the upcoming period, enabling us to take the next leap forward national and international positioning as a leading multidisciplinary research center. Thus, the **overall objective of CiQUS research activity consists of the discovery and development of new advanced molecular materials and disruptive chemical technologies, with applications in the fields of health & biomedicine and sustainability**.

To ensure the viability of these scientific priorities, it will be necessary to address a slight restructuring of the center's scientific organization. Thus, while the three vertical thematic areas are maintained and reinforced by new lines: ***i)*** Biological and Medical Chemistry, ***ii)*** Functional Materials of Technological Interest and ***iii)*** Synthetic Technologies for Sustainable Development, we have established a new cross-disciplinary thematic area focused on Computational Chemistry and Data Science whose research lines are aligned to the three main thematic areas*: i) Biological and Medicinal Chemistry; ii) Functional Materials with Technological Application and iii) Synthetic Technologies for Sustainable Development* (See CiQUS webpage for more info).

MANAGEMENT AREA

This area integrates 3 different units:

✓ Strategic Initiatives: coordination of CiQUS scientific strategic project, talent attraction programmes, training activities, events and writing of scientific and activity's reports. (*Dr. Almudena García*).

✓ Knowledge Transfer & International Affairs: promotion of international R&D initiatives and identification of technology transfer opportunities (*Fernando Casal).*

✓ Communications and Outreach Unit: Maintenance and updating of CiQUS social media, edition of press release and contact with press media. Coordination of outreach and social programme (*Mariano Comino*).

RESEARCH SUPPORT AREA

This area is responsible for the implementation of the centralized operational model which gives technical support to CiQUS' research activity, aiming at the optimization of the available resources and the improvement of the working conditions at the centre. This area integrates 5 different units:

✓ Core facilities: provide the scientific instrumentation support needed to carry out research at CiQUS, ensures the maintenance and optimal use of the equipment, and offers training in the use of the equipment, sample preparation and data processing [*Dr. Arcadio Guerra* (manager)*, Laura Acevedo*]. Furthermore, a Biological Support Technician (*Rebeca Menaya*) is responsible for cell culture labs and for assistance on other biological techniques to the CiQUS researchers.

✓ Infrastructures: responsible for the management and maintenance of labs, equipment, furniture, and general spaces at CiQUS [*Laura Acevedo* (manager)].

✓ Purchasing and Warehouse: centralized purchasing of reagents, solvents, disposable laboratory products and management of the CiQUS' warehouse [*Noela Torrente* (manager)*, Andrea López*].

✓ Safety, Health and Environment: Updating and implementation of the CiQUS' Safety and Risk Prevention Plan, including training to all new CiQUS members, coordination and training of the emergency teams and management of the laboratories' safety (*Noela Torrente*).

✓ Information technology: responsible for technical assistance, installation, configuration and maintenance of the computer equipment associated with the scientific instrumentation and the rest of computer and electronic equipment at the Centre (Adrián Torreiro).

In 2022, our research support team was strengthened by hiring new personnel:

✓ An Advanced Microscopy Lab manager (*Dr. Enrica Soprano*, part-time dedication to this task): PhD in Materials Science with extensive experience in fluorescence, confocal and hyperspectral microscopy. Responsible for scientific-technical support in the Advanced Microscopy laboratory at CiQUS.

✓ Process automatization manager (*Dr. Víctor Leborán*): PhD in Physics with solid background in the construction of thermal and electrical transport measurement devices as well as in the development of scientific instrumentation control software. Responsible for the development and implementation of new scientific devices and software for supporting CiQUS research groups.

In 2023, our research support team was strengthened by hiring an assistant research support technician (*Álvaro Sande*) for supporting the core facilities unit. The new technician supports the CiQUS 3D printing Lab and provides expertise in the design and development of 3D printing scientific setups and devices.

ADMINISTRATION AND SERVICES STAFF AREA

This area is covered by USC Permanent Staff (*PAS category – Persoal de administración e servizos*) and includes:

✓ Accounting and administrative support (*Andreas Stockheim, Carlos Pererira and Elena Brocos*). Lucía Rodríguez former CiQUS secretary and administration staff retired in August 2023.

✓ Concierge and general services (*M. Carmen Rey, Ángel Rama*).

Different working teams and/or committees have been launched to analyze and implement new programmes and strategic actions related to transversal issues: *i) Gender Equality and Diversity Committee; ii) Safety and Sustainable Lab's Working Group; iii) Academic Subcommittee for the ChemBio&Mat master's degree and iv)*

Talent and Professional Career Development Working Group. These working groups and committees are formed by members of the CiQUS community representing the different categories, areas, and positions at the Center.

2. FACTS & FIGURES

As an overview, we include 8 cumulative key figures to illustrate the performance of CiQUS in 2023:

1 New ERC-StG

12 ERC projects in total

1 SyG, 1 AdG, 1 CoG, 5StG, 4 PoC

8,61 M€

Income of new Projects & Contracts

26

New R&D Projects

including

12 "Generación de Conocimiento Projects" (*)

(*) Also granted with 8 Predoctoral Contracts

2 EIC Projects

European Innovation Council

2 New International granted patents

33%

articles published in JCR-journals with IF>9

33

New Researchers granted with HHRR public competitive programs

14

PhD Theses defended

57% International Mention

4,179 followers

3,220 followers

2,160 followers

>1,000 New followers in 2023

3. SCIENTIFIC AREAS AND RESEARCH LINES

The CiQUS Strategic Scientific Agenda was developed in alignment with on the Mission, Vision and Strategic Values defined for the Center at the time of its creation, which maintain fully validity now a days:

MISSION

- ✓ To promote the advancement of **science at the frontier of knowledge** in **the fields** of synthetic chemistry, chemical biology and functional materials
- ✓ **Training** new scientists, professionals and future leaders
- ✓ To create socio-economic **progress** and **technology transfer**
- ✓ To increase the international **prestige** of the USC and Galicia

VISION

To be an **international reference** center on excellent, interdisciplinary chemical research at the frontier with chemical biology and materials science

STRATEGIC VALUES

- ✓ **Cutting edge science**
- ✓ Multidisciplinarity
- ✓ Intra & inter-collaborative projects
- ✓ Responsible research and innovation
- ✓ Outreach to society

- ✓ **Best researchers and best students**
- ✓ Stimulating scientific environment
- ✓ Competitive recruitment and selection processes
- ✓ Gender balance
- ✓ Excellence in training

- ✓ **Self-demanding model**
- ✓ Professional R&D management
- ✓ Support to researchers
- ✓ Shared resources and facilities

3.1 Strategic Scientific Programme

CiQUS research activity is organized to exploit the full potential and quality of its research groups in the most effective way to generate science of high impact at the frontier of knowledge, pursuing innovative solutions and approaches to face societal challenges in the fields of health, environment, or new materials and energies, in line with the priorities established by the European, national and regional R&D strategies. This commitment is supported by our policies to optimize efforts and promote collaborations and synergies between the different research groups and disciplines within the centre with the aim to maximize our scientific and technological competitiveness.

In this context, during the period 2019-2023 the centre was organized into 18 research groups, ascribed to three main thematic areas: (A)Biological and Medicinal Chemistry, (B) Functional Materials with Technological Applications, and (C)Synthetic Technologies for Sustainable Development. Far from being compartmentalised, the research activity of the groups is strongly interconnected and, in fact, some of the most significant CiQUS contributions have resulted from work at the interface. Towards this end we seek an effective Interdisciplinary Integration of Research Topics supported by highly competitive scientists with complementary expertise.

Biological & Medicinal Chemistry

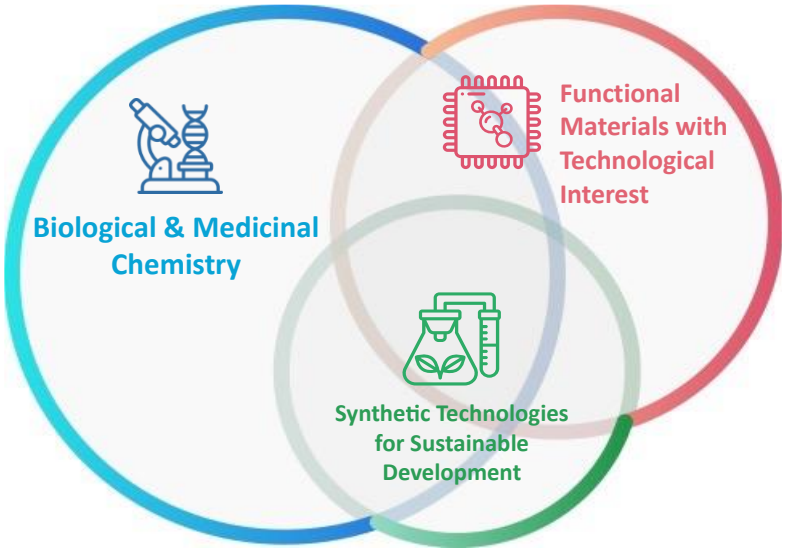
- Bio-Supramolecular Chemistry
- Chemistry & Nanotechnology at the frontier with Cell Biology and Biomedicine
- Pharmacological Agents, cell transport an innovative strategies for the activation of pro-drugs

Functional Materials with Technological Application

- Nanostructures with technological applications
- Sensors & termal and electronic devices

Synthetic Technologies for Sustainable Development

- Catalysis & synthesis for sustainable development
- Chemical technologies for product health



CiQUS Strategic Scientific Areas and Research Lines

3.2 Scientific Areas and Research Lines

The CiQUS scientific programme is currently organized around three main thematic areas:

- BIOLOGICAL AND MEDICINAL CHEMISTRY
- FUNCTIONAL MATERIALS WITH TECHNOLOGICAL APPLICATIONS
- SYNTHETIC TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

The broad scientific background of the CiQUS researchers, from chemists to physics, biologists, pharmacists, and biochemists, is a cornerstone to strongly interconnect the scientific areas mentioned above. **The promotion of collaborative research lines between the different areas of knowledge as well as encouraging intramural synergies by the participation of all the PIs and groups in each research topic, is crucial to ensure the success of our Strategic Scientific Project**.

Our efforts are focused on the generation of impact, in the development of excellence science to contribute to the socioeconomical progress of the contour and the training of the next generation of research leaders and highly qualified scientists.

A brief description of the CiQUS research areas, sub-areas and the corresponding active research lines is outlined below:

I. BIOLOGICAL AND MEDICINAL CHEMISTRY

Research in this area focuses on the fields of supramolecular, biomolecular and cellular chemistry as well as biomedicine, and addresses pressing medical problems and challenges in cancer, neurodegenerative diseases or bacterial resistance. This area includes, among others, the following research topics associated to different PIs:

I.1) BIO-SUPRAMOLECULAR CHEMISTRY: a) Supramolecular devices based on peptides and biological applications (J. Granja, J. Montenegro). b) Metallopeptides for nucleic acid interactions (E. Vázquez). c) Multiscale simulations of supramolecular systems (R. García Fandiño).

I.2) CHEMISTRY AND NANOTECHNOLOGY AT THE INTERFACE WITH CELL BIOLOGY: a) Metal catalysis in biological habitats (J.L. Mascareñas). b) Molecular fluorescent probes in cell biology (E. Sotelo, J. Montenegro, E. Vázquez). c) Bioprinting of nanoparticles for medical applications (B. Pelaz). d) Smart biomimetic nano-systems (J. Montenegro, P. del Pino). e) Photocatalytic processes inside cells (M. Tomás). F) Biomimetic cell-derived nanovectors (E. Polo).

I.3) PHARMACOLOGICAL AGENTS AND NEW STRATEGIES FOR DRUG TRANSPORT AND DELIVERY: a) Cellular transport of proteins, nucleic acids and cytotoxic molecules (J. Montenegro). b) Antibiotics for resistant bacteria (C. González-Bello). c) Combinatorial technologies for drug discovery (E. Sotelo). d) Mitochondria-targeted antitumoral agents (E. Vázquez). f) Dendrimeric nanostructures in drug delivery and diagnosis (E. Fernández-Megía). g) Carbohydrate and peptide-based bioactive compounds (J.C. Estévez); h) Virus-based biotechnological tools (J.M. Martínez-Costas). i) Anticancer drugs based on helical metallo-peptides (M. Vázquez). j) New materials for nanomedicine application (B. Pelaz).

The main novelty regarding this area was the incorporation of Dr Beatriz Orosa as *Ramón y Cajal* researcher who joint the CiQUS in spring 2022. She leads a new research line at the Center focused on the development of new immunity tools by post-translational modifications.

II. FUNCTIONAL MATERIALS WITH TECHNOLOGICAL APPLICATIONS

Research in this topic aims at the discovery of new organic, inorganic and metallo-organic materials with unique properties, as well as their implementation for the development of devices and technologies with applications in different fields, such as biomedicine, molecular electronics or energy storage and conversion.

II.1) INNOVATIVE MATERIALS AND TECHNOLOGIES: a) Study of chemical reactions mechanisms at the single-molecule level using scanning tunnelling microscopy to manipulate electron charge within molecules (D. Peña). b) Nanoparticles, MOFs and hybrid nanomaterials with applications in drug delivery, theragnostic or as cell reprogramming agents (P. del Pino, B. Pelaz). c) Magnetic and transport properties in transition-metal materials (F. Rivadulla). d) Metal-carbon hybrid nanostructures for catalysis and energy-related applications (M. Giménez-López). e) Bottom-up approaches to graphene materials (D. Peña/D. Pérez). f) Functional polycyclic conjugated systems (D. Pérez/E. Guitián). g) Smart helical polymers (F. Freire/E. Quiñoá). h) Nanomaterials with applications in catalysis and sustainability (M. Lazzari). i) Dynamic Chiral Catalysts based on Helical Polymers (F. Freire).

II.2) SENSORS: THERMAL AND ELECTRONIC DEVICES: a) Custom-crafted graphene nanostructures for the design of new nanoscale quantum spintronic devices (D. Peña). b) Fabrication of new electrodes of zinc-air long-life batteries (M. Giménez-López). c) Devices for ultraprecise thermal measurements (F. Rivadulla). d) Stimuli-responsive dynamic polymers (F. Freire/E. Quiñoá). e) Development of portable nanophotonic biosensors based on multifunctional nanoporous graphene for early diagnostics (D. Peña). f) Functional materials for active control of thermal conductivity (F. Rivadulla). g) Engineered conductive proteins for upscaling and using as smart ink-based conductors and ionic electrolytes in energy storage devices (E. Vázquez). h) Development of thin film oxide nanostructures for information, logic and energy management (R. Ramos). i) Design, synthesis and characterization of electroactive organic/hybrid molecules/polymers for electrical, optical and magnetic applications (a new research line led by Manuel Souto, ERC grantee and Oportunius Research Professor who joined CiQUS in Oct 2023).

III. SYNTHETIC TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

This area is focused on the discovery of effective catalytic processes and the development of sustainable synthetic methods.

III.1) CATALYSIS AND SYNTHESIS FOR A SUSTAINABLE WORLD: a) Synergistic catalytic processes to transform methane and other abundant feedstocks into high value-added products. b) Metal-based technologies for C-H activation/C-C bond formation (M. Fañanás, M. Gulías). c) Synthetic methods for anticancer agents (J.L. Mascareñas/F. López). d) Catalytic routes for the preparation of doped PAHs and bioactive heterocycles (C. Saá/J. Varela). e) Theoretical methods and mechanistic studies (A. Fernández-Ramos, R. García-Fandiño). f) Sustainable chemical methods promoted by visible light for greenhouse gases valorization, biodegradable polymers and bioconjugation processes (M. Nappi). g) Simulation of MOFs and related heterogeneous catalytic systems form biomass Upgrading (M. Ortuño).

III.2) CHEMICAL TECHNOLOGIES FOR PRODUCT HEALTH (J. Sardina): Application of chemical technologies to the development of safe, sustainable processes in the industry: product health in consumable goods.

Despite each group focuses on specific thematic and research lines, the scientific organization has been designed to facilitate interactions and synergies between groups of experts on different subjects and thus allow to pursue interdisciplinary projects and relevant scientific challenges from an interdisciplinary perspective.

For a more detailed description of the different research lines of the Strategic Scientific Project, see https://www.usc.es/ciqus/en/research/research-groups.

WHAT IS NEXT?: Scientific & Strategic Programme for the period 2023-2027

During 2023, CiQUS developed a new Strategic Plan that will guide the course of the centre in the period 2023-2027. The Plan is designed to promote a new leap in the scientific, academic and technological competitiveness of the centre, facilitating a better integration of its interdisciplinary capabilities in the fields of chemistry, cell biology, biomedicine and functional materials, in order to address far-reaching strategic challenges, many of which are included among the priorities of RIS3 and Horizon Europe.

Specifically, ***the overall scientific objective of the new CiQUS strategic plan is the discovery and development of new advanced molecular materials and disruptive chemical technologies, and the development of applications in the fields of health and sustainability***.

Particularly, in the field of **health and biomedicine**, the discovery of new concepts in biosupramolecular chemistry will be addressed, and collaborative projects will be promoted between experts in synthetic and biological chemistry to address challenges in cancer and in the field of infectious diseases (vaccines, new antibacterial strategies). An essential aspect in many of these studies at the frontier between chemistry and biomedicine has to do with the intracellular transport of bioactive substances. Collaboration between experts in biological chemistry and nanobiology will facilitate the development of technologies to internalize relevant biomolecular agents, such as mRNA. In fact, one of the major current challenges in the use of mRNA as a drug, even in the field of vaccines, has to do with the difficulties in releasing it into the cell cytoplasm. Thus, the scientific priorities in the field of health and biomedicine for the period 2023-2027 are:

1. Development of new synthetic probes and nanomaterials capable of acting selectively on biological receptors

2. Discovery of (bio)molecular, therapeutic and biotechnological tools for the fight against cancer, viral infections or bacterial resistance.

3. Development of innovative devices and materials such as biological sensors with application in new early diagnosis strategies.

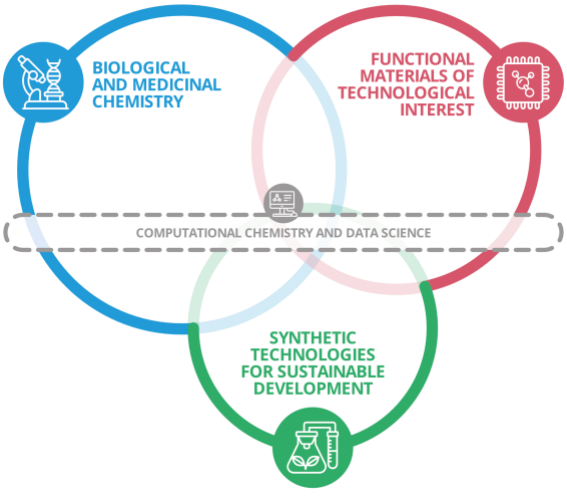
Regarding **sustainability**, the development of novel synthetic technologies that can facilitate the preparation of drugs and other products of interest in an economical and low-polluting way will be addressed. Collaboration between experts in catalysis and materials science will allow research into the development of functional materials that can be used as catalysts for the valorisation of feedstocks, or transformative technologies based on photocatalysis or electrocatalysis. Furthermore, with the collaboration of synthetic chemists, experts in materials science will be able to advance more efficiently in the development of novel methodologies to manufacture materials with electronic, optical, magnetic or thermal properties, which find application in nanoelectronics, bioelectronics or spintronics, as well as novel solutions in the field of energy generation and storage. The scientific priorities of the 2023-2027 strategic plan in the field of sustainability would therefore be:

4. Development of new synthetic and catalytic technologies that are environmentally friendly and that allow the valorisation of raw materials (feedstocks).

5. Preparation of new materials with applications in nanoelectronics (including single-molecule electronics), bioelectronics or spintronics.

6. Design and development of innovative materials for a new generation in energy production and storage.

In order to efficiently address these scientific priorities, the scientific organisation of the centre will be updated. The three thematic areas [A) Biological and Medical Chemistry, B) Functional Materials of Technological Interest, C) Synthetic Technologies for Sustainable Development] **will be reinforced with** new lines that take advantage of the potential of the most recently incorporated researchers, and the complemented with **a new transversal thematic area in computational chemistry and data science** will be created.



This new area will integrate capabilities from artificial intelligence (AI), quantum computing (taking advantage of the alliance with CESGA for the use of

the 32-qubit quantum computer) and immersive molecular visualization through Virtual and Augmented Reality. These tools will be used to explain experimental facts, but above all as prediction tools, since this can save a lot of experimental work, with the consequent benefit in terms of work time, and economic and environmental costs.

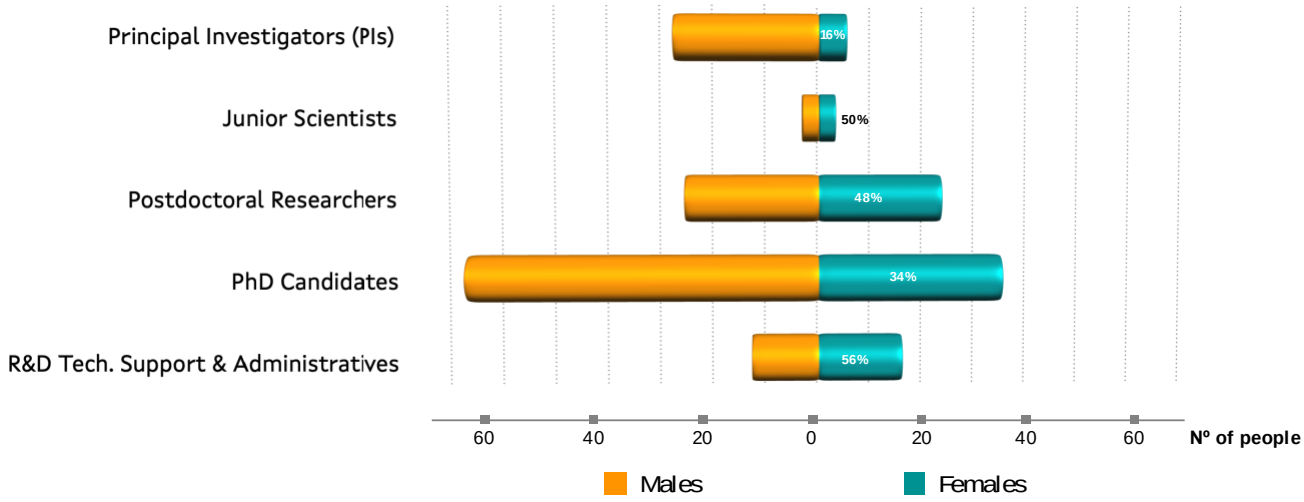
This **new transversal thematic area in computational chemistry and data science** will be led by CiQUS PI, Rebeca García Fandiño. The work in this field will benefit from the center's proximity to CITIUS, a unique USC center specialized in the field of new technologies and AI, and to CESGA.

4. HUMAN RESOURCES

4.1 Human Resources by Categories

31 Principal Investigators (PIs), 6 Junior Scientists (Junior Group Leader), 46 postdoctoral researchers, 96 PhD candidates and 27 Technical and administrative assistants (8 of them are directly hired by CiQUS research groups, under their own R&D research projects, for supporting them with administrative issues and/or technical research tasks) (Dec 31, 2023)

In December 2023, more than 200 people (38% female; 15% foreigners) were working at CiQUS: 31 Principal Investigators (1 of them *Ramón y Cajal* associate; 16% female; 6% foreigners), 6 Junior group leaders (4 *Ramón y Cajal* associates, 1 *Xunta de Galicia Distinguished Researcher,* 1 *Manuela Barreiro – USC Distinguished Researcher*, 50% female; 16% foreigners), 46 postdoctoral researchers (2 Ramón y Cajal, 4 *Juan de la Cierva*, 6 *MSCA-PF*, 10 *Xunta de Galicia* postdocs, and 1 *María de Zambrano* researchers; 48% female and around 28% of CiQUS postdoctoral researchers coming from abroad), 96 PhD candidates (34% female and 14% foreigners), together with 27 people of technical, management and administration staff (8 of them hired by a research groups). Furthermore, around 4 USC faculty members collaborate in the scientific activity of different research groups, though they are not officially affiliated at CiQUS. The full list of people (as for December 31, 2023) is included in Annex I.



Distribution of human resources by categories

4.2 Talent Recruitment

4.2.1 Human Resources hired under competitive public calls

At the level of **senior researchers**, Dr. Manuel Souto (ERC-Starting researcher) joined CiQUS in 2023 through the Oportunius program. Dr Souto will lead a new line of research at CiQUS, aimed at the design and synthesis of covalent organic networks (COFs) for their application in the development of electrodes for rechargeable batteries; strengthening the center's scientific capabilities in the area of functional materials and with broad synergies and potential interest in collaboration with other groups in the center both in the area of materials and synthetic methodologies. Dr. Souto joins CiQUS as a Principal Investigator (PI) after obtaining a positive assessment from the ESAB and approval from the center's Steering Committee.

Additionally, in spring 2023, professors Flor Rodríguez and Carmen Rios resigned their positions as Principal investigators at the CiQUS for personal reasons. This request was approved by CiQUS Governing Committee in November 2023.

At **senior postdoctoral level**, in 2023 it should be noted that CiQUS has two new Ramón y Cajal researchers (Julián Bergueiro and André Pérez Potti from the 2021 call). CiQUS researchers Manuel Nappi and Adrián Fernández were selected in the 2022 call for the same program, it is foreseeable that they will be incorporated as Ramón y Cajal contractors during the year 2024. Additionally, up to 3 other CiQUS researchers were selected as beneficiaries of the 2022 call (Jéssica Rodríguez, Manuel Ortuño and Rafael Rodríguez), who will continue their academic career from 2024 in other research centers in Spain.

The call for the year 2023 of the post-doctoral grant program of the Government of Galicia allowed in Modality B the continuity as a CiQUS researcher of Dr. Marta Castiñeira, while up to 4 CiQUS researchers were also selected in Modality A [Brenda Velasco, Juan Pedro mora, Martín Calvelo and Giulia Salluce]. With regard to the Juan de la Cierva call, 2 young researchers were granted in 2023 within this HHRR program (Sabela da Silva and Asier Selas). Additionally, Dr. Luis Mateo de Doni also started his Juan de la Cierva Contract in 2023 (call 2021).

Regarding International HHRR Programmes, up to **4 scientists have been granted with MSCA Postdoctoral Fellowships in the year 2023** (Mayra Queme, Ahmad Tayyebi, Esperanza Padín and Shaheen Pathan; 75% females and 75% foreigners from 3 different countries). The result of this call clearly reflects the success of the CiQUS strategic action for supporting MSCA candidates during the application process (see more info). Through this initiative, highly specialized support is provided to those candidates with outstanding scientific profiles aligned with our scientific strategic agenda in order to complement our research capacities (See link).

With regard to pre-doctoral trainees, up to **20 CiQUS PhD candidates** have been granted within the framework of different national and regional HHRR programmes during the year 2023: **4 MECD – FPU Predoctoral Contracts** (*National Programme*): D. Abella and A. López (Supervisor: J. Martínez-Costas), J. Corral (Supervisor: F. Rivadulla), and S. Serantes (Supervisor: J. Granja); **6 AEI – Predoctoral Contracts** (*National Programme; contracts associated to research projects funded by the AEI*): A. Vale (Supervisor: J.L. Mascareñas), H. Landín (Supervisor: F. Freire), A. Luaces (Supervisor: D. Pérez), N. Rey (Supervisor: D. Peña), M. Aguilera (Supervisor: B. Pelaz) and V. Álvarez (Supervisor: F. Rivadulla). Additionally, other 2 AEI -Predoctoral Contracts from this call are still open. **10 Xunta de Galicia Predoctoral Contracts** (*Regional Programme*): C. Aira (Supervisor: M. Nappi), A. Cabezón (Supervisor: R. García-Fandiño), B. Casabella and P. Suárez (Supervisor: C. González-Bello), P. Losada (Supervisor: M. Gulías), M.V. Malavé (Supervisor: D. Peña), M. Pérez (Supervisor: J. Montenegro), S. Serantes and A. Torrón (Supervisor: J. Granja) and A. Suárez (Supervisor: C. Saá).

It is worth mentioning that during 2023 **up to 70 researchers were funded by competitive public programmes** (49% of CiQUS trainees, considering postdoctoral and predoctoral researchers).

4.2.2 Human Resources hired through R&D contracts

During 2023, up to 77 researchers were directly hired by the CiQUS groups through R&D contracts (23 postdoctoral researchers and more than 54 PhD candidates). Additionally, CiQUS funds the R&D contract of 1 Junior Scientist (M. Nappi, *Manuela Barreiro Distinguished Researcher)* and 8 Master Students (CiQUS Part-time Research Initiation contracts. *See section 4.2.3*).

Regarding research support technicians and managers, whereas CiQUS funds the contract of 9 people (CiQUS technical support unit), up to 8 technicians are directly hired by the CiQUS groups.

4.2.3 CiQUS talent attraction programmes

Research initiation contracts for CiQUS Master Students: a strategic initiative aimed at master's students for strengthening some of the center's most active lines of research, as well as providing an unbeatable stimulus and experience to young, prospective researchers during this first training period. The 10th edition of this programme was launched in November 2022. Up to 8 master students were hired as part-time research initiation staff during 9 months in 2023. The final awardees are currently enrolled in the Master of Organic Chemistry (3), the Master in Biomedical Research (2), the Master in Chemistry at the Interface with Biology and Materials Science (1), the master in Physics (1) and the Master in Chemical Research and Industrial Chemistry (1). It is worth noting that 5 of the 8 master students granted within the framework of this call during the academic year 2022/2023 are currently performing their PhD studies at the CiQUS. All of them have been already granted with HHRR competitive public contracts for performing their PhD studies.

The 11th edition of this programme was launched in January 2024. Up to 8 master students were hired as part-time research initiation staff during 6 months in 2024. The final awardees are currently enrolled in the Master of Organic Chemistry (2), the Master in Biomedical Research (1), the Master in Chemistry at the Interface with Biology and Materials Science (4), and the Master in Chemical Research and Industrial Chemistry (1).

- **CiQUS Summer Fellowships programme**: a strategic initiative aimed at highly motivated undergraduate students (pursuing the last or penultimate academic course of their corresponding University Bachelor's Degree) with excellent academic records, giving them the opportunity to achieve their first research experience in first class labs, using state of the art equipment, and being training under the guidance of the different CiQUS Research groups. Although this initiative was originally launched by the CiQUS in the year 2014, since 2019 the call is jointly published with CiMUS, CiTIUS e IGFAE centers (*USC Research Centers accreditated by the Xunta de Galicia as Research Centers of Excellence*) and it is coordinated by the USC central services as a joint programme.

The 8th edition of this programme was launched in spring 2023. Up to 15 undergraduate students (8 of them were females) from 6 different Spanish Universities were granted within this call, and performed their one-month stay at CiQUS in July 2023. All of them presented an average mark on their academic track records above 8.0 points on a scale 0-10. Regarding their bachelor's degrees, 11 of them were enrolled in Chemistry, 1 in Biotechnology, 1 in Biology, 1 in the Physics & Chemistry Double Degree and 1 in the Chemistry Double Degree. Four of these scholarship holders are currently pursuing either their master's or bachelor's dissertations at the CiQUS.

Overall, CiQUS has maintained an increasing capacity to attract young researchers, especially predoctoral students.

5. R&D PROJECTS, NETWORKS, AND INTERNATIONAL COLLABORATIONS

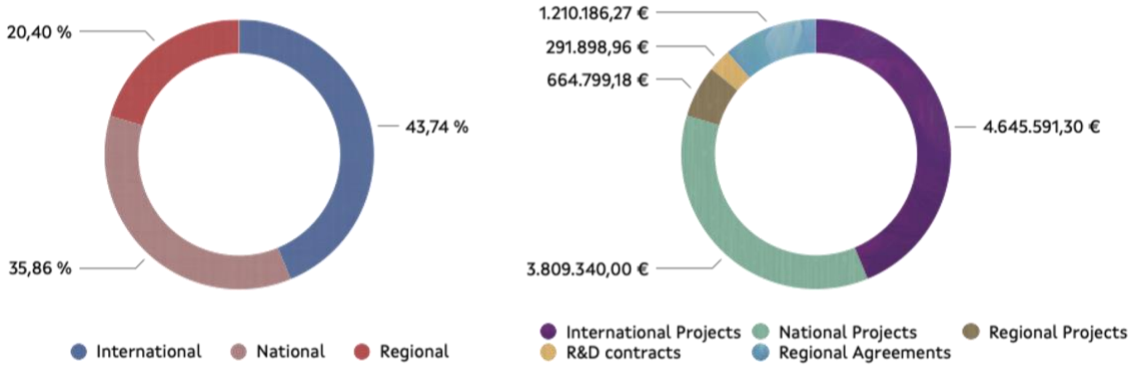
5.1 R&D Projects

- Over 11,5 M€ Total income of R&D projects, grants, contracts and agreements raised by CiQUS researchers in 2023.
- 1 EIC Transition Open, 1 ERC-StG and 1 CaixaResearch Health
- 12 New R&D Projects funded by the AEI (Spanish Research Agency) in 2023 (2,75 M€). Also granted with 8 Predoctoral Contracts (0,93 M€).

During 2023, the CiQUS progress continued in consolidating the scientific structure of the center, by obtaining funding through competitive R&D programmes that will sustain the different research lines define as the strategic nucleus of the CiQUS' Scientific agenda for the next 3-5 years.

The year 2023 has been successful both in terms of total achieved income (**over 11,5 M€**), as well as regarding the total number of competitive R&D projects granted to CiQUS Researchers through the different international, national, and regional calls (**8,31 M€** for a total number of **26 projects**).

A detailed analysis shows that 13 of the 18 CiQUS research groups have been granted with new funds in 2023 (72% of CiQUS' research groups), while up to 19 CiQUS researchers are listed as Principal Investigator (PI) of the different proposals (among them, 16 CiQUS PIs and 3 Ramón y Cajal Researchers).



Left: Distribution of R&D projects granted in 2023, by source of revenue | Right: CiQUS' 2023 fundraising results, by type of Income

The distribution of funds raised by CiQUS research groups in 2023 by source of revenue shows that 44% of them comes from international programmes, 36% from national programmes and 20% from regional programmes. An analysis of the type of income shows that 91% comes from R&D projects, 6,2% correspond to special agreements with the Regional Government, and 2,8 % comes from R&D contracts.

In the framework of international funding, CiQUS received a new ERC Starting Grant (Dr. Manuel Souto, 1.5 M€) and 1 EIC Transition Open (Dr. Javier Montenegro, 2.5 M€), which to date represents the first and unique EIC Transition project in Galicia. At the national level, the success achieved by CiQUS researchers in the new call for Knowledge Generation Projects is particularly noteworthy, achieving 12 projects with a total amount of around 2.75 million euros, in addition 8 of them have associated pre-doctoral contracts, and a CaixaResearch project from the 2023 Health Research call of the "la Caixa" Foundation, awarded to Javier Montenegro (€0.90 M).

The main R&D projects (including innovation projects) granted and/or starting at the CiQUS throughout 2023 are listed below:

COMPETITIVE INTERNATIONAL CALLS

1 ERC Starting Grant | 1,5 M€

• DOI: 10.3030/101039748 | *Molecular Design of Electrically Conductive Covalent Organic Frameworks as Efficient Electrodes for Lithium-Ion Batteries* (ELECTROCOFS). PI: Manuel Souto. EU contribution: € 1.498.619,00.

1 EIC Transition Open| 2,5 M€

• DOI: 10.3030/101113110 | *TraffikGene-Tx: TraffikGene-Tx: Targeted Peptide Carriers for RNA Delivery* (TraffikGene-Tx). PI: Javier Montenegro. EU contribution: € 2.498.963,75.

1 EIC Pathfinder | 0,5 M€

• DOI: 10.3030/101099867 | *Cart T cells Rewired to prevent EXhaustion in the tumour microenvironment* (CAR-T REX). PI: Javier Montenegro. EU contribution: € 2.733.931,25 (Total CiQUS: € 560.513, started in Spring 2023). (*)

6 MSCA Postdoctoral Fellowships (PF) | 0,87 M€ (total EU contribution. The corresponding employment contracs are included)

• DOI: 10.3030/101109331 | *Elucidating the nano-biointeractions on DNA origami* (ORBIT). Supervisor: Beatriz Pelaz. EU contribution: € 181.152,96.

• DOI: 10.3030/101110303 | *From Supramolecular to Covalent Boron Cluster Membrane Carriers* (CONNECT). Supervisor: Javier Montenegro. EU contribution: € 165.312,96.

• DOI: 10.3030/101109284 | *Development of chiral palsmonic materials with the tailored optical response of self-assembled chiral nanocomposite* (GoldHelix). Supervisor: Félix Freire. EU contribution: € 165.312,96.

• DOI: 10.3030/101107294 | *Bias-free high-performance solar NH_3 production by perovskite-baseed photocathode and in-situ valorisation of glycerol* (PECSolFuel). Supervisor: María Giménez-López. EU contribution: € 181.152,96. This project started in April, 2024. (*)

Additionally, two other MSCA-PF projects from the 2021 call have started at CiQUS during 2023:

• DOI: 10.3030/101063372 | *Deep eutectic solvents for membrane transporto f nucleic acids* (DUNE). Supervisor: Javier Montenegro. EU contribution: € 165.312,96.

• DOI: 10.3030/101063372| *Engineered Exosomes for Stimuli-responsive Image-guided Drug delivery for Cancer Theranostic applications* (TheranoXome). Supervisor: Pablo del Pino. EU contribution: € 181.152,96.

(*) INCOME not included as 2023 funds.

COMPETITIVE NATIONAL CALLS

1 CaixaResearch Healt | 0,98 M€

• HR23-00221: *ChaoTROPIC Antimicrobial Hybrids for Bacterial Penetration*. PI: Javier Montenegro. INCOME: € 984.050,00.

12 AEI - Knowledge Generation Projects| 2,75 M€

- PID2022-136785NB-I00: *New strategies of enantioselective synthesis based on the activation of C-H bonds through organometallic catalysis*. PI: Moisés Gulías. INCOME: € 175.000.

- PID2022-136848NB-I00: *Covalent and Supramolecular Helical Polymers: Design, Structure, and Stimuli-Responsive Properties*. PI: Félix Freire. INCOME: € 281.250. Also granted with a Predoctoral Contract.

- PID2022-136963OB-I00: *New Precision Antibacterial Agents and Combined Therapies to Combat Multiresistant Infections* (PRECO). PI: Concepción González Bello. INCOME: € 237.500. Also granted with a Predoctoral Contract.

- PID2022-137318OB-I00: *Biomedical applications of transition metal complexes: catalytic tools and development of new anticancer therapies*. PI: José Luis Mascareñas. INCOME: € 500.000. Also granted with a Predoctoral Contract.

- PID2022-139720OB-I00: *Evolution of IC-Tagging technology for the production of vaccines and stabilized enzymes* (MiST-IC). PI: Jose M. Martínez Costas. INCOME: € 125.000.

- PID2022-139933NB-I00: *Arynes and metal catalysis: innovative strategies and methods for the synthesis on nonconventional carbon nanostructures* (ARYCATINN). PI: Dolores Pérez. INCOME: € 218.750. Also granted with a Predoctoral Contract.

- PID2022-140845OB-C62: *Design and synthesis of precursors for the preparation of functional molecular nanostructures*. PI: Diego Peña. INCOME: € 262.500. Also granted with a Predoctoral Contract

- PID2022-141534OB-I00: *Deciphering the lipid code connection between cancer, infection and aging: towards unconventional theranostic tools and innate memory-based vaccines* (KnockOnCellDoor). PI: Rebeca García Fandiño. INCOME: € 156.250.

- PID2022-141673OA-I00: *Eutectic systems for transmembrane transport of nucleic acids and proteins*. PI: Adrián Sánchez Fernández. INCOME: € 118.750.

- PID2022-142338OB-I00: *DNA origamis for modulating acquired immune response. PI: Beatriz Pelaz*. INCOME: € 185.000. Also granted with a Predoctoral Contract.

- PID2022-142440NB-I00: *Supramolecular materials based on cyclic peptides. A supramolecular chemotherapeutic approach* (SupraCPs). PI: Juan R. Granja. INCOME: € 275.000. Also granted with a Predoctoral Contract.

- PID2022-138883NB-I00: *Complex oxide interfaces for reconfigurable thermal boundary conductance* (COMTHERFACES). PI: Francisco Rivadulla. INCOME: € 212.500. Also granted with a Predoctoral Contract.

It should be noted that 33.3% of the projects financed for CiQUS within the framework of this call are led by women.

Finally, national funding also includes the complementary support income associated to the young talent incorporation programmes such as Ramón y Cajal and Juan de la Cierva.

COMPETITIVE REGIONAL PROGRAMMES

5 Regional Competitive Grants for Consolidation and structuring of research Groups and Young researchers | 0,64 M€

• **ED431B 2023/19**: Potential Growth Group: GI-1217 – *Nanotools for biomedical applications*. PI: Beatriz Pelaz. INCOME: **€ 90,000**.

• **ED431B 2023/23**: Potential Growth Group: GI-1597 – *Drug discovery and synthesis*. PI: Eddy Sotelo. INCOME: **€ 120,000**.

• **ED431F 2023/42**: Modality C (Excellence Projects): *Development of new tools and probes for the study of biological processes. Transfer of photocatalysis to the context of bioorthogonal chemistry*. PI: María Tomás. INCOME: **€ 115,000**.

• **ED431F 2023/22**: Modality C (Excellence Projects): *Study of the topology of peptide secondary structures and their interaction with other biomolecules and synthesis of new structures combining anisotropic plasmonic particles and supramolecular polymers*. PI: Julián Bergueiro. INCOME: **€ 115,000**.

• **ED431F 2023/12**: Modality C (Excellence Projects): *Generation of Libraries of New Dynamic Peptides for the Delivery of Nucleic Acids with Therapeutic Potential*. PI: Javier Montenegro. INCOME: **€ 200,000**.

Regional funding also includes the complementary support income associated to the young talent incorporation programme Contratos Predoutorais Xunta de Galicia – Modality B.

Furthermore, CiQUS' income for the year 2023 also includes funds linked to regional agreements (1,21 M€), R&D contracts (0,30 M€) and R&D funds associated to HHRR competitive programmes (0,08 M €).

Our figures in 2023, show **86 active competitive projects**. These projects include **6 ERC** (1 SyG, 1 CoG, 3 StG and 1 PoC), **2 EIC** (1 Pathfinder, 1 Transition Open), **3 FET-Open**, **1 ICT**, **1 MSCA ITN**, **1 H2020 Societal Challenges**, **1 CaixaResearch Consolidate, 1 CaixaResearch Health**, up to **28 RETOS or Generación de Conocimiento** national projects, among others. Update information on the complete list of active projects at the center can be found at the following link https://www.usc.es/ciqus/en/research/projects.

Additionally, regarding other financial contributions, in 2023 CiQUS received a transfer of € 187,472 associated to a USC pilot programme for the partial (20%) return of the overheads to the accredited research centers.

Finally, it is also worth noting the significant financial support associated to the hiring expenses of the 74 CiQUS' trainees holding research contracts under competitive HHRR programmes (Ramón y Cajal, Juan de la Cierva, MSCA-PF, FPU, AEI predoctoral, Galician postdoctoral and predoctoral programmes, etc). This funding is directly managed by the USC central offices, and it has not been included in the INCOME figures disclosed above.

5.3 Research Networks

Regarding **International Research Networks**, CiQUS researchers participate in **two newly COST Actions** approved in Spring 2023 by the European Union:

- **Supramolecular LUminescente Chemosensors for Environmental Security (LUCES)** | CA22131 | Action Chair: Prof Laura Rodríguez (Universitat de Barcelona, Inorganic Department – Faculty of Chemistry, Spain) | CiQUS PI: **E. Vázquez** | Start date – 16/10/2023; End date – 15/10/2027.

- **European metal-organic framework network: combining research and development to promote technological solutions (EU4MOFs)** | CA22147 | Action Chair: Prof Stefan Wuttke (University of Lincoln, Joseph Banks Laboratories, UK) | CiQUS PI: **M. Souto** | Start date – 02/12/2023; End date – 01/11/2027.

Additionally, six COST Actions remained active in 2023 with participation of CiQUS PIs:

- **European Network for diagnosis and treatment of antibiotic resistant bacterial infections (EURESTOP)** | CA21145 | Action Chair: Prof Mattia Mori (Università di Siena, Italy) | CiQUS PI: **R. García-Fandiño** | Start date – 06/10/2022; End date – 05/10/2026.

- **Modelling immunotherapy response and toxicity in cancer (IMMUNO-model)** | CA21135 | Action Chair: Dr. Eva Martínez-Balibrea (Fundació Institut d' Investigació Germans Trias i Pujol, Spain) | CiQUS PIs: **E. Sotelo** and **J.M. Martínez-Costas** | Start date – 02/11/2022; End date – 01/11/2026.

- **Iron-sulphur (FeS) clusters: from chemistry to immunology (FeSImmChemNet)** | CA21115 | Action Chair: Dr. Kourosh Ebrahimi (King's College London, UK) | CiQUS PI: **J.M. Martínez-Costas** | Start date – 19/09/2022; End date – 18/09/2026.

- **European Network for Innovative and Advanced Epitaxy (OPERA)** | CA20116 | Action Chair: Dr. Noelle Gogneau (CNRS, France) | CiQUS Junior Scientist: **R. Ramos** | Start date – 27/09/2021; End date – 26/09/2025.

- **European Research Network on Signal Transduction (ERNEST)** | CA18133 | Action Chair: Dr. Jana Selent (GRIB – Research Programme on Biomedical Informatics, Spain) | CiQUS PI: **E. Sotelo** | Start date – 11/03/2019; End date – 10/03/2023.

- **Cancer nanomedicine – from the bench to the bedside (NANO2CLINIC)** | CA17140 | Action Chair: Prof. Sabrina Pricl (University of Trieste – MOSE-DMNR, Italy) | CiQUS PI: **E. Fernández-Megía** | Start date – 13/04/2018; End date – 27/03/2023.

In terms of **National Research Networks**, CiQUS researchers participate in **7 newly Research Networks** (Redes de Investigación) which has been provisional approved by the Spanish Research Agency within the Call 2022. Furthermore, 1 of these new research networks is coordinated by a CiQUS PI (M. Lazzari):

- **Science and Technology Network for the conservation of cultural heritage** | RED2022-134287-T | Coordinator: **Massimo Lazzari** (CiQUS PI, Galicia) | Start date 2023; End date 2024.

- **Structures, methodologies and materials based on organometallic complexes** | RED2022-134287-T | Coordinator: Complutense de Madrid University (Madrid) | CiQUS PIs: **C. Saá** and **J.V. Varela** | Start date 2023; End date 2024.

- **Molecular Nanoscience Network (NanoMolNet)** | RED2022-134713-T | Coordinator: ICMOL (C. Valenciana) | CiQUS PIs: **D. Pérez** | Start date 2023; End date 2024.

- **Organic electronic devices: from high-performance materials to advanced applications** | RED2022-134503-T| Coordinator: ICMAB (Catalonia) | CiQUS PIs: **D. Peña**| Start date 2023; End date 2024.

- **Asymmetric Catalysis Research Network** | RED2022-134331-T | Coordinator: Euskal Herriko Univertsitatea (Basque Country) | CiQUS PIs: **M. Fañanás**| Start date 2023; End date 2024.

- **Nanomedicine Network for advancing in the diagnosis and treatment of high social impact diseases (NanoCARE 2.0)** | RED2022-134560-T| Coordinator: University of Granada (Andalucía) | CiQUS PIs: **E. Fernández-Megía** | Start date 2023; End date 2024.

- **(Photo-)electrocatalysis: from the atomic scale to advance devices** | RED2022-134508-T| Coordinator: Euskal Herriko Univertsitatea (Basque Country) | CiQUS PIs: **M. Giménez-López** | Start date – 02/11/2022; End date – 01/11/2026.

Finally, regarding **Regional Research Networks**, CiQUS holds the accreditation of excellence as Research Center of the Galician University System 2023-2027, ranked by the external evaluation committee as first of the 10 centers that currently make up the **CIGUS Network** promoted by the Xunta de Galicia. Additionally, CiQUS is 1 of the 5 USC Research Centers included in the Singular Research Centers Network of the University of Santiago de Compostela.

5.4 International Collaborations

CiQUS researchers have demonstrated their commitment with international collaborations, both through the active participation in collaborative projects funded by highly competitive international programmes, and through scientific collaborations resulting in high impact publications. In this context, **44 articles** (49%) of CiQUS scientific production during the year 2023 **resulting from international collaborations**. Among them, it is worth mentioning those results published in top-ranked journals such as **Chem**, **Advanced Functional Materials, Angewandte Chemie International Edition**, **Nature Communications**... Among the collaborators, there are research groups from up to 29 different countries (UK, Italy, Germany, Portugal, USA, Czech Republic, Argentina, Austria, Estonia, France, Ireland, Japan, Luxembourg, Mexico, The Netherlands, Poland, Switzerland, Belgium, Brazil, Chile, Denmark, Finland, Hungary, India, Pakistan, China, Scotland, Sweden and UAE).

Furthermore, it is highly remarkable the number of international projects in collaboration active at the CiQUS during the year 2023:

- **ERC-SyG-MolDAM** (CiQUS PI: D. Peña) | *Single Molecular Devices by Atomic Manipulation* | In collaboration with: IBM Research GMBH (Switzerland) and the Universitaet Regensburg (Germany).

- **ICT-REAP** (CiQUS PI: B. Pelaz) | *Revealing drug tolerant persister cells in cancer using contrats enhanced optical coherence and photoacoustic tomography* | In collaboration with: the Medizinische Universitaet Wien, the AIT Austrian Institute of Technology GMBH, the Picophotonics Oy (Finland), the Tampereen Korkeakoulusaatio SR (Finland), the Politecnico di Torino (Italy), Innolas Laser GMBH (Germany), Lavision Biotec GMBH (Germany) and Linoix International BV (The Netherlands).

- **FET-Open e-Prot** (CiQUS PI: E. Vázquez) | *Protein-based conductive materials pave the way for next-generation energy storage devices* | In collaboration with: CiC biomaGUNE (Spain), Universidade de Aveiro (Portugal), Ben-Gurion University of the Negev (Israel), University of Alicante (Spain), CiC EnergiGUNE (Spain), Smart Fabric Inks Limited (UK) and Specific Polymers (France).

- **FET-Open SWIMMOT** (CiQUS PI: B. Pelaz) | *Switchable magneto-plasmonic contrast agents and molecular imaging technologies* | In collaboration with: AIT Austrian Institute of Technology GMBH (Austria), Institut National des Sciences Appliquees de Toulouse (France), Centre National de la Recherche Scientifique CNRS (France), Medizinishce Universitaet Wien (Austria) and Universitaet Innsbruck (Austria).

- **FET-Open SPRING** (CiQUS PI: D. Peña) | *Spin Research IN Graphene* | In collaboration with: CIC NanoGUNE (Spain), Technische Universiteit Delft (The Netherlands), IBM Research GMBH (Switzerland), The Chancellor, Masters and Scholars of the University of Oxford (UK) and the DIPC Foundation (Spain).

- **MSCA-ITN HeatNMof** (CiQUS PI: P. del Pino) | *Heating triggered drug release from nanometric inorganic-metal organic framework composites* | In collaboration with: IMDEA Energy Foundation (Spain), Centre National de la Recherche Scientifique CNRS (France), Univeriteit Antwerpen (Belgium), Immaterial LTD (UK), Institut

National des Sciences Appliquees de Toulouse (France), Univeritaet Hamburg (Germany), Fondazione Istituto Italiano di Tecnologia (Italy), Nanoscale Biomagnetics S.L. (Spain) and ISERN Patentes y Marcas M S.L. (Spain).

- **JTC FLAG-ERA LEGOCHIP** (CiQUS PI: D. Peña) | *Multifunctional Nanoporous Graphene Integration in Operational Nanophotonic Biosensor Devices* | In collaboration with: ICN2 (Spain), University of Bologna (Italy) and University of Manchester (UK).

- **JTC EuroNanoMed III PLATMED** (CiQUS Junior Scientist: E. Polo) | *Biomimetic Platelet-Derived Nanomedicines for Treatment of Thromboembolic Stroke* | In collaboration with: IDIS (Spain), University Caen-Normandy, GIP Cyceron (France), McGill University (Canada) and Op2Lysis (France).

- **EIG CONCERT-Japan 5th Joint Call SUPRAPOROUS** (CiQUS PI: J. Montenegro) | *Nanoparticle Supramolecular Frameworks as Advances Nanoporous Materials* | In collaboration with: University of Tokyo (Japan), University of Hamburg (Germany) and UAB Ferentis Company (Lithuania).

Regarding international scientific meetings, it should be highlighted that **Prof. José Luis Mascareñas** has been appointed in 2023 as **2024 Vice-president** and **2025 President** of the very prestigious **Bürgenstock Conference**, annually organized by the Swiss Chemical Society.

In terms of International Evaluation Panels, **Prof. María Giménez-López** participated as panel member for the Call 2023 of the ERC Starting Grant. Additionally, it is also worth noting the active participation of CiQUS researchers as remote and/or external evaluators for international funding agencies all around the world. Specifically, during 2023 up to 19 CiQUS researchers (16 PIs, 2 Junior Scientists and 1 Postdoctoral researcher) acted as evaluators for more than 45 international competitive calls, EIC Pathfinder (*EU*), MSCA-PF (*EU*), MSCA-DN (*EU*), Research Grant Council (*Hong Kong*), Individual Call to Scientific Employment Stimulus – 6th Edition (*FCT, Portugal*), Eurostars (*EUREKA, Europe*), Grand Solutions Programme (*Innovation Fund Denmark*), ACS PRF (Petroleum Research Fund) (*USA*), FWO Large infrastructures (*Belgium*), SPP - DFG Priority Programs (*German Research Foundation, Germany*), National Science Center (*Poland*), Leibniz Collaborative Excellence (*Leibniz Association, Germany*), Ikerbasque (*Spain*), AEI (*Spain*), ISCIII (*Spain*), among others.

6. RESEARCH OUTPUT

6.1 Scientific Production

6.1.1 Scientific publications

CiQUS maintained a good record of scientific contributions in 2023, with 90 articles, all of them published in JCR Journals. From them, **up to 30 articles were published in journals with IF>9**, which represents 33% of CiQUS JCR publications in 2023. It should be especially highlighted the papers published by CiQUS researchers in top impact journals during last year, **1 Advanced Materials, 1 Chem, 2 Advanced Functional Materials, 4 Angewandte Chemie International Edition**, among many others. Furthermore, up to 4 articles were published in Nature Communications and other 3 in the Journal American Chemical Society.

Journal Name	JCR - IF (*)	nº of published articles
Advanced Materials	27,4	1
Chem	19,1	1
Advanced Functional Materials	18,5	2
Angewandte Chemie-International Edition	16,1	4
ACS Nano	15,8	2
Advanced Drug Delivery Reviews	15,2	1
Nature Communications	14,7	4
Journal of the American Chemical Society	14,4	3
Trends in Chemistry	14,0	1
Chem Catalysis	11,5	1
ACS Catalysis	11,3	4
Additive Manufacturing	10,3	1
Nano Letters	9,6	1
Journal of Colloid and Interface Science	9,4	3
Energy	9,0	1

Table 1. Scientific Journals with JCR- IF > 9, in which CiQUS articles were published during 2023 and total number of articles per Journal.

During 2023, 49% of the contributions involved international collaborations, many of them with prestigious research centres and groups. **Annex IV** shows a full listing of the scientific articles in JCR journals published by CiQUS researchers in 2023.

Finally, in line with the commitments of the National and European R&D funding agencies regarding Open Access policy, CiQUS encourages its research groups for publishing under Open Access models. According to Web of Science database, 81 articles (90% of the total number of JCR papers) published by CiQUS researchers in 2023 were already Open Access articles. Furthermore, in collaboration with the USC library, CiQUS supports its researchers in archiving their scientific production in the institutional online repository of the University of Santiago de Compostela (Minerva).

During the year 2023, **78% of CiQUS's articles were published in journals indexed in the first quartile (Q1)** of **Journal Citation Reports (JCR)** and, more significantly, **34% in the first decile (JCR-D1)** of their respective thematic areas of the Web of Science database (WoS) (see Annex IV). In 2023, the **average impact factor of CiQUS JCR articles was 7,9**, keeping this impact indicator above 7 for eigth year in a row, which is truly remarkable considering the general decline in impact indices experienced by almost all journals indexed in JCR for the year 2023. Regarding *Scimago Journal & Country Rank (SJR)*, 88% of CiQUS's articles were published in journals indexed in the first quartile (SJR-Q1), and 49% in the first decile (SJR-D1).

6.1.2 CiQUS Scientific Highlights

Among the most outstanding CiQUS scientific results, in 2023 there are remarkable contributions in the three strategic thematic areas of the center. Among the articles published by the center's researchers last year, the following two stand out for their impact:

- "*Photo-assembling cyclic peptides for dynamic light-driven peptide nanotubes*", published on ***Chem*** journal. This is the result from the international collaboration of the group of Prof. Juan R. Granja and Prof. Alesssandro Moretto from the University of Padova (Italy). The authors explore the behavior of cyclic peptides containing b-unsaturated amines against light irradiation, and the influence that this irradiation exerts on the behavior of the structures of the self-assembled peptide nanotubes themselves, inducing self-fusion properties in these supramolecular structures.

- "*On-Surface Synthesis of Nanographenes and Graphene Nanoribbons on Titanium Dioxide*", published on ***ACS Nano***. An international collaboration of the group of Profs. Dolores Pérez and Diego Peña and the group of Prof. Szymon Godlewski of the Center for Nanometer-Scale Science and Advanced Materials, NANOSAM, at the Jagiellonian University (Krakow, Poland). The authors present the development of a new methodology based on cyclodehydrogenative planarization of great interest for the rational design and synthesis of molecular nanostructures in semiconductors.

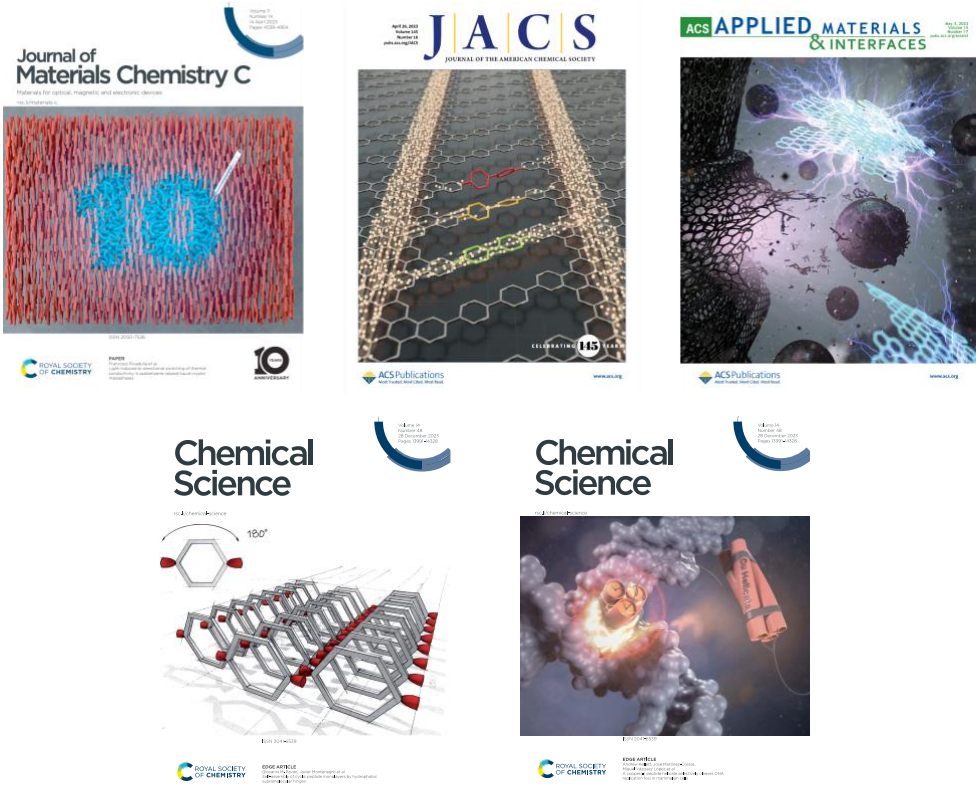
- "*Iridium-Catalyzed ortho-Selective Borylation of Aromatic Amides Enabled by 5-Trifluoromethylated Bipyridine Ligands*", published on ***Angew. Chem. Int. Ed***. A collaboration between the group of Prof. Mascareñas and the group of Prof. Jiménez-Osés from CIC bioGUNE (expert in computational chemistry). The authors present in this work the introduction of a CF_3 group as a substituent in bipyridine-type linkages as a crucial strategy for regioselective control in benzamide borylation reactions catalyzed by iridium complexes, with notable advantages over other previous synthetic procedures.

We must also highlight the efforts of CiQUS PIs from different research groups to combine skills and tackle new and ambitious challenges from a multidisciplinary approach. Among the collaborative articles published in 2023, the following work is very notable:

- *A copper(II) peptide helicate selectively cleaves DNA replication foci in mammalian cells* (*Chem. Sci.*). This article is the result of collaborative research of up to 3 different CiQUS research groups: the group of professors Miguel Vázquez and Eugenio Vázquez (Biological Chemistry, experts in metallopeptides and on the design of agents for DNA recognition, sensors and molecular devices), the group of Professor Jose M. Martínez-Costas (Biochemist, expert in molecular virology, who jointly led with Prof. Miguel Vázquez the development and supervision of the biological studies of the article), and the participation of professor Francisco Rivadulla (Physical Chemist and expert in functional materials, responsible in this article of the EPR study). This publication reports the first example of a chemical nuclease that can discriminate with high selectivity 3WJ from other forms of DNA, both in vitro and in mammalian cells. The experimental results achieved in this project have the potential to pave the way for the development of a new class of anticancer agents based on artificial nucleases based on copper complexes.

On the other hand, up to 4 CiQUS articles were selected by different journals as ***Hot articles/hot topics*** in 2023: *Iridium-Catalyzed ortho-Selective Borylation of Aromatic Amides Enabled by 5-Trifluoromethylated Bipyridine Ligands* (*Angew. Chem. Int. Ed.*, **Hot Topic: C-H activation**); *The role of the degree of polymerization in the chiroptical properties of dynamic asymmetric poly(diphenylacetylene)s* (*J. Mater. Chem. C*, **HOT Paper**), *C-C Bond Formation via Photocatalytic Direct Functionalization of Simple Alkanes* (*Chem. Commun.*, **HOT Article 2023**), and *On-Surface Synthesis and Characterization of a High-Spin Aza-[5]-Triangulene* (*Angew. Chem. Int. Ed.*, **Hot Topic: Surfaces and Interfaces**).

Finally, 5 CiQUS' articles were selected as **cover image** in the volumes in which they were published: i) *Light-induced bi-directional switching of thermal conductivity in azobenzene-doped liquid crystal mesophases (**J. Mater. Chem. C**), ii) Molecular Bridge Engineering for Tuning Quantum Electronic Transport and Anisotropy in Nanoporous Graphene (**J. Am. Chem. Soc.**), iii) Electrochemically Versatile Graphite Nanoplatelets Prepared by a Straightforward, Highly Efficient, and Scalable Route (**ACS Appl. Mater. Interfaces**), iv) Self-assembly of cyclic peptide monolayers by hydrophobic supramolecular hinges (Chem. Sci.)* and *v) A copper(II) peptide helicate selectively cleaves DNA replication foci in mammalian cells (Chem. Sci.)*



2023 CiQUS' covers

A complete list of articles, with links to their respective journal websites, can be found in CiQUS web page (https://www.usc.es/ciqus/en/research/publications). Additional information about the selected articles, considered as significant scientific contributions of that period, can be found in the News section of the website (https://www.usc.es/ciqus/en/news). These findings and other relevant announcements were disseminated by our Communication and Outreach unit through the CiQUS' website (news section), social networks (Twitter, Facebook, Youtube, and LinkedIn) and, in some cases, through the press media.

6.1.3 Other research outputs

- ***Patent applications***

During 2023, CiQUS researchers obtained the **approval of two international patents:** *Ruthenium complexes for treating cancer* (JP72296877, PI J.L. Mascareñas) and *Magnetic nanoparticles for treatment of tumors* (US11547721B2, PI J. Granja, in collaboration with Italian institutions), respectively. Furthermore, up to 10 International extensions were applied for the next patents in 2023*: Functionalized isonitriles* (US18/006,908, CA3187052, PI E. Sotelo), *Compound for batteries* (EP4213247A1, US2023357289A1, PI M. Giménez-López),

Supramolecular fluid (EP4213251A1, US2023361330A1, JP2023541187A, CN116323549A, BR112023004649A2, PI M. Giménez-López) and *Peptides for intracellular delivery* (TW112123732, PI J. Montenegro).

Additionally, a new Spanish patent (P202330185, PI J. Martínez-Costas) and a European patent (EP23382707, PI M. Giménez-López) have been applied during 2023. For more detail, please see section 7.4 Patents.

• ***PhD Theses***

In 2023, up to 14 PhD Theses (50% female) were defended under the supervision of CiQUS PIs. All of them obtained a *Sobresaliente cum laude* qualification and 8 of them obtained a *European doctorate/International Mention,* which represents the 57% of CiQUS PhD dissertations. Additionally, 3 of them were international trainees (21%).

Detailed information about CiQUS PhD theses presented in this period can be found in Annex V and on CiQUS website. Up to 71% these PhD candidates were funded from competitive human resources programmes while the rest were hired under R&D contracts linked to their advisor's research grants.

• ***Contributions to scientific congresses***

CiQUS Research Staff gave over 31 lectures in 2023. **2 of them as Plenary, 5 as Keynote and 24 as Invited Speakers** at international conferences and meetings from up to 9 different countries (Germany, Belgium, Brazil, China, Spain, France, Italy, Portugal and Poland). Furthermore, CiQUS Researchers attended many others national and international scientific meetings from up to 17 different countries (Germany, Brazil, China, Spain, USA, France, Greece, Island, Italy, Japan, The Netherlands, Portugal, Czech Republic, Singapore, Sweden, Switzerland and UK), and presenting there more than 71 oral communications, 19 *flash* communications and more than 108 posters.

• ***Research Mobility***

In 2023, up to 11 CiQUS PhD candidates had short stays at prestigious national and international research institutions from 6 different countries: South Korea (Institute for Basic Science, Daejeon / Korea Advanced Institute of Science and Technology); Spain [CIC biomaGUNE and Universitat Autònoma de Barcelona(UAB)], USA (University of California-Berkeley, University of Oregon, University of California-San Francisco), Ireland (University College Dublin); Switzerland (IBM Zurich and ETH Zurich), and UK (NIBSC-MHRA and University of Glasgow). These short stays were part of their PhD training programme (predoctoral secondments).

Additionally, in the framework of scientific collaborative projects 1 CiQUS PI and 3 CiQUS Postdoctoral researchers had short stays at the University of Minnesota (USA), Rennes University 1 (France), iThera (Germany) and ALBA Synchrotron Light (Spain), respectively.

• ***Visiting Researchers***

Despite of the difficulties for mobility and the extended period of lockdown, CiQUS received during the year 2023 up to 21 visiting researchers for short stays at our center (52% female; 4 Senior Researcher and 17 Postdoctoral or PhD candidates), coming from up to 12 different countries (Italy, Germany, Spain, Cuba Poland, Turkey, Czech Republic, Greece, France, India, Chile and China).

6.2 Awards

Prof. Diego Peña was recognized with the 2023 Research Excellence Award from the Royal Spanish Chemical Society (RSEQ), sponsored by the chemical company BASF. In addition, the Royal Galician Academy of Sciences (RAGC) awarded the Ernesto Viéitez Cortizo 2022 Research Award, in the category of senior researchers, to the team formed by Prof. Diego Peña and Dr. Iago Pozo, for an article "*Selectivity in single-*

molecule reactions by tip-induced redox chemistry" published in Science journal of the year 2022 (https://doi.org/10.1126/science.abo6471).

Prof. Félix Freire received the José Barluenga Medal 2023 from the Specialized Group of Organic Chemistry (GEQOR) of the Royal Spanish Society of Chemistry (RSEQ).

Prof. José Luis Mascareñas was selected as new academic member of the Royal Academy of Pharmacy of Galicia (RAFG).

Dr. Manuel Nappi received one of the Thieme Chemistry Journal Awards of the year 2023, prizes awarded by the Thieme publishing house.

Furthermore, regarding to the predoctoral researchers of the center, in the year 2023, **Joan Miguel Ávila** PhD dissertation (former CiQUS PhD candidate supervised by Prof. José Luis Mascareñas) was selected as the 2022 best thesis in the field of biological chemistry by the Specialized Group of Biological Chemistry of the Royal Spanish Society of Chemistry (RSEQ-QEGB); **José Manuel González** (former CiQUS PhD candidate supervised by Prof. José Luis Mascareñas) received one of the 2023 Lilly Research Awards for doctoral students and **Marcos Vilela** (PhD Candidate supervised by Prof. Juan Granja) received the Second prize for Excellence in the 10th Julián Francisco Suárez Freire Award for young researchers from the Royal Academy of Pharmacy of Galicia. In terms of academic recognitions, Iago Pozo (former CiQUS PhD candidate supervised by Professors Dolores Pérez and Diego Peña) and *Soraya Learte* (former CiQUS PhD candidate supervised by Prof. José Luis Mascareñas) received the Extraordinary Doctorate Prize from the University of Santiago de Compostela.

Several other CiQUS researchers have also been awarded for their contributions to different scientific conferences, among others:

· *Marta Castiñeira* (Postdoctoral Researcher – Fernández-Ramos Group): Best Oral Communication at the XVII Iberian Joint Meeting on Atomic and Molecular Physics | Portugal.

· *Jesús Bello* (PhD candidate – Saá | Varela Group): Best Poster Prize at the XIV International School on Organometallic Chemistry "Marcial Moreno Mañas" | Alicante, Spain.

· *Anxo Lema* (PhD candidate – Fernández-Ramos Group): Best Online Poster Prize at the 12th International Conference of Chemical Kinetics 2023 | China.

· *Manuel Ceballos* (PhD candidate – del Pino| Pelaz Group): Best Poster Prize at 1st Mediterranean Conference on Porous Materials (sponsored by Journal of Materials Chemistry A, B, C) | Greece.

· *Bruno Delgado* (PhD candidate – Quiñoá | Fernández-Megía | Freire Group): Best Poster Prize at the X Encontro da Mocidade Investigadora | Galicia, Spain.

· Carla Lorenzo (Phd candidate - Quiñoá | Fernández-Megía | Freire Group): José Otero-Carmela Martinez 2023 grant for the promotion of research through doctoral studies | Galicia, Spain.

· *Alejandra Varela* (Master student – Mascareñas | López | Gulías Group): Best Poster Second Prize at the XV Simposio del Máster Interuniversitario en Química Orgánica UAM-UCM-USC | Madrid, Spain.

· Adrián López (Master student – Martínez-Costas Group)): Best Oral Communication – Master Student Category at the II Xuntanza de Investigador@s Nov@s no ámbito da química (XINQ_2) | Galicia, Spain.

· David Montoto (Master student – Martínez-Costas Group)): Best Presentation – Master Student Category at the II Xuntanza de Investigador@s Nov@s no ámbito da química (XINQ_2) | Galicia, Spain.

Finally, CiQUS undergraduate and graduate students were recognized with different awards for the excellence of their academic dissertations and track records of the corresponding bachelor's or master's degree programmes:

· *Raquel Feijoo*: Bachelor's in chemistry - "Ángela Ruiz Robles" Academic Excellence Award 2022/2023

· *Beatriz Lista*: Double bachelor's in chemistry and in Biology - "Ángela Ruiz Robles" Academic Excellence Award 2022/2023

· *Lourdes Patricia Sanmiguel*: Bachelor's in Chemistry Extraordinary Award 2023

· *David Montoto*: Bachelor's in Chemistry Extraordinary Award 2023 and Bachelor's in Biology Extraordinary Award 2023

· *Alejandra Varela*: Master in Organic Chemistry Extraordinary Award 2023

· *Amaia Agulleiro*: Master in Chemistry at the Interface with Biology and Materials Science Extraordinary Award 2023

· *Adrián López*: Master in Biotechnology Extraordinary Award 2023

· *Beatriz Lista*: USC Linguistic Quality Award for the Final Bachelor's Degree Programme 2022/2023

7. INNOVATION, TECHNOLOGY TRANSFER AND VALORIZATION

7.1 Valorisation & Innovation Projects

With regard to international Innovation projects, at the beginning of 2023 the European Innovation Council (EIC) approved the granting of 1 EIC Transition Open (2.5 M€) to a project coordinated by CiQUS PI Javier Montenegro. So far, the first and the one EIC Transition Open project granted in Galicia. In the coming years, it is expected the creation of a spin-off, culminating the valorization of this technology that has been also previously supported by the IGNICIA, AEI-PdC and ERC-PoC programs. Furthermore, this technology is also part of a European consortium funded by EIC-Pathfinder with 3 million euros and which started in 2023.

Additionally, CiQUS PI Javier Montenegro obtained the support of the prestigious **Caixa Research Health programme** (€ 900K). A project aims at the study of metal and boron clusters with antibiotic properties and the ability to cross the bacterial membrane.

7.2 R&D contracts and services in collaboration with companies

During 2023, CiQUS researchers have signed 7 new R&D contracts for a total budget of € 296K. Among them it should be remarked:

- **MestreLab Research**. As part of a long-term relationship, a new 99,220 € contract has been signed to provide support for the development of chemical software.
- **ONCOSTELLAE** Following previous agreements since 2018, a new 30,000 € contract has been signed to develop synthetic methodologies and organic molecules libraries.

The full list of active R&D contracts during 2023 is available in Annex III.

7.3 Entrepreneurship

In terms of entrepreneurship, the spin-off Celtarys (PI. E. Sotelo), created with the support of the IGNICIA program, signed partnership agreements with G.CLIPS Biotech and the multinational NanoTemper Technologies GmbH. Additionally, it should be noted that Celtarys currently is also a partner of the UniSens European consortium a 2023 ECI-Pathfinder project (3 M€).

7.4 Patents

- *2 New international patents have been granted in 2023*:

- Japan | Ruthenium complexes for treating cancer | JP72296877 | PI: J.L. Mascareñas.

- USA | Magnetic nanoparticles for treatment of tumors | US11547721B2 | PI: J. Granja, in collaboration with Italian institutions

- *10 International extensions were applied for the next patents in 2023:*

- USA & Canada | *Functionalized isonitriles* | US18/006,908, CA3187052 | PI: E. Sotelo,

- Europe & USA | Compound for batteries | EP4213247A1, US2023357289A1 | PI: M. Giménez.

- Europe, USA, Japan, China & Brazil | Supramolecular fluid | EP4213251A1, US2023361330A1, JP2023541187A, CN116323549A, BR112023004649A2 | PI: M. Giménez.

- Taiwan | Peptides for intracellular delivery | TW112123732 | PI: J. Montenegro.

- *1 International patent has been applied in 2023:*

- Europe | Encapsulated transition metal oxide nanorods for durable air cathodes | EP23382707 | PI: M. Giménez.

- *1 National patent has been applied in 2023:*

- Spain | Proteína de fusión muNSs capaz de formar microesferas | P202330185 | PI: J. Martínez-Costas

7.5 Technological Platforms and European Networks

Regarding ***European Technology Platforms and Networks***, the CiQUS continued during in 2023 with a stable a regular participation in the meetings and networking actions of ETP SusChem (European Technology Platform for Sustainable Chemistry), ETP Nanomedicine (European Technology Platform for Nanomedicine), and MATERPLAT (Spanish Technology Platform for Advanced Materials and Nanomaterials).

In addition, CiQUS' KTT manager attended both online and in person several important sectoral events: ETPN2023 (Liverpool, UK), BioSpain2023 (Barcelona, Spain), HIGREEW Workshop (Vitoria, Spain), Bionnale, Battery Innovation Days, Horizon Europe Industry Brokerage, Clean Energy Transition Partnership e BioSpeed Dating.

Finally, it is worth mentioning that CiQUS website provides detailed and accessible information about all the activity of the centre, including its scientific production and patents generated, as well as a specific section with the technology transfer offers (www.usc.es/ciqus/en/technology-transfer)

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8. TRAINING

8.1 Bachelor

Up to 47 bachelor final projects defended by undergraduate students in 2023 were developed at CiQUS under the supervision of CiQUS PIs. A complete list of the final projects presented yearly can be found in Annex VII.

Most of the undergraduate students (24) were enrolled in the bachelor's degree in Chemistry. The rest of students were enrolled in the bachelor's degree in Pharmacy (8), in Biotechnology (5), in the Double Degree in Physics & Chemistry (1) and in the Double Degree in Chemistry & Biology (9).

Regarding the distribution by thematic areas, 70% of the projects were focused in Biological & Medicinal Chemistry, 17% in Functional Materials with Technological Application and 13% in Synthetic Methodologies for Sustainable Development.

In terms of training actions aimed to undergraduate students, CiQUS annually launched its **Summer Fellowships Programme** (See section 4.2.3 CiQUS Talent Attraction Programmes). Within this framework, 15 undergraduate students spent 1 month research stays at the CiQUS during July 2023.

Full Name	Bachelor's degree	University
España Fariñas, María del Pilar	Biotechnology	U. de Santiago de Compostela
Feijoo Díaz, Raquel	Chemistry	U. de Santiago de Compostela
Fernández Martínez, María	Biology	U. de Alcalá
Jiménez Cristobal, Hugo	Chemistry	U. de Oviedo
Laforga Martín, Juan Bautista	Chemistry	U. Autónoma de Madrid
Largo Barrientos, Antonio	Chemistry	U. de Valladolid
Medina Pedreira, Natalia	Chemistry & Biology	U. de Santiago de Compostela
Parada Pérez, Laura	Chemistry	U. de Santiago de Compostela
Rodríguez Fernández, Asensio	Chemistry	U. Autónoma de Madrid
Sahuquillo Barbo, Pablo	Chemistry	U. Autónoma de Madrid
Sánchez Iglesias, Ximena	Chemistry	U. de Santiago de Compostela
Suárez Padrón, Maykell	Chemistry	U. de La Laguna
Vera Tuset, María	Chemistry	U. Autónoma de Madrid
Vidal Sánchez, Micaela	Chemistry	U. Autónoma de Madrid
Zabala Sánchez, Mario	Physics & Chemistry	U. de Santiago de Compostela

Table 2. Undergraduate students granted with a CiQUS Summer Fellowships in 2023

On this occasion, up to 10 CiQUS research groups participated in the summer programme, supervising the research projects of the fellows and hosting them in their laboratories. Their stays at the CiQUS began with a reception and welcome event for the fellows on Monday, July 3, 2023, which included a short presentation by CiQUS about the center and its capabilities, a guided tour of the CiQUS facilities, and a welcome coffee and socialization. Afterwards, the fellows attended the prevention and safety course, which is mandatory for all the center's staff and, once they passed the corresponding test, they immediately joined the different recipient research groups.

2023 CiQUS Summer Fellowships holders

Summer Fellowship holders had the opportunity to participate in the different activities scheduled at CiQUS during their whole stay at the center: invited lectures, internal seminars, thesis defenses, etc. On Thursday, July 27, a closing seminar took place in the CiQUS auditorium, during this event summer fellows presented to the community of the center (directors, principal researchers, postdoctoral researchers, and PhD candidates) a summary of the research project in which they had collaborated during their stay at CiQUS. It is worth noting the high level of the presentations given by the fellows and the good atmosphere of the scientific discussion during the day.

8.2 Master

Most of CiQUS PIs participate in the *Master's Degree in Chemistry at the Interface with Biology and Materials Science*, the *Master in Organic Chemistry* (with the UCM and the UAM), and the *Master in Chemical Research and Industrial Chemistry* (in collaboration with the University of Vigo and the University of A Coruña). The participation of some of them in the Master in Theoretical Chemistry and Computer Modelling (Erasmus Mundus) and the Master in Drug Research and Development is also relevant. CiQUS annually offers between 30 and 40 vacancies for the Master Project. Approximately, 65% of the students for the master's degree in Chemistry from USC are trained at the CiQUS.

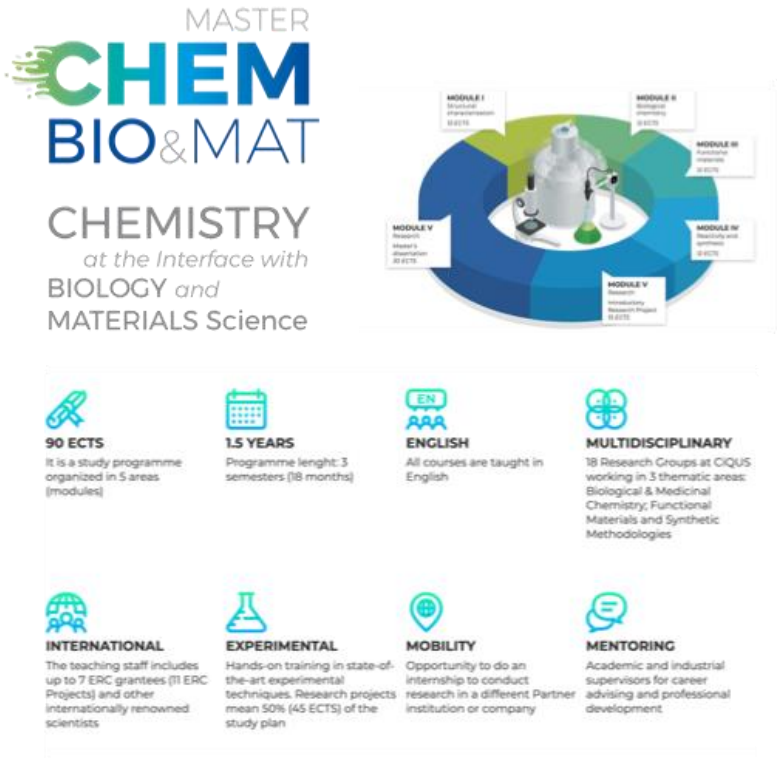
During 2023, 36 master dissertations were defended by CiQUS master students. Most of the students (15) were enrolled in the Master's degree in Organic Chemistry at the USC, 9 student were enrolled in the Master in Chemistry at the Frontier with Biology and Materials Science, 7 in the master's in Chemical Research and Industrial Chemistry, 2 in the master's in Nanoscience and Nanotechnology, 2 in the Physics and 1 student in the master's in Environmental Engineering, all of them are Master Programmes at the USC. A complete list of 2023 CiQUS master dissertations can be found in Annex VI.

These research training projects were aligned with the CiQUS' main thematic areas: 53% were focused on the field of Biological & Medicinal, 33% on the Functional Materials with Technological Application area and 14% on the field of Synthetic Methodologies for Sustainable Development.

Outstandingly, the Master's degree in Organic Chemistry was ranked as the third-best Master's degree in Spain within the category of Experimental and Technological Sciences, and the best Master in Chemistry according to the ranking annually published by El Mundo newspaper (https://www.elmundo.es/especiales/mejores-masters/ciencias-experimentales-y-tecnologicas.html#quimica-organica).

However, Master's Degree in Chemistry at the Interface with Biology and Materials Science (ChemBio&Mat) is of particular strategic interest for the CiQUS. This Master Programme launched in 2019 by the CiQUS, the Faculty of Chemistry and the USC is the first example of an academic offer aligned with the scientific research agenda of a Research Centre accredited by the Galician University System (SUG). This Master is coordinated by CiQUS PI Prof. Juan Granja. It is a 1.5-year programme (90 ECTS) aimed at providing first-class multidisciplinary training at the frontier of chemistry, biomedicine and materials sciences, from a molecular approach and giving the students the necessary practical skills and knowledge to undertake a professional or a research career.

CiQUS has created a specific website for this Master Programme (http://masterchembiomat.usc.es), were visitors have access to complete and detailed information about the academic programme, the Lecturers and many other interesting details. Posters and graphic material were designed for advertising the new Master's Programme. Furthermore, a specific Twitter account (https://twitter.com/ChemBioMatMSc) and an Instagram account (https://www.instagram.com/chembiomatmsc/) were open to promote the Master Programme among the undergraduate students and the rest of the scientific community.



Master's Degree official logo | ECTS distribution by thematic modules of the study programme

In 2023, it received the recognition of the Xunta de Galicia as a Degree of Singular Character, being the first and only master's program in Galicia that has this declaration.

The academic programme also includes special lectures and scientific events organized through the whole year:

- In February 2023, Prof. Donal Hilvert, delivered the lecture *Design can pae the way to fully programmable enzyme catalysts*, closing the graduation of the second promotion of the master's degree.

- In July 2023, a special scientific programme was organized for closing the academic year 2022/2023, which included:

- A **Scientific Panel Session**: the master's degree students presented, in a poster session, the results achieved in the subject *Research Initiation Project.* Students had the opportunity to discuss their results with Prof. Carmen Galán (guest speaker at the closing lecturer).

- A **Closing Lecture**: Prof. Carmen Galán delivered the lecture *Glycan-based fluorescent nanomaterials: from diagnostic to theragnostic applications* which was attended by master's students and other CiQUS researchers.

Finally, as part of the Tutored Training Activities subject, the master students attended several complementary courses focused on transversal skills: ***i)*** Introduction to Intellectual Property Rights for Chemists, ***ii)*** Introducing to Scientific Publishing & How to Read a Paper, ***iii)*** Becoming a Scientific Writer: Putting Why? Before How?, ***iv)*** Graphic Design for scientific communication, and ***v)*** the thematic Lecture Series: Industrial Days, among others.

8.3 Doctoral programmes

One of the major strengths at CiQUS is its success in the training of researchers, both at doctoral and post-doctoral level.

Most of the CiQUS PhD candidates (>85%) are enrolled in the interuniversitary PhD programme *Chemical Science and Technology*. Other doctoral programmes are *Drug Research and Development*, *Materials Science* or *Biology*. Regarding the gender distribution, currently 34% of doctoral students are women and over 14% come from abroad. Remarkably, 44% of CiQUS PhD candidates are currently granted with competitive public HHRR contracts.

In 2023, 14 theses were defended by CiQUS students, all of them obtained *cum laude* top marks. A complete list of theses presented yearly can be found in Annex V. Importantly, the 57% of the PhD theses defended during this period received the International Mention.

The excellent training received by our PhD students is remarkable, not only due to the scientific level of most of the research groups of the centre, but also thanks to the stimulating and competitive environment of CiQUS, the biweekly interdisciplinary seminars programme or the training in transferable skills. Additionally, our MSc and PhD students, together with the rest of CiQUS members, have the opportunity to attend the CiQUS Lectures Programme, with top level international speakers from many different scientific disciplines. (See Annex XI for the complete list of speakers in 2023)

The success of the training activity is evident in the awards and recognitions received by our PhD students (see section 6.2 Awards) and their success in accessing the best international centres.

8.4 Postdoctoral programmes

Up to 46 postdoctoral researchers (48% women and 28% international from 7 different countries Switzerland, India, Venezuela, Italy, Portugal, Egypt and Brazil) developed their advanced training at CiQUS in 2023. 50% of CiQUS postdoctoral researchers were beneficiaries of a competitive HR programme. During 2023, 1 Xunta postdoctoral contract of modality B (already incorporated as researchers at CiQUS) was obtained, as well as 2 Ramón y Cajal contracts and 4 MSCA contracts. Finally, 4 researchers from the CiQUS have been selected in modality A of postdoctoral grants from the Xunta de Galicia, and will receive funding to work for 2 years in foreign institutions, returning to CiQUS during the third year of the grant.

8.5 Other training activities and courses

- **Cross-disciplinary training courses**: in 2023, CiQUS continue with its own career development programme, which included the organization of different courses and workshops to provide CiQUS researchers and technical staff with cross-curricular tools that complement and improve the competitiveness and professional profile:

- ***Becoming a Scientific Writer: Putting Why? Before How?*** (For research staff): A course aimed at improving the strategies and tools used by researchers in the preparation of scientific articles.

- ***Introduction to Scientific Publishing: How to Read a Paper*** (For research staff): A course aimed at improving methodologies and the use of new tools for bibliographic consultation and the monitoring of thematic areas in the world of magazines and publishers.

- ***Managing myself and working with my team: A skills upgrade for Group Leaders*** (aimed to PIs and Junior Scientists): The content of this course offered researchers an important battery of advice and recommendations for managing human teams, time management and assertive communication tools for conflict management. The course had an important practical component where participants were able to receive individual personal advice on their own experiences.

- ***Graphic Design for Scientists*** (aimed to researchers and technical staff): through the development of this course, CiQUS members learned about recommendations for the preparation of graphic materials (presentations, posters, graphical abstracts, etc.), as well as instructions on the use of graphic design tools and software.

- ***Patenting: Introduction to Intellectual Property Rights for Scientists*** (aimed to young researchers): An introductory seminar on patents and intellectual property rights for protecting scientific results.

- ***Scientific ArtWork*** (for Research staff): a workshop focused at improving the use of bioRender software as an efficient tool for effective science communication.

In addition, the CiQUS research and technical staff actively participated in the courses organized in the framework of the training program of the CIGUS NETWORK.

- **Prevention and risk course**: all the centre's staff must attend a general security course, taught by the centre's security manager (Noela Torrente), before joining the CiQUS facilities, in order to know the basic rules of work in the laboratory and the safety and evacuation plan of the center.

- **Technical training courses**: the CiQUS technical support team regularly organizes workshops and seminars on the operation and management of the centre's instrumental equipment. These seminars are mandatory for all new users. Among others, in 2023, specific seminars on X-ray Powder Diffraction (XRD), State-of-the-Art advancements for LC/MS techniques, Advanced Flow Cytometry, etc. were organized. (See full list: https://www.usc.es/ciqus/gl/node/4720).

- **CiQUS Lecture Programme**: During the year 2023 the programme of lectures given by top national and international scientists included up to 19 research talks at the CiQUS. Invited speakers included Donald Hilvert (ETH Zürich | Switzerland), Matthew Lagnton (University of Oxford | UK), Syuzanna Harutyunyan (Stratingh Institute for Chemistry | The Netherlands), Ángela Casini (Technical University of Munich | Germany), Ivan Huc (Ludwig-Maximilians-University Munich | Germany), among many others. (See full list: https://www.usc.es/ciqus/en/ciqus-lectures).

- **CiQUS Seminar Programme**: We also continue with the internal fortnightly programme of seminars with the participation of PhD candidates, and postdoctoral researchers. (See complete list: https://www.usc.es/ciqus/en/internal-seminar-programme).

Finally, in 2023 CiQUS researchers (PIs and Junior Scientists) were invited to participate as lecturers in up to 22 different scientific training seminars or doctoral programmes at several department at national and international institutions.

8.6 Other strategic training initiatives

- **International mobility grant's programme**. A strategic initiative focused on supporting the mobility of the center's research staff, with the idea of promoting short research stays associated to the development of the

center's scientific agenda and the establishment of new international collaborations. In the context of this call, CiQUS financially supported the trips and stays abroad of 1 PI in USA (for a collaborative research work), 1 postdoctoral researcher and 2 predoctoral researchers for the performance of measures in the framework of collaborative work [Institut des Sciences Chimiques de Rennes da Université de Rennes (France), IBM Research Zurich and Universidad Autónoma de Barcelona (Spain)], and 6 PhD students for research stays (secondments) [ETH Zürich (Switzerland), School of chemistry - University College Dublin (UCD) (Ireland), The National Institute for Biological Standards and Control (NIBSC) (United Kingdom), LACDR-Leiden University (Netherlands), University of Rijeka (Croatia) and University of Glasgow (United Kingdom)]. (See all editions https://www.usc.es/ciqus/gl/node/4726).

- **Program to support the preparation of Marie Skłodowska-Curie postdoctoral proposals**. For the third consecutive year, CiQUS opened a call for expressions of interest to search for candidates for the MSCA-PF call. Among the applications received, the center supports those that are more strategically aligned with the center's scientific priorities through specialized advice in the drafting of the different projects, strengthening the competitiveness of the corresponding candidacies. Up to 6 fellowships were granted to young international scientists for joining CiQUS as postdoctoral researchers during the year 2024. The success of this initiative is widely endorsed by the results achieved in the previous calls: 4 beneficiaries (call 2022) and another 4 beneficiaries (call 2021). (see the full list of MSCA-PF contract beneficiaries in CiQUS)

9. COMMUNICATION & OUTREACH

9.1 Communication

CiQUS Governing Committee approved an updated version of our Communication Plan in November 2023. This document contextualizes and defines the center's communication and dissemination strategy and establishes its priority objectives and the set of actions to achieve them. The plan has been approved as a dynamic document, likely for updating during its period of validity.

9.1.1 CiQUS website and presence in the media

CiQUS website (www.usc.es/ciqus/es) is a fully trilingual web page, with an adaptive design (web responsive) for facilitating the access and correct display from any electronic device (computer desktops, mobiles, or tablets). It shown update information about research areas, scientific production, research groups, facilities, job offers, training programmes and comprehensive information about the centre's activities and research outputs. Additionally, you can find specific sections on transparency, structure and organization and other information regarding CiQUS policies and commitments.

CiQUS website also has access to an INTRANET section with authorized access for CiQUS members. From this section, it is possible to access to all the documentation and operating regulations of the center, as well as reservation forms, equipment catalogues or shared folders for the different commissions and work groups that operate in the center (in this case, the access is only authorized for the members of the corresponding committees or working groups).

On the other hand, CiQUS website is complemented with the corresponding social networks: Facebook (2011), LinkedIn (2012), YouTube (2013), and Twitter (2014). CiQUS accounts on these platforms kept in 2022 a rising trend both in followers as well as number of generated interactions:

- **X (former Twitter)**. 3,220 followers (262 new followers since 2022). 251 new posts and more 363,00 total impressions reached.
- **LinkedIN**: 4,179 followers (739 new followers since 2022). 152 new posts. 4,696 people visited the profile, reaching more than 148,600 impressions, 7,725 clicks and 2,478 feedback. Different entries were shared up to 124 times.
- **Facebook**. 2,160 followers and 1,987 Likes (reaching a scope of more than 21,000 users).
- **YouTube**: 406 subscriptions. 3 new entries. Over 2,300 views (viewing time: 52,3 h).

Regarding presence in the media, over 32 items were published in 2023 in the news section of the Centre's website (https://www.usc.es/ciqus/en/news). The news covered the activities's programme developed at the CiQUS during the whole year (e.g., scientific highlights, lectures and seminars, Theses defense, awards, training outreach activities, etc.). Furthermore, 17 were also published as press releases and disseminated to media. This generated numerous impacts in newspapers (El País, El Mundo, La Vanguardia, La Voz de Galicia, El Correo Gallego, ...), news agencies (Eurekalert, Europapress, EFE, etc), dissemination portals (Gciencia, Biotech, IM Médico, Mapping Ignorance, etc), and other international platforms (Chemistry World, PHYS.org, StatNano, Bioengineer.com, Photonics.com, InfoBae, etc.). A brief summary is shown below:

Press
https://www.elcorreogallego.es/santiago/2023/10/19/estudio-alerta-peligrosidad-cannabinoides-sinteticos-93501100.html
https://www.lavozdegalicia.es/noticia/sociedad/2022/12/14/jose-luis-mascarenas-ingresara-real-academia-ciencias-galicia/0003_202212G14P26993.htm

https://www.elcorreogallego.es/santiago/2023/06/23/o-ciqus-busca-novos-tratamentos-celulas-tumores-colon-mama-89030036.html

https://www.elcorreogallego.es/santiago/2023/11/13/dedicamos-investigacion-individuos-obsesivamente-curiosos-94540768.html

https://www.lavanguardia.com/local/galicia/20230327/8856779/centro-gallego-avanza-nuevas-herramientas-quimicas-gran-importancia-futuras-terapias-cancer.html

News agencies

https://www.eurekalert.org/news-releases/940315

https://www.europapress.es/galicia/noticia-investigacion-usc-logro-modificar-moleculas-individuales-premiada-real-academia-galega-ciencias-20230207123853.html

https://www.galiciapress.es/articulo/sanidad/2023-07-12/4367791-investigacion-avanza-desde-santiago-transporte-farmacos-interior-celulas

Scientific outreach platforms

https://gciencia.gal/universidade-gl/equipo-galego-desena-metodo-non-invansivo-extraer-mostras-cadros-historia-arte/

https://www.immedicohospitalario.es/noticia/39709/se-disenan-nuevos-compuestos-para-el-transporte-de-biomoleculas-al-i.html

https://www.quimicaysociedad.org/nuevo-metodo-para-la-entrega-directa-de-farmacos-en-el-interior-celular/

http://biotech-spain.com/es/articles/communications-chemistry-destaca-un-estudio-liderado-por-investigadores-del-ciqus/

Others international platforms

https://phys.org/news/2023-06-light-controlled-biomolecules-cell-membrane.html?deviceType=desktop

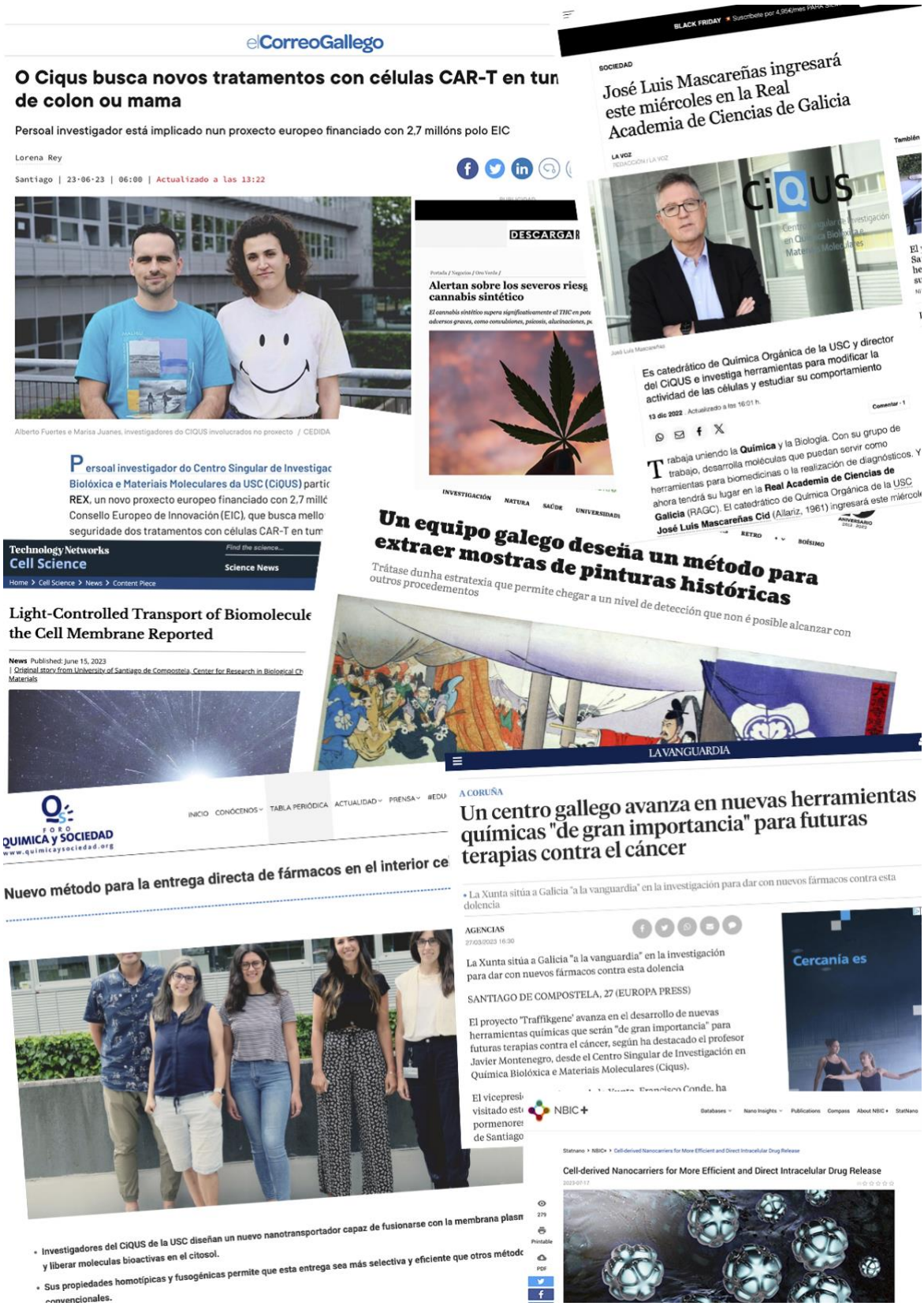
https://www.infobae.com/espana/agencias/2023/10/18/un-estudio-de-la-usc-alerta-de-los-riesgos-del-cannabis-sintetico/

https://statnano.com/news/72631

https://www.technologynetworks.com/cell-science/news/light-controlled-transport-of-biomolecules-across-the-cell-membrane-reported-374819

https://www.forbes.com.mx/alertan-sobre-los-severos-riesgos-del-uso-del-cannabis-sintetico/

Every press released and news were always support by coverage on the Centre's social networks (Twitter, LinKedIn and Facebook).



Some examples of CiQUS' news in Press media

9.2 Outreach

9.2.1 Outreach aimed at the general public

- **2023 Ciencia Singular – Open Door's Day**: In November, the sixth edition of the Singular Science Open Day was organized by CiQUS jointly with CiMUS, CiTIUS and IGFAE (https://cienciasingular.usc.es/). An event sponsored through a specific agreement with the *Consellería de Cultura, Educación, Formación Profesional e Universidade* of the Xunta de Galicia Governement. Over 40 people (over 45% kids) visited the center on November 25th, attended the lectures and talks with CiQUS Researchers and participated in the chemical games and workshops included in the programme.

More than 60 CiQUS researchers and technical staff participated as volunteers during the celebration of this event. The volunteers carried out experiments, demonstrations and workshops, gave talks and guided the groups (adults and children) for the visit, as well as other tasks for the organization and general coordination of the activity.

- **2nd Andaina en Marcha**, a solidarity event organized by the Spanish Association against Cancer (AECC) which included a scientific fair for raising funds for investment in cancer research. CiQUS researchers participated with information stands on the CiQUS advances on cancer research and related.

- **G-Night European Researchers' Night**: on September 29th, CiQUS participated in a row together with other USC centers in this worldwide outreach event (https://gnight.gal/). On this occasion, CiQUS researchers and technical staff organized thematic workshops ("nanovehicles" for drug delivery, electroactive polymers for the design of soft robots, …) and hands-on experiments of chemistry for kids.

- **Pint of Science**: CiQUS researchers participated both as organizers and speakers of this international dissemination initiative organized annually during Spring. Additionally, the CiQUS center participate as sponsor of the event held in Santiago de Compostela.

9.2.2 Outreach aimed to promote scientific vocations among young students

- **International Day of Women and Girls in Science**: an activity aimed at STEM high school students, organized on February 11, within the framework of the *International Day of Women and Girls in Science*. CiQUS programme was based on initiatives for bringing experiences of female researchers of different profiles and professional stages to the participants, with the aim of promoting scientific vocations among young students with especial focus on female students. A total of 54 students and 4 teachers from two Galician high school centers attended to the event.

- **CiQUS annual programme for school visits**: The activity included a guided tour of the facilities, a presentation of the center's scientific agenda and the main research lines and talks and interviews with the researchers at the laboratories. The center received the visit of 26 centers from all over the Galician community. More than 650 students and teachers attended the programme.

Finally, it is also worth mentioning the presence and collaboration of CiQUS researchers in different dissemination initiatives organized by other USC units of by other public institutions (City Councils, Provincial Councils, Schools, etc.). Thus, CiQUS researchers participated during 2023 in more than 30 outreach events. Among them:

- ***A Ponte* Programme**: Concepción González-Bello [*Chemistry Facing the Challenge of Superbacteria* – IES Pontepedriña (A Coruña), IES A Sardiñeira (A Coruña), IES Xesús Taboada Chivite (Verín, Ourense), IES Sanxillao (Lugo), IES As Mariñas (Betanzos, A Coruña), IES Lagoa de Antela (Xinzo de Limia, Ourense) and IES Politécnico de Vigo (Pontevedra); *How to design drugs using computers*? – IES Monte da Guía (Vigo, Pontevedra), IES Agra

de Raíces (Cee, A Coruña), SEK Atlántico (Pontevedra), CPR Santiago Apostol (Soutomaior, Pontevedra]; Diego Peña [*Accelerated course in Organic Chemistry: short walk through the molecular world* – Marín (Pontevedra), Vigo (Pontevedra)], Félix Freire [*Molecular cuisine: chemical reactions at the kitchen* – several high school centers in Pontevedra (Marín, Vigo) and A Coruña (Ribeira, Pontedeume and Curtis)], and Noa Varela [*Chemistry at the frontier with biology and materials science*, Cee (A Coruña)].

- ***Open Science Cambre (A Coruña)***: Daniel Marcos

- **MentorAJE** (Spanish Young Academy): Beatriz Pelaz

- **Outreach and dissemination scientific lectures**: *Scientific Career Path* (Carlos Herrero, Santiago de Compostela), *Research in Materials Science* (Noa Varela, Cee – A Coruña), Inclusion of end of life in environmental assessment of (bio)plastics (Massimo Lazzari, Santiago de Compostela), *Chemistry for the conservation of Heritage* (Massimo Lazzari, Santiago de Compostela).

On the other hand, CiQUS strongly supports other scientific dissemination initiatives that have arisen in our environment, such as those organized by the Galician Youth Society of Chemistry (SXGQ), which> 80% is currently made up of predoctoral researchers from CiQUS.

10. INFRAESTRUCTURES

10.1 Research facilities

The CiQUS building, has 5.900 m^2 built-up area with 22 RESEARCH LABS (90 m^2 each) designed under the criteria of safety, sustainability and flexibility, and equipped with first class laboratory furniture suited to fit the needs of the different research areas: synthetic chemistry, chemical biology and materials science.

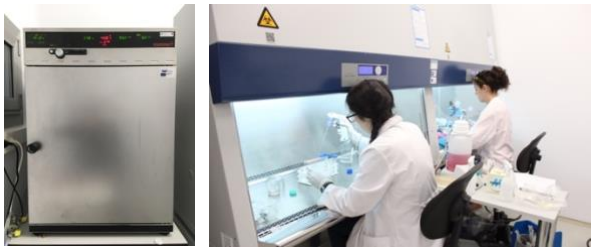
Furthermore, over 1000 m^2 are dedicated to shared research support facilities, a highly well-equipped infrastructure to cover the needs of all our research areas and interdisciplinary projects:

- **4 General Support Laboratories** (over 200 m^2 in total) for instrumental equipment, covering a broad range from analytical to preparative experimental techniques: chromatography (HPLC, UHPLC, Recycling GPC, SFC, GC, GC-MS, LC-MS), spectroscopy and spectrometry [UV-Vis, IR, fluorescence, CD, Dynamic Light Scattering [DLS and (MADLS)], NanoDrop spectrophotometers], calorimetry (DSC, TGA), etc.

Representative General Support Laboratories

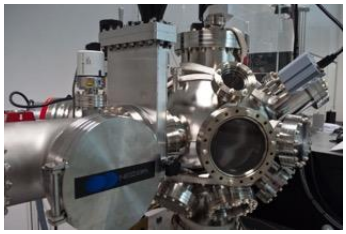
- **An NMR room** equipped with two 300 MHz and one 500 MHz spectrometers, two of them including a robot module for continuous NMR sample tube handling automation. This equipment is part of the equipment for the Research Infrastructure Area at the USC and also provides service to the rest of the university community. This service works under the supervision of the USC-NMR technical staff.

- **3 Cell Culture Laboratories** equipped with biosafety cabinets (with the certification and validation of Biosafety Level 2, BSL-2), centrifuges, cell culture incubators, among other cell culture stuff.



Cell culture lab equipped with a cell culture incubator (left) and two cell culture biosafety cabinets (right)

Other facilities and resources include a radioactive facility, two cold rooms, a high-pressure lab (in the roof of the building), glove boxes, solvent purification systems, lyophilizers, Automated Microwave Peptide Synthesizer, a computer cluster and other small equipment.



PLD Equipment

It is very important to emphasize that the management structure of the centre contributes to the optimization of available resources by promoting the shared use of equipment, both the instruments provided by the different groups and those specifically purchased for general use. Sharing equipment also allows for expert exchange of different instrumental techniques and for the development of scientific collaborations and interdisciplinary projects. In this context, since 2022 a detailed catalogue with full info of CiQUS' equipment is available in the webpage of the center (https://www.usc.es/ciqus/sites/default/files/instalaciones/listado_equipamento_ciqus.pdf).

Our central service for purchasing of solvents and other consumables is also very relevant from an economical and safety (reduction of stocks of hazardous and flammable materials) perspective.

A CiQUS' virtual tour is available at our webpage (https://www.usc.es/ciqus/visita-virtual/). Through this section it is possible to visit our laboratories and facilities, additional information and specific features are also included for the different rooms. Implementation of the English version is in progress.

Some screenshots form CiQUS virtual tour

Finally, with regard to audio-visual and IT resources, the center has a lecture room equipped with a digital video production to enable streaming events (e.g., lectures, PhD viva ceremonies…) through Microsoft Teams and Zoom platforms, and even to broadcast open events by our YouTube channel; two seminar rooms fully equipped for hosting online meetings and a computer server for remoting access to the experimental files and the automatic periodic backing up of the experimental data from all CiQUS equipment and the rest of the CiQUS general archive.

All facilities, resources and laboratories work under the supervision of CiQUS' technical staff.

10.2 Singular Laboratories

• ***Advanced Microscopy Laboratory*** for live-cell imaging equipped with a Hyperspectral Microscope, a Confocal Microscope with Spinning-Disk and TIRF modules Nikon Dragonfly, an Epifluorescence Microscope and a flow cytometer.

• ***PLD Laboratory***: equipped with a Pulse Laser Deposition (PLD) system and a cryostat system for electrical transport, Seebeck Coefficient and thermal conductivity measurements.

• ***Lithography Laboratory:*** equipped with photoresist film (SpinCoater) and metallic and dielectric layers (PECS) deposition systems, mask aligner, a wire-bonding system and a battery testing equipment.

• ***AFM microscopy Laboratory***. Equipped with an AFM NX-10 Park Systems microscope, designed to work in multi-user mode (high degree of automation) and capable of studying surfaces with a resolution in the region of 1 nm, and additional modules of electrical conductivity and thermal conductivity.

Laboratories for AFM microscopy (left), lithography equipment (centre) and advanced microscopy (right)

• ***2 Innovative Labs for technology development***. Open spaces for developing and implementing novel technologies based on CiQUS's knowledge. At this moment, they are dedicated to:

-**Thermal Characterization Laboratory**: a laboratory designed for the study of new materials using CCD thermoreflectance techniques. This space is equipped with a bench with active vibration isolation, a laminar flow air system with HEPA filters, connection to an uninterruptible power supply (UPS) and independent air conditioning.

Laboratory for Thermal Characterization

-**Laboratory for the development of new batteries**: Space enabled at the CIBUS building for the assembly of new types of batteries under inert atmosphere and the study of their capacity, durability and viability. This laboratory is equipped with independent air conditioning, its own technical gases installation (Ar, Ar/H_2), uninterruptible power supply (UPS) and oxygen absence detection system with connection to alarm and reading from outside.

Laboratory for the development of new batteries

• ***3D Printing Lab.*** Space enabled at the CIBUS building for the design and printing of models using different 3D printing techniques, both to provide to the different CiQUS research groups with materials adapted to the needs of their research lines, and to complement the scientific-technical equipment and new experimental set-ups. This laboratory has its own technical gases installation, compressed air connection, extraction hood, space for waste storage and a system for detecting the absence of oxygen with connection to an alarm and reading from the outside.

CiQUS 3D Printing Lab

A full description of CiQUS equipment (and core facilities is available at the CiQUS webpage:
-https://www.usc.es/ciqus/en/ciqus/facilities
-https://www.usc.es/ciqus/sites/default/files/instalaciones/listado_equipamento_ciqus.pdf

10.3 Other facilities and resources at the USC

In addition to our own facilities, CiQUS researchers have access to the general research support services of the University of Santiago de Compostela (see www.usc.es/gl/investigacion/riaidt/) most of them located at the CACTUS building, 200 m away from CiQUS. These services include a high field NMR (750 MHz), mass spectrometry, electronic and confocal microscopy, X-Ray diffraction, magnetic susceptibility, etc, as well as the associated technologic platforms.

Among them, it is especially crucial for some of our research groups, the new high-resolution Transmission Electron Microscopy (TEM) - specifically, a JEOL JEM- F200CF-HR microscope, acquired in 2019 thanks to the financial support of the Consellería de Cultura, Educación e Universidade. The technical capacities of this instrument are fundamental for the development of research lines at CiQUS related with soft-matter and, in particular, for the area of carbon-based materials (including the ERC-Starting Grant NANOCOMP, PI Dr. María Giménez).

CiQUS researchers working in biological topics have access to the CEBEGA, the Center for Experimental Biomedicine of the USC, when they require experiments which involved animal testing.

For computational studies, CiQUS researcher are regular user of CESGA, the Galician Supercomputing Center (https://www.cesga.es/en/home-2/).

Finally, CiQUS PIs regularly support and/or lead internal and external proposals for the acquisition of equipment for the general R&D services of the University of Santiago (CACTUS).

ANNEXES

Annexes Legend

- Biological & Medicinal Chemistry
- Functional Materials with Technological Applications
- Synthetic Methodologies for Sustainable Development
- CiQUS structural staff and CiQUS Funding (as research center)

ANNEX I: CiQUS Members (December 31, 2023)

CiQUS Principal Investigators (December 31, 2023)		
Area	**Name**	**Academic Category**
	Del Pino, Pablo	Associate Professor (Profesor Titular)
	Estévez Cabanas, Ramón J.	Emeritus Professor
	Estévez Cabanas, Juan Carlos	Associate Professor (Profesor Titular)
	Fañanás Mastral, Martín	Associate Professor (Profesor Titular)
	Fernández Megía, Eduardo	Full Professor
	Fernández Ramos, Antonio	Full Professor
	Freire Iribarne, Félix Manuel	Full Professor
	García Fandiño, Rebeca	Associate Professor (Profesor Titular)
	Giménez López, María del Carmen	Associate Professor (Profesor Contratado Doctor)
	González Bello, Concepción	Full Professor
	Granja Guillán, Juan Ramón	Full Professor
	Guitián Rivera, Enrique	Emeritus Professor
	Gulías López, Moisés	Associate Professor (Profesor Titular)
	Lazzari, Massimo	Full Professor
	López García, Fernando	CSIC Senior Research Scientist
	Martínez Costas, José Manuel	Full Professor
	Mascareñas Cid, José Luis	Full Professor
	Montenegro García, Javier	Oportunius Research Professor
	Pelaz, Beatriz	Ramón y Cajal Researcher
	Peña Gil, Diego	Oportunius Research Professor
	Pérez Meirás, María Dolores	Full Professor
	Quiñoá· Cabana, Emilio	Full Professor
	Riguera Vega, Ricardo Jesús	Emeritus Professor
	Rivadulla Fernández, Francisco	Associate Professor (Profesor Titular)
	Saá Rodríguez, Carlos	Full Professor
	Sardina López, Francisco Javier	Full Professor
	Sotelo Pérez, Eddy	Associate Professor (Profesor Titular)
	Souto Salom, Manuel	Oportunius Research Professor
	Varela Carrete, Jesús	Full Professor
	Vázquez López, Miguel	Associate Professor (Profesor Titular)
	Vázquez Sentís, Eugenio	Full Professor

Junior Scientists (December 31, 2023)		
Area	**Name**	**Position**
	Nappi, Manuel	*Manuela Barreiro* USC -Distinguished Researcher
	Orosa Puente, Beatriz	Ramón y Cajal Researcher
	Ortuño Maqueda, Manuel Ángel	Xunta Distinguished Researcher
	Polo, Ester	Ramón y Cajal Researcher
	Ramos, Rafael	Ramón y Cajal Researcher
	Tomás Gamasa, María	Ramón y Cajal Researcher

Postdoctoral Researchers (December 31, 2023)		
Area	**Name**	**Position**
	Ahmed Mohamed Abdelazim Nosir, Mohamed	R&D Research Contract
	Alcalde Ordoñez, Ana	AEI Postdoctoral Researcher (former FPI contract)
	Aparicio Gil, Borja	R&D Research Contract
	Azzi, Emanuele	R&D Research Contract
	Barreiro Piñeiro, Natalia	R&D Research Contract
	Bergueiro Alvarez, Julian	Ramón y Cajal Researcher
	Bouzada Reboredo, David	R&D Research Contract
	Calvelo Souto, Martin	Xunta Postdoctoral Researcher
	Castiñeira Reis, Marta	Xunta Postdoctoral Researcher
	Castro Esteban, Jesus	Xunta Postdoctoral Researcher
	Castro Fernandez, Silvia	Xunta Postdoctoral Researcher
	Correa Chinea, Juan Francisco	R&D Research Contract
	Fazal, Sajid	MSCA-PF
	Fuertes Garcia, Alberto	R&D Research Contract
	Gomez-Orellana Seguin, Pablo	R&D Research Contract
	Herreros Lucas, Carlos	R&D Research Contract
	Juanes Carrasco, Maria Luisa	R&D Research Contract
	Lopez Blanco, Roi	R&D Research Contract
	Lostale Seijo, Irene	R&D Research Contract
	Lucio Martinez, Maria De Fatima	R&D Research Contract
	Maneiro Rey, Maria	Xunta Postdoctoral Researcher
	Mateo De Doni, Luis Manuel	Juan de la Cierva Researcher
	Mayer Mayer, Celia	R&D Research Contract
	Mora Fuentes, Juan Pedro	Contratos posdoutorais Xunta
	Nair, Akshay Murali	R&D Research Contract
	Padín González, Esperanza	MSCA-PF
	Pathan, Shaheen Hamidkhan	MSCA-PF
	Paz Gomez, Sonia	R&D Research Contract
	Perez Potti, Andre	Ramón y Cajal Researcher
	Pozo Miguez, Iago	Margarita Salas Researcher
	Quemé Peña, Mayra Maritza	MSCA-PF
	Rivera Chao, Eva	Xunta Postdoctoral Researcher
	Rodrigues Vilares Cabral Monteiro, Ana Rita	R&D Research Contract
	Rodriguez Riego, Rafael	Juan de la Cierva Researcher

	Rodriguez Villar, Jessica	Juan de la Cierva Researcher
	Salluce, Giulia	Xunta Postdoctoral Researcher
	Sanchez Fernandez, Adrian	MSCA-PF
	Sanchez Sordo, Irene	R&D Research Contract
	Santos Claro, Marcel	R&D Research Contract
	Sendon Lago, Juan Jose	R&D Research Contract
	Tiwari, Naveen	MSCA-PF
	Velasco Rodriguez, Brenda	Xunta Postdoctoral Researcher
	Vila Fungueiriño, Jose Manuel	Juan de la Cierva Researcher
	Vilas Varela, Manuel	R&D Research Contract
	Vilela Goñez, Karen	R&D Research Contract
	Villarino Palmaz, Lara	R&D Research Contract
	Zampini, Giulia	R&D Research Contract

PhD CANDIDATES (December 31, 2023)		
Area	**Name**	**Funded by**
	Agulleiro Beraza, Amaia	FPU PhD Candidate
	Aguilera Llavero, Maria	R&D Research Contract
	Aira Rodriguez, Carla	Xunta PhD Candidate
	Alameda Felgueiras, Maria Teresa	R&D Research Contract
	Alvarez Constantino, Andres Manuel	Xunta PhD Candidate
	Alvarez Martinez, Victor	R&D Research Contract
	Andujar Arias, Antonio	Xunta PhD Candidate
	Arribas Domingo, Andres	FPU PhD candidate
	Barbeira Aran, Sergio	R&D Research Contract
	Besteiro Saez, Javier	R&D Research Contract
	Bordallo Leon, Fernando	R&D Research Contract
	Cabezon Vizoso, Alfonso	Xunta PhD Candidate
	Campos Prieto, Lucia	Xunta PhD Candidate
	Casabella Amieiro, Braulio	Xunta PhD Candidate
	Ceballos Guzman, Manuel	R&D Research Contract
	Chaves Pouso, Andrea	R&D Research Contract
	Conde Torres, Daniel	Xunta PhD Candidate
	Cool, Leonard Gerrit	R&D Research Contract
	D'avino, Cinzia	R&D Research Contract
	Delgado Gonzalez, Bruno	Xunta PhD Candidate
	Diaz Alonso, Sergio	AEI PhD Candidate (former FPI)
	Diaz Arias, Sandra Natalia	R&D Research Contract
	Duran Bravo, Alvaro	AEI PhD Candidate (former FPI)
	Fernandez Castro, Saleta	R&D Research Contract
	Fernandez Gonzalez, Xulian	AEI PhD Candidate (former FPI)
	Fernandez Iglesias, Antia	FPU PhD candidate
	Fernandez Miguez, Manuel	AEI PhD Candidate (former FPI)
	Fernandez Vega, Javier	Xunta PhD Candidate
	Fiel Baña, Alejandro	R&D Research Contract
	Fojo Carballo, Hugo	Xunta PhD Candidate
	Folgar Camean, Yeray	FPU PhD candidate
	Fulias Guzman, Patricia	AEI PhD Candidate (former FPI)
	Funes Hernando, Samuel	Xunta PhD Candidate
	Garcia Abuin, Lucas	R&D Research Contract
	Garcia Rey, Aitor	FPU PhD candidate
	Gioe, Claudia	R&D Research Contract
	Goicoechea Crespo, Laura	FPU PhD candidate
	Gomez Rodrigo, Lucia	R&D Research Contract

	Gomez Roibas, Patricia	R&D Research Contract
	Gonzalez Gonzalez, Carmen	R&D Research Contract
	Huertas Morales, Ivan	FPU PhD candidate
	Janeiro Rodriguez, Jesus	AEI PhD Candidate (former FPI)
	Jimenez Lopez, Celia	R&D Research Contract
	Lago Lorenzo, Laura	R&D Research Contract
	Lago Silva, Maria	R&D Research Contract
	Le, Thi Thanh Hiep	R&D Research Contract
	Lema Saavedra, Anxo	Xunta PhD Candidate
	Lopez Corbalan, Maria Victoria	R&D Research Contract
	Losada Castro, Pablo	Xunta PhD Candidate
	Luaces Calvin, Anton	R&D Research Contract
	Malave Fernandez, Maria Valentina	Xunta PhD Candidate
	Marcos Atanes, Daniel	R&D Research Contract
	Martinez Balart, Pol	R&D Research Contract
	Martinez Castrillon, Adrian	AEI PhD Candidate (former FPI)
	Martinez Parra, Jose Maria	Xunta PhD Candidate
	Maximo Moreno, Irene	R&D Research Contract
	Mendez Gomez, Lucia	R&D Research Contract
	Migliavacca, Martina	R&D Research Contract
	Miranda Pastoriza, Dario	Xunta PhD Candidate
	Narayanan Kolusu, Sai Rohini	R&D Research Contract
	Naseebullah, Naseebullah	R&D Research Contract
	No Gomez, Miguel	R&D Research Contract
	Nogueira Blanco, Carlos	R&D Research Contract
	Osorio Celis, Marcelo	R&D Research Contract
	Otero Riesgo, Sergio	R&D Research Contract
	Pacin Salvador, Maria Del Carmen	R&D Research Contract
	Perez Perez, Manuel	Xunta PhD Candidate
	Piñeiro Suárez, Martín	AEI PhD Candidate (former FPI)
	Prieto Diaz, Ruben	R&D Research Contract
	Rahimi, Vahid	R&D Research Contract
	Rey Bello, Nicolas	R&D Research Contract
	Rey Lopez, Alejandro	Xunta PhD Candidate
	Reza Ramos, David	R&D Research Contract
	Rodiño Balboa, Ricardo	R&D Research Contract
	Rodriguez Garcia, Carlos	R&D Research Contract
	Rodriguez Perez, Diego	R&D Research Contract
	Sabater Algarra, Yolanda	R&D Research Contract
	Salgado Barca, Jesus Fernando	R&D Research Contract

	Sanchez Gascon, Paula	R&D Research Contract
	Sanchez Martinez, Laura	R&D Research Contract
	Sarmiento Fuentes, Axel	FPU PhD candidate
	Seco González, Alejandro	R&D Research Contract
	Semenov, Oleg	R&D Research Contract
	Serantes Otero, Sergio	Xunta PhD Candidate
	Suarez De Cepeda Fuentes, Pilar	Xunta PhD Candidate
	Suarez Lustres, Alejandro	Xunta PhD Candidate
	Taheri Ledari, Reza	R&D Research Contract
	Torron Celada, Alba Maria	Xunta PhD Candidate
	Troncoso Mondragon, Ezequiel Arturo	Contratados predoutorais AEI (antigos FPI)
	Vale Gomez, Alejandra	Contratados predoutorais AEI (antigos FPI)
	Varela Domínguez, Noa	R&D Research Contract
	Vazquez Viso, Juan	R&D Research Contract
	Vilela Picos, Marcos	FPU PhD candidate
	Villar Castro, Daniel	R&D Research Contract
	Vizcaíno Anaya, Lucía	FPU PhD candidate

TECHNICAL STAFF (December 31, 2023)		
Area	**Name**	**Position**
	Acevedo Arteaga, Laura Alicia	Infrastructure's manager
	Alonso Álvarez, Ricardo	Concierge
	Barros Frieiro, Manuela	Administrative support (CiQUS' Research Group)
	Brocos Brea, Mª Elena	CiQUS Secretary & Administration
	Casal Garea, Fernando	Knowledge Transfer & International Projects
	Casas Pais, Alba	Lab Technician (CiQUS' Research Group)
	Comino León, Mariano	Communication and Outreach manager
	Fernández Aguiño, Carmen	Lab Technician (CiQUS' Research Group)
	García Fernández, Almudena	Head of Strategic Initiatives
	Guerra Fandiño, Arcadio J.	Core Facilities manager
	Jiménez Balsa, Adrián	Scientific manager (CiQUS' Research Group)
	Lago Rama, Patricia	Administrative support (CiQUS' Research Group)
	Leborán Álvarez, Víctor	Process Automatization Manager
	López Ulloa, Andrea	Purchasing & Warehouse support technician
	Maqueda Rodríguez, Elena María	Lab Technician (CiQUS' Research Group)
	Menaya Vargas, Rebeca	Biological Techniques' research specialist technician
	Pereiras Maceira, Carlos	CiQUS Secretary & Administration
	Rama Rivera, Ángel	Concierge
	Reif López, Rubén	Scientific manager (CiQUS' Research Group)
	Rey Ramos, María Carmen	Concierge
	Salgado González, Elisa	Concierge
	Sande Barreira, Álvaro	3D Printing Research specialist Technician
	Soprano, Enrica	Advanced Microspopy manager
	Torreiro Cea, Adrián	IT Support manager
	Torrente Filgueira, Noela	Purchasing & Warehouse / HSE manager
	Stockheim, Andreas	Administrative support - Account manager (shared with CiTIUS and IGFAE)
	Vazquéz Zas, Tamara	Research Specialist Technician (CiQUS' Research Group)

ANNEX II: Active R&D & Valorziation Projects during 2023

Active International R&D Projects in 2023							
Area	PI	Title	Programme	Funding Agency	Start	End	Budget
	M. Queme	From Supramolecular to Covalent Boron Clusters Membrane Carriers (CONNECT)	MSCA-PF	MSCA Actions	1/6/23	31/5/25	165.313 €
	E. Padín	Elucidating the nano-biointeractions on DNA origami (ORBIT)	MSCA-PF	MSCA Actions	15/9/23	14/9/25	181.153 €
	J. Montenegro	TraffikGene-Tx: Targeted Peptide Carriers for RNA Delivery (TraffikGene-Tx)	EIC-Transition	EIC	1/6/23	31/5/26	2.498.964 €
	J. Montenegro	Cart T cells Rewired to prevent EXhaustion in the tumour microenvironment (CAR-T REX)	EIC-Pathfinder	EIC	01/04/2023	31/03/2027	560.513 €
	M. Souto	Molecular Design of Electrically Conductive Covalent Organic Frameworks as Efficient Electrodes for Lithium-Ion Batteries (ELECTROCOFS)	ERC-StG	ERC	11/9/23	30/6/27	1.258.383 €
	M. Lazzari	Novel electroactive polymeric materials for dielectric elastomers actuators and soft robots (EPOMA DESO)	MSCA-PF	MSCA Actions	01-09-22	31-08-24	181.153 €
	F. Rivadulla	New Germanium-based materials for Green electronics (NeGeMat)	MSCA-PF	MSCA Actions	01-07-22	30-06-25	261.381 €
	D. Peña	Single Molecular Devices by Atomic Manipulation (MolDAM)	ERC-SyG	ERC	01-10-21	30-09-27	2.820.106 €
	E. Vázquez	Protein-based conductive materials pave the way for next-generation energy storage devices (e-Prot)	FET-Open	REA	01-09-21	31-08-25	337.106 €
	B. Pelaz	SPAtially-Controlled lIgand arraNGement by origami-based nanoprinters (SPACING)	ERC-StG	ERC	01-01-21	31-03-26	1.498.866 €
	B. Pelaz	Revealing drug tolerant persister cells in cancer using contrast enhanced optical coherence and photoacoustic tomography (REAP)	H2020 | ICT-36-2020 - Disruptive photonics technologies	REA	01-01-21	31-12-24	453.903 €
	B. Pelaz	Switchable magneto-plasmonic contrast agents and molecular imaging technologies (SWIMMOT)	FET-Open	REA	27/10/20	30/9/24	546.035 €
	M. Fañanás	Bimetallic Catalysis for Diverse Methane Functionalization (BECAME)	ERC-CoG	ERC	1/9/20	31/8/25	1.999.679 €
	P. del Pino	Heating triggered drug release from nanometric inorganic-metal organic framework composites (HeatNMof)	MSCA-ITN	MSCA Actions	0/7/2020	29/2/24	250.905 €
	D. Peña	Spin Research IN Graphene (SPRING)	FET-Open	REA	1/10/19	30/9/23	500.940 €
	M. Giménez-López	Complex Dinamic of Clusters in High-Aspect Hollow Nanostructures (NANOCOMP)	ERC-StG	ERC	1/2/18	2024	1.571.692 €

Active National R&D Projects in 2023							
Area	PI	Title	Programme	Funding Agency	Start	End	Budget
	J. Montenegro	ChaoTROPIC Antimicrobial Hybrids for Bacterial Penetration	Investigación en Salud - La Caixa 2023	Fundación LaCaixa	1/12/23	30/12/26	984.050 €
	S. Da Silva Alvarez	Labores relacionadas con un proyecto que se centra en el desarrollo de nanoestructuras y el estudio de la senescencia celular y su modulación	Dotación Juan de la Cierva	AEI	1/1/24	31/12/25	7.400,00
	M. Nappi	Realizar actividades de investigación de alta especialización en el marco delprograma científico del CiQUS, especialmente en las áreas de fotocatálisis ydesarrollo de procesos fotoinducidos en química sintética	Dotación Ramón y Cajal	AEI	1/1/24	31/12/28	50.000,00
	R. Garcia Fandiño	Descifrando la conexión del código lipídico entre cáncer, infección y envejecimiento: hacia herramientas teranósticas no convencionales y vacunas basadas en la memoria innata	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/27	156.250,00
	M. Gulias	Nuevas estrategias de síntesis enantioselectiva basadas en la activación de enlaces C-H mediante catálisis metálica	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos de investigación no orientada	AEI	1/9/23	31/8/26	175.000,00
	D. Pérez	Arinos y Catálisis Metálica: Estrategias y Métodos Innovadores para la Síntesis de Nanoestructuras de Carbono No Convencionales	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos de investigación no orientada	AEI	1/9/23	31/8/26	218.750,00
	J.R. Granja	Materiales supramoleculares basados en péptidos cíclicos. Una aproximación supramolecular quimioterapéutica	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos de investigación no orientada	AEI	1/9/23	31/8/26	275.000,00
	J. Martínez-Costas	Evolución de la tecnología IC-Tagging para la producción de vacunas y enzimas estabilizadas	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/26	125.000,00
	J.L. Mascareñas	Aplicaciones biomédicas de complejos de metales de transición: herramientas catalíticas y desarrollo de nuevas terapias anticáncer	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/26	500.000,00
	F. Rivadulla	Interfases complejas entre óxidos para conductancias térmicas reconfigurables	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos de investigación no orientada	AEI	1/9/23	31/8/26	212.500,00
	F. Freire	Polímeros Helicoidales Covalentes y Supramoleculares: Diseño, Estructura y Propiedades Estímulo Respuesta	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos de investigación no orientada	AEI	1/9/23	31/8/26	281.250,00

	D. Peña	Diseño y síntesis de precursores para la preparación de nanoestructuras moleculares funcionales	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/26	262.500,00
	C. González-Bello	Nuevos agentes antibacterianos de precisión y terapias combinadas para combatir infecciones multirresistentes	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/26	237.500,00
	B. Pelaz	Origamis de ADN para modular la respuesta inmune adquirida	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/26	185.000,00
	A. Sánchez	Sistemas eutécticos para el transporte transmembrana de ácidos nucléicos y proteínas	GENERACIÓN DE CONOCIMIENTO 2022 - Proyectos investigación orientada	AEI	1/9/23	31/8/26	118.750,00
	M. Lazzari	Red de Ciencia y tecnología para la conservación del patrimonio cultural	REDES DE INVESTIGACIÓN 2022	AEI	1/6/23	31/5/25	20.390,00
	Mascareñas, José Luis	Beyond metalloenzymes: Metal-grafted nanostructures for organometallic catalysis in live settings	Sello de Excelencia ISCIII-HEALTH 2022	ISCIII	2022	2024	984.252 €
	del Pino, Pablo	Engineered Exosomes for Stimuli-responsive Image-guided Drug delivery for Cancer Theranostic applications	Programación Conjunta Internacional - MSCA-PF-EF	AEI	2022	2024	160.932€
	Tomás, María	Desarrollo de nuevas herramientas y sondas para el estudio de procesos biológicos. traslado de fotocatálisis al contexto de la química bioortogonal.	Dotación Ramón y Cajal	AEI	2022	2026	42.000 €
	Lazzari, Massimo	Recuperación de metales escasos y valiosos de residuos electrónicos mediante materiales adsorbentes preparados a medida	Generación de Conocimiento	AEI	2022	2025	121.000€
	Sotelo, Eddy	Fármacos multi-diana en la inmunoterapia del cáncer: Descubrimiento de ligandos que actúan sinérgicamente en dos puntos de control inmunitarios en el microambiente tumoral	Generación de Conocimiento	AEI	2022	2025	145.200 €
	Giménez-López, M. Carmen	Refrigerantes de estado sólido, electrocatalizadores y baterías de iones metálicos activados por presión o mediante confinamiento enmateriales híbridos sostenibles	Generación de Conocimiento	AEI	2022	2025	181.500 €
	Orosa, Beatriz	Descifrando la inmunidad de los cereales mediada por la ubiquitinación	Generación de Conocimiento	AEI	2022	2025	163.350€

	Fernández-Megía, Eduardo	Acidos borónicos: Un viaje de ida y vuelta entre transporte de fármacos y caracterización por RMN	Generación de Conocimiento	AEI	2022	2025	133.100€
	Vázquez, Eugenio	Herramientas peptídicas en sensores, catálisis y ciencia de materiales	Generación de Conocimiento	AEI	2022	2025	114.950€
	Vázquez, Miguel	Nuevas estrategias para terapias anticáncer y contra el Covid-19 basadas en herramientas	Generación de Conocimiento	AEI	2022	2025	114.950€
	Nappi, Manuel	Aprovechar la energía de la luz visible para convertir los gases de efecto invernadero en valiosos productos químicos	Transición Ecológica y Transición Digital	AEI	2022	2024	218.500€
	Ramos, Rafael	Memorias térmicas y termoreguladores basados en conductores iónicos	Transición Ecológica y Transición Digital	AEI	2022	2024	152.950 €
	Giménez-López, M. Carmen	Catalizador Confinado Duradero con Actividad Mejorada para Resolver las Limitaciones del Cátodo en una Bateria de Zn-Aire - (ENDURANCE)	Transición Ecológica y Transición Digital	AEI	2022	2024	278.300 €
	Ortuño, Manuel	Depolimerización asistida por dominios en líquidos iónicos usando técnicas computacionales a nivel atómico	Transición Ecológica y Transición Digital	AEI	2022	2024	116.955 €
	Vázquez, Eugenio	Péptidos conductores semisintéticos y de síntesis química	Transición Ecológica y Transición Digital	AEI	2022	2024	149.500€
	Peña, Diego	Diseño y síntesis de precursores moleculares para sensores de gases	Transición Ecológica y Transición Digital	AEI	2022	2024	148.350 €
	Fañanás, Martín	Valorización de metano promovida por luz	Transición Ecológica y Transición Digital	AEI	2022	2024	184.000 €
	Rodríguez, Rafael	-	Dotación Juan de la Cierva Incorporación	AEI	2022	2025	6.300 €
	Ramos, Rafael	Thin film oxide nanostructures for information, logic and energy management	Dotación Ramón y Cajal	AEI	01-09-21	31-08-25	40.000 €
	Montenegro, Javier	Conceptually New Chemical Tools for the Next Generation of Nucleic Acid Delivery Vehicles	RETOS	AEI	01-09-21	31-08-24	242.000 €
	Fañanás, Martín	Catalytic hydrocarbon valorization into multifunctional building blocks	RETOS	AEI	01-09-21	31-08-24	193.600 €
	Saá, Carlos / Varela, Jesús A.	Organometallic/Photo Catalysis: Sustainable Routes to Non-natural Peptides and PAHs (PhotocatPePPAH)	GENERACIÓN	AEI	01-09-21	31-08-24	181.500 €
	Polo, Ester	Biomimetic Platelet-Derived Nanomedicines for Treatment of Thromboembolic Stroke	ISCIII-Programación Conjunta Internacional	AEI-ISCIII	01-01-21	31-12-23	140.965 €

	López, Fernando	Enantioselective synthetic methods based on transition metal catalysis and applications thereof	GENERACIÓN	AEI	01-09-21	31-08-24	145.200 €
	del Pino, Pablo	Plasmonic Nanocomposites for Photothermophoretic Manipulation of Molecules inside Living Cells	RETOS	AEI	01-09-21	31-08-24	121.000 €
	Polo, Ester	Biomimetic dendritic-cell-derived nanovectors for targeting the immune system (NanoDCell)	RETOS	AEI	01-09-21	31-08-24	96.800 €
	Nappi, Manuel	Sustainable chemical methods promoted by visible light: greenhouse gases valorisation, biodegradable polymers synthesis and novel bioconjugation methodologies	GENERACIÓN	AEI	01-09-21	31-08-24	84.700 €
	Ortuño, Manuel	Metal–organic frameworks for biomass Upgrading via SImulations of CAtalytic systems (MUSICA)	RETOS	AEI	01-09-21	31-08-24	84.700 €
	Orosa, Beatriz	Improving plant immunity using post-translational modifications	Dotación Ramón y Cajal	AEI	01-09-21	31-08-25	40.000 €
	Vázquez, Miguel	A new family of anticancer drugs: selective cleavage of DNA three-way junctions by Cu(II) peptide helicates acting as nucleases	Programa - IDEAS Semilla 2021	AECC	15-11-21	14-11-23	10.000 €
	Mateos, Jaime	-	Dotación Juan de la Cierva - Incorporación	AEI	2021	2023	6.000 €
	Rodríguez, Jessica	-	Dotación Juan de la Cierva - Incorporación	AEI	2021	2023	6.000 €
	Polo, Ester	Synthetic biomimetic cell-derived nanostructures	Dotación Ramón y Cajal	AEI	01-01-21	31-12-25	40.000 €
	Fernández-Ramos, Antonio	Simulación de Biocombustibles y Aditivos de Gasolina	RETOS-Mod. B	AEI	1/6/20	31/5/24	60.500 €
	Peña, Diego	Síntesis en disolución para la integración del grafeno nanoporoso multifuncional en biosensores nanofotónicos	FLAG ERA 3	PCI-AEI	1/3/20	28/2/23	62.400 €
	González-Bello, Concepción	Combatiendo las bacterias resistentes a los antibióticos y controlando su evolución in vivo mediante estrategias innovadoras y nuevos tests de diagnóstico clínico	RETOS-Mod. B	AEI	1/6/20	31/5/23	169.400 €
	Martínez-Costas, Jose	Nuevos enfoques de la encapsulación de proteínas en micro/nanoesferas basadas en viroplasmas para aplicaciones industriales, terapéuticas e immunoterapia (VIROSPHERE)	RETOS-Mod. B	AEI	1/6/20	31/5/23	121.000 €

	Rivadulla, Francisco	Materiales funcionales para el control activo de la conductividad térmica	RETOS-Mod. B	AEI	1/6/20	31/5/23	151.250 €
	Seoane, Andrés	Desarrollo de reacciones catalizadas por metales en el entorno celular	Juan de la Cierva - Incorporación	AEI	1/7/20	30/6/23	6.000 €
	Pelaz García, Beatriz	Sintesis y caracterización de nanomateriales para el desarrollo de nanomedicinas	Ramón y Cajal	AEI	4/2/19	3/2/23	40.000 €
	Pelaz, Beatriz	Nanoimpresoras basadas en origamis para controlar la disposición espacial de ligandos en nanopartículas: estudio de su influencia en procesos intracelulares (ORIGARITMO)	RETOS-Mod. B	AEI	1/6/20	31/5/23	84.700 €
	Granja, Juan	Materiales Supramoleculares Dinámicos Funcionales Basados en Ciclopéptidos. Una Aproximación a Terapias Supramoleculares	RETOS-Mod. B	AEI	1/6/20	31/5/23	1963.600 €
	Gulías, Moisés	Nuevos Métodos de Síntesis Química Mediante la Funcionalización de Enlaces C-H con Catalizadores Metálicos	Generación de Conocimiento	AEI	1/6/20	31/5/23	84.700 €
	Pérez, Dolores	Lego Molecular Basado en Arinos: Aplicación a la Síntesis de Hidrocarburos Policíclicos Conjugados y Materiales π-Funcionales	Generación de Conocimiento	AEI	1/6/20	31/5/23	127.050 €
	Freire, Félix; Quiñoá, Emilio	Materiales quirales con propiedades-estimulo respuesta: Diseño, síntesis y aplicaciones	Generación de Conocimiento	AEI	1/6/20	31/5/23	205.700 €
	Mascareñas, José Luis	Herramientas basadas en metales para su uso en química biológica y biomedicina. Desarrollo de nuevas estrategias anticancer	RETOS-Mod. B	AEI	1/6/20	31/5/23	363.000 €
	Peña, Diego	Síntesis en disolución para sistemas moleculares funcionales (FunMolSys)	RETOS-Mod. B	AEI	1/6/20	31/5/23	151.250 €

Active Regional R&D Projects and Signed Agreements in 2023							
Area	PI	Title	Programme	Funding Agency	Start	End	Budget
	M. Castiñeiras	Elucidación mecanística dos procesos de formación de moléculas orgánicas complexas no medio interestelar	Contratos Posdoutorais Xunta – Mod. B	Xunta de Galicia	16/9/23	15/4/25	24.906 €
	J. Montenegro	Xeración de Librerías de Novos Péptidos Dinámicos Para a Entrega de Ácidos Nucleicos con Potencial Terapéutico	Proxectos de Excelencia (liña emerxente)	Xunta de Galicia	1/1/23	20/11/27	199.967 €
	M. Tomás	Química bioortogonal controlada por luz y ultrasonidos (QuimBioFotoSon)	Proxectos de Excelencia (liña emerxente)	Xunta de Galicia	1/1/23	20/11/27	114.991 €
	J. Bergueiro	Modificaciones epigenéticas artificiales mediante química supramolecular	Proxectos de Excelencia (liña emerxente)	Xunta de Galicia	1/1/23	20/11/27	115.000 €
	B. Pelaz	GPC GI-2197 - Nanoherramientas para Aplicaciones Biomédicas - BioNanoTools	CONSOLIDACIÓN - GPC	Xunta de Galicia	1/1/23	20/11/25	89.967 €
	E. Sotelo	GPC GI-1597 - Descubrimento e síntese de fármacos - DESINFARMA-COMBIOMED	CONSOLIDACIÓN - GPC	Xunta de Galicia	1/1/23	20/11/25	119.967 €
	D. Pérez	Acción 8. Apoio Centros Red CIGUS: CIQUS. Convenio Accións I+D	-	Conselleria De Cultura, Educacion, Formacion Profesional e Universidades	1/1/23	30/9/24	494.093 €
	D. Pérez	Xornadas de portas abertas e bolsas de verán 2023: CIQUS	-	Conselleria De Cultura, Educacion, Formacion Profesional e Universidades	1/1/23	30/11/24	47.991 €
	J.L. Mascareñas	Convenio de colaboración entre a Axencia Galega de Innovación a Universidade de Santiago de Compostela e a Universidade de Vigo para fomentar a Actividade Investigadora do Persoal Universitario beneficiario dunha axuda do ERC no marco H2020	-	GAIN	1/1/21	31/12/24	8.000 €
	F. Ribadulla	Convenio de colaboración entre a Axencia Galega de Innovación a Universidade de Santiago de Compostela e a Universidade de Vigo para fomentar a Actividade Investigadora do Persoal Universitario beneficiario dunha axuda do ERC no marco H2020	-	GAIN	1/1/21	31/12/24	5.000 €
	C. Saá	GRC GI-1603 - Catálisis organometálica	CONSOLIDACIÓN - GRC	Xunta de Galicia	2022	2025	320.000 €
	E. Quiñoá	GRC GI-1608 - Nanomateriais e Moléculas Bioactivas	CONSOLIDACIÓN - GRC	Xunta de Galicia	2022	2025	278.772 €

	R. Ramos	Estudio de interacciones entre spin-red-electrón(ion) en óxidos de metales de transición para la manipulación de la conducción térmica y conversión termoeléctrica	PROXECTOS DE EXCELENCIA	Xunta de Galicia	2022	2026	115.000 €
	B. Orosa	-	PROXECTOS DE EXCELENCIA	Xunta de Galica	2022	2026	115.000 €
	D. Peña	Convenio de colaboración entre a Consellería de Cultura, Educación e Universidade e a Universidade de Santiago de Compostela (USC) para Completar as axudas ao Persoal Investigador Principal dos Programas Grant do Consello Europeo de Investigación (ERC)	Agreement	Xunta de Galica	2023	2023	80.000,00 €
	M. Fañanás	Convenio de colaboración entre a Consellería de Cultura, Educación e Universidade e a Universidade de Santiago de Compostela (USC) para Completar as axudas ao Persoal Investigador Principal dos Programas Grant do Consello Europeo de Investigación (ERC)	Agreement	Xunta de Galica	2023	2023	65.000,00 €
	B. Pelaz	Convenio de colaboración entre a Consellería de Cultura, Educación e Universidade e a Universidade de Santiago de Compostela (USC) para Completar as axudas ao Persoal Investigador Principal dos Programas Grant do Consello Europeo de Investigación (ERC)	Agreement	Xunta de Galica	2023	2023	50.000,00 €
	M. Carmen Giménez-López	Convenio de colaboración entre a Consellería de Cultura, Educación e Universidade e a Universidade de Santiago de Compostela (USC) para Completar as axudas ao Persoal Investigador Principal dos Programas Grant do Consello Europeo de Investigación (ERC)	Agreement	Xunta de Galica	2022	2022	50.000,00 €
	C. González-Bello	GRC GI 2155 Inhibidores Enzimáticos e Ferramentas Químicas	CONSOLIDACIÓN - GRC	Xunta de Galicia	1/1/21	30/11/24	280.000 €
	J.R. Granja	GRC GI-2132 Química supramolecular e nanotubos peptídicos (QSNP)	CONSOLIDACIÓN - GRC	Xunta de Galicia	1/1/21	30/11/24	400.000 €
	J.L. Mascareñas	GRC GI-1611 Química Biolóxica e Supramolecular (BCS)	CONSOLIDACIÓN - GRC	Xunta de Galicia	1/1/21	30/11/24	400.000 €
	M. Giménez-López	GPC GI 2170 Materia Condensada & Materiais Funcionais (MAT2)	CONSOLIDACIÓN - GPC	Xunta de Galicia	1/1/21	30/11/23	90.000 €
	E. Polo	CONSOLIDACION 2021 - Mod. D Excelencia	EMERXENTES	Xunta de Galicia	1/1/21	30/11/24	115.000 €
	Ortuño, Manuel	Axuda Complementaria para o desenvolvemento da liña de investigación asociada as axudas para atracción e retención de talento investigador na categoría	Distinguised Researchers	Xunta de Galicia	1/12/20	30/11/24	160.000 €

		de persoal investigador distinguido nas universidades do SUG					
	Guitián, Enrique	GI-1595_Catálisis Organometálica y Materiales Moleculares Orgánicos	Grupo de Referencia Competitiva	Xunta de Galicia	1/1/20	30/11/23	280.000 €
	Pelaz, Beatriz	Desarrollo de tecnologías basadas en ADN para ingeniería de nanomedicinas inspiradasen las cápsides víricas: ADNanoVir	Consolidación – Mod.D Excelencia	Xunta de Galicia	1/1/20	30/11/23	90.000 €
	García-Fandiño, Rebeca	Estudio de la intersección entre la infección y el cáncer a través de enfoque sinérgico in-silico	Consolidación – Mod.D Excelencia	Xunta de Galicia	1/1/20	30/11/23	115.000 €

Active Valorization Projects in 2023							
Area	PI	Title	Programme	Funding Agency	Start	End	Budget
	J.L. Mascareñas	Selectively eliminating cancer stem cells through inhibition of mitochondrial respiration using metal-based small molecules	La Caixa Research Consolidate 2021	La Caixa Foundation	2022	2025	300.000 €
	J. Montenegro	TraffikGene	IGNICIA	GAIN	2022	2025	490.000 €
	M. Carmen Giménez-López	A New Supramolecular Rechargeable Zinc-Bromine Battery for a Sustainable Energy Transition (ZUPRAenergy)	PROYECTOS DE I+D+i PRUEBAS DE CONCEPTO	AEI	2022	2024	149.500 €
	R. García-Fandiño	Descifrando el lipidoma humano: CRYPT LIPID CODES para predecir y diagnosticar enfermedades	PROYECTOS DE I+D+i PRUEBAS DE CONCEPTO	AEI	2022	2024	141.450 €
	E. Sotelo	Cuantificación en paralelo de múltiples interacciones de puntos de control inmunitario en onco-inmunología. PREDICTEAM	Proyectos de colaboración público-privada 2021	AEI	2022	2025	181.654 €
	E. Sotelo	CAPN12-IO: preclinical development and first human clinical trial of a selective calpain-12 inhibitor as a new strategy for cancer immunotherapy	Proyectos de colaboración público-privada 2021	AEI	2022	2025	276.948 €
	J. Montenegro	A new chemical platform for customized gene therapy (GeneVector)	PROYECTOS DE I+D+i PRUEBAS DE CONCEPTO	AEI	1/12/21	30/11/23	143.750 €
	J.L. Mascareñas	Metal-based anticancer agents targeting the mitochondrial respiration of cancer stem cells	PROYECTOS DE I+D+i PRUEBAS DE CONCEPTO	AEI	1/12/21	30/11/23	108.100 €
	M. Giménez-López	A New Zn-Air Battery Prototype to Overcome Cathode Degradation Through Catalyst Confinement (ZABCAT)	ERC-PoC	ERC	01/10/2021	31/03/2023	85.500 €

ANNEX III: Active R&D Contracts during 2023

Active R&D Contracts in 2023						
Area	PI	Title	Partnert/Client	Start	End	Budget
	M.R. Paleo	Asistencia y consultoría científico técnica encaminados a la síntesis, purificación y caracterización de colecciones de compuestos orgánicos relacionados con los ligandos fluorescentes desarrollados por CELTARYS	CELTARYS RESEARCH SL	11/12/23	10/12/27	60.000 €
	F.J. Sardina	SmartGlobalLab: un mercado global de datos farmacéuticos	MESTRELAB RESEARCH, SL	15/3/23	23/5/25	80.780 €
	E. Sotelo	Servicios de síntesis orgánica, química médica y química biológica aplicada al desarrollo de compuestos intermedios para el proyecto Neotec Nueva tecnología de conjugación química para dianas terapéuticas	CELTARYS RESEARCH SL	9/1/23	30/4/24	11.899 €
	F.J. Sardina	Desenvolvemento de novas liñas de investigación ligadas ao Centro de Investigación Mestrelab. Investigacións para o deseño de ferramentas experimentais e informáticas para incrementar a capacidade de instrumentos de RMN de sobremesa para a identificación e cuantificación de sustancias de interese en mixturas complexas	MESTRELAB RESEARCH, SL	15/3/23	14/3/27	99.220 €
	E. Sotelo	Puesta a punto y desarrollo de metodologías sintéticas y la obtención de quimiotecas de moléculas orgánicas	ONCOSTELLAE, SL	1/1/23	31/12/25	30.000 €
	E. Sotelo	Servicios de consultoría técnica, síntesis de colecciones de ligandos y análisis estructural relacionados con los ligandos fluorescentes desarrollados por CELTARYS	Celtarys Research S.L.	25/10/21	24/1/23	22.890 €
	R.J. Estévez	Asesoría técnica para a realización e elucidación das análises de Resonancia Magnética	GALCHIMIA S.A.	1/1/23	31/12/24	9.999 €
	M. Lazzari	Estudio de materiales celusósicos	FUNDACION CENTRO GALLEGO DE INVESTIGACIONES DEL AGUA (CETAqua GALICIA)	20/11/23	30/5/25	4.000 €
	E. Sotelo	Puesta a punto y desarrollo de metodologías sintéticas y obtención de quimiotecas de moléculas orgánicas.	LANDSTEINER GENMED, SL	5/3/18	3/8/23	27.083 €
	F.J. Sardina	Deseño e desenvolvemento de algoritmos e bases de datos espectroscópicas para a análise e interpretación asistidas por intelixencia artificial de datos e información química para o seu uso en entornos de aplicacións web e prestación de servizos analíticos cualitativos, cuantitativos e de asignación estrutura	MESTRELAB RESEARCH, SL	1/1/22	31/12/25	99.220 €
	E. Sotelo	Apoio técnico no deseño de novas ferramentas químicas e soporte no proceso de desenvolmento de intermedios químicos. InnovaPeme	CELTARYS RESEARCH SL	19/5/22	30/9/23	10.482 €

	E. Sotelo	Servicios de consultoría técnica, síntesis de colecciones de ligandos y análisis estructural relacionados con los ligandos fluorescentesdesarrollados por CELTARYS	CELTARYS RESEARCH SL	2/6/22	1/7/23	19.561 €
	D. Peña	*Síntesis de compostos policíclicos aromáticos*	*ABCR GMBH*	1/1/21	31/12/25	*500 €*
	J.M. Martínez-Costas	Etiquetado e inclusión de antígenos recombinantes seleccionados del virus del síndrome reproductivo y respiratorio porcino (PRRSV) en microesferas de reovirus aviar para su posterior validación en modelo murino y modelo porcino como candidato vacunal frente a esta enfermedad	UNIVERSIDAD DE CORDOBA	28/12/21	27/9/23	20.000 €
	F.J. Sardina	Deseño e desenvolvemento de algoritmos para a análise e interpretación asistidas por intelixencia artificial de datos e información química para o seu uso en entornos de aplicacións Web e prestación de servizos analíticos cualitativos, cuantitativos e de asignación estrutural	Mestrelab Research	01-02-21	31-12-23	66.550 €
	F.J. Sardina	Deseño e desenvolvemento de algoritmos para a automatización de tarefas de recollida, interpretación e análise de datos para o seu uso nun entorno de libreta de laboratorio electrónica que inclúa a prestación de servizos analíticos cualitativos e cuantitativos dentro do contexto do Proxecto Futurelab	MESTRELAB RESEARCH, SL	1/1/20	31/12/23	66.550 €
	Sardina Lopez, Francisco Javier	Nuevas técnicas analíticas de control para la transición industrial hacia unha economía circular (CdTI-Misiones)	TORUS SOFTWARE SOLUTIONS SL	1/8/20	31/12/23	60.000 €
	F.J. Sardina	Nuevas técnicas analíticas de control para la transición industrial hacia unha economía circular (CdTI-Misiones)	SIGILLUM KNOWLEDGE SOLUTIONS, SL	1/8/20	31/12/23	60.000 €
	F.J. Sardina	Nuevas técnicas analíticas de control para la transición industrial hacia unha economía circular (CdTI-Misiones)	APPLIED MASS SPECTROMETRY LABORATORY, SLU (AMSLAB)	1/8/20	31/12/23	120.000 €

ANNEX IV: List of Publications

2023 List of CiQUS Publications						
Area	Authors	Title	Journal	Vol.	Pages	DOI
	E. Rems, M. Anayee, E. Fajardo, R.L. Lord, D. Bugallo*, Y. Gogotsi, Y.-J. Hu	*Computationally Guided Synthesis of MXenes by Dry Selective Extraction*	Adv. Mater.	45	2305200	10.1002/adma.202305200
	M. Vilela-Picos, F. Novelli, A. Pazó, A. Méndez-Ardoy, G. Marafon, M. Amorín, A. Moretto, J.R. Granja	*Photo-assembling cyclic peptides for dynamic light-driven peptide nanotubes*	Chem	9	3365-3378	10.1016/j.chempr.2023.10.005
	M.S. Claro*, J.P. Martínez-Pastor, A. Molina-Sánchez, K. El Hajraoui, J. Grzonka, H. Pashaei Adl, D. Fuertes Marrón, P.J. Ferreira, O. Bondarchuk, S. Sadewasser	*Van der Waals Heteroepitaxy of GaSe and InSe, Quantum Wells, and Superlattices*	Adv. Funct. Mater.	23	2211871	10.1002/adfm.202211871
	H. Meer, S. Wust, C. Schmitt, P. Herrgen, F. Fuhrmann, S. Hirtle, B. Bednarz, A. Rajan, R. Ramos, M.A. Niño, M. Foerster, F. Kronast, A. Kleibert, B. Rethfeld, E. Saitoh, B. Stadtmüller, M. Aeschlimann, M. Kläui	*Laser-Induced Creation of Antiferromagnetic 180-Degree Domains in NiO/Pt Bilayers*	Adv. Funct. Mater.	33	2213536	10.1002/adfm.202213536
	D. Marcos-Atanes, C. Vidal, C.D. Navo, F. Pecatti, G. Jiménez-Osés, J.L. Mascareñas	*Iridium-Catalyzed ortho-Selective Borylation of Aromatic Amides Enabled by 5-Trifluoromethylated Bipyridine Ligands*	Angew. Chem. Int. Ed.	62	e202214510	10.1002/anie.202214510
	M. Lago-Silva, M.M. Cid, E. Quiñoá, F. Freire	*Dynamic Axial-to-Helical Communication Mechanism in Poly[(allenylethynylenephenylene)acetylene]s under External Stimuli*	Angew. Chem. Int. Ed.	62	e202303329	10.1002/anie.202303329
	J.J. Tarrío, R. Rodríguez, J. Crassous, E. Quiñoá, F. Freire	*Conformational Kinetics in Chiral Poly(diphenylacetylene)s: Dynamic P/M Memory Effect*	Angew. Chem. Int. Ed.	62	e202307059	10.1002/anie.202307059
	M. Vilas-Varela, F. Romero-Lara, A. Vegliante, J.P. Calupitan, A. Martínez, L. Meyer, U. Uriarte-Amiano, N. Friedrich, D. Wan, F. Schulz, N.E. Koval, M.E. Sandova-Salinas, D. Casanova, M. Corso, E. Artacho, D. Peña, J.I. Pascual	*On-Surface Synthesis and Characterization of a High-Spin Aza-[5]-Triangulene*	Angew. Chem. Int. Ed.	62	e202307884	10.1002/anie.202307884
	R. Zuzak, J. Castro-Esteban, M. Engelund, D. Pérez, D. Peña, S. Godlewski	*On-Surface Synthesis of Nanographenes and Graphene Nanoribbons on Titanium Dioxide*	ACS Nano	17	2580-2587	10.1021/acsnano.2c10416

	F. Liu, P. Golani, T.K. Truttmann, I. Evangelista, M.A. Smeaton, D. Bugallo, J. Wen, A.K. Manjeshwar, S.J. May, L.F. Kourkoutis, A. Janotti, S.J. Koester, B. Jalan	*Doping the Undopable: Hybrid Molecular Beam Epitaxy Growth, n-Type Doping, and Field-Effect Transistor Using $CaSnO_3$*	ACS Nano	17	16912–16922	10.1021/acsnano.3c04003
	A. Pérez-Potti, M. Rodríguez-Pérez, E. Polo, B. Pelaz, P. del Pino	*Nanoparticle-based immunotherapeutics: From the properties of nanocores to the differential effects of administration routes*	Adv. Drug Deliv. Rev.	197	114829	10.1016/j.addr.2023.114829
	F. Rey-Tarrío, R. Rodríguez, E. Quiñoá, F. Freire	*Screw sense excess and reversals of helical polymers in solution*	Nat. Commun.	14	1742	10.1038/s41467-023-37405-z
	E. Rongione, O. Gueckstock, M. Mattern, O. Gomonay, H. Meer, C. Schmitt, R. Ramos, T. Kikkawa, M. Mičica, E. Saitoh, J. Sinova, H. Jaffrès, J. Mangeney, S. T. B. Goennenwein, S. Geprägs, T. Kampfrath, M. Kläui, M. Bargheer, T. S. Seifert, S. Dhillon, R. Lebrun	*Emission of coherent THz magnons in an antiferromagnetic insulator triggered by ultrafast spin–phonon interactions*	Nat. Commun.	14	1818	10.1038/s41467-023-37509-6
	F. Rey-Tarrío, E. Quiñoá, G. Fernández, F. Freire	*Multi-chiral materials comprising metallosupramolecular and covalent helical polymers containing five axial motifs within a helix*	Nat. Commun.	14	3348	10.1038/s41467-023-39014-2
	J. Brede, N. Merino-Díez, A. Berdonces-Layunta, S. Sanz, A. Domínguez-Celorrio, J. Lobo-Checa, M. Vilas-Varela, D. Peña, T. Frederiksen, J.I. Pascual, D.G. de Oteyza, D. Serrate	*Detecting the spin-polarization of edge states in graphene nanoribbons*	Nat. Commun.	14	6677	10.1038/s41467-023-42436-7
	C. Moreno, X. Diaz de Cerio, M. Vilas-Varela, M. Tenorio, A. Sarasola, J. Brandbyge, D. Peña, A. Garcia-Lekue, A. Mugarza	*Molecular Bridge Engineering for Tuning Quantum Electronic Transport and Anisotropy in Nanoporous Graphene*	J. Am. Chem. Soc.	145	8988-8995	10.1021/jacs.3c00173
	Y. Chen, A. Barba-Bon, B. Grüner, M. Winterhalter, M.A. Aksoyoglu, S. Pangeni, M. Ashjari, K. Brix, G. Salluce, Y. Folgar-Cameán, J. Montenegro, W.M. Nau	*Metallacarborane Cluster Anions of the Cobalt Bisdicarbollide-Type as Chaotropic Carriers for Transmembrane and Intracellular Delivery of Cationic Peptides*	J. Am. Chem. Soc.	145	13089-13098	10.1021/jacs.3c01623
	J.N. Martins, B. Raimundo, A. Rioboo,	*Photoswitchable Calixarene Activators for Controlled Peptide Transport across Lipid Membranes*	J. Am. Chem. Soc.	145	13126-13133	10.1021/jacs.3c01829

	Y. Folgar-Cameán, J. Montenegro, N. Basílio					
	J. Miguel-Ávila, M. Tomás-Gamasa, J.L. Mascareñas	*Metal-promoted synthetic chemistry within living cells*	Trends Chem.	5	474-485	10.1016/j.trechm.2023.04.001
	I. Sánchez-Sordo, A. Chaves-Pouso, J. Mateos-Gil, E. Rivera-Chao, M. Fañanás-Mastral	*Desymmetrization of meso-dibromocycloalkenes by copper-catalyzed asymmetric borylative coupling with alkynes*	Chem Catalysis	3	100730	10.1016/j.checat.2023.100730
	L. Gutiérrez, V. Martin-Diaconescu, C. Casadevall, F. Oropeza, V.A. de la Peña O'Shea, J.J. Meng, M.A. Ortuño, J. Lloret-Fillol	*Low Oxidation State Cobalt Center Stabilized by a Covalent Organic Framework to Promote Hydroboration of Olefins*	ACS Catal.	13	3044-3054	10.1021/acscatal.2c05442
	M. Piñeiro-Suárez, A.M. Álvarez-Constantino, M. Fañanás-Mastral	*Copper-Catalyzed Enantioselective Borylative Allyl–Allyl Coupling of Allenes and Allylic gem-Dichlorides*	ACS Catal.	13	5578-5583	10.1021/acscatal.3c00536
	A. Chaves-Pouso, E. Rivera-Chao, M. Fañanás-Mastral	*Catalytic Alkyne Allylboration: A Quest for Selectivity*	ACS Catal.	13	12656-12664	10.1021/acscatal.3c03015
	P. Losada, L. Goicoechea, J.L. Mascareñas, M. Gulías	*Axially Chiral 2-Hydroxybiaryls by Palladium-Catalyzed Enantioselective C–H Activation*	ACS Catal.	13	13994–13999	10.1021/acscatal.3c03867
	E. Gato, P. Guijarro-Sánchez, I. Alonso-García, R. Pedraza-Merino, A. Conde, E. Lence, S. Rumbo-Feal, A. Peña-Escolano, C. Lasarte-Monterrubio, T. Blanco-Martín, A. Fernández-González, M.C. Fernández-López, R. Maceiras, M. Martínez-Guitián, J.C. Vázquez-Ucha, L. Martínez-Martínez, C. González-Bello, J. Arca-Suárez, A. Beceiro, G. Bou	*In vitro development of imipenem/relebactam resistance in KPC-producing Klebsiella pneumoniae involves multiple mutations including OmpK36 disruption and KPC modification*	Int. J. Antimicrob. Agents	62	106935	10.1016/j.ijantimicag.2023.106935
	R.D. Goodridge, C. Herreros-Lucas, M.C. Giménez-López	*Addressing Electron Spins Embedded in Metallic Graphene Nanoribbons*	Addit. Manuf.	69	103518	10.1016/j.addma.2023.103518
	J.P. Calupitan, A. Berdonces-Layunta, F. Aguilar-Galindo, M. Vilas-Varela, D. Peña, D. Casanova, M. Corso, D.G. de Oteyza, T. Wang	*Emergence of π-Magnetism in Fused Aza-Triangulenes: Symmetry and Charge Transfer Effects*	Nano Lett.	23	9832-9840	10.1021/acs.nanolett.3c02586
	A. Cabezón, M. Calvelo, J.R. Granja, A. Piñeiro, R. García-Fandiño	*Uncovering the mechanisms of cyclic peptide self-assembly in membranes with the chirality-aware MA(R/S)TINI forcefield*	J. Colloid Interface Sci.	642	84-99	10.1016/j.jcis.2023.03.101
	E. Soprano, M. Migliavacca, M. López-Ferreiro, B. Pelaz, E. Polo, P. del Pino	*Fusogenic Cell-Derived nanocarriers for cytosolic delivery of cargo inside living cells*	J. Colloid Interface Sci.	648	488-496	10.1016/j.jcis.2023.06.015

	A. Vikram Singh, A. Katz, R. Singh Maharjan, A. K. Gadicherla, M. Heinrich Richter, J. Heyda, P. del Pino, P. Laux, A. Luch	*Coronavirus-mimicking nanoparticles (CorNPs) in artificial saliva droplets and nanoaerosols: Influence of shape and environmental factors on particokinetics/particle aerodynamics*	Sci. Total Environ.	860	160503	10.1016/j.scitotenv.2022.160503
	C. Herreros-Lucas, J.M. Vila-Fungueiriño, M.C. Giménez-López	*Electrochemically Versatile Graphite Nanoplatelets Prepared by a Straightforward, Highly Efficient, and Scalable Route*	ACS Appl. Mater. Interfaces	15	21375-21383	10.1021/acsami.2c22495
	M.S. Claro*, J. Corral-Sertal, A. Otero Fumega, S. Blanco-Canosa, M. Suárez-Rodríguez, L.E. Hueso, V. Pardo, F. Rivadulla	*Temperature and Thickness Dependence of the Thermal Conductivity in 2D Ferromagnet Fe_3GeTe_2*	ACS Appl. Mater. Interfaces	15	49538-49544	10.1021/acsami.3c11578
	A. Blanco-González, J.S. Marrink, A. Piñeiro, R. García-Fandiño	*Molecular insights into the effects of focused ultrasound mechanotherapy on lipid bilayers: Unlocking the keys to design effective treatments*	J. Colloid Interface Sci.	650	1201-1210	10.1016/j.jcis.2023.07.077
	C. Chiatti, C. Fabiani, R. Bondi, G. Zampini, L. Latterini, A.L. Pisello	*Controlled combination of phosphorescent and fluorescent materials to exploit energy-saving potential in the built environment*	Energy	275	127333	10.1016/j.energy.2023.127333
	M. Núñez-Martínez, E. Quiñoá, F. Freire	*Stereocomplex Nanocomposite Switch Based on Dynamic Helical Polymer-Gold and Silver Nanoparticle Hybrid Materials*	Chem. Mater.	35	4865–4872	10.1021/acs.chemmater.3c00912
	E. Miguel-Casañ, M.D. Darwsheh, V. Fariña-Torres, I. Vitorica-Yrzebal, E. Andres-Garcia, M. Fañanás-Mastral, G. Minguez Espallargas	*Heterometallic palladium-iron Metal-Organic Framework as a highly active catalyst for cross-coupling reactions*	Chem. Sci.	14	179-185	10.1039/D2SC05192C
	A. Gutiérrez-González, D. Marcos-Atanes, L.G. Cook, F. López, J.L. Mascareñas	*Ruthenium-catalyzed intermolecular alkene–alkyne couplings in biologically relevant media*	Chem. Sci.	14	6408-6413	10.1039/D3SC01254A
	I. Insua, A. Cardellini, S. Díaz, J. Bergueiro, R. Capelli, G.M. Pavan, J. Montenegro	*Self-assembly of cyclic peptide monolayers by hydrophobic supramolecular hinges*	Chem. Sci.	14	14074-14081	10.1039/D3SC03930G
	A. Alcalde-Ordóñez, N. Barreiro-Piñeiro, B. McGorman, J. Gómez-González, D. Bouzada, F. Rivadulla, M.E. Vázquez, A. Kellet, J. Martínez-Costas, M. Vázquez López	*A copper(ii) peptide helicate selectively cleaves DNA replication foci in mammalian cells*	Chem. Sci.	14	14082-14091	10.1039/D3SC03303A
	C. Gioé-Gallo, S. Ortigueira, J. Brea, I. Raïch, J. Azuaje, M.R. Paleo, M. Majellaro, M.I. Loza, C.O. Salas, X. García-Mera, G. Navarro, E. Sotelo	*Pharmacological insights emerging from the characterization of a large collection of synthetic cannabinoid receptor agonists designer drugs*	Biomed. Pharmacother.	164	114934	10.1016/j.biopha.2023.114934
	G. García-Lainez, M. El Ouardi, A. Moreno, E.	*Singlet Oxygen and Radical-Mediated Mechanisms in the Oxidative Cellular*	Free Radic. Biol. Med.	194	42-51	10.1016/j.freeradbiomed.2022.11.006

	Lence, C. González-Bello, M.A. Miranda, I. Andreu	*Damage Photosensitized by the Protease Inhibitor Simeprevir*				
	R. Prieto-Díaz, M. González-Gómez, H. Fojo-Carballo, J. Azuaje, A. El Maatougui, M. Majellaro, M.I. Loza, J. Brea, V. Fernández-Dueñas, M.R. Paleo, A. Díaz-Holguín, B. Garcia-Pinel, A. Mallo-Abreu, J.C. Estévez, A. Andújar-Arias, X. Garcia-Mera, I. Gomez-Tourino, F. Ciruela, C.O. Salas, H. Gutiérrez-de-Terán, E. Sotelo	*Exploring the Effect of Halogenation in a Series of Potent and Selective A2B Adenosine Receptor Antagonists*	J. Med. Chem.	66	890-912	10.1021/acs.jmedchem.2c01768
	F. Intranuovo, L. Brunetti, P. DelRe, G.F. Mangiatordi, A. Stefanachi, A. Laghezza, M. Niso, F. Leonetti, F. Loiodice, A. Ligresti, M. Kostrzewa, J. Brea, M.I. Loza, E. Sotelo, M. Saviano, N.A. Colabufo, C. Riganti, C. Abate, M. Contino	*Development of N-(1-Adamantyl)benzamides as Novel Anti-Inflammatory Multitarget Agents Acting as Dual Modulators of the Cannabinoid CB2 Receptor and Fatty Acid Amide Hydrolase*	J. Med. Chem.	66	235-250	10.1021/acs.jmedchem.2c01084
	F.S. Abatematteo, M. Majellaro, B. Montsch, R. Prieto-Díaz, M. Niso, M. Contino, A. Stefanachi, C. Riganti, G.F. Mangiatordi, P. Delre, P. Heffeter, E. Sotelo, C. Abate	*Development of Fluorescent 4-[4-(3H-Spiro[isobenzofuran-1,4′-piperidin]-1′-yl)butyl]indolyl Derivatives as High-Affinity Probes to Enable the Study of σ Receptors via Fluorescence-Based Techniques*	J. Med. Chem.	66	3798-3817	10.1021/acs.jmedchem.2c01227
	A. Bayón-Fernández, A. Méndez-Ardoy, C. Álvarez-Lorenzo, J.R. Granja, J. Montenegro	*Self-Healing Cyclic Peptide Hydrogels*	J. Mater. Chem. B	11	606-617	10.1039/D2TB01721K
	S. Raposo-García, D. Castro, E. Lence, P. Estévez, J.M. Leão, C. González-Bello, A. Gago-Martínez, M.C. Louzao, C. Vale, L.M. Botana	*In Silico Simulations and Functional Cell Studies Evidence Similar Potency and Distinct Binding of Pacific and Caribbean Ciguatoxins*	Expo. Health	15	641-660	10.1007/s12403-022-00513-0
	G. Graziano, P. Delre, F. Carofiglio, J. Brea, A. Ligresti, M. Kostrzewa, C. Riganti, C. Gioè-Gallo, M. Majellaro, O. Nicolotti, N.A. Colabufo, C. Abate, M.I. Loza, E. Sotelo, G.F. Mangiatordi, M.	*N-adamantyl-anthranil amide derivatives: New selective ligands for the cannabinoid receptor subtype 2 (CB2R)*	Eur. J. Med. Chem.	248	115109	10.1016/j.ejmech.2023.115109

	Contino, A. Stefanachi, F. Leonetti					
	N. Varela-Domínguez, C. López-Bueno, A. López-Moreno, M.S. Claro, G. Rama, V. Leborán, M.C. Giménez-López, F. Rivadulla	*Light-induced bi-directional switching of thermal conductivity in azobenzene-doped liquid crystal mesophases*	J. Mater. Chem. C	11	4588-4594	10.1039/D3TC00099K
	J.J. Tarrío, B. Fernández, E. Quiñoá, F. Freire	*The role of the degree of polymerization in the chiroptical properties of dynamic asymmetric poly(diphenylacetylene)s*	J. Mater. Chem. C	11	8378-8382	10.1039/D3TC01419C
	D. Reggio*, A. Mirabile, M. Lazzari	*Sensing soluble molecules through SERS substrates in one-step procedure: Unrevealing the Meiji woodblock printing materials*	Talanta	254	124177	10.1016/j.talanta.2022.124177
	Y. Perfecto-Avalos, D.E. Navarro-López, S. Martínez-Beltrán, D.E. Rojas-Torres, K.D. Suárez Ávila, T.I. Robles, A. Zavala, M.A. de Luna, A. Sanchez-Martinez, O. Ceballos-Sanchez, M. Sepúlveda-Villegas, G. Sanchez-Ante, N. Tiwari*, E.R. López-Mena	*Data-Driven Machine Learning to Predict Antibacterial Activity of Cerium-Doped Nanoparticles*	ACS Appl. Nano Mater.	6	20719-20730	10.1021/acsanm.3c03651
	J.P. Calupitan, T. Wang, A. Pérez Paz, B. Álvarez, A. Berdonces-Layunta, P. Angulo-Portugal, R. Castrillo-Bodero, F. Schiller, D. Peña, M. Corso, D. Pérez, D.G. de Oteyza	*Room-Temperature C–C σ-Bond Activation of Biphenylene Derivatives on Cu(111)*	J. Phys. Chem. Lett	14	947-953	10.1021/acs.jpclett.2c03346
	R. Zuzak, S. Quiroga, M. Engelund, D. Pérez, D. Peña, S. Godlewski, M. Melle-Franco	*Sequential On-Surface Cyclodehydrogenation in a Nonplanar Nanographene*	J. Phys. Chem. Lett	14	10442-10449	10.1021/acs.jpclett.3c02710
	G. Graziano, A. Stefanachi, M. Contino, R. Prieto-Díaz, A. Ligresti, P. Kumar, A. Scilimati, E. Sotelo, F. Leonetti	*Multicomponent Reaction-Assisted Drug Discovery: A Time- and Cost-Effective Green Approach Speeding Up Identification and Optimization of Anticancer Drugs*	Int. J. Mol. Sci.	24	6581	10.3390/ijms24076581
	D. Jiménez-Arias, S. Morales-Sierra, E. Suárez, J. Lozano-Juste, A. Coego, J.C. Estévez, A.A. Borges, P.L. Rodriguez	*Abscisic acid mimic-fluorine derivative 4 alleviates water deficit stress by regulation ABA-responsive genes, proline accumulation, CO_2 assimilation, water use efficiency and better nutrient uptake in tomato plants*	Front. Plant Sci.	14	10.3389/fpls.2023.1191967	10.3389/fpls.2023.1191967
	I. Fernández-Mariño, C. Anfray, J. Crecente-Campo, A. Maeda, A. Ummarino, C. Teijeiro-Valiño, D. Blanco-Martínez, F.	*Mannose-modified hyaluronic acid nanocapsules for the targeting of tumor-associated macrophages*	Drug Deliv. And Transl. Res.	13	1896-1911	10.1007/s13346-022-01265-9

	Mpambani, L. Poul, J. Devalliere, M. Germanin, J. Correa, M. Fernández-Villamarín, P. Allavena, E. Fernández-Megía, M.J. Alonso, F. Torres Andón					
	M.B.Violatto, G. Sitia, L. Talamini, A. Morelli, N.L. Tran, Q. Zhang, A. Masood, B. Pelaz, I. Chakraborty, D. Cui, W.J. Parak, M. Salmona, N.G. Bastús, V. Puntes, P. Bigini	*Variations in Biodistribution and Acute Response of Differently Shaped Titania Nanoparticles in Healthy Rodents*	Nanomaterials	13	1174	10.3390/nano13071174
	A. Suárez-Lustres, N. Martínez-Yáñez, Á. Velasco-Rubio, J.A. Varela, C. Saá	*Palladium-Catalyzed [5 + 2] Rollover Annulation of 1-Benzylpyrazoles with Alkynes: A Direct Entry to Tricyclic 2-Benzazepines*	Org. Lett.	25	794-799	10.1021/acs.orglett.2c04300
	E. Da Concepción, C. Lázaro-Milla, I. Fernández, J.L. Mascareñas, F. López	*Cobalt(I)-Catalyzed (3 + 2 + 2) Cycloaddition between Alkylidenecyclopropanes, Alkynes, and Alkenes*	Org. Lett.	46	8372-8376	10.1021/acs.orglett.3c03511
	Á. Rodríguez, M. Maneiro, E. Lence, J.M. Otero, M.J. van Raaij, P. Thompson, A.R. Hawkins, C. González-Bello	*Quinate-based ligands for irreversible inactivation of the bacterial virulence factor DHQ1 enzyme—A molecular insight*	Front. Mol. Biosci.	10	1111598	10.3389/fmolb.2023.1111598
	S. Carreiras-Suárez, L. Domínguez-Ramos, M. Lazzari	*Study of the Long-Term Aging of Polypropylene-Made Disposable Surgical Masks and Filtering Facepiece Respirators*	Polymers	15	1001	10.3390/polym15041001
	M.-J. Tahk, T. Laassfeld, E. Meriste, J. Brea, M.I. Loza, M. Majellaro, M. Contino, E. Sotelo, A. Rinken	*Fluorescence based HTS-compatible ligand binding assays for dopaine D3 receptors in baculovirus preparation and live cells*	Front. Mol. Biosci.	10	1119157	10.3389/fmolb.2023.1119157
	M. Cedrún-Morales, M. Ceballos, E. Polo, P. del Pino, B. Pelaz	*Nanosized metal–organic frameworks as unique platforms for bioapplications*	Chem. Commun.	59	2869-2887	10.1039/D2CC05851K
	C. Lasarte-Monterrubio, P. Guijarro-Sánchez, J. Vázquez-Ucha, I. Alonso-García, L. Alvarez-Fraga, M. Outeda, M. Martínez-Guitián, A. Peña-Escolano, R. Maceiras, E. Lence, C. González-Bello, J. Arca-Suárez, G. Bou, A. Beceiro	*Antimicrobial Activity of Cefiderocol against the carbapenemase-producing Enterobacter cloacae complex and characterization of reduced susceptibility associated with metallo-β-lactamase VIM-1*	Antimicrob. Agents. Chemother.	67	e01505-01522	10.1128/aac.01505-22
	A. Velasco-Rubio, P. Martínez-Balart, A.M. Álvarez Costantino, M. Fañanás-Mastral	*C-C Bond Formation via Photocatalytic Direct Functionalization of Simple Alkanes*	Chem. Commun.	59	9424-9444	10.1039/D3CC02790B
	I. Alonso-García, J.C. Vázquez-Ucha, M. Martínez-Guitián, C.	*Interplay Between OXA-10 β-lactamase Production and Low Outer Membrane*	Antibiotics	12	999	10.3390/antibiotics12060999

	Lasarte-Monterrubio, S. Rodríguez-Pallares, P. Camacho-Zamora, S. Rumbo-Feal, P. Aja-Macaya, L. González-Pinto, M. Outeda, R. Maceiras, P. Guijarro-Sánchez, M.J. Muíño-Andrade, A. Fernández-González, M. Oviaño, C- González-Bello, J. Arca-Suárez, A. Beceiro, G. Bou	*Permeability in Carbapenem Resistance in Enterobacterales*				
	B. McGorman, S. Poole, M. Vázquez López, A. Kellett	*Analysis of non-canonical three- and four-way DNA junctions*	Methods	219	30-38	10.1016/j.ymeth.2023.09.002
	T. Kench, V. Rakers, D. Bouzada, J. Gomez-González, J. Robinson, M.K. Kuimova, M. Vázquez López, M.E. Vázquez, R. Vilar	*Dimeric Metal-Salphen Complexes Which Target Multimeric G-Quadruplex DNA*	Bioconjugate Chem.	34	911-921	10.1021/acs.bioconjchem.3c00114
	C. Ruiz Martínez, J.M. Pérez, F.M. Arrabal-Campos, A. Rodríguez-Diéguez, Duane Choquesillo-Lazarte, J.A. Martínez-Lao, M.A. Ortuño, I. Fernández	*Lithium anthraquinoids as catalysts in the ROP of lactide and caprolactone into cyclic polymers*	Polym. Chem.	14	452-461	10.1039/D2PY01076C
	S. Baweja, E. Antonelli, S. Hussain, A. Fernández-Ramos, I. Kleiner, H.V.L. Nguyen, M.E. Sanz	*Revealing Internal Rotation and 14N Nuclear Quadrupole Coupling in the Atmospheric Pollutant 4-Methyl-2-nitrophenol: Interplay of Microwave Spectroscopy and Quantum Chemical Calculations*	Molecules	28	2153	10.3390/molecules28052153
	A. Wolfel, H. Wang, E.R. Osorio-Blanco, J. Bergueiro, M.R. Romero, C.I. Alvarez Igarzabal, M. Calderon	*Structural control and functionalization of thermoresponsive nanogels: turning cross-linking points into anchoring groups*	Polym. Chem.	14	2998-3007	10.1039/D3PY00347G
	A. Blanco-González, A. Cabezón, A. Seco-González, D. Conde-Torres, P. Antelo-Riveiro, A. Piñeiro, R. Garcia-Fandino	*The Role of AI in Drug Discovery: Challenges, Opportunities, and Strategies*	Pharmaceuticals	16	891	10.3390/ph16060891
	G. Navarro, E. Sotelo, I. Raïch, M.I. Loza, J. Brea, M. Majellaro	*A Robust and Efficient FRET-Based Assay for Cannabinoid Receptor Ligands Discovery*	Molecules	28	8107	10.3390/molecules28248107
	S. Delgado-Rodríguez, S. Carrascal Domínguez, R. García-Fandiño	*Design, Development and Validation of an Educational Methodology Using Immersive Augmented Reality for STEAM Education*	J. New Approaches Edu. Res.	12	19-39	10.7821/naer.2023.1.1250
	W. Li, R.T. Saragi, M. Juanes, J. Demaison, N. Vogt, A. Fernández-Ramos, A. Lesarri	*Equilibrium structures of selenium compounds: The torsionally flexible molecule of selenophenol*	J. Chem. Phys.	159	24303	10.1063/5.0156413

	J. Rodriguez, F. Battistini, S. Learte-Aymamí, M. Orozco, J.L. Mascareñas	*Molecular dynamic modelling of the interaction of a synthetic zinc-finger miniprotein with DNA*	RSC Chem Biol	4	486-493	10.1039/D3CB00053B
	D.E. Navarro-López, A.R. Bautista-Ayala, M.F. Rosales-De la Cruz, S. Martínez-Beltrán, D.E. Rojas-Torres, A. Sanchez-Martinez, O. Ceballos-Sanchez, J.A. Jáuregui-Jáuregui, L.M. Lozano, M. Sepúlveda-Villegas, N. Tiwari*, E.R. López-Mena	*Nanocatalytic performance of pectinase immobilized over in situ prepared magnetic nanoparticles*	Heliyon	9	e19021	10.1016/j.heliyon.2023.e19021
	A. Barranca, I. Agirrezabal-Tellería, M. Rellán-Piñeiro, M.A. Ortuño, I. Gandarias	*Selective furfural hydrogenolysis towards 2-methylfuran by controlled poisoning of Cu–Co catalysts with chlorine*	React. Chem. Eng.	8	687-698	doi.org/10.1039/D2RE00414C
	A.M. Álvarez-Constantino, A. Álvarez-Pérez, J.A. Varela, G. Sciortino, G. Ujaque, C. Saá	*Chemoselective Ru-Catalyzed Oxidative Lactamization vs Hydroamination of Alkynylamines: Insights from Experimental and Density Functional Theory Studies*	J. Org. Chem.	88	1185-1193	10.1021/acs.joc.2c02770
	F. Fabris, E. Lima, J.M. Nuñez, E.H. Troiani, H.M. Aguirre, V. Leborán, F. Rivadulla, E.L. Winkler	*Annealing effects on the magnetic and magnetotransport properties of iron oxide nanoparticles self-assemblies*	Nanotechnology	34	455702	10.1088/1361-6528/aced0e
	L. Guerrero-Mendez, A. Lema-Saavedra, E. Jimenez, A. Fernandez-Ramos, E. Martínez-Núñez	*Gas-phase formation of glycolonitrile in the interstellar medium*	Phys. Chem. Chem. Phys.	25	20988-20996	10.1039/d3cp02379f
	D. Reza, R. Balo, J.M. Otero, Ai M. Fletcher, R. García-Fandiño, V.M. Sánchez-Pedregal, S.G. Davies, R.J. Estévez, J.C. Estévez	*β-Peptides incorporating polyhydroxylated cyclohexane β-amino acid: synthesis and conformational study*	Org. Biomol. Chem.	21	8535-8547	10.1039/D3OB00906H
	V. Leborán, F. Rivadulla	*Interactive Learning of Diffusion and the Diffusion Equation with Mathematical Software*	J. Chem. Edu.	100	4525-4529	10.1021/acs.jchemed.3c00309
	D. Rodríguez, C. González-Bello	*Siderophores: Chemical tools for precise antibiotic delivery*	Bioorg. Med. Chem. Lett.	87	129282	10.1016/j.bmcl.2023.129282
	Z. Zhou, W. Frost, D.C. Lloyd, T. Seki, T. Kubota, R. Ramos, E. Saitoh, K. Takanashi, A. Hirohata	*Current-induced crystallisation in a Heusler-alloy-based giant magnetoresistive junction for neuromorphic potentiation*	J. Magn. Magn. Mater.	571	170575	10.1016/j.jmmm.2023.170575
	R. Rodríguez*, E. Rivadulla-Cendal, E. Quiñoá, F. Freire*	*Diastereomeric multi-chiral pendant groups: Their key role in stimuli-responsive polymeric responses*	Chirality	35	172-177	doi.org/10.1002/chir.23530
	K.V. Góñez, J. Suárez García, F.J. Sardina, Y. Pazos, A. Saá, M. Martín-Pastor	*J-filter: An experiment to simplify and isolate specific signals in 1H NMR spectra of complex mixtures based on scalar coupling constants*	Magn. Reson. Chem.	61	615-622	10.1002/mrc.5396

	A. Gutiérrez-González, F. López, J.L. Mascareñas	*Ruthenium catalysis in Biological Habitats*	Helv. Chim. Acta	106	e202300001	10.1002/hlca.202300001
	D. Ferro-Costas, A. Fernández-Ramos	*New computational tools for chemical kinetics: the Cathedral Package*	Theor. Chem. Acc.	142	76	10.1007/s00214-023-03012-w
	S. Delgado-Rodríguez, S. Carrascal Domínguez, R. García-Fandiño	*Degree of acceptance of digital evaluation systems adapted to the use of educational technological resources based on Augmented Reality*	Rev. Latinoam. Tecnol. Edu.-RELATEC	22	135-148	10.17398/1695-288X.22.2.135

Annex V: Theses Defended

2023 – Theses Defended					
Area	**Author**	**Title**	**Supervisor(s)**	**European/International Doctorate**	**Date**
	Martina Migliavacca	Engineering smart biomimetic nanocarriers for biomedical applications	E. Polo, B. Pelaz	No	November 10th, 2023
	Rubén Prieto Díaz	A2B Adenosine Receptor as a novel target in cancer immunotherapy: Validation and optimization of new ligands	E. Sotelo	Yes	October 6th, 2023
	Aitor Álvarez Lorenzo	Plasmonic nanocomposites for handling molecules in living cells	P. Taboada, P. del Pino	Yes	September 29th, 2023
	José Manuel González González	Enantioselective Assembly of Aza-Heterocycles through Pd(II)-Catalyzed Annulations Initiated by the Activation of C–H Bonds	J.L. Mascareñas, M. Gulías	Yes	July 21st, 2023
	Claudia Gioé	Discovery and optimization of selective CB2 receptor agonists	E. Sotelo	No	July 14th, 2023
	Eduardo Da Concepción Vicente	Transition metal promoted cycloadditions of strained three-membered carbocycles	J.L. Mascareñas, F. López	Yes	July 14th, 2023
	Ana Alcalde Ordoñez	Selective recognition of three-way DNA junctions with designed peptidomimetics	M. Vázquez, E. Vázquez	Yes	July 13th, 2023
	Giulia Salluce	Superchaotropicity, a new mechanism for the intracellular delivery of bioactive molecules using boron clusters	I. Lostalé, J. Montenegro	Yes	June 9th, 2023
	David Reza Ramos	Síntesis, estudio estructural e propiedades de péptidos e de N-alquilamidas de beta- y gamma-aminoácidos derivados do ácido ciclohexenocarboxílico e do ácido (-)-shikímico	J.C. Estévez, R.J. Estévez	Yes	May 5th, 2023
	Nuria Vázquez Galiñanes	Novel synthetic methodologies via synergistic bimetallic catalysis	M. Fañanás	No	March 31st, 2023
	Alejandro Gutiérrez González	Orthogonal Metal Catalysis in Biological Systems	J.L. Mascareñas, F. López	Yes	March 30th, 2023

	Elena Rivadulla Cendal	Helix Induction Mechanisms in Poly(Phenylacetylene)s bearing Oligopeptides as Pendants	E. Quiñoá, F. Freire	No	March 17th, 2023
	Ángela Rodríguez Costa	Novas Aproximacións para facer fronte ao Desafío da Ineficiencia dos Antibióticos fronte ás Superbacterias	C. González-Bello	No	March 17th, 2023
	Roi López Blanco	Nanosistemas dendríticos para transporte de fármacos	E. Fernández Megía, R. Riguera	No	February 24th, 2023

Annex VI: Master Dissertations

2023 – Master Thesis Projects				
Area	**Author**	**Title**	**Supervisor(s)**	**Master Programme**
	A.A.B.	Antimicrobial peptide nanotubes: unravelling the mechanism of action	**J.R. Granja**, M. González (CiMUS)	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	R.B.F.	Transition metal-based artificial metalloenzymes for localized reactions in living cells	**J.L. Mascareñas, A. Seoane**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	D.C.C.	Unravelling the interaction between serum albumin proteins and the fluorescent probe 6-amino-2-cyanobenzothiazole	**M.F. Rodríguez**, M. Novo (Área Química Física, Campus de Lugo)	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	L.G.R.	Design and synthesis of graphene derivatives containing eight-membered rings	**D. Peña, D. Pérez**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	D.P.S.M.	Investigating Cyclic Peptide-Lipid interactions using the Langmuir monolayer technique: Synthesis, Characterization and Preliminary Studies	**R. García-Fandiño, J.R. Granja**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	M.P.P	Peptide Modification of Platinum Nanocages for Tumor Targeting	**J. Montenegro, I. Lostalé**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	I.R.D.	Optimization of analytical techniques for the analysis of heritage and art materials	**M. Lazzari, F. Rivadulla**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	S.S.A.	Hetero-Doped Polycyclic Aromatic Hydrocarbons (Het-PAHs): Synthesis and Electronic Properties	**C. Saá, J. Varela**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	L.T.A.	Bioorthogonal synthetic photocatalysis	**J.L. Mascareñas, M. Tomás**	MASTER CHEM BIO&MAT CHEMISTRY at the Interface with BIOLOGY and MATERIALS Science
	A.V.G.	Combinación de catálisis metálica y enzimática para la construcción de circuitos metabólicos artificiales	**J.L. Mascareñas, M. Tomás**	MASTERQO
	M.N.G.	Desarrollo de nuevos vehículos moleculares basados en disolventes eutécticos para el transporte de poli-iones	J. Montenegro, **A. Sánchez-Fernández**	MASTERQO
	D.M.D.R.	Péptidos anfifílicos para la inibición de la recristalización del hielo	**J.C. Estévez, R.J. Estévez**	MASTERQO
	A.M.B.	Estudio por 1H y 11B RMN de las interacciones entre ácidos borónicos tipo Wulff y 1,2-dioles: aplicaciones como sensores fluorescentes de sacáridos	**E. Fernández-Megía**	MASTERQO
	D.P.A.	Nuevas rutas sostenibles a HAPs dopados con heteroátomos	**C. Saá, J. Varela**	MASTERQO
	S.S.M.	Síntesis de nanotubos peptídicos con una cavidad hidrofóbica para la encapsulación de fulereno	**J.R. Granja**, M. Amorín (Dpto. Q. Orgánica, Facultade de Farmacia)	MASTERQO
	D.R.P.	Desimetrización de meso-dibromocicloalquenos catalizada por cobre a través de acoplamiento borilativo con alenos	**M. Fañanás**	MASTERQO
	J.M.T.R.	Síntesis de copolímeros Aptámero-PEG-Aptámero para aplicaciones biomédicas	**R.J. Estévez**, R. Novoa (Dpto. Q. Orgánica, Facultade de Química)	MASTERQO
	J.V.V.	Activación C C en [N]fenilenos y derivados: estudio de la reacción con alquinos y con arinos para el acceso a hidrocarburos policíclicos aromáticos (HPAs) de interés	**D. Pérez**, A.A. Cobas (Dpto. Q. Orgánica, Facultade de Química)	MASTERQO
	M.B.L.	Hacia nuevos ligandos paraciclofánicos para catalizadores organometálicos de oro y molibdeno.Aplicaciones en catálisis enantioselectiva y fijación de N_2 atmosférico	**J.L. Mascareñas, F. López**	MASTERQO

	F.B.C.	Síntesis y estudios estructurales de un foldámero constituído por beta-aminoácidos	**J.C. Estévez**, **R.J. Estévez**	MASTERQO
	D.C.V.	Estudio de la topología peptídica en su interacción con la membrana celular	**J. Montenegro**, **J. Bergueiro**	MASTERQO
	L.L.L.	Nuevas rutas sostenibles a HAPs azulénicos	**C. Saá**, **J. Varela**	MASTERQO
	H.L.G.	Fibras metalo-supramoleculares a partir de monómeros quirales de fenilacetilenos: autoensamblaje inducido por cationes	**E. Quiñoá**, **R. Rodríguez**	MASTERQO
	N.R.B.	Cicloadiciones de arinos con antracenos: hacia la preparación de poliarenos tridimensionales	**D. Peña**, **L.M. Mateo**	MASTERQO
	A.H.P.	Medida de la conductividad térmica de disoluciones acuosas mediante la técnica de termoreflectancia	**M. Lazzari**, **F. Rivadulla**	Máster Universitario en Investigación Química e Química Industrial
	D.A.D.	Amplificación de asimetría en sistemas metalosupramoleculares	**F. Freire**, **R. Rodríguez**	Máster Universitario en Investigación Química e Química Industrial
	P.B.G.	Simulación computacional del mecanismo de activación de factores transcripcionales que regulan la virulencia bacteriana	**C. González-Bello**, **E.J. Lence**	Máster Universitario en Investigación Química e Química Industrial
	Y.M.C.	Micelas PIC xigantes como modelos protocelulares	**E. Fernández-Megía**	Máster Universitario en Investigación Química e Química Industrial
	D.R.P.	Diseño topológico de péptidos para la interacción con biomoléculas	**J. Montenegro**, **J. Bergueiro**	Máster Universitario en Investigación Química e Química Industrial
	A.M.V.	Estabilización de estructuras de G-cuaduplejos en el ARN genómico del SARS-CoV-2 con metalopéptidos de rutenio(II)	**M. Vázquez**	Máster Universitario en Investigación Química e Química Industrial
	J.F.B.D.B.	Diseño y síntesis de nuevos precursores de nanografenos porosos	**D. Peña**	Máster Universitario en Investigación Química e Química Industrial
	V.A.M.	Efecto de la distribución de vacantes de oxígeno en la conmutación eléctrica y térmica de óxidos dieléctricos	**F. Rivadulla**, **R. Ramos**	Máster en Nanociencia e Nanotecnoloxía
	E.R.G.	Síntesis y caracterización fisicoquímica de nanoestructuras plasmónicas microporosas	**P. del Pino**, **G. Zampini**	Máster en Nanociencia e Nanotecnoloxía
	B.V.V.	Inclusión del fin de vida en la evaluación ambiental de los (bio)plásticos	A. Hospido, **M. Lazzari**	Environmental Engineering
	P.A.R.	Monocapas lipídicas como modelo de membrana en cáncer: un estudio sinérgico in vitro-in silico - Especialidad en Física de la Materia	A. Piñeiro, **R. García-Fandiño**	Physics
	J.C.S.	Estudio de la conductividad térmica en el Fe_3GeTe_2, un material ferromagnético bidimensional. Especialidad de Física de la Materia	V. Pardo, **F. Rivadulla**	Physics

Annex VII: Bachelor final projects

2023 – Bachelor's Final Project				
Area	**Author**	**Title**	**Supervisor(s)**	**Bachelor Degree**
	P.D.L.I.G.	Nuevos Boronatos Bicíclicos de Conformación Restringida para Restaurar la Eficacia de los Carbapenems.	**Concepción González-Bello**	Chemistry
	I.M.C.N.	Preparación y caracterización de películas delgadas nanométricas de iridatos epitaxiales	**Francisco Rivadulla**, **José M. Vila**	Chemistry
	H.E.F.P.	Heterociclos Borilados: Síntesis y Reactividad	**Carlos Saá, Jesús Varela**	Chemistry
	R.F.L.	Síntesis de un nuevo aminoácido para la construción de nanotubos peptídicos funcionales para la separación y transporte de diferentes tipos de moléculas	**Juan R. Granja**, M. Amorín	Chemistry
	S.N.V.	Estudio supramolecular de agregados helicoidales en oligofenilenetinilenos (OPEs)	**F. Freire, R. Rodríguez**	Chemistry
	L.P.S.V.	Síntesis y efectos biológicos de agentes de unión a uniones de tres vías de ADN	**Eugenio Vázquez**, M. González (CiMUS)	Chemistry
	F.L.E.	Síntesis y reactividad del heptafulvaleno	**Diego Peña, Dolores Pérez**	Chemistry
	D.C.T.	Síntesis de aza-heterociclos mediante activación electrocatalítica de enlaces C-H	**Moisés Gulías, José Luis Mascareñas**	Chemistry
	R.A.L.	Nanopartículas plasmónicas derivadas de células para estudios con células vivas	**Pablo del Pino, Sajid Fazal**	Chemistry
	Y.V.G.	Síntesis de aminoácidos artificiales para ensamblaje supramolecular controlado por pH	**Javier Montenegro**, I. Insua	Chemistry
	A.C.F.	Aminoborilación de alenos selectiva como herramienta para la síntesis de compuestos bioactivos	**M. Fañanás-Mastral**	Chemistry
	S.G.U.	Nuevos isoindoles polihidroxilados derivados del ácido (-)-shikímico	**Juan Carlos Estévez**	Chemistry
	M.R.M.	Isomerización de alcoholes cíclicos terciarios a cetonas lineales promovida por la luz visible	**Carlos Saá, Manuel Nappi**	Chemistry
	D.F.G.	Nanopartículas magnéticas derivadas de células para estudios con células vivas	**Pablo del Pino, Sajid Fazal**	Chemistry
	T.R.V.	Hacia nuevos COFs con redes de enlaces C-C mediante metátesis	M. Torneiro, **Massimo Lazzari**	Chemistry
	P.R.L.	Síntesis de nanocubos de oro mediante reemplazo galvánico	**Javier Montenegro, Julián Bergueiro**	Chemistry
	C.L.V.	Aproximación a la síntesis electroquímica de nanografenos y otros poliarenos pi funcionales	**Dolores Pérez, Diego Peña**	Chemistry
	B.H.V.	Efecto de la sustitución aromática en la inducción del sentido de giro en un polímero helicoidal.	**Félix Freire, Rafael Rodríguez**	Chemistry
	U.O.A.	Análisis de cosméticos por RMN. Identificación y cuantificación simultánea de múltiples sustancias.	**Javier Sardina**	Chemistry
	A.P.O.	Carbones multifuncionales para la recuperación de metales escasos y valiosos de residuos electrónicos	**Massimo Lazzari**, J. González	Chemistry
	Y.F.M.	Síntesis de péptidos fotosensibles para el ensamblaje supramolecular disipativo	**Javier Montenegro, Adrián Sánchez**	Chemistry
	S.T.L.	Procesos Acelerados de Síntesis de Dendrímeros para Aplicaciones en Diagnóstico	**Eduardo Fernández-Megia**	Chemistry
	M.M.C.	Ensamblaje supramolecular de alfa-helices no canónicas	**Javier Montenegro, Julián Bergueiro**	Chemistry

	M.P.C.	Funcionalización selectiva de enlaces C-H en anillos aromáticos distales	**José Luis Mascareñas, Moisés Gulías**	Chemistry
	B.L.L.	Síntesis, caracterización y estudio del comportamiento in vitro de origamis de ADN: Parte B	**Pablo del Pino, Esperanza Padín**	Chemistry & Biology
	B.L.L.	Síntesis, caracterización y estudio del comportamiento in vitro de origamis de ADN: Parte A	**Pablo del Pino**	Chemistry & Biology
	D.M.P.	Reacciones abióticas promovidas por la maquinaria celular PARTE B	**Beatriz Orosa, José Luis Mascareñas, María Tomás**	Chemistry & Biology
	D.M.P.	Reacciones abióticas promovidas por la maquinaria celular PARTE A	**José Luis Mascareñas, María Tomás**	Chemistry & Biology
	Y.M.P.	Síntesis del peptidomimético alpha-hélice de mCry1	**Eugenio Vázquez, David Bouzada**	Chemistry & Biology
	N.M.V.C.	Nucleasas selectivas de ADN de tres vías basadas en helicatos peptídicos como nueva terapia anticáncer	**Miguel Vázquez, Ana Alcalde**	Chemistry & Biology
	M.V.P.	Hidrogeles transportadores de antibióticos	**Juan Carlos Estévez**	Chemistry & Biology
	N.M.P.	Vectores dendriméricos para terapia génica: relación estructura/actividad	**Eduardo Fernández-Megia**	Chemistry & Biology
	D.A.G.	Enjaulamiento electrostático de nucleasas selectivas de ADN de tres vías basadas en helicatos peptídicos como nueva terapia anticáncer	**Miguel Vázquez, Ana Alcalde**	Chemistry & Biology
	G.A.P.	Diseño y síntesis de nuevos nanografenos mediante síntesis orgánica en disolución	**Diego Peña**	Physics & Chemistry
	I.L.G.	Química Computacional en el Estudio del Cáncer y la Infección: el Papel de la Membrana Biológica y la Influencia de las Mutaciones en los Péptidos Antimicrobianos	**Rebeca García-Fandiño**, A. Piñeiro	Biotechnology
	A.M.R.	La importancia de los conectores en la ingeniería de proteínas multidominio recombinantes	**Eugenio Vázquez**	Biotechnology
	L.S.L.	Síntesis de fibras peptídicas conductoras basadas en hélices alfa	**Eugenio Vázquez**	Biotechnology
	N.R.C.	Desarrollo de un método de captura de proteínas basado en microesferas de la proteína muNS-Mi por interacción con un ligando conocido	**José Manuel Martínez-Costas**, L.K. Busch	Biotechnology
	L.O.V.	Nanopartículas biomiméticas para el desarrollo de inmunoterapia	**Pablo del Pino, André Pérez**	Biotechnology
	C.G.P.	Desarrollo de ligandos análogos de la indometacina como moduladores alostéricos de los receptores CB1	**Eddy Sotelo**	Pharmacy
	H.L.G.	Screening de nuevos materiales orgánicos para el transporte de cargos bioactivos a través de membranas	**Javier Montenegro**	Pharmacy
	M.R.A.	Moléculas pequeñas antagonistas del receptor de muerte celular programada PD-1	**Eddy Sotelo**	Pharmacy
	S.L.R.	Diseño y síntesis de ligandos bitópicos para el estudio de los receptores D2-like	**Eddy Sotelo**	Pharmacy
	L.S.A.	Antagonistas selectivos de los receptores A1 de adenosina como potenciales fármacos para el tratamiento de la enfermedad de Alzheimer	**Eddy Sotelo**	Pharmacy
	C.L.F.	Síntesis multicomponente en la obtención de miméticos de la Melanostatina (MIF-1)	**Eddy Sotelo**	Pharmacy
	I.R.P.	Moduladores de los receptores de adenosina como inhibidores de los puntos de control inmunitario	**Eddy Sotelo**	Pharmacy

	S.R.V.	Diseño y síntesis de agonistas selectivos para el CB2R en el tratamiento de la esclerosis múltiple	**Eddy Sotelo**	Pharmacy

ANNEX VIII: Invited Lectures given by CiQUS Researchers during 2023

Area	Author(s)	Title	Type	Conference	Place
	José L. Mascareñas	Transition Metal Catalysis in Biological Habitats	Invited Lecture	Highlighting Organic Chemistry in Spain, EuChemS – Division of Organic Chemistry	on-line
	Beatriz Orosa	Utilización de la ruta de la ubiquitina para inducir resistencia a patógenos en cereales	Invited Lecture	Mision Biologica de Galicia, Pontevedra	Spain
	Beatriz Orosa	Improving crop immunity by deciphering the interplay between pathogens and the plant ubiquitin system	Invited Lecture	International symposium in plant-microorganism interactions	Spain
	Beatriz Orosa	Improving crop immunity by exploitation of the ubiquitin system	Invited Lecture	International Conference on SFBBM and Proteocure, Sorbonne University Cordelier campus - París	France
	José L. Mascareñas	Translating transition metal catalysis to biological environments	Invited Lecture	INAM - Universitat Jaume I, Castellón	Spain
	José L. Mascareñas	Moléculas, Metais e Medicina: Entre o fermoso e o útil	Plenary Lecture	RAFG - Pazo de San Roque, Santiago de Compostela	Spain
	José L. Mascareñas	Transition metal catalysis in biological habitats	Plenary Lecture	XXVIII Encontro Nacional da SPQ, Centro Cultural e de Congressos de Aveiro	Portugal
	Fernando López García	Building molecular complexity through metal catalyzed cycloaddition and cyclization reactions	Keynote Lecture	3rd JAPANESE-SPANISH SYMPOSIUM ON ORGANIC SYNTHESIS, San Sebastián	Spain
	Dolores Pérez	The benzyne trail: discovering new pathways en route to natural products and functional materials	Invited Lecture	Challenges in Synthetic Methodology & Molecular Materials	Spain
	Diego Peña	From aryne chemistry to on-surface synthesis and single-molecule reactions	Invited Lecture	Challenges in Synthetic Methodology & Molecular Materials	Spain
	Diego Peña	Bottom-up approach to nanographenes by merging organic chemistry and on-surface synthesis	Invited Lecture	1st European School on Advanced Materials (ESAM2023)	Spain
	Felix Freire	Stimuli responsive helical polymers	Invited Lecture	1st Iberian Symposium on Functional Organic Polymers **2023**	Portugal
	Félix Freire	Stimuli responsive helical polymers	Keynote Lecture	Chirality	Italy
	Javier Montenegro	Simple peptide amphiphiles at the origin of functional protofilaments	Invited Lecture	IX UIMP Summer School on Integrative Synthetic Biology	Spain
	Javier Montenegro	Supramolecular Peptide Assemblies for Membrane Transport and Biomimetic Systems	Invited Lecture	8th Iberian Peptide Meeting	Portugal
	Juan R. Granja	Light-induced dynamic cyclic peptide nanotubes	Keynote Lecture	16th German Peptide Symposium	Germany
	Adrián Sánchez	Controlling rheological responses through the assembly of compositionally identical surfactants with varied geometries	Keynote Lecture	12th International Colloids Conference	Spain

	Martín Fañanás Mastral	Catalytic Approaches for Stereoselective Hydrocarbon Difunctionalization	Invited Lecture	7th Brazil-Spain Workshop on Organic Chemistry	Brazil
	Martín Fañanás Mastral	Catalytic Stereoselective Hydrocarbon Difunctionalization	Invited Lecture	8th International Conference on Multicomponent Reactions and Related Chemistry	Brazil
	Martínez Costas, José M.	Development of a vaccine candidate against SARS-CoV2 via the muNS-Mi platform by production of microspheres (MS) containing three different viral antigens	Invited Lecture	TRANSVAC2 Final Meeting	Belgium
	Martínez Costas, José M.	IC-Tagging and MiST-IC technologies for vaccine development …and else	Invited Lecture	EU-China Vaccine Collaboration Forum	China
	Maria del Carmen Gimenez Lopez	Advanced Material for Energy Conversion and Storage	Invited Lecture	1st European School on Advanced Materials (ESAM2023).	Spain
	Maria del Carmen Gimenez Lopez	A New POM-based Water Splittting Catalyst Material	Keynote Lecture	Second International Chemistry Conference	Spain
	P. Del Pino	Functional Nanostructured Materials: Tools for Biomedical Applications	Invited Lecture	Conference on Tools and Tests for Safer-by-Design Nanomaterials	Portugal
	P. Del Pino	Core@shell inorganic nanoparticle@MOF nanosystems for live cell applications	Invited Lecture	XXXIX Reunión Bienal RSEQ	Spain
	B. Pelaz	Multifunctional nanomof as nanocarriers	Invited Lecture	XXXIX Reunión Bienal RSEQ	Spain
	Manuel Souto	Exploiting the versatility of electroactive organic building blocks for the construction of functional framework materials	Invited Lecture	5th European Conference on Metal Organic Frameworks and Porous Polymers	Spain
	N. Tiwari	Bioinspired Polymeric Materials for Triboelectric Nanogenerators	Invited Lecture	International Summit on Biopolymers and Polymer Science	Belgium
	N. Tiwari	High sensitivity pressure sensor with ultra-wide linear range by laser-induced gradient micro-pyramids.	Invited Lecture	E-MRS 2023 Fall Meeting	Poland
	Francisco Rivadulla	Effective control of thermal transport with light in molecular materials	Invited Lecture	E-MRS 2023 Spring Meeting	France

ANNEX IX: Research stays of CiQUS members during 2023

Area	Researcher	Position	Hosting Institution	Country	Funding	Start	End
	Daniel Marcos Atanes	PhD Candidate	University of California, Berkeley	Estados Unidos de América	MEDC (FPU), Fulbright España	15/8/22	14/2/23
	Andrés Arribas Domingo	PhD Candidate	Institute for Basic Science, Daejeon / Korea Advanced Institute of Science and Technology	Corea del Sur	MEDC (FPU)	1/8/23	30/10/23
	Antonio Fernández Ramos	PI	University of Minnesota	EEUU	CiQuS	13/7/23	24/7/23
	Jesús Janeiro Rodríguez	PhD Candidate	Universidad de Oregón	Estados Unidos	AEI	2/7/23	2/10/23
	Javier Besteiro Sáez	PhD Candidate	IBM Zúrich	Suiza	CiQUS	1/10/23	15/10/23
	Rafael Rodríguez Riego	Postdoc	Rennes University 1	Francia	CiQUS	28/9/23	14/10/23
	Carmen González González	PhD Candidate	CIC biomaGUNE	Spain	Fet-Open (e-Prot)".	20/2/23	24/3/23
	Paula Sánchez Gascón	PhD Candidate	NIBSC-MHRA	UK	CIQUS	2/10/23	27/10/23
	Pol Martínez Balart	PhD Candidate	University College Dublin	Ireland	CiQUS Funding	1/9/23	15/10/23
	Sergio Barbeira Arán	PhD Candidate	ETH Zurich	Switzerland	CiQUS	21/8/23	1/10/23
	Lucía Vizcaíno Anaya	PhD Candidate	Universidad de Glasgow	UK	MEDC (FPU)	1/8/23	31/10/23
	Antia Fernandez	PhD Candidate	University of California San Francisco	USA	AEI (FPU)	ago-23	nov-23
	Giulia Zampini	Postdoc	iThera	Germany	REAP project	5/12/23	7/12/23
	Marcel Santos Claro	Postdoc	ALBA Synchrotron Light	Spain	ALBA	18/10/23	21/10/23
	Noa Varela Domínguez	PhD Candidate	Universitat Autònoma de Barcelona	Spain	CiQUS	27/6/23	29/6/23

ANNEX X: Patents in 2023

Area	Title	Country / Region	Publication Number	Date	Inventors	Owner(s)
	Ruthenium complexes for treating cancer which comprises cancer stem cells	JP	EP 3539971B1	23/06/23	J. Rodríguez, **J.L. Mascareñas**, J. Rodríguez-Couceiro, J. Mosquera, **M.E. Vázquez**, B. Sainz	USC UAM
	Magnetic nanoparticles for use in the treatment of tumors	US	US11547721B2	10/01/23	M. Barthel, M. Cssani, M. Figini, **J. Granja**, T. Pellegrino, A. Quarta	USC, CNR, Universita degli Studi di Genova, Fondazione IRCCS Istituto Nazionale dei Tumori, Fondazione Istituto Italianio di Tecnologia
	Functionalized isonitriles and products, preparation and uses thereof	US	US18/006,908	Applied 2023	**E. Sotelo**, J.A. Azuaje Guerrero, M. Majellaro	USC
		CA	CA3187052A1			
	Compounds for batteries	EU	EP4213247A1	Applied 2023	**M. Giménez López**, E. Quiros Diez, M. Soler Guillen	USC
		US	US2023357289A1			
	Supramolecular Fluid	EU	EP4213251A1	Applie 2023	**M. Giménez López**, **J.F. Rivadulla**, C. Herreros, C. López	USC
		US	US2023361330A1			
		JP	JP2023541187A			
		CN	CN116323549A			
		BR	BR112023004649A2			
	Cell Penetrating Peptides	TW	TW112123732	Applied 2023	**J. Montenegro**, M.L. Juanes, I. Lostalé-Seijo, I. Gallego, J.J. Reina, M. Pazo, G. Salluce	USC
	Encapsulated transition metal oxide nanorods for durable air cathodes	EU	EP23382707.0	Applied 2023	**M.C. Giménez López…**	USC [……]
	Proteína de fusión muNSs capaz de formar microesferas	ES	P202330185	Applied 2023	D. López, N. Barreiro, A. López, **J.M. Martínez Costas**	USC

ANNEX XI: 2023 CiQUS Lecture's Programme

Area	Lecturer	Topic	Institution	Country	Date
	Prof. Marcus Mandolesi Sá	*Chemistry at MesoLab: Symphony of molecules through dominos, one-pot & multicomponents*	Universidade Federal de Santa Catarina (UFSC – Brazil)	Brazil	25/01/23
	Prof. Rubén Martín	*Ni-catalyzed functionalization of strong s bonds*	Institut Catalá d´Investigació Química (ICIQ)	Spain	26/01/23
	Prof. Donald Hilvert	*Design can pave the way to fully programmable enzyme catalysts*	Lab of Organic Chemistry, ETH Zürich, Switzerland	Switzerland	10/02/23
	Prof. Ángel Orte Guitiérrez	*Microenvironment sensing by multiparametric microscopy and nanoscopy*	Laboratorio Singular Nanoscopy - Universidad de Granada	Spain	02/03/23
	Prof. Matthew Lagnton	*Stimuli-responsive supramolecular ion receptors and transmembrane transporters*	Department of Chemistry, University of Oxford	UK	15/03/23
	Prof. Angela Casini	*Broadening the Scope of Bioorganometallic Chemistry: From Catalysis to Biomedical Applications*	Medicinal and Bioinorganic Chemistry Group – Technical University of Munich (TUM)	Germany	30/03/23
	Prof. Syuzanna Harutyunyan	*Organometallic and oscillating catalysis*	Stratingh Institute, University of Groningen	The Netherlands	24/04/23
	Prof. Artur Silva	*Development of new synthetic methods for novel oxygen and nitrogen heterocyclic compounds*	Universidade de Aveiro	Portugal	05/05/23
	Prof. Ivan Huc	*Aromatic foldamers: engineering molecular shape*	Ludwig-Maximilians-University Munich	Germany	25/05/23
	Prof. Gilles Gasser	*Metal Complexes as Diagnostics and Therapeutics*	Chimie ParisTech, PSL University	France	08/06/23
	Prof. Rosario Fernández	*Catalysts, Ligands, Methods & Reagents for Selective Organic Synthesis*	Universidad de Sevilla	Spain	20/06/23
	Prof. Vincent Gandon	*Calcium in Organic Synthesis*	Université París-Saclay	France	14/07/23
	Prof. Carmen Galán	*Glycan-based fluorescent nanomaterials: from diagnostic to theragnostic applications*	School of Chemistry | University of Bristol	UK	18/07/23
	Dr. Allegra Franchino	*Bifunctional ligands for enantioselective Ag(I) and Au(I) catalysis*	University of Durham	UK	20/07/23
	Prof. César Rodriguez-Emmenegger	*Bio-inspired soft matter at the service of interactive biointerfaces and synthetic cells*	IBEC	Spain	15/09/23
	Prof. Steven F. Dowdy	*Delivery of RNA Therapeutics: How To Pull Off The Great Endosomal Escape!*	UC San Diego, School of Medicine	USA	21/10/23
	Dr. Valeria Grazu Bonavía	*Nanobiocatalysis: opportunities for remote enzymatic control by nanoactuation*	Instituto de Nanociencia y Materiales de Aragón (INMA), CSIC-UNIZAR	Spain	10/11/23
	Dr. Manuel Souto	*Exploiting the versatility of electroactive organic building blocks for the design of functional framework materials*	CiQUS	Spain	17/11/23
	Prof. Ángel Carracedo	*De la Genética forense a la Medicina personalizada"*	CiMUS	Spain	13/12/23