

# Global cooperation in Research Infrastructures: the EU-CELAC case, with focus on bioimaging and structural biology.

## White Paper

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## Executive Summary

This White Paper outlines a strategic approach to further develop the collaboration among Research Infrastructures (RIs) in the European Union (EU) and the Community of Latin American and Caribbean States (CELAC, for its acronym in Spanish/Portuguese), prioritising long-term planning and commitment, sustainability, open access, and scientific excellence. Building upon existing policy frameworks, particularly the EU-CELAC Working Group on Research Infrastructures, this document proposes concrete mechanisms to strengthen bi-regional cooperation in research and innovation, in the context of shared values and global scientific needs.

Research Infrastructures (RIs) are key enablers of scientific progress and innovation, especially in advanced domains such as artificial intelligence, big data, and biomedicine. Their value lies not only in the high performance of their sophisticated equipment, but also in the advanced expertise of RI researchers and technical staff. Global challenges—like pandemics, climate change, and energy transition—require robust and internationally connected RIs supported by stable, long-term institutional commitments.

This White Paper focuses on strengthening RI collaboration between European and CELAC countries, particularly in Bioimaging and Structural Biology, which already have established network partnerships through [Euro-BioImaging ERIC](#) / [Latin America BioImaging](#), and [Instruct-ERIC](#) / [Mercosur Structural Biology Center](#). The document serves as a roadmap for expanding EU–CELAC cooperation, building upon previous collaborative projects, and proposing new mechanisms for sustainable engagement.

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### 3. Introduction

- Background and Context

Research Infrastructures (RIs) are essential facilities, resources and services used by the scientific research communities to conduct cutting-edge research and foster innovation <sup>[1]</sup>. RIs encompass not only sophisticated, cutting-edge equipment, but also critical know-how that can only achieve its full potential through well-trained personnel working together at critical mass, particularly in demanding areas such as artificial intelligence, big data and biomedicine. RIs serve as fundamental pillars sustaining Science, Technology & Innovation (STI) ecosystems, with impact extending far beyond immediate scientific applications.

The effectiveness of RIs relies on several key principles, all demanding long-term strategies and commitment from funding bodies and society. Amongst them, open access through peer-reviewed procedures ensuring scientific excellence; and implementation of data management practices adhering to FAIR (Findability/Accessibility/Interoperability/Reusability) <sup>[2]</sup> and CARE (Collective Benefit/Authority to Control/Responsibility/Ethics) <sup>[3]</sup> are crucial.

Contemporary global challenges like epidemic outbreaks, climate change acceleration, and persistent reliance on polluting energy sources demand coordinated international responses supported by well-developed global RI landscapes. This document analyses current EU-CELAC RI cooperation

experiences, proposing concrete initiatives to enhance productive interactions between these regions while acknowledging diversity as a source of creative solutions.

With the globalization of the scientific endeavour, choosing partnerships most likely to succeed is critical. Investing in EU-CELAC collaborations seems particularly appropriate given the current worldwide scenario, which calls for greater stability. Identifying like-minded partners with historical and cultural links, who demonstrate commitment to common goals, appears logical. We believe this to be the case for Europe and Latin America, regions that share fundamental values such as respecting all human rights and promoting democracy, building fair societies and advancing peace along a global scheme of inclusive multilateralism <sup>[4]</sup>.

- Existing Policy Framework

The [EU-CELAC Working Group on Research Infrastructures](#) provides the foundational policy framework for bi-regional cooperation. Building on this established structure, recent years have witnessed significant progress in strategic [EU-CELAC cooperation](#), particularly in Bioimaging & Structural Biology:

- EU-funded projects EU-LAC ResInfra (2019-2023) and ResInfra Plus (2024-2025), engaging national policy makers with Research Infrastructures from both regions <sup>[5]</sup>
- RI\_Hubs project (2023-2025), funded by EU and CELAC national agencies, exploring the Regional Hubs model to enhance cooperation <sup>[6]</sup>
- Multiple Memoranda of Understanding between European Research Infrastructure Consortia (ERICs) with CELAC institutions and networks
- Symposia organised by the EU-funded project [RI-VIS](#).

However, systematic professional connections between these high-level policy structures and “on the ground” national/regional RI leadership in CELAC remain underdeveloped, representing a key area for enhancement, complementing both top-down and grassroots approaches.

- Purpose of the White Paper

This White Paper serves as a strategic framework for sustained EU-CELAC scientific cooperation, focusing on RI consolidation and accessibility. It builds upon the EU-CELAC Working Group’s foundation while proposing mechanisms to strengthen formal connections between policy structures and RI networks.

The fields of Bioimaging and Structural Biology are particularly suited for bi-directional collaboration featuring counterpart architectures: [Euro-BioImaging ERIC/LABI](#), and [Instruct-ERIC/CEBEM](#). These two joint efforts cover highly complementary fields, already collaborating on multiple projects across both regions, benefiting the entire scientific community through expanded access to essential infrastructure and expertise.

## 2. Vision and Mission for EU-CELAC RI Collaboration

- Aspirational Vision

We envision a seamlessly integrated EU-CELAC Research Infrastructure ecosystem where scientists from both regions have equitable access to world-class facilities, expertise, and data. This ecosystem will be characterized by:

- Sustained institutional commitments ensuring long-term financial stability, addressing the national level, but also regional/state and institutional levels
- A complementary network of large-scale installations and strategically distributed mid-size Regional Hubs
- Professional coordination mechanisms linking policy frameworks with RI operations
- Open science principles governing data sharing and access
- Excellence-driven resource allocation supporting cutting-edge research addressing global challenges

- Mission Statement

Our mission is to contribute to the work of the EU-CELAC Working Group on Research Infrastructures through enhanced coordination mechanisms with RI networks, developing practical pathways for sustainable bi-regional collaboration in Bioimaging and Structural Biology that can serve as a model for broader international RI cooperation.

## 3. Analysis of RI Models Collaborative Frameworks

- Evaluation of the landscape

Few previous documents analyse global collaborative models involving RIs from different regions <sup>[7]</sup>. The ERIC Forum's "Best Practices and Recommendations for Procedures of Engagement with Third Countries" document <sup>[8]</sup> provides key insights into EU international RI engagement, identifying financial, political, administrative, and managerial barriers. Although ERICs have successfully used Memoranda of Understanding for internationalization purposes, these show limitations for sustainable long-term collaboration. Full ERIC membership for non-European countries could be a way forward, and even though it is an allowed scheme under the current ERIC regulatory framework, it has seldom been used due to administrative complexity.

Complementing this EU perspective, Latin American researchers are increasingly discussing their points of view, showcasing the region's scientific potential <sup>[9]</sup>. A recent effort to address more specifically about the current RI capacities and needs, a White Paper was published presenting a comprehensive bottom-up assessment of the CELAC Structural Biology community <sup>[10]</sup>. Based on surveys of 157 researchers and interviews with 29 participants across eight CELAC countries, this analysis reveals common challenges including funding constraints, bureaucratic obstacles, training gaps, and equipment maintenance issues. The study

recommends establishing national/regional/state roadmaps, strengthening institutional support, implementing regional hub models, and enhancing international collaboration - findings that directly inform the strategic approach outlined in this White Paper.

A prime example of how bi-regional EU-CELAC cooperation can amplify into a larger global framework is found in the bioimaging field. The productive collaboration between Euro-BioImaging ERIC and LABI was a catalyst for their influential participation as members of [Global BioImaging](#). This decade of experience within a global network offers valuable lessons for strengthening the broader EU-CELAC RI cooperation framework advocated for in this White Paper.

The EU-CELAC case demonstrates both significant opportunities and inherent challenges for bi-regional RI cooperation. While clear RI counterparts exist (Instruct-ERIC/CEBEM, Euro-BioImaging ERIC/LABI) and EC-funded collaborative projects have established strong foundations, the differing organizational approaches between regions highlight the need for enhanced cooperation mechanisms that can bridge these structural differences while building on existing strengths.

- Current Organisational Models

The EU and CELAC RI landscapes present complementary organisational approaches. European RIs operate mainly through the legally binding ERIC (European Research Infrastructure Consortium) framework, ensuring stable national commitments and coordinated operations. CELAC counterparts, while possessing strong national research agencies and established networks (CEBEM, LABI), lack equivalent formal legally binding structures.

While it is true that this organisational disparity may offer opportunities for innovative collaboration models, and that the Model of Memoranda of Understanding has proven successful in many cases, two clear elements that we propose in this document are strategically needed in CELAC, which are also at the core of the ERIC architecture: stable commitment and coordinated operations. As further developed in this document, the way to incorporate these elements may be different in the EU and CELAC, but the need for this incorporation is clear and vital.

- Regional Hubs Model

Central to our approach is the Regional Hubs concept: strategically located, mid-sized facilities that complement large-scale installations while remaining physically and organizationally close to research-performing entities. These Hubs would:

- Bridge the gap between major installations and local research communities
- Provide accessible entry points for RI utilization
- Offer specialized training and technical support
- Maintain high scientific standards through excellence-based selection

- Funding and Sustainability Mechanisms

Sustainable RI collaboration requires diversified funding approaches addressing regional disparities. While CELAC STI investment levels (0.6-0.7% GDP, Brazil at 1.15%) lag behind global trends, successful regional examples like the states of São Paulo and Rio de Janeiro demonstrate the potential for targeted excellence.

Mixed funding models combining national, regional, and international sources, including exploration of mechanisms like FOCEM ([Fondo de Convergencia Estructural del Mercosur](#)), and EU funding mechanisms can provide stability, while accommodating regional variations in financial capacities.

A further approach to address funding and sustainability mechanisms would be exploring the possibility of participation in ERICs, to develop existing collaborations and to create new ones, all within a framework of more institutional, legal and financial sustainability. Within existing legal frameworks, this relationship may go from full membership or observership of CELAC countries in ERICs, to Memoranda of Understanding already used by ERICs with organisations outside of Europe. Other modalities of collaboration within the ERICs could be developed, such a strategic “Associated Membership” schemes. This newly proposed modality of interaction remains to be explored in detail and would require the approval of each ERIC’s governing body; the cornerstones of this new form of association would be the capacity to introduce the crucial elements of stable commitment (financial and institutional) and coordinated actions – as indicated above, this is vital for the future of RIs. These modalities of collaboration could be open not only to countries, as is the case with full membership, but also to regions or states (especially in federal countries), and even to institutions if they are of significant entity, involving concrete, pre-defined long-term financial commitment.

#### 4. Key Recommendations for EU-CELAC RI Collaboration

- Action-Oriented Framework

- Immediate Actions (1-2 years):

- i. Standardisation of Terminology and Practices

- Establish a common Research Infrastructure terminology glossary
- Develop standardised open access protocols
- Harmonise data management practices following FAIR and CARE principles
- Standardise shared evaluation metrics for RI performance assessment

- ii. Enhancement of Existing Networks

- Strengthen LABI and CEBEM through formal recognition mechanisms
- Support the evolution of successful bottom-up initiatives into more structured frameworks

- Implement professional access management tools (such as Instruct-ERIC's ARIA system) in LAC facilities
  - Establish staff exchange protocols between EU and LAC RIs
- iii. Legal Framework Development
- Design/propose flexible “Associate Membership” schemes for participation in ERICs by:
    - CELAC countries with simplified administrative requirements
    - Federal states/regions (particularly relevant for Brazil)
    - Exceptional institutions meeting defined criteria
  - Create bi-lateral agreement templates
  - Develop frameworks for shared equipment operation and maintenance
- Medium-term Actions (3-5 years):
- i. Creation and consolidation of Regional RI Hubs.
- Create/consolidate entry- and mid-level facilities, with clear connections to high-end installations in both regions
  - Implement standardized open access procedures
  - Define Hub selection criteria based on:
    - Scientific excellence record
    - Biomedical research engagement
    - Open access commitment
    - Technical capacity and expertise
    - Strategic geographic location
  - Promote the adoption, validation, and cross-development of RI technology among EU-CELAC Hubs
- ii. Sustainable Funding Implementation
- Explore FOCEM funding for Mercosur countries
  - Develop mixed funding models combining national, regional, and international sources
  - Initiate dialogue with funding agencies at all levels to explore models for long-term financial commitment

- Create EU-CELAC specific funding instruments for RI cooperation
  - Establish cost-sharing mechanisms for equipment maintenance
  - Design sustainable business models incorporating
    - Data Quality certification services
    - Training and micro-credentials programs
    - Benefit and access sharing schemes
- iii. Comprehensive Capacity Building
- Address multiscale approaches combining Bioimaging and Structural Biology towards Integrative Biology
  - Develop professionalized and recognised training programs for RI staff, including mentoring and job shadowing
  - Implement "train the trainers" initiatives
  - Create technical expertise certification systems
  - Promote a unified career paths for RI staff
- iv. Legal sustainability and Framework Development
- Explore for which LAC countries the full membership or observership in an ERIC is a viable option; and facilitate consultations between the relevant bodies.
  - Finalise the implementation of the new modality of engagement: legally binding agreement or Associate Membership, having a first signed collaboration agreement to an ERIC from the LAC area
- Long-term Goals (5-10 years):
- i. Integration of Regional Networks
- Create seamless complementary facility networks across LAC and EU
  - Establish integrated data and meta-data management systems
  - Develop shared technological development programs
  - Implement coordinated equipment upgrade strategies
- ii. Global Impact Enhancement
- Position EU-CELAC cooperation as an inter-regional RI collaboration model

- Address global challenges through coordinated research programs
- Create academia/industry innovation ecosystems
- Develop region-specific solutions with global impact potential

### iii. Sustainable Evolution

- Establish mechanisms for continuous evaluation and adaptation of collaboration models
- Create technology transfer and innovation frameworks
- Develop long-term sustainable funding models

## ▪ **Implementation Strategy**

### Coordination Mechanisms

Building upon the EU-CELAC Working Group on Research Infrastructures, we propose establishing a formal RI Coordination Forum comprising:

- Representatives from EU ERICs and CELAC RI networks
- National research agency delegates
- Regional Hub coordinators

This Forum would develop detailed implementation roadmaps, monitor progress, and adapt strategies based on evolving needs while maintaining connection to high-level policy structures. The forum would be supported by technical Working Groups for specific domains.

At the same time, high-level officers of the EU and CELAC areas should organize the appropriate legal procedures for the definition and implementation of the notion of “Associate Membership”, including as a crucial target the incorporation of the first CELAC Associated Member to an ERIC.

### Key Performance Indicators

- Volume and quality of bi-regional staff exchanges and mentorships established, and other joint training actions
- Joint research projects utilizing shared RI resources
- Data sharing compliance with FAIR/CARE principles
- Regional Hub establishment and utilization rates
- Sustainable funding mechanism implementation
- Outreach and visibility of the EU-CELAC RI interactions (e.g. social media, organisation of formal RI Coordination Group meetings)
- Number of CELAC countries achieving ERIC membership or observership
- Approval of an Associate Membership scheme by an ERIC

## 5. Conclusion

The EU-CELAC Research Infrastructure collaboration represents an unprecedented opportunity for bi-regional scientific advancement. By building upon existing policy frameworks, acknowledging regional diversities as strengths, and implementing carefully phased action plans, we can create a model for international RI cooperation that serves both regional needs and global scientific progress, creating whole new ways of collaboration and new established legal channels, first to be implemented between the EU and CELAC areas, but that could be further extended globally.

Success requires sustained commitment from all stakeholders—policy makers, funding bodies, institutional leaders, and research communities. The vision outlined here, grounded in scientific excellence and open science principles, provides a pathway toward this collaborative future while respecting the unique characteristics and capacities of both regions.

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### ■ References

[1] Regulation (EU) N° 1291/2013 of the European Parliament and of the Council. *Official Journal of the European Union* 347/104-347/173 (2013). <[https://ec.europa.eu/home-affairs/system/files/2020-09/h2020-eu-establact\\_en.pdf](https://ec.europa.eu/home-affairs/system/files/2020-09/h2020-eu-establact_en.pdf)>.

[2] Mark D. Wilkinson; Michel Dumontier; IJsbrand Jan Aalbersberg; et al. (15 March 2016). "The FAIR Guiding Principles for scientific data management and stewardship". *Scientific Data*. 3 (1): 160018. doi:10.1038/SDATA.2016.18

[3] Carroll, Stephanie Russo; Garba, Ibrahim; Figueroa-Rodríguez, Oscar L.; Holbrook, Jarita; Lovett, Raymond; Materechera, Simeon; Parsons, Mark; Raseroka, Kay; Rodriguez-Lonebear, Desi; Rowe, Robyn; Sara, Rodrigo; Walker, Jennifer D.; Anderson, Jane; Hudson, Maui (2020). "The CARE Principles for Indigenous Data Governance". *Data Science Journal*. 19. doi:10.5334/dsj-2020-043

[4] <https://data.consilium.europa.eu/doc/document/ST-12000-2023-INIT/en/pdf> — With over 1 billion people, CELAC and the EU together represent 14% of the world's population, 21% of global GDP and one-third of UN membership. EU's relations with Latin America and the Caribbean (LAC) as a strategic partnership date back to 1999, when the first bi-regional EU-LAC summit was held in Rio de Janeiro, Brazil. Since the creation of CELAC in 2010, three EU-CELAC summits were held in 2013 (Santiago, Chile), 2015 (Brussels, Belgium) and 2023 (Brussels); the 4th EU-CELAC Summit of Heads of State and Government will take place in Santa Marta (Colombia) in November 2025.

[5] <https://resinfra-eulac.eu/>

[6] <https://biocomputingunit.es/ri-hubs/>

[7] <https://academic.oup.com/spp/article/52/1/1/7849602>

[8] <https://zenodo.org/records/13870885>

[9] <https://www.sciencedirect.com/science/article/pii/S0962892425001527>

[10] <https://zenodo.org/records/7260779#.Y1vnaOzMJVd>

## ▪ Appendix

### ● Glossary of Terms

Access – The use of research infrastructure in person or remotely

ARIA – Access to Research Infrastructure Administration: Instruct-ERIC’s access management system

CEBEM – “Centro de Biología Estructural del Mercosur”: a network of scientific research groups that work to enhance capacities in, and disseminate the use of Structural Biology in South America (<https://cebem-lat.org>)

Euro-BioImaging ERIC – Pan-European distributed Research Infrastructure providing world-class biological and biomedical services to researchers, including access to imaging technologies, imaging data and training services (<https://www.eurobioimaging.eu/>)

ERIC – European Research Infrastructure Consortium: a specific legal form that facilitates the establishment and operation of Research Infrastructures with European interest (more information here: [https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/european-research-infrastructures/eric\\_en](https://research-and-innovation.ec.europa.eu/strategy/strategy-research-and-innovation/our-digital-future/european-research-infrastructures/eric_en))

ERIC Forum – A Horizon 2020 project bringing together European Research Infrastructure Consortia to strengthen their coordination and enhance their collaborations (<https://www.eric-forum.eu/>)

EU-LAC ResInfra – The European Union – Latin America and Caribbean partnership in Research Infrastructures pursues the construction of a bi-regional collaboration between European Union and the LAC countries (<https://resinfra-eulac.eu/>)

Instruct ERIC – Pan-European distributed research infrastructure making high-end technologies and methods in structural biology available to users (<https://instruct-eric.org/>)

LABI – Latin America Bioimaging: is a network of imaging scientists interested in improving training, education, and access to imaging technologies across the Latin American and Caribbean region (<https://labi.lat>)

MoU – Memorandum of Understanding

RI – Research Infrastructure, which normally includes equipment and the technical support for its use. The words “Platform” and “Research Center” are very often synonymous with the term RI as used here

RI-HUBS – “Amplifying RI impact with a global perspective: a Regional Hubs model” —an EU-CELAC Capacity Building Project, with national funding from six countries in EU and LAC (<https://biocomputingunit.es/ri-hubs/>)

RI-VIS – Horizon 2020 funded project designed to increase the visibility of European research infrastructures to new communities in Europe and beyond (<https://ri-vis.eu>)