

LINKER

Large **IN**frastructures for **Key Excellent Research** in the Basque Country

LINKER

What is it?

LINKER is the Basque Program for Scientific Large INfrastructures for Key Excellence Research.

LINKER is a major component of the IKUR 2030 Strategy created at the end of 2020 and based on the European Commission's Flagship Initiatives, that identifies, creates and manages cutting-edge infrastructures and equipment located in the Basque Country or promotes the participation in european consortiums that help Basque cutting-edge Research.

LINKER provides infrastructures that make it possible to shorten development times and make a truly structural leap forward in the Basque Country.

The LINKER program has a double approach: local infrastructures and European Research Infrastructures Consortiums



LINKER

List of Infrastructures

- **Local Infrastructures**
 - Basque Resource for Electron Microscopy –BREM–
 - High Performance Computer –Hyperion–
 - IBM-Euskadi Quantum Computer Center –BasQ–
 - Basque Data Network for Research -I2Basque-
- **Participation in European Research Infrastructure Consortiums**
 - EuroBioimaging
 - European Marine Biological Resource Centre” –EMBRC–
 - European Spallation Source –ESS–



Basque Resource for Electron Microscopy



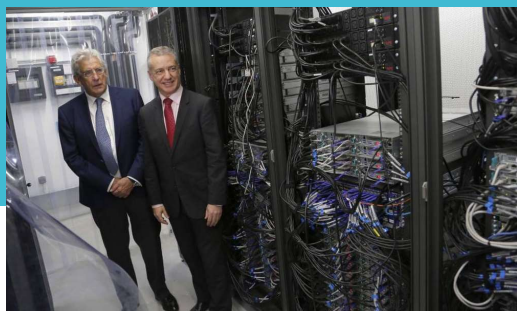
- The Basque Resource for Electron Microscopy (BREM) provides access to high-end instrumentation and expertise in high-resolution cryo-electron microscopy (Cryo-EM) to national and international researches, from academia and industry.
- Located at Instituto Biofisika (UPV/EHU, CSIC) in the scientific park of the UPV/EHU in Leioa, and supported primarily by the Department of Education and the Innovation Fund of the Basque Government, with additional support from Fundación Biofísica Bizkaia through the Basque Excellence Research Centres program, BREM focuses on structure determination of vitrified biological specimens – macromolecules and their complexes, organelles, cells and tissue – with the goal of understanding the structural basis of biological processes and the pathogenesis of human diseases.
- BREM also supports structure-based drug discovery efforts and the development of advanced disease therapies. Through the Recovery, Transformation and Resilience Plan of the Spanish Government, BREM has been selected to participate in a multi-disciplinary project on personalized medicine alongside prominent research institutions from several autonomous regions in Spain.

<https://brem.biofisika.org/>

Computing Infrastructures

- High Performance Computer -Hyperion-
- IBM-Euskadi Quantum Computer Center –BasQ–
- Basque Data network for Research -I2Basque-

LINKER Computing





High performance computing

Hyperion

Since 2017, the Department of Education has invested in the purchase and improvement of supercomputing equipment. The latest commissioning the so-called Hyperion High Performance Computer.

Hyperion is already used, among other things, to simulate the formation of galaxies, the behavior of new materials, developments in quantum technologies, artificial intelligence, or computational chemistry. These kinds of supercomputers are used to facilitate the work of researchers, who are able to distinguish a major problem between small and useful. The results of each of them are then combined to find the final solution in less time.

Hyperion has more than 14,000 nuclei and 150 TB RAM, three times the power of its predecessor, the Atlas supercomputer. It currently serves more than 500 scientists from the Basque scientific ecosystem.

BasQ and IBM-Euskadi QCC

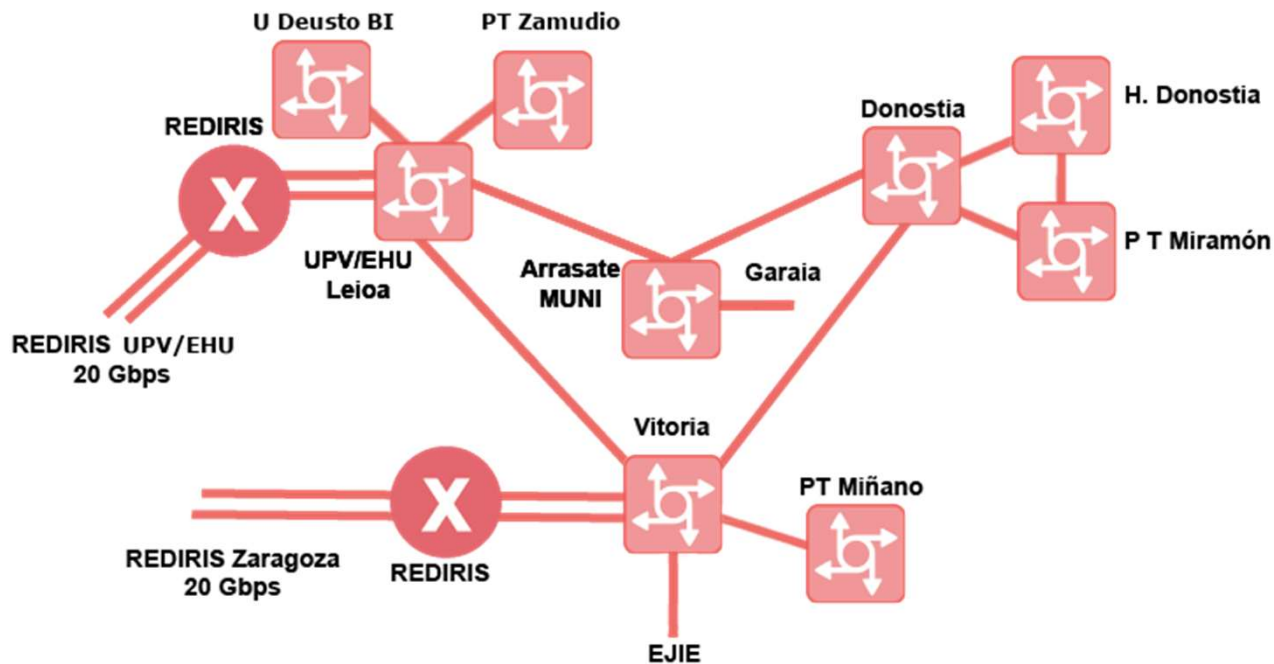
- IBM Research and the Department of Education, through Ikerbasque, have established an alliance to promote and accelerate the development of new global quantum technologies based on the quantum technology ecosystem of the Basque Country.
- To develop this Basque node of excellence in quantum technologies, a six-year alliance has been established between IBM Research and Ikerbasque to develop five pillars:
 - RVCTI's access to IBM's global quantum computer network
Implementation of a new cutting-edge quantum computer in the Basque Country by 2025;
 - Training of new scientific talent to promote the research and application of quantum technologies;
 - Develop R & D research projects that apply new quantum technologies to priority scientific areas;
 - Application and testing of new quantum technologies in different economic sectors.

BasQ
Basque Quantum



i2basque

Basque Foundation for Science



i2basque was born in 2005 in the frame of *Plan Euskadi en la Sociedad de la Información* programme, developed by the Basque Government Department of Education. Since 2011, it depends on Ikerbasque Foundation.

i2basque focuses on supporting the RDI Community in the Basque Country, providing telecom and ICT service infrastructures to Basque Science and Technology Network players:

- State and Public Universities: UPV/EHU, Deusto, TECNUN, Mondragon, UNED
 - Science and Technology Centers
 - Hospitals and Biomedical research
 - R&D management entities
-



Eurobioimaging ERIC



Gateway to European biological and biomedical imaging Euro-BioImaging's mission is to provide with imaging services that bridge biological and biomedical imaging and facilitate innovative and world-class research. Whatever the scale of the imaging, Euro-BioImaging will give researchers the tools and support to explore and answer research questions. The Basque Country, through the BERCs FBB and Achucarro, is the coordinator of the Spanish node of the ERIC.

Access to imaging technologies: Access to a range of imaging technologies to allow image across the scales at one of our **35 Nodes**, located in **16 countries** and the European Molecular Biology Laboratory, EMBL.

Expert training and support: Each Node is staffed with personnel who can provide the support required to maximise the output of your research project. Guidance is available for all aspects of the imaging pipeline, from study design to image capture. In addition, provided access to training courses for all different levels of expertise.

Image data management: Store and disseminate data and extract meaningful conclusions from imaging.

<https://www.eurobioimaging.eu/>



European Marine Biological Resource Centre ERIC —EMBRC—

The European Marine Biological Resource Centre (EMBRC) is Europe's 'research infrastructure' for marine biological resources. EMBRC provides access to marine resources, as well as cutting-edge services and facilities that allow researchers, from both academia and industry, to study the ocean and develop innovative solutions to tackle societal issues.

EMBRC enables researchers to better understand the ocean's biodiversity. We facilitate access to marine organisms and their ecosystems, while providing the necessary services, facilities and other resources to support innovative research.

The Plentzia Marine Station offers three interconnected services for One Health research and environmental monitoring network, an environmental specimen bank for retrospective (eco)toxicological studies and an experimental toxicological research aquaria unit.



<https://www.embrc.eu/>



European Spallation Source ERIC -ESS-



The **European Spallation Source ERIC (ESS)** is a multi-disciplinary research facility currently under construction in Lund, Sweden. ESS is scheduled to begin its scientific user program in 2023, with the construction phase set to be completed by 2025. ESS will enable scientists to observe and understand basic atomic structures and forces, which is not achievable with other neutron sources in terms of lengths and time scales.

The construction of the facility began in the summer of 2014 and the first science results are planned for 2025. The Basque Country is a major contributor to the construction along with Spain.

During the operation, ESS will use nuclear spallation, a process in which neutrons are liberated from heavy elements by high energy protons. This is intrinsically a much safer process than uranium fission. This facility was an example of a "long pulse" source (milli-seconds).

The facility consists of a linear accelerator, in which protons are accelerated and collide with a rotating, helium-cooled tungsten target, generating intense pulses of neutrons. Surrounding the tungsten are baths of cryogenic hydrogen, which feed neutron supermirror guides.

<https://www.ess.eu/>