

RED ESPAÑOLA DE
SUPERCOMPUTACIÓN

HPC resources of the Spanish Supercomputing Network for the scientific community

Spanish Supercomputing Network (RES)



RED ESPAÑOLA DE
SUPERCOMPUTACIÓN



Infraestructuras
Científicas y Técnicas
Singulares

www.res.es



- Created 2006
- 14 nodes
- 17 supercomputers
- HPC resources for scientific community
- NEW! Data management projects
- 12.000 Tflo/s
- +600 million CPU hours/year
- 3 calls/year
- Support team
- +1.000 regular users
- +200 scientific papers annually
- Member of Unique Scientific and Technical Infrastructure network (ICTS).
- Coordinated by **BSC-CNS**



Updated: September 2020

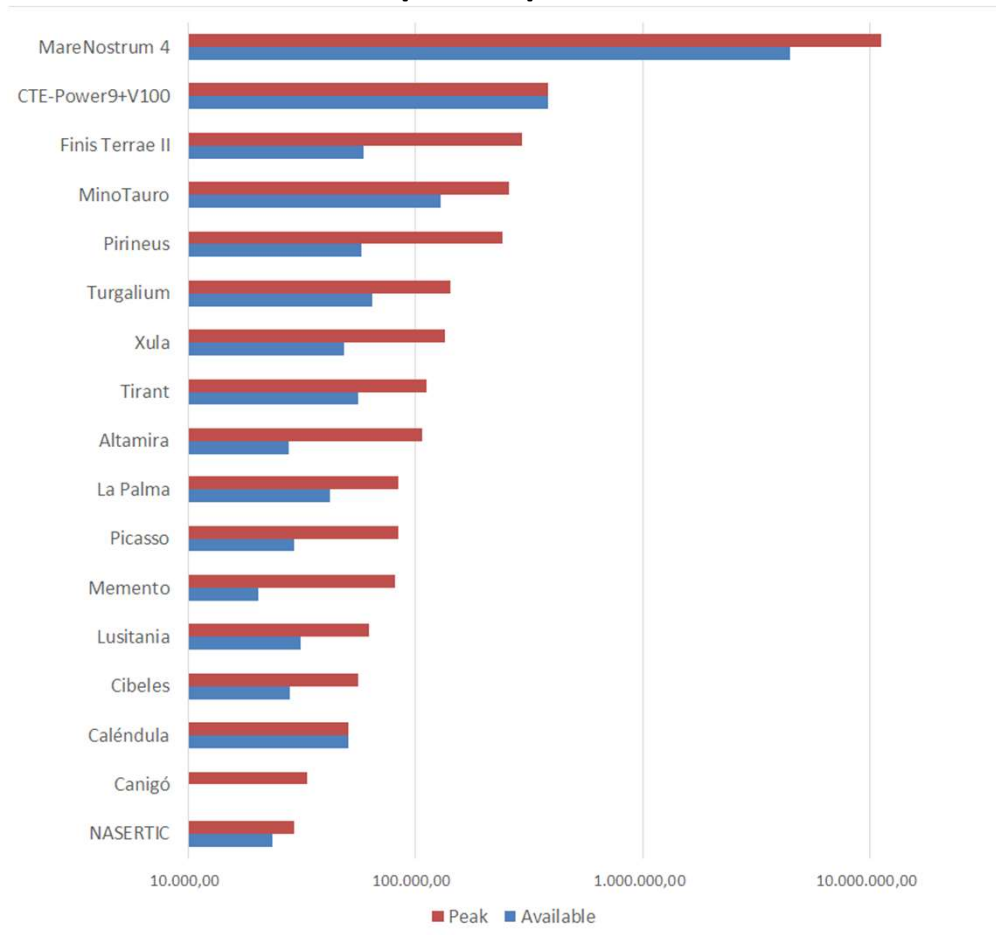


RED ESPAÑOLA DE
SUPERCOMPUTACIÓN

- Spanish national reference for HPC, providing HPC and data services to the international scientific community
- Networking of HPC users
- Education and training in HPC for new and expert users
- Internationalization: EU strategy and international projects
- Dissemination of HPC towards society and SME
- Emerging Scientific Big Data Network

RES: HPC Services for Spain

RES is made up of **17 interconnected supercomputers**.



Access to
internationalization
Programs, projects, etc



Access to knowledge
and expertise
Scientific seminars



Access to training and skills
development
Open training courses and
technical workshops



Access to Spanish
supercomputing & data facilities
Free allocation of computing hours
to researchers and industry staff



Access to European
supercomputing
facilities
Mobility of researchers
and industry staff



Access to networking and
awareness
Annual Users Conference,
RES Newsletter

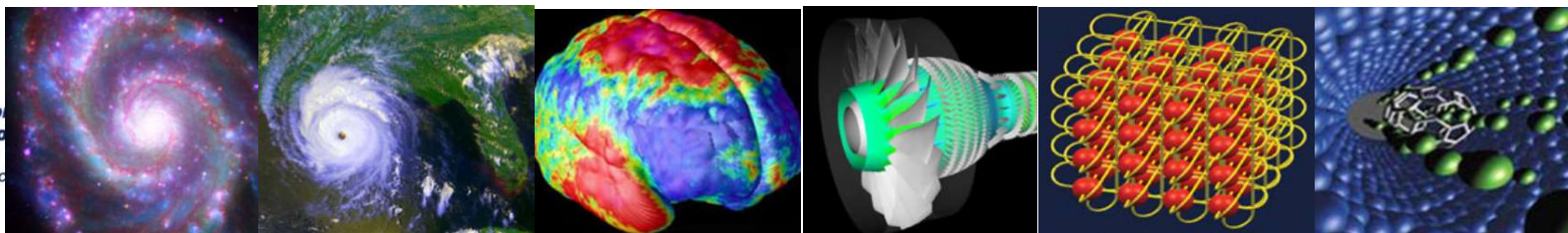


Access to business innovation
Competence center
DIH, One-stop shop

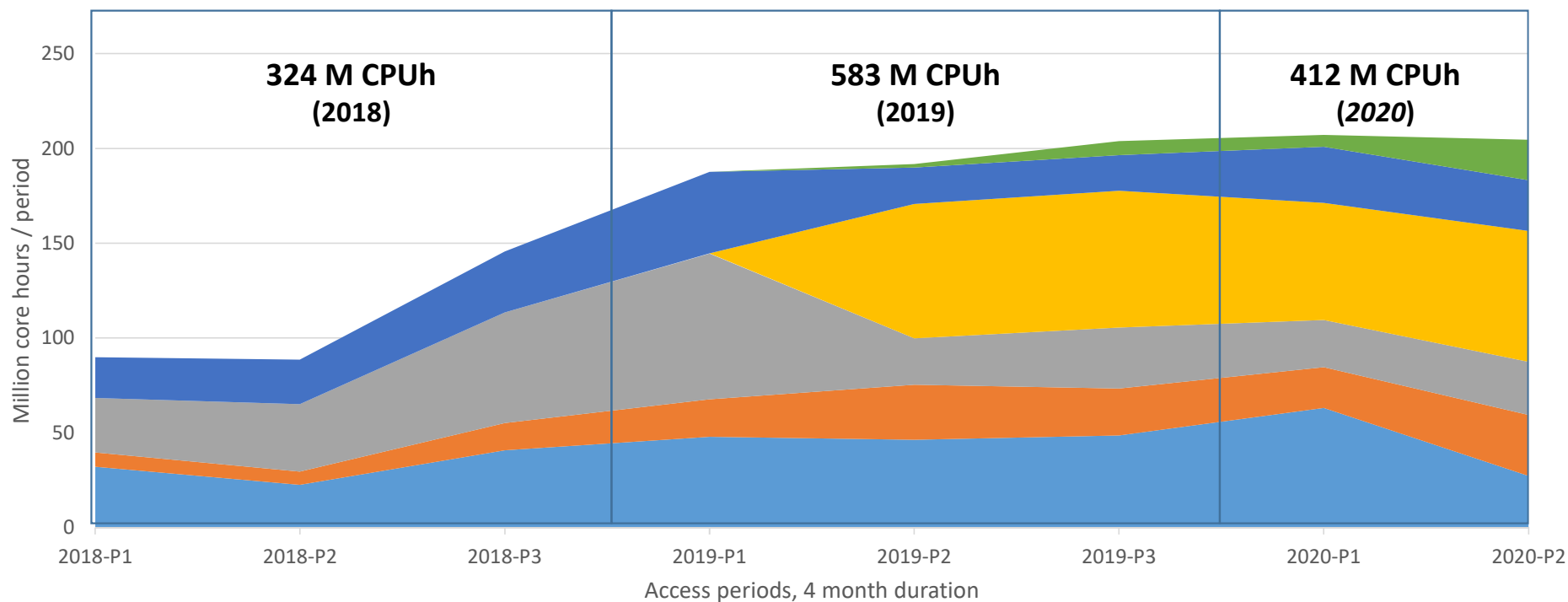


Scientific areas

- Astronomy, Space and Earth Sciences (AECT)
- Physics (FI)
- Mathematics and Engineering (MI)
- Life and Health Sciences (BCV)
- Homogeneous Chemistry (QH)
- Heterogeneous Chemistry and Solids (QHS)



RES: HPC services provided



■ Astronomy, Space and Earth Sciences
 ■ Life and Health Sciences
 ■ Engineering and Mathematics
 ■ Physics
 ■ Solid State Chemistry
 ■ Chemistry of Biological Systems



RES users have published +180 articles in scientific journals in 2020

<https://www.res.es/es/investigacion/publicaciones>

2020

Matemáticas, Física e Ingeniería

[On the onset of negative lift in a symmetric airfoil at very small angles of attack](#)

PHYSICS OF FLUIDS

Aguilar-Cabello, J., P. Gutierrez-Castillo, L. Parras, C. del Pino, y E. Sanmiguel-Rojas

Química y Ciencia y Tecnología de los Materiales

[Neutral Organic Radical Formation by Chemisorption on Metal Surfaces](#)

JOURNAL OF PHYSICAL CHEMISTRY LETTERS

Ajayakumar, M. R., C. Moreno, I. Alcon, F. Illas, C. Rovira, J. Veciana, S. T. Bromley, A. Mugarza, y M. Mas-Torrent

Astronomía, Espacio y Ciencias de la Tierra

[The Three Hundred Project: Correcting for the hydrostatic-equilibrium mass bias in X-ray and SZ surveys](#)

ASTRONOMY & ASTROPHYSICS

Ansarifard, S., E. Rasia, V. Biffi, S. Borgani, W. Cui, M. De Petris, K. Dolag, S. Ettori, S. M. S. Movahed, G. Murante, y G. Yepes

Astronomía, Espacio y Ciencias de la Tierra

[Precipitation Features of the Maritime Continent in Parameterized and Explicit Convection Models](#)

JOURNAL OF CLIMATE

Argueso, D., R. Romero, y V. Homar

Química y Ciencia y Tecnología de los Materiales

[Three-dimensional effects on the aerodynamic performance of flapping wings in tandem configuration](#)

Journal of Fluids and Structures

Arranz, G., O. Flores, y M. García-Villalba

Matemáticas, Física e Ingeniería

[A tutorial-driven introduction to the parallel finite element library FEMPAR v1.0.0](#)

COMPUTER PHYSICS COMMUNICATIONS

Badia, S., y A. F. Martín

Article

Quantum crystal structure in the 250-kelvin superconducting lanthanum hydride

<https://doi.org/10.1038/s41586-020-1955-z>

Received: 24 July 2019

Accepted: 14 November 2019

Ion Errea^{1,2,3}, Francesco Belli^{1,2}, Lorenzo Monacelli⁴, Antonlo Sanna⁵, Takashi Koretsune⁶, Terumasa Tadano⁷, Raffaello Bianco², Matteo Calandra⁸, Ryotaro Arita^{9,10}, Francesco Mauri^{4,11} & José A. Flores-Livas^{4*}



66 | Nature | Vol 578 | 6 February 2020

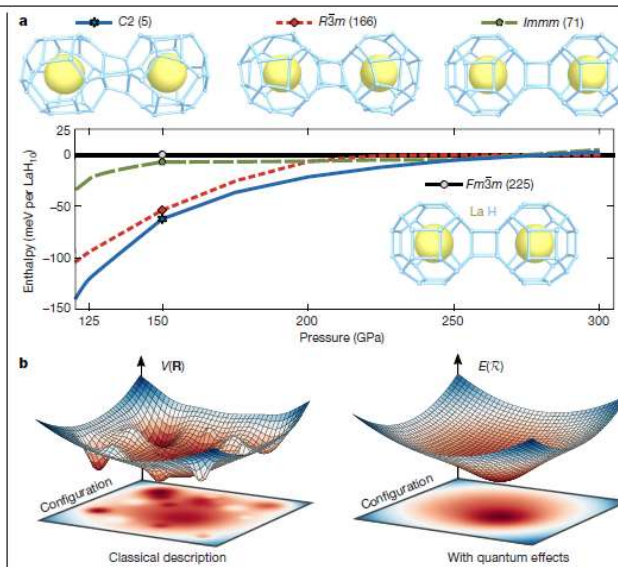


Fig. 1 | Quantum effects stabilize the symmetric $Fm\bar{3}m$ phase of LaH_{10} . **a**, Enthalpy as a function of pressure for different structures of LaH_{10} , neglecting zero-point energy in the calculations. Here, pressure is calculated classically from $V(\mathbf{R})$, neglecting quantum effects on $V(\mathbf{R})$. **b**, Left, a Born–Oppenheimer energy surface $V(\mathbf{R})$, exemplifying the presence of many local minima belonging to distorted structures. \mathbf{R} represents the positions of atoms treated classically as simple points. Right, the configurational energy surface $E(\mathbf{R})$, including quantum effects. \mathbf{R} represents the quantum centroid positions, which determine the centre of the ionic wave functions—that is, the average atomic positions. By including quantum effects, all phases collapse to a single phase: the highly symmetric $Fm\bar{3}m$.



Science, 26 June 2020

Micelle-directed chiral seeded growth on anisotropic gold nanocrystals

Guillermo González-Rubio^{1,*}, Jesús Mosquera^{1,*}, Vished Kumar¹, Adrián Pedraza-Tardajos², Pablo Llombart^{3,4}, Diego M. Solís⁵, Ivan Lobato², Eva G. Noya⁴, Andrés Guerrero-Martínez³, José M. Taboada⁶, Fernando Obelleiro⁷, Luis G. MacDowell³, Sara Bals^{2,†}, Luis M. Liz-Marzán^{1,8,9,†}

¹CIC biomaGUNE, Basque Research and Technology Alliance (BRTA), 20014 Donostia-San Sebastián, Spain.

²Electron Microscopy for Materials Research (EMAT), University of Antwerp, 2020 Antwerp, Belgium.

³Departamento de Química Física, Universidad Complutense de Madrid, 28040 Madrid, Spain.

⁴Instituto de Química Física Rocasolano, CSIC, E-28006 Madrid, Spain.

⁵Department of Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA 19104, USA.

⁶Departamento de Tecnología de los Computadores y de las Comunicaciones, University of Extremadura, 10003 Cáceres, Spain.

⁷Departamento de Teoría de la Señal y Comunicaciones, University of Vigo, 36310 Vigo, Spain.

⁸Ikerbasque, Basque Foundation for Science, 48013 Bilbao, Spain.

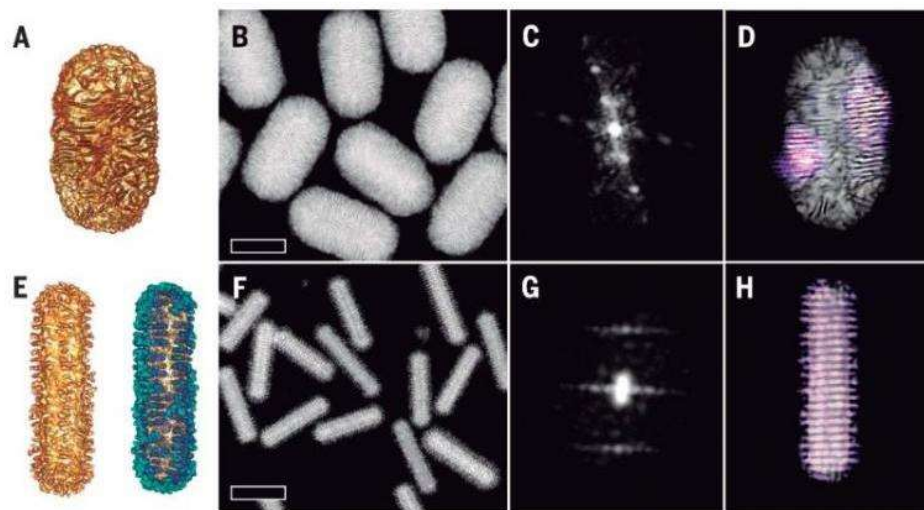
⁹CIBER de Bioingeniería, Biomateriales y Nanomedicina (CIBER-BBN), 20014 Donostia-San Sebastián, Spain.

[†]Corresponding author. Email: sara.bals@uantwerpen.be (S.B.); llizmarzan@cicbiomagune.es (L.M.L.-M.)

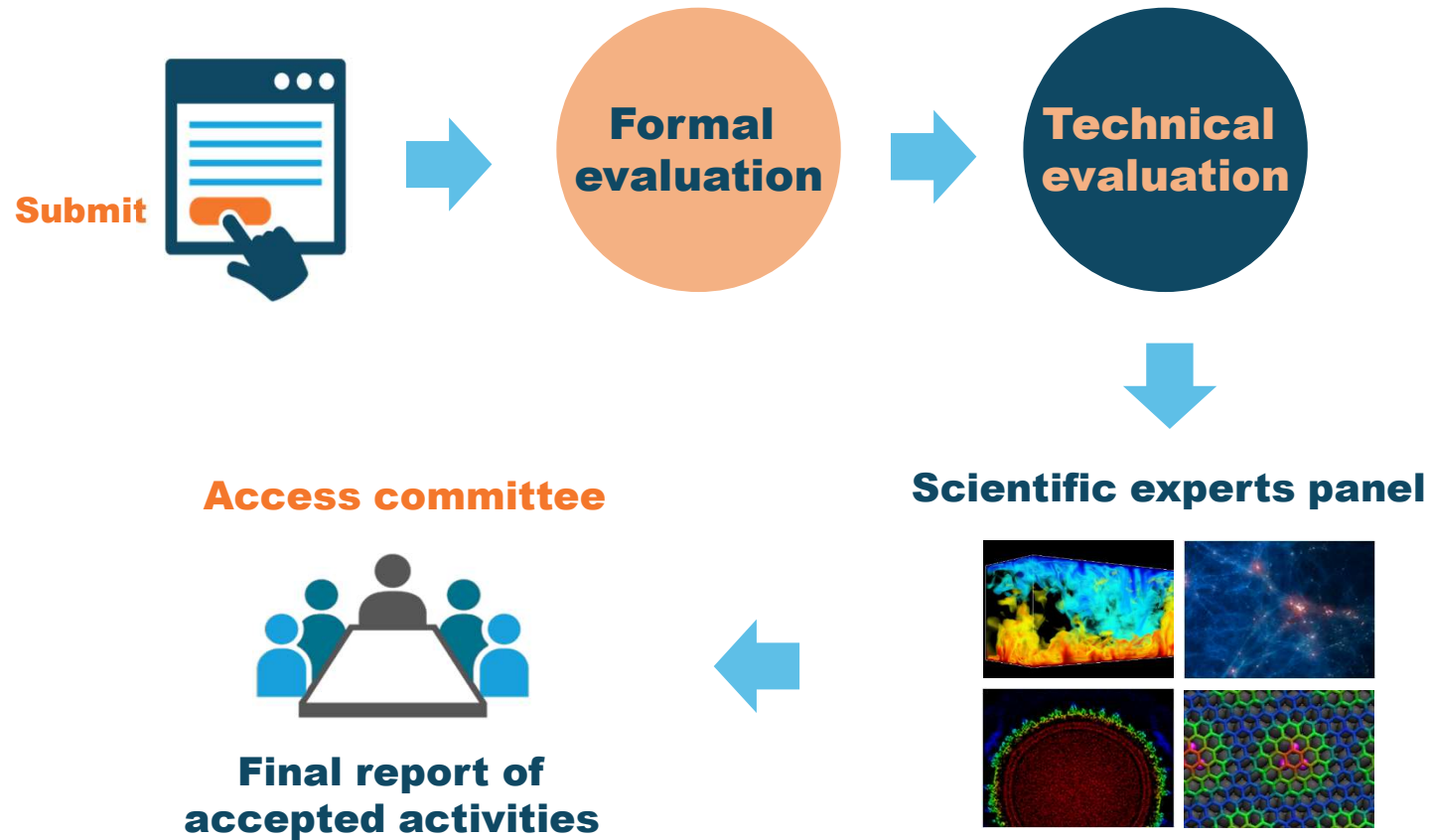
* These authors contributed equally to this work.

- Hide authors and affiliations

Science 26 Jun 2020:
Vol. 368, Issue 6498, pp. 1472-1477



Application process: Proposal evaluation





Supercomputing resources to
promote the progress of science

Supercomputing resources

Would you like to take advantage of RES resources? Click below to get more information about the application procedure.

[Access our resources](#)

If you are a RES user, access the intranet.

[RES intranet](#)

The Spanish Supercomputing Network

The **Spanish Supercomputing Network** (RES) is a distributed infrastructure involving the interconnexion of 12 supercomputers which work together to offer High Performance Computing resources to the scientific community. It is coordinated by the Barcelona Supercomputing Center (BSC).

The RES is a Unique Scientific and Technical Infrastructure (ICTS) distributed throughout Spain, which aims to support the development of top-quality cutting-edge research.

[Read more](#)

2021-P3 call just closed!
Next call 2022-P1 will
open soon!!

How to apply?

RES intranet: <https://www.bsc.es/res-intranet>



RES - Red Española de Supercomputación
Intranet Area

Log in

Please, enter your username (e-mail) and your password in order to log in to the RES Intranet Area. If you do not have an account or you forgot your password, click one of the options below.

[Create new account](#) [I forgot my password](#)

INFORMATION

More information about RES in <https://www.res.es/>

The [list of accepted activities for 2nd period 2020](#) was published on June, 25th.

These activities will start on July 1st, 2020.

The deadline for next period applications is 2020, September 17th - 11:00, CEST.



- Researchers present a **proposal** which includes research project description, technical requirements and research group experience.
- Accepted proposals have access to RES supercomputers for 4 months.
- Granted time can be: hours with priority (hours A) or without priority (hours B)

Administration

Switch to user ...

 Switch

Go to Administration Area

Original user: jordi.mascastella@bsc.es

[Home](#) > [New Application](#)

New Application

New activity application for period 2020-2 (2020, July 1st - 2020, October 31st)

Before applying ...

The deadline for next period applications is 12/05/2020 11:00:00, CEST.

Dear user,

Each application to the RES is expected to be destined to perform an activity (a term that can be understood as one experiment or several) and not for long term projects. The RES understands that one project can include more than one activity. Considering that, an applicant can submit more than one application for different activities framed in a same global project.

For activities whose computing needs require access to resources during more than a period to be properly developed, applicants can request access for up to two periods (a first period as new application and a second period as continuation activity). The request for a continuation will be evaluated and the applicants will have to report to the Access Committee the results obtained during the first period. For more information [click here](#).

If you need help or any clarification, please contact us in applications@bsc.es.

Thanks for your cooperation,
Spanish Supercomputing Network.


 Before applying, read the Access Protocol to the equipment of the Barcelona Supercomputing Center and the Spanish Supercomputing Network (RES) document.

 Create new application

New Application

New activity application for period 2020-3 (2020, November 1st - 2021, February 28th)

1. COVID-19

 In accordance with the RD8/2020 of extraordinary urgent measures to face the economic and social impact of COVID-19, which establishes measures to support research on COVID-19 as a priority objective of the Government, promoting research on the disease for the development of effective drugs and vaccines that help contain the impact of future outbreaks, the RES Council propose to temporarily include in the access protocol the following criteria:

- for activities related to COVID-19. The researcher must mark it in the web application and it will be validated the corresponding scientific panel
- for the call that ends on May 12, and which gives access from July to October 2020, both included
- for activities led or with confirmed participation of researchers located in Spain
- for activities that exceed a minimum quality threshold

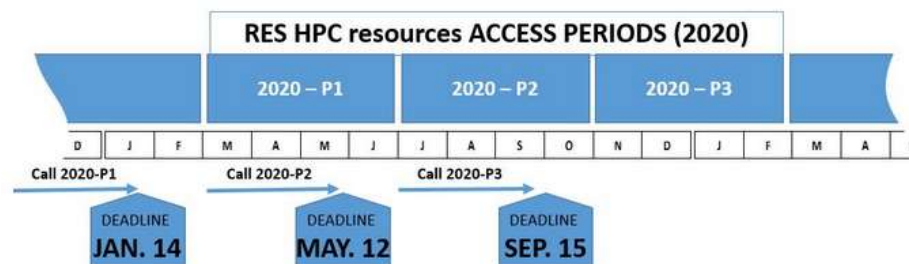
they will have priority, up to 50% of the capacity of the RES in this period.

Is this activity related to COVID-19?

Select an option



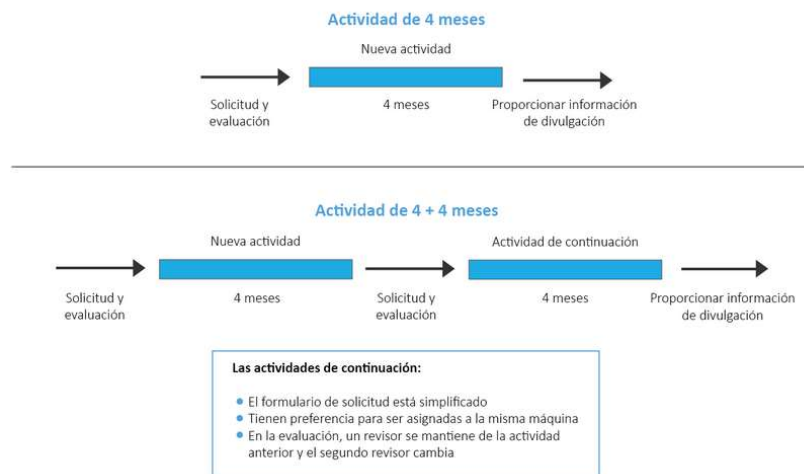
When to apply?



Las solicitudes recibidas son evaluadas cada 4 meses. El calendario anual de convocatorias es:

Periodo	Plazo para presentación de solicitudes	Fecha de inicio de las actividades
P1	Enero (confirmar fecha)	1 de marzo
P2	Mayo (confirmar fecha)	1 de julio
P3	Septiembre (confirmar fecha)	1 de noviembre

La duración de las actividades está limitada a un periodo de 4 meses. Las actividades que requieran acceso a los recursos durante más tiempo pueden solicitar una **actividad de continuación**, con la obligación de informar sobre los resultados intermedios al Comité de Acceso.





RES @RES_HPC · 24 nov.

...

NEW!! The first call for RES Data Projects is now open! This call will be accepting proposals requiring to store, share, publish and connect large data sets with computing and data services for exploitation services. More info: res.es/en/access-to-r... [#ICTSNews](#) [#data](#) [#HPC](#)

ARCHIVAL RESOURCES

Which resources are available?

Researchers can request to store, share, publish, or connect large data sets with data and/or computing services on all the RES's nodes. The data storage services and the services necessary for their exploitation constitute a data project for the RES, and for which the RES offers infrastructure and support.

Who can request access to the RES?

Scientific groups with the need to store large volumes of data associated with their exploitation services can respond to the call.

How can resources be requested?

Data storage is granted through competitive access calls. The first call for data projects will open once the terms of the call are approved by the Council and will remain open for a minimum period of 2 months. Successive calls will be opened each year in November.

To participate in the RES calls, each data project must present its own data management plan (DMP) according to the template published in the call, which will be subject to peer evaluation for its approval. An internal access committee will carry out the evaluation made up of technicians, managers, and scientists to evaluate each project presented. The information required for the DMP can be consulted in this document [RES Application Guide for archival resources](#). The terms of the first call for the RES data project can be found in the document "[Call for Data Projects](#)."

RES resources are awarded according to criteria of excellence and impact of the research activity and are free for all research groups. For more information, see the RES [Frequently Asked Questions](#) (FAQ) for applicants and users.

RES Users' Committee

- **CURES aims to provide advice and feedback to RES coordinators:**
 - Promotes optimal use of high performance computing facilities
 - Shares information about users' experiences
 - Voices user concerns
- You can **contact CURES** through RES intranet:

RES Users Committee

[Documents](#) [Mailbox](#) [Contact CURES](#)

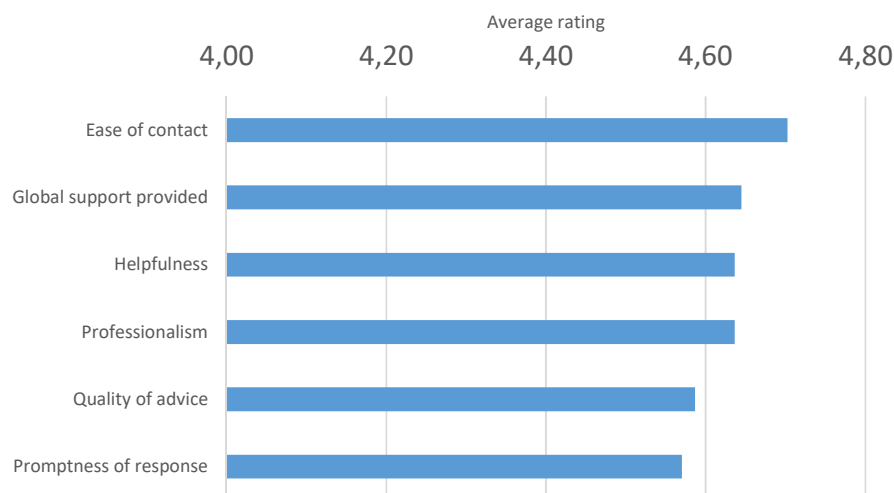
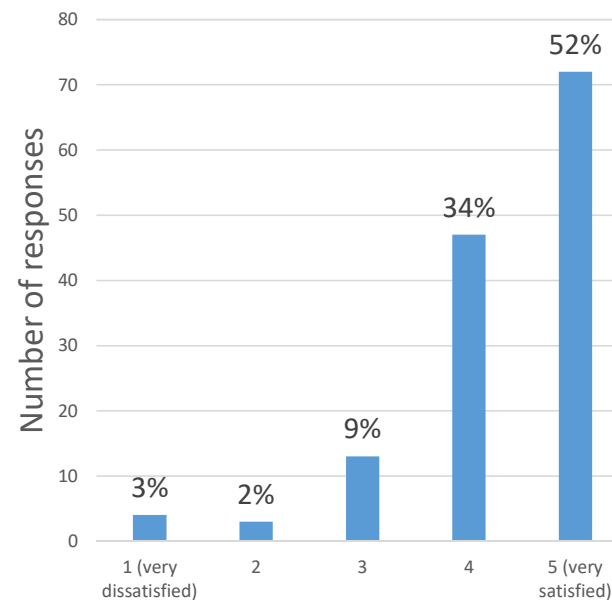
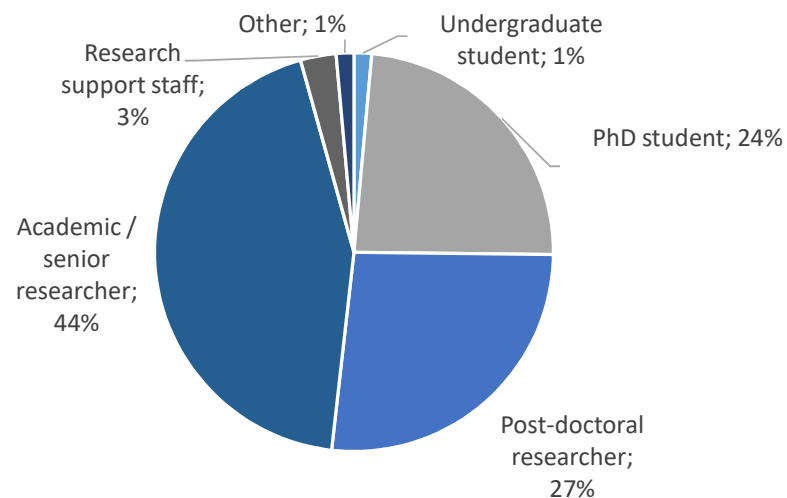
Information and available documents related to CURES (RES Users Committee).
Please, find below the documents that CURES has published and that are of interest to all the RES Users.

Documents

 CURES_rules.pdf

 RES Application guide.docx

Users satisfaction survey 2017-18



High overall satisfaction
Highly rated (4,6/5) support service

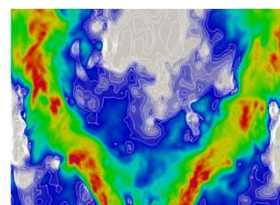


RES events: networking & training opportunities (Around 1.000 attendees reached)



RES Users' Conference

Networking, scientific & technical lectures, poster sessions, users' committee meeting, training workshops, social activities, etc.



Scientific seminars supported



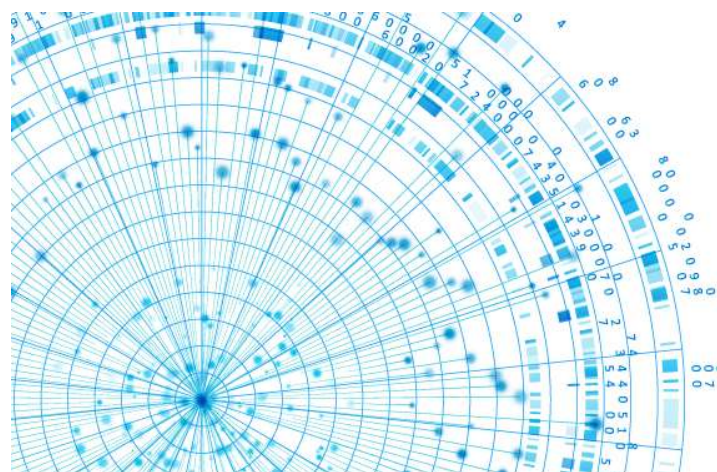
Technical training sessions organized



RES events: networking opportunities

The agenda includes:

- Information about RES and the European HPC ecosystem
- Plenary sessions
- Parallel scientific & technical sessions
- RES Award – Best scientific paper



15th USERS CONFERENCE

16 - 17 September 2021



REGISTRATION STILL OPEN!! AT:

<https://www.res.es/es/eventos/15th-users-conference>



15th USERS CONFERENCE



Users meeting - 16 SEP 2021 - ONLINE

The 15th USERS CONFERENCE brings together supercomputing users to share knowledge and experience in the use of HPC.

The Spanish Supercomputing Network (RES) organises the **Annual RES Users Conference** to inform about RES news and to provide information of interest about access to its resources and about the European HPC ecosystem. This event is a meeting place for all users, support technicians, the access committee and the users committee. The duration of the conference will be 2 days, starting on Thursday 16 September, with plenary sessions and technical and scientific conferences by leading supercomputing specialists. The second day, Friday 17th September, will continue with sessions

focused on scientific and technical topics within the HPC world and will end with an awards ceremony for the most relevant contribution in the HPC area.

PROGRAM & ABSTRACTS BOOK, you can download the document [here](#).

3rd EDITION OF RES AWARDS (call closed!): Once again, the RES Award for the best scientific article using RES resources will be announced. More information on the call can be found at the following [link](#). Users can submit their proposal while registering for the conference.

To receive news about the 15th USERS CONFERENCE, subscribe to our [newsletter](#). You can also check our Twitter profile: [@RES_HPC](#)

Sponsors



RES events: networking opportunities

Scientific seminars

The RES promotes and sponsors scientific meetings which address supercomputing technology applications in specific scientific areas.



Upcoming events

www.res.es/en/events



New Trends in Computational Chemistry – 2021

Scientific seminar - 09 SEP 2021 -

The emergence of data sciences in atomistic modelling



2nd Fusion HPC Workshop

Scientific seminar - 02 DEC 2021 - Barcelona / Online

The 2nd Fusion HPC Workshop covers all computer applications using High Performance Supercomputing (HPC) in the field of fusion research.

RES events: technical training

These workshops are organized by the RES nodes and aim at providing the knowledge and skills needed to use and manage the supercomputing facilities.

- **Check the agenda in RES website:**
https://www.res.es/en/events?event_type=technical_training
- **PATC courses in BSC (PRACE Advanced Training Center):**
<https://www.bsc.es/education/training/patc-courses>



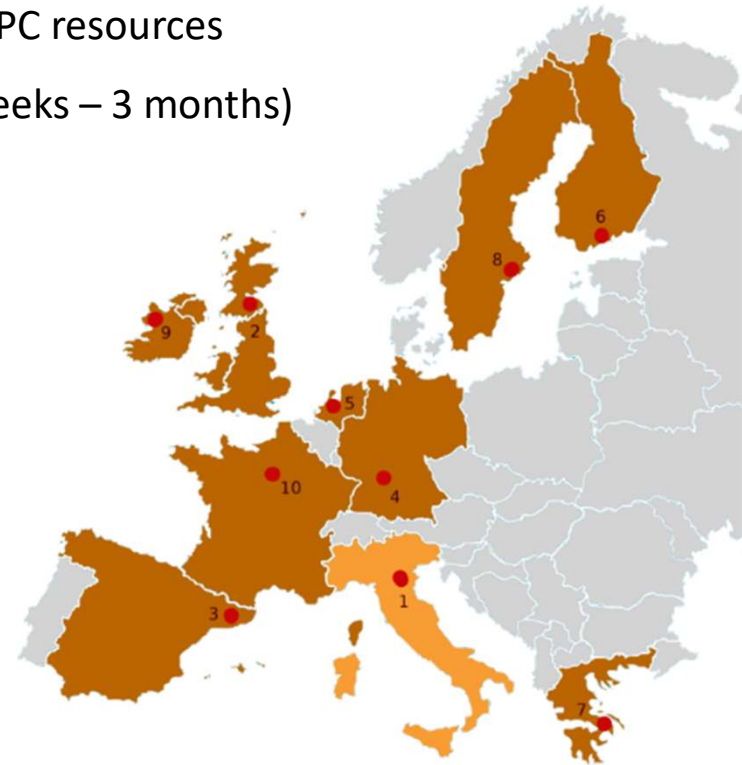
Infrastructure on High Performance Computing



Funded by the EC: 2017 - 2021



- ✓ Mobility grants for researchers using HPC resources
- ✓ Short stays to visit scientific hosts (3 weeks – 3 months)
- ✓ Funds for travel and living allowance
- ✓ Access to European HPC facilities



**Barcelona
Supercomputing
Center**
Centro Nacional de Supercomputación

<http://www.hpc-europa.eu/>



Funding for research visits to build international networks in HPC
Network Compute Learn Travel

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Main navigation

Home

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[Visitors area](#)

▶ [Events](#)

▶ [About](#)

Next call for applications - open!

The sixteenth call for applications has just closed and we are proceeding now with the scientific and technical evaluations. The next closing date will be on **09th Sept 2021 (23:59 CEST)**. The programme will end in April 2022 so do not miss the last calls!

Next calls calendar is visible [here](#)

NOTE: KTH has already achieved its target number of visitors so it is not possible anymore to visit Sweden.

[Read more](#)

**TODAY, LAST
DAY OF THIS
CALL!**



HPCEuropa3 @HPCEuropa3 · 14 may.

New call open! Apply by 9/9/21.

Programme ends 30/4/22

- ➡ Use world-class [#HPC](#) systems
- ➡ Collaborate with host researcher in your field
- ➡ Get HPC technical support
- ➡ Plus travel & living expenses

[@BSC_CNS](#) [@Cineca1969](#) [@CSCfi](#) [@EPCCed](#) [@grnet_gr](#) [@HLRS_HPC](#)
[@icheck](#) [@SURF_onderzoek](#)



**Barcelona
Supercomputing
Center**
Centro Nacional de Supercomputación

Collaborations with Industry



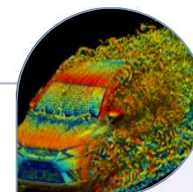
Research into advanced technologies for the exploration of hydrocarbons, subterranean and subsea reserve modelling and fluid flows



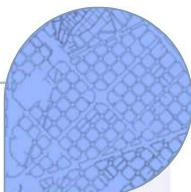
Research on wind farms optimization and wind energy production forecasts



Collaboration agreement for the development of advanced systems of deep learning with applications to banking services



Simulations to improve the understanding of the rotating wheels flow physics and its impact over the aerodynamic performance



Advanced statistical methods to the optimization of maintenance, energy usage, and control of the city's water treatment and supply processes.



Research on efficient data sensing, algorithms for analysis of industrial processes and visualization of large datasets of industrial data



Artificial Intelligence and Big Data techniques to improve the quality of care and personalized diagnosis



BSC's dust storm forecast system licensed to be used to improve the safety of business flights.

RES as National HPC Competence Centre



(+34) 987 29 31 60 | eurocc@res.es

Síguenos:

INICIO SERVICIOS HPC, BIG DATA Y AI SOCIOS NOTICIAS LINKS CONTACTO

PROYECTO EUROPEO





EuroCC Spain


Centro Nacional de Competencia (NCC) en Supercomputación (HPC), Big Data (HPDA) e Inteligencia Artificial (AI).

<https://eurocc-spain.res.es/>



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BEGINNING SERVICES HPC, BIG DATA AND AI PARTNERS NEWS LINKS CONTACT

EuroCC_Spain_RES Conference


NATIONAL CENTER FOR SUPERCOMPUTATION COMPETENCIES Promoting the use of HPC in business innovation




September 16, 2021



10:00 to 14:00



FREE ENROLLMENT



PROGRAM

OBJECTIVES:

Make companies aware of the **National Center for Supercomputing Competencies** , as well as national strengths in high-performance computing (HPC), supercomputing, as well as High Performance Data Analysis (HPDA) and Artificial Intelligence capabilities. (AI) to increase the usability of these technologies in national companies.

SCHEDULE

10: 00-10: 05	Welcome. SCAYLE, Castilla y León Supercomputing.
10: 05-10: 15	Presentation of the National Center for Supercomputing Competencies. BSC-CNS, National Supercomputing Center.
10: 15-10: 35	Round table . The map of competences in HPC, IA, Big Data in Spain. -BIFI, Institute of Biocomputation and Complex Systems. <i>Mr. Alfredo Ferrer Marco , Technical and research staff hired .</i> -COMPUTAEX-CénitS, Extremadura Computing and Advanced Technologies Foundation. <i>D. Javier Corral</i>

Innovation Journey 2021



Innovation Journey is a workshop series that aims to promote collaboration between research personnel in need of entrepreneurship management skills; and industry and SME professionals searching for new ventures in the field of High-Performance Computing, Big Data and AI.

The goal is to accompany researchers as they make their first contact with the private sector and to foster the use of HPC technologies in industry and SME initiatives.

The seven-session program will offer business training through interactive workshops and an approach to the implementation of practical solutions in the market, as well as mentoring and guidance by entrepreneurs, which will be established through a rigorous curriculum.



Promoted and organised by:



EuroHPC

This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 951732. The JU receives support from the European Union's Horizon 2020 research and innovation programme and Germany, Bulgaria, Austria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Sweden, the United Kingdom, France, the Netherlands, Belgium, Luxembourg, Slovakia, Norway, Switzerland, Turkey, Republic of North Macedonia, Iceland, Montenegro

EUROCC SPAIN_RES & THE BSC-CNS PRESENT:

INNOVATION JOURNEY

Find your inner **entrepreneur**

OCT 1ST - NOV 12TH 2021

ARE YOU A RESEARCHER WITH A LOT OF POTENTIAL?

We are sure you are.

In fact, you are probably aware of that too. And you might have started thinking: what if all my potential could be further developed in the **private sector**?

LEARNING BY DOING

A methodology that works

The Innovation Journey is a **success** story: 3 companies emerged after participating in the last edition*. This year, you will also be able to **collaborate** with **companies** that will bring their expertise to assist you on your way to the private sector.

**10/10 participants in last edition, assured they would recommend the programme to their colleagues.

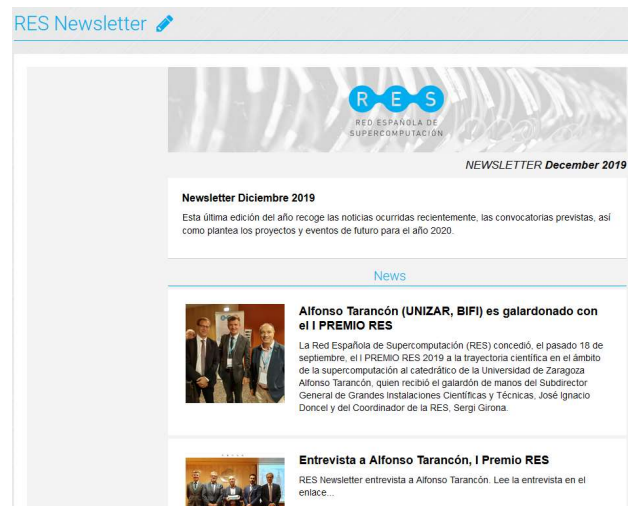
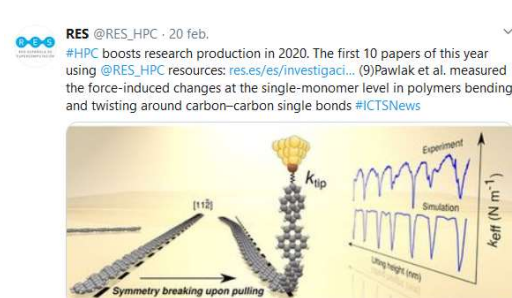
YOU HAVE THE SCIENTIFIC POTENTIAL

Let yourself discover your inner entrepreneur

The Innovation Journey will take place during **7 full-day sessions** in seven consecutive weeks. It will combine a **theoretical** and **practical** "learning by doing" methodology, which will approach **actual enterprises and businesses**.

It will take off on **October 1st**.

Follow us for info updates!



Contact us!



Visit our website: www.res.es



Subscribe to our [newsletter](#)



Follow us in Twitter:
[@RES_HPC](#)



applications@res.es
dissemination@res.es

THANK YOU!

