



RED ESPAÑOLA DE  
SUPERCOMPUTACIÓN



Spanish Fusion  
HPC Workshop



9.00 CET

November 27, 2020

## The Spanish Supercomputing Network offers HPC resources to the scientific community



**Barcelona  
Supercomputing  
Center**  
Centro Nacional de Supercomputación

Jordi Mas  
RES Project Officer  
[jordi.mascastella@bsc.es](mailto:jordi.mascastella@bsc.es)



# Spanish Supercomputing Network (RES)



[www.res.es](http://www.res.es)



- Created 2006
- 13 institutions
- 13 supercomputers
- HPC resources for scientific community
- NEW! Data management projects
- 12.000 Tflops
- +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**



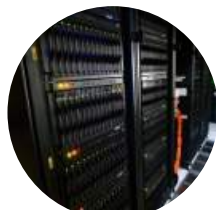
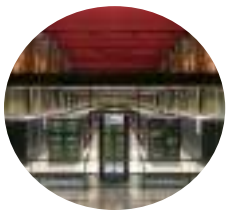
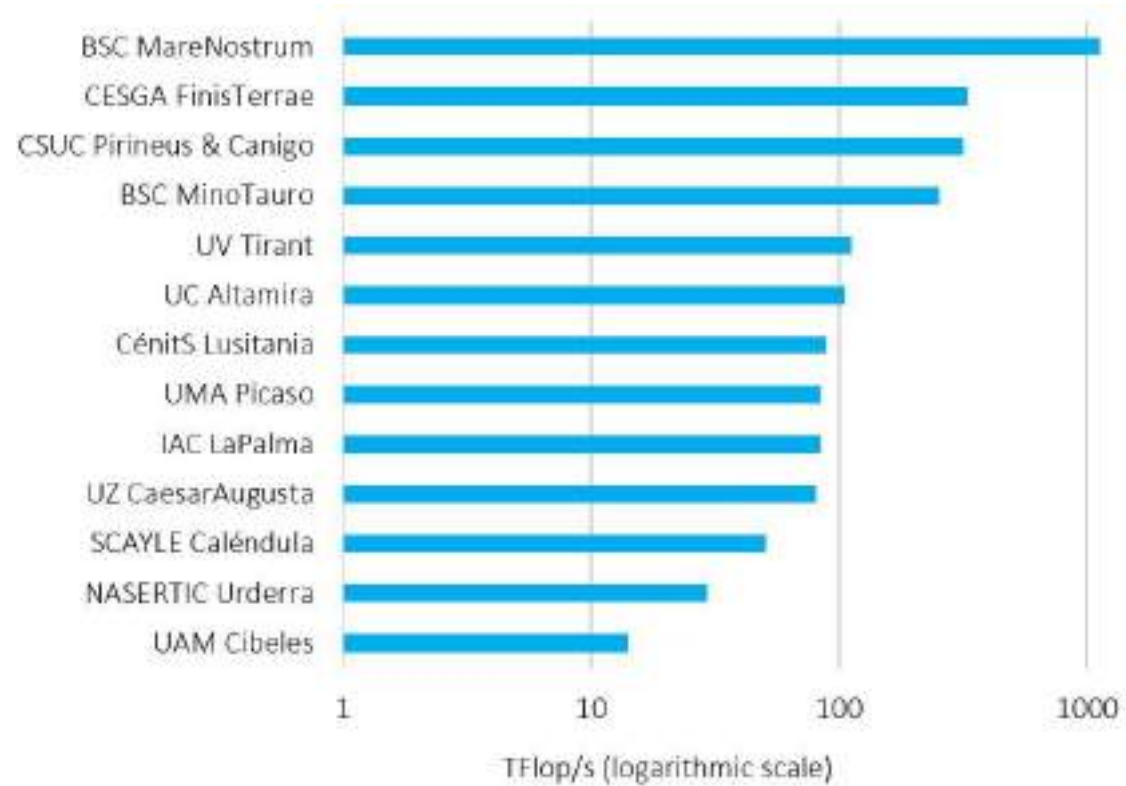


RED ESPAÑOLA DE  
SUPERCOMPUTACIÓN

- 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 **13 interconnected supercomputers**.



# RES supercomputers (1/3)



**BSC (MareNostrum 4)** 165888 cores, 11400 Tflops  
Main processors: Intel(R) Xeon(R) Platinum 8160  
Memory: 390 TB  
Disk: 14 PB

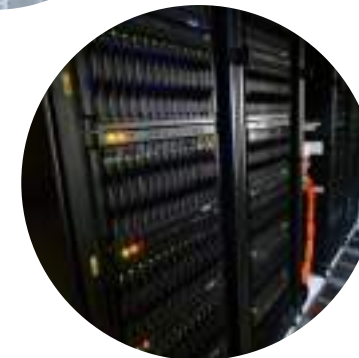
**BSC(MN4 CTE-Power)** 2160 cores and 216 V100GPU's, 1.6 Pflops  
Main processors: 54x 2 Power9 (20 cores)  
Memory: 27 TB  
Disk: 14PB (shared with MN4)

**UMA (Picasso)** 4016 cores, 84Tflops  
Main processors: Intel SandyBridge-EP E5-2670  
Memory: 22400 GB  
Disk: 720 TB

**UV (Tirant 3)** 5376 cores, 111,8 Tflops  
Main processors: Intel SandyBridge-EP E5-2670  
Memory: 10752 GB  
Disk: 14 + 10 TB

**CSUC (Pirineus)** 2784 cores, 283,66 Tflops  
Main processors: Intel(R) Xeon(R) Platinum 8160  
Memory: 12000 GB  
Disk: 200 TB

**CSUC (Canigo)** 384 cores, 33,2 Tflops  
Main processors: Intel(R) Xeon(R) Platinum 8160  
Memory: 9000 GB  
Disk: 200 TB



# RES supercomputers (2/3)



**Cénits (Lusitania 2)** 800 cores, 33,2 Tflops  
Main processors Intel Xeon E5-2660v3, 2.6GHz  
Memory: 10 GB  
Disk: 328 TB

**Cénits (SandyBridge)** 2688 cores, 56 Tflops  
Main processors Intel Sandybridge Xeon  
Memory: 5376 GB  
Disk: 328 TB

**BSC (MinoTauro)** 624 cores, 251 Tflops  
Main processor: 39x 2 Intel Xeon E5-2630 v3  
Memory: 20 TB  
Disk: 14PB (shared with MN4)

**CESGA (FinisTerae 2)** 7712 cores, 328,3Tflops  
Main processor: Intel Xeon E5-2680v3  
Memory: 40 TB  
Disk: 960 TB

**UC (Altamira 2+)** 5120 cores, 105 Tflops  
Main processor: Intel SandyBridge  
Memory: 15,4 TB  
Disk: 2PB

**UZ (Caesaraugusta)** 2014 cores, 80.5 Tflops  
Main processor: Intel E5-2680v3, 2.5GHz  
Memory: 5400 GB RAM memory  
Disk: 219TB





# RES supercomputers (3/3)

**SCAYLE (Caléndula)** 2432 cores, 50,6 Tflops  
Main processor: Intel SandyBridge Xeon  
Memory: 4864 GB  
Disk: 600 TB

**UAM (Cibeles)** 368 cores, 14,1 Tflops  
Main processor: Intel Xeon E5-2630 v3, 2.40GHz  
Memory: 896 GB  
Disk: 80 TB

**UAM (SandyBridge)** 2688 cores, 56Tflops  
Main processor: Intel SandyBridge Xeon, 2.60GHz  
Memory: 5376 GB  
Disk: 80 TB

**IAC (LaPalma)** 4032 cores, 83,85 Tflops  
Main processor: Intel SandyBrigde  
Memory: 8064 GB  
Disk: 60 TB

**NASERTIC (Urederra)** 760 cores, 29,2 Tflops  
Main processor: Intel(R) Xeon(R) CPU E5-2640 v4  
Memory: 5Tb RAM  
Disk: 163 TB





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

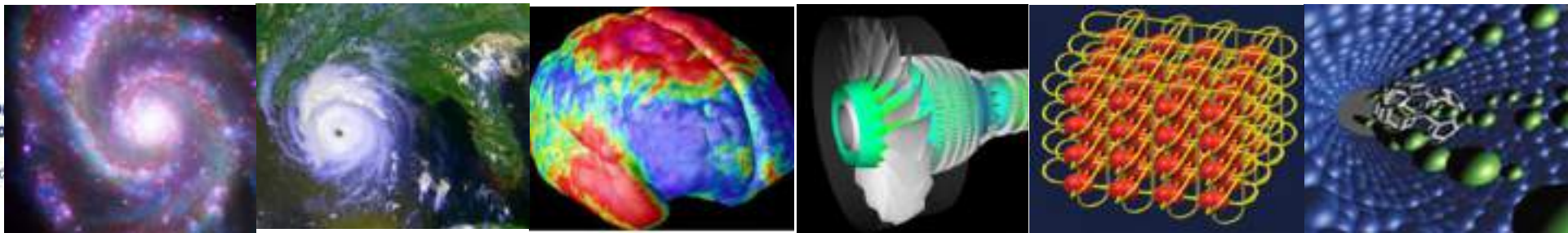


Access to business innovation  
Competence center  
DIH, One-stop shop

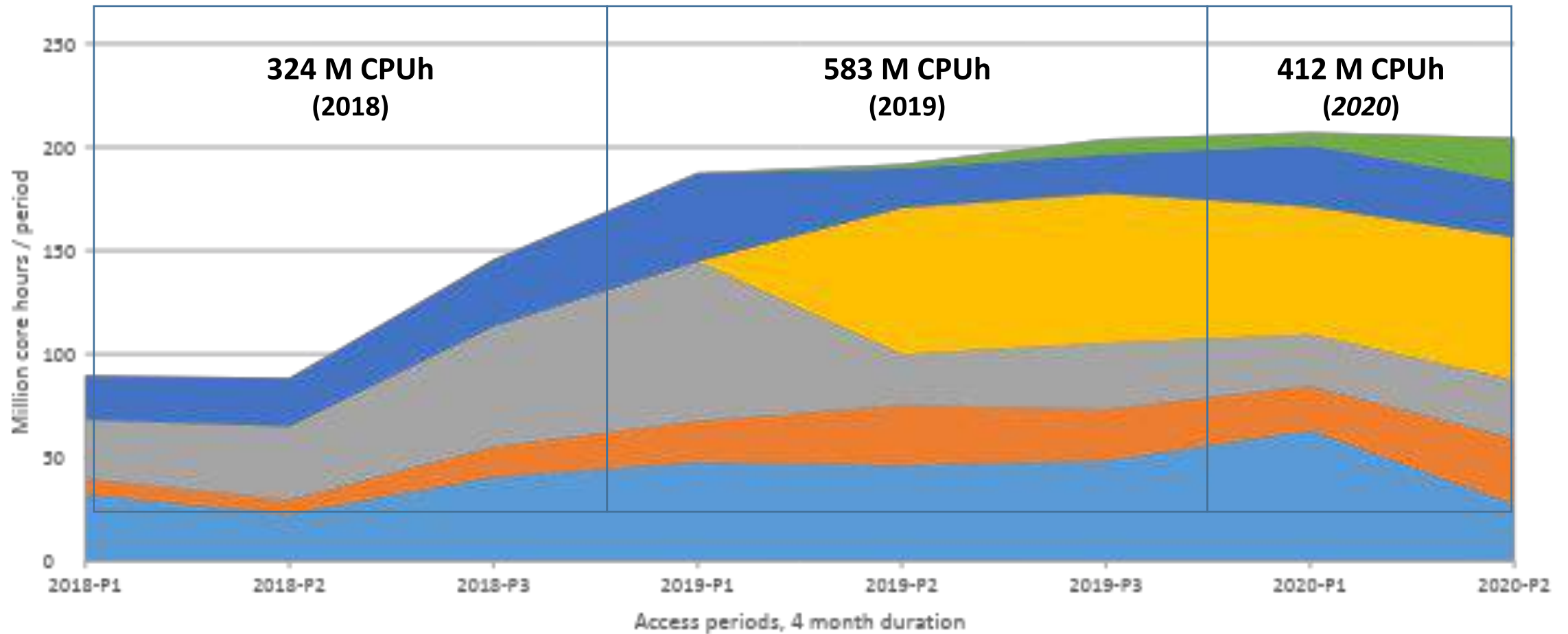


# Scientific areas

- Astronomy, Space and Earth Sciences (AECT)
- Physics (FI)
- Mathematics and Engineering (MI)
- Life and Health Sciences (BCV)
- Solid State Chemistry (QS)
- Chemistry of Biological Systems (QSB)



# RES: HPC services provided





**RES users  
have  
published  
+180 articles  
in scientific  
journals in  
2019**

<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. Garcia-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

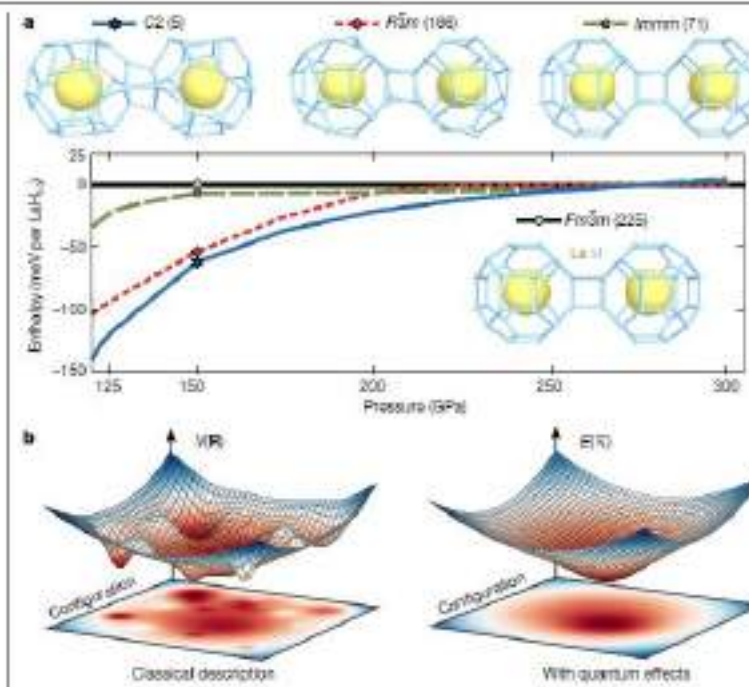
# Quantum crystal structure in the 250-kelvin superconducting lanthanum hydride

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

Received: 24 July 2019

Accepted: 14 November 2019

Ion Errea<sup>1,2,3</sup>, Francesco Belli<sup>1,2</sup>, Lorenzo Monacelli<sup>4</sup>, Antonio Sanna<sup>5</sup>, Takashi Koretsune<sup>6</sup>, Terumasa Tadano<sup>7</sup>, Raffaello Bianco<sup>2</sup>, Matteo Calandra<sup>6</sup>, Ryotaro Arita<sup>9,10</sup>, Francesco Mauri<sup>4,11</sup> & José A. Flores-Livas<sup>4\*</sup>



**Fig. 1** | Quantum effects stabilize the symmetric  $Fe3In$  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 VRR, neglecting quantum effects on VRR. **b**, Left, a Born-Oppenheimer energy surface (VES) exemplifying the presence of many local minima belonging to distorted structures. **R** represents the positions of atoms treated classically as simple points. Right, the configurational energy surface  $\tilde{E}(\tilde{R})$ , including quantum effects. **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  $Fe3In$ .



Science, 26 June 2020

## Micelle-directed chiral seeded growth on anisotropic gold nanocrystals

Guillermo González-Rubio<sup>1,\*</sup>, Jesús Mosquera<sup>1,\*</sup>, Vished Kumar<sup>1</sup>, Adrián Pedraza-Tardajos<sup>2</sup>, Pablo Llombart<sup>3,4</sup>, Diego M. Solís<sup>5</sup>, Ivan Lobato<sup>2</sup>, Eva G. Noya<sup>4</sup>, Andrés Guerrero-Martínez<sup>1</sup>, José M. Taboada<sup>6</sup>, Fernando Obelleiro<sup>7</sup>, Luis G. MacDowell<sup>1</sup>, Sara Bals<sup>2,1</sup>, Luis M. Liz-Marzán<sup>1,8,9,1</sup>

<sup>1</sup>CIC biomAGUNE, Basque Research and Technology Alliance (BRTA), 20014 Donostia-San Sebastián, Spain.

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

<sup>3</sup>Departamento de Química Física, Universidad Complutense de Madrid, 28040 Madrid, Spain.

<sup>4</sup>Instituto de Química Física Rocasolano, CSIC, E-28006 Madrid, Spain.

<sup>5</sup>Department of Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, PA 19104, USA.

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

<sup>7</sup>Departamento de Teoría de la Señal y Comunicaciones, University of Vigo, 36310 Vigo, Spain.

<sup>8</sup>kerbasque, Basque Foundation for Science, 48013 Bilbao, Spain.

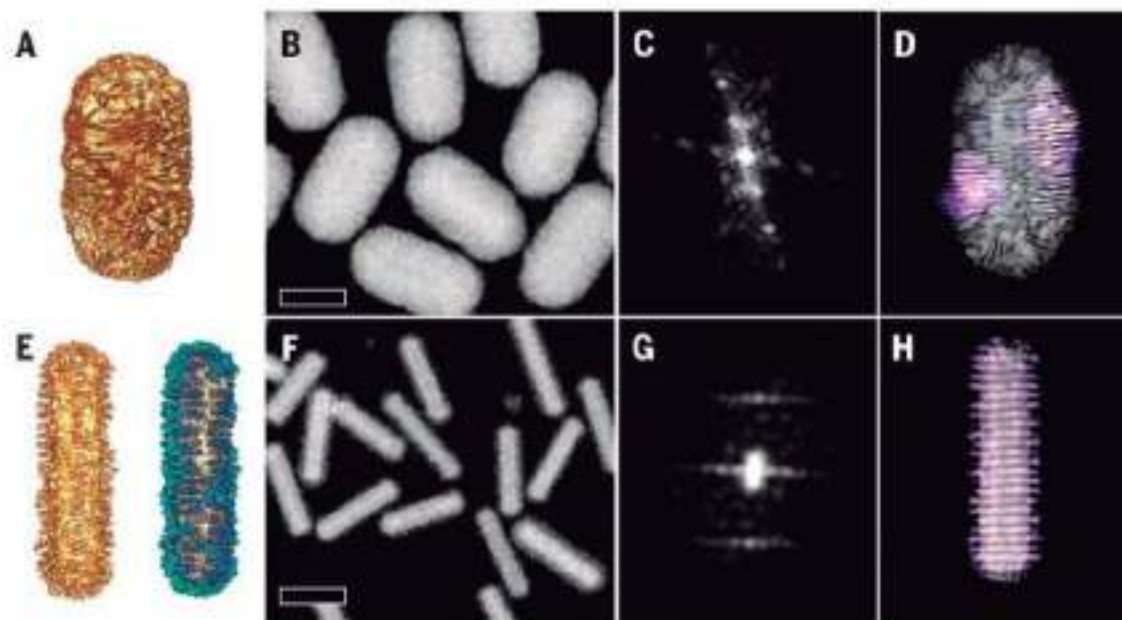
<sup>9</sup>CIBER de Biotecnología, Biomateriales y Nanomedicina (CIBER-BBN), 20014 Donostia-San Sebastián, Spain.

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

\* These authors contributed equally to this work.

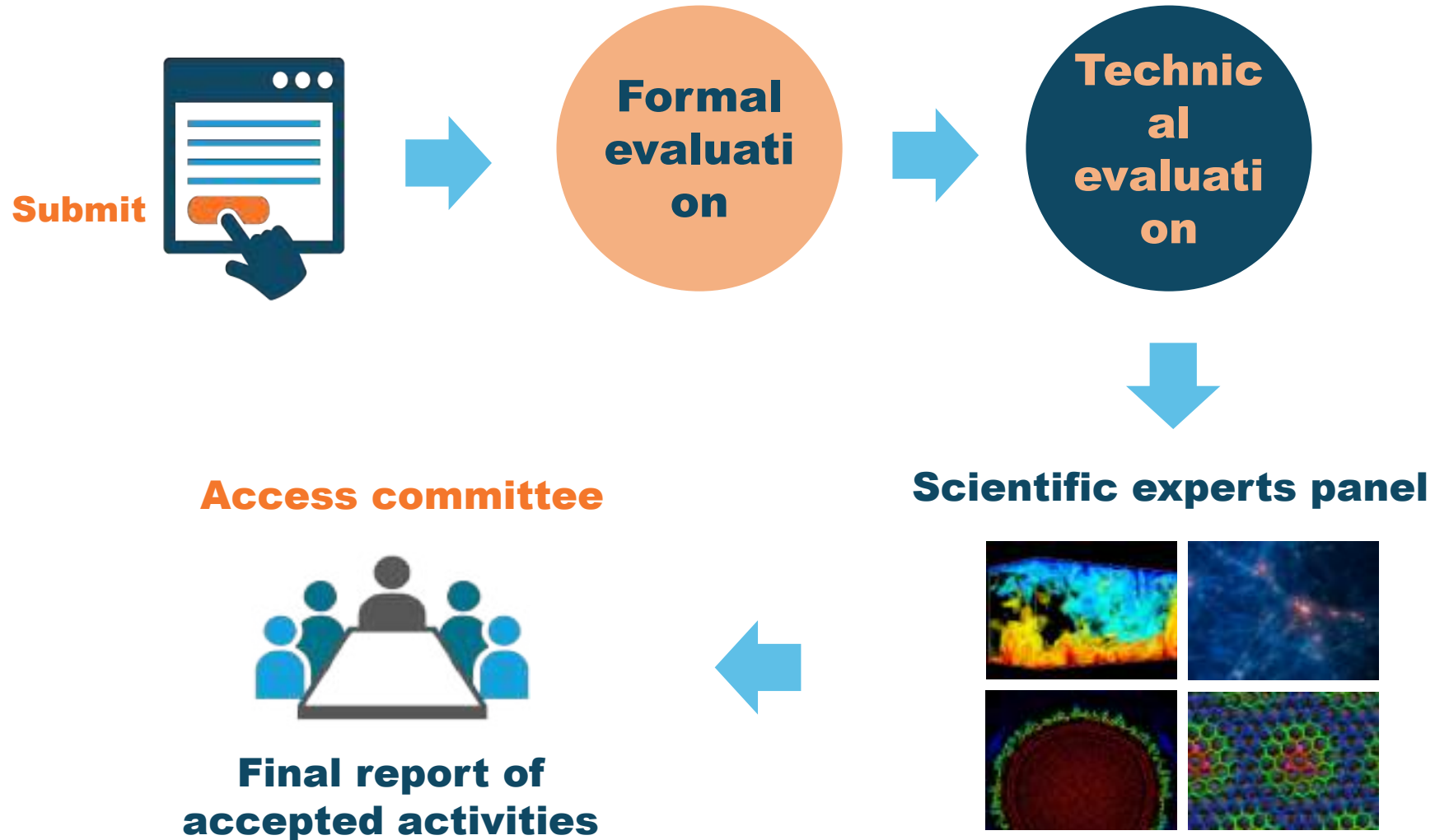
– Hide authors and affiliations

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](#)

The deadline for next period applications is 2021, January 12th - 11:00, CEST.

# How to apply?

RES intranet:

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

Barcelona Supercomputing Center  
Centro Nacional de Supercomputación

RES - Red Española de Supercomputación  
Intranet Area

jordi.mascastella@bsc.es

.....

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](mailto: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

## New Application

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

### 1. General Information

**a) Activity Title**

**b) Area**

Your application will be evaluated by different expert teams depending on your area selection.

**c) Type of application**

Standard Activity for the next 4 months

Standard Activity for the next 4 months ( For a novel user, without previous expertise in HPC ), it will remove from the review the evaluation of the previous expertise of the team in the HPC. This option can be selected only for users with less than 1 year of expertise in the usage of HPC.

Pre-reservation of hours for European projects ( this option allow the users submitting a EU proposal to have a reservation of hours for a maximum of 2 years. The hours will be granted only if the EU proposal is approved and granted by the EC).



## 2. Research Project Description

### a) Brief description of the Project

If this Activity takes place in the context of a Scientific Research Project, give a brief description of the Project, including the reference of National or International grants which support it. Summarize the research in the context of the current state-of-the-art, including references if appropriate. (Maximum 5000 characters).

### b) Grants and funded projects related to this activity

[+ Add New Grant](#)

### c) Brief description of the Project (if this Activity takes place in the context of a Technology or Industrial Project)

If this Activity takes place in the context of a Technology or Industrial Project, give a brief description of the Project, including the potential impact resulting from this activity, in measurable terms (potential for patent applications, competitive advances, prototypes, new products, economic impact, etc). (Maximum 5000 characters).

### d) Specific Activity proposed

Describe the specific Activity proposed. Discuss the need for Supercomputing facilities. Describe in detail the specific calculations you plan to do, and their relevance to the Research Project. If the Activity is a 'Long Term Activity' (which will extend over several application periods), you must clearly specify which calculations will be done in this period, and which ones will be done in following periods. (Maximum 10000 characters).

### e) Computational algorithms and codes outline

Outline the computational algorithms and codes, and their suitability for supercomputing facilities. Describe any benchmarks performed on HPC systems. (Maximum 3000 characters).

### 3. Software and Numerical Libraries

Software components that the project team requires for the activity.

Please select any software components that the project team requires for the activity. If any program required for the application is license protected, the user will need to provide the license in order to use the program in the RES infrastructure.

#### a) Applications + Libraries

- JONA
- ASINIT
- ABYSS
- ALFRED
- ALGLIB
- ALLECCOUNT
- ALLPATHS

#### b) Compilers and Development Tools

- OUDA
- GCC
- G0
- HPCX
- IBM
- INTEL
- LLVM

#### c) Utilities + Parallel Debuggers and Performance Analysis Tools

- 7ZIP
- ACE
- ANACONDA
- ANACONDA3
- AUTOCNF
- AUTOTOOLS
- BISON

#### d) Other requested software

(Additional information might be requested by the Access Committee)

#### e) Proprietary software

In case of proprietary software, you should include software name, short description, link to web page with full software description.

#### 4. Research Team Description

##### a) Personal Data

Name of Team Leader

Gender

Select an option

Institution

e-mail

Phone

Nationality

The employment contract of the activity leader with the research organisation is valid at least 3 months after the end of the allocation period.

##### b) Curriculum Vitae of the Team Leader

Please provide a brief Curriculum Vitae of the Team Leader, including any relevant information that may help in demonstrating his/her qualifications to lead the proposed activity. (Maximum 2000 characters)

##### c) Names of other researchers involved in this activity

Include only name, institution and e-mail.

##### d) Relevant publications

List the five most relevant publications, in the last five years, from the members of the research team that guarantee the scientific quality of the proposed Activity and demonstrate the qualifications of the team to complete it.



## 5. Resources

[Show / Hide Available Machines](#)

<b>MaroNostrum 4</b> Intel(R) Xeon(R) Platinum 8100 2.10GHz with Intel(R) Omni-Path / 165984 cores <a href="#">Click here for more information</a>	<b>Altamira</b> Xeon E5-2670 a 2.6 GHz with Infiniband/ 5120 cores <a href="#">Click here for more information</a>
<b>Picasso</b> Intel SandyBridge-EP E5-2670/1600 20M a 2.6 GHz with Infiniband/ 4016 cores <a href="#">Click here for more information</a>	<b>Tirant</b> 672 SandyBridge 2.6 GHz with Infiniband/ 5376 cores <a href="#">Click here for more information</a>
<b>Memento</b> Intel Xeon E5-2680v3 2.5GHz with Infiniband / 3040 cores <a href="#">Click here for more information</a>	<b>La Palma</b> Intel Xeon SandyBridge a 2.00Ghz with Infiniband/ 4032 cores <a href="#">Click here for more information</a>
<b>MinoTauro</b> BULL cluster with Intel processors + NVIDIA CUDA accelerators <a href="#">Click here for more information</a>	<b>CTE-Power9+V100</b> IBM Power9 with NVIDIA V100 GPUs, 2160 cores and 216 GPUs, with a performance of more than 1PFlop sustained <a href="#">Click here for more information</a>
<b>Caléndula</b> Intel Xeon E5450, 3G-cc with Infiniband / 1440 cores <a href="#">Click here for more information</a>	<b>Pinneus</b> Cluster BULL Sequoia with Intel Xeon Skylake processors, 2880 cores <a href="#">Click here for more information</a>
<b>Canigo</b> 31M BULL Sequoia with Intel Xeon Skylake processors and 9.2TB of shared memory and 284 cores <a href="#">Click here for more information</a>	<b>Luísania II</b> Intel SandyBridge-EP E5-2670/1600 with Infiniband / 3000 cores <a href="#">Click here for more information</a>
<b>Cibeles</b> Intel E5-2670 Sandy Bridge-EP 2.6 GHz with Infiniband / 560 cores <a href="#">Click here for more information</a>	<b>Finis Terrae II</b> BULL with 7712 cores Intel Haswell 2680v3, Infiniband Fat Tree FDR, 44TB memory, 1 TB disk <a href="#">Click here for more information</a>

a) To which machine(s) are you requesting access?

Select a machine  [+ Add Machine](#)

**INFORMATION:** The estimated cost of the requested hours, considering only the electricity cost, is — euros.

**Please select:**

- The required resources have to be executed in the selected machines, the other architectures do not fit the requirements to execute the proposal.  
\*\* this option implies that if no hours in this machine/these machines are available, the acces committee will reject the full application.
- The architectures selected for the requested resources are only a suggestion. If no hours in this machine/these machines are available, please grant resource any other similar architecture where the codes used for the application may run efficiently.  
\*\* this option implies that if no hours in this machine/these machines are available, the acces committee will allocate the activity in any other similar machine.



## 6. Abstract for publication

Max. 850 characters, ready for publication in the web page in case the proposal is accepted.

## 7. Contact with CURES during last year

Information about the RES Users Committee (CURES).

**a) User has contacted the CURES during last year**

Yes  No

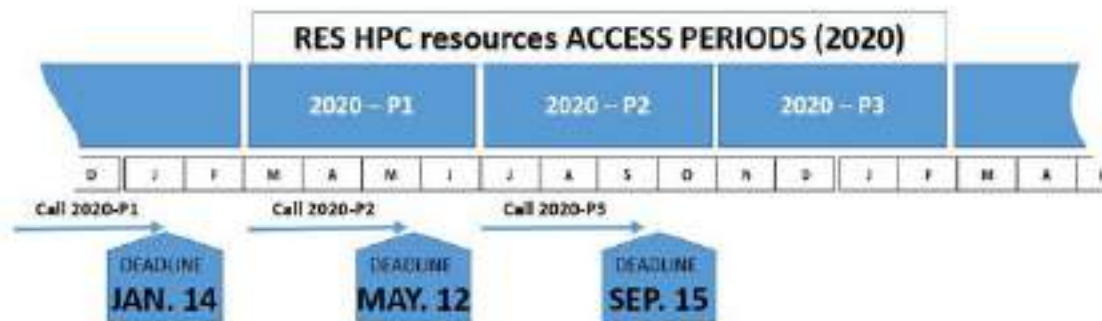
## 8. Usage Terms & Conditions

I have read and accept the Usage Terms & Conditions.

The data will be saved. You may continue editing it until the deadline. It will not be accessible to the Access Committee if you do not submit it.



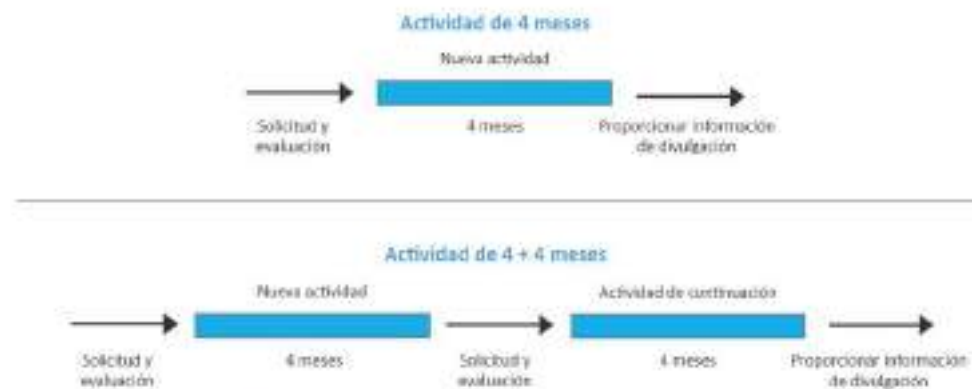
# When to apply?



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

Período	Plazo para presentación de solicitudes	Fecha de inicio de las actividades
P1	Enero (confirmar <a href="#">fecha</a> )	1 de marzo
P2	Mayo (confirmar <a href="#">fecha</a> )	1 de julio
P3	Septiembre (confirmar <a href="#">fecha</a> )	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.



#### Las actividades de continuación:

- El formulario de solicitud está simplificado
- Tienen preferencia para ser asignadas a la misma máquina
- En la evaluación, un revisor se mantiene de la actividad anterior y el segundo revisor cambia





**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...](https://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

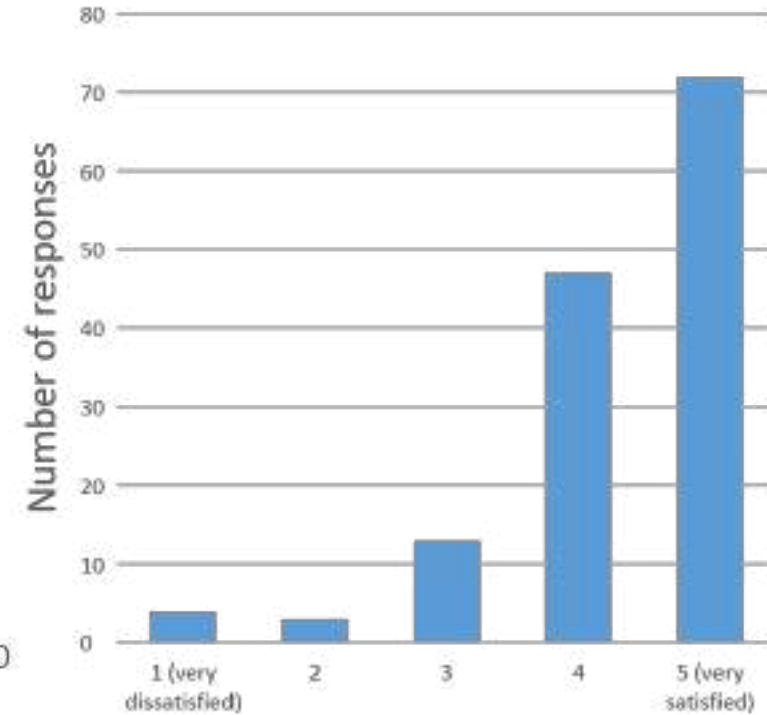
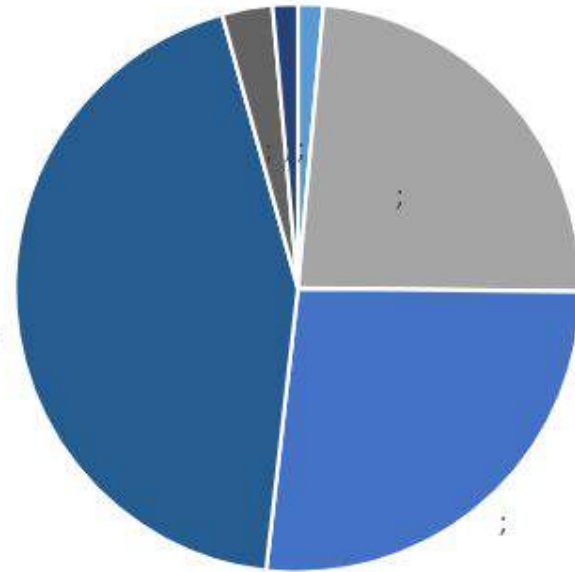
[Documents](#) [Mailbox](#) [Contact CURES](#)

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**

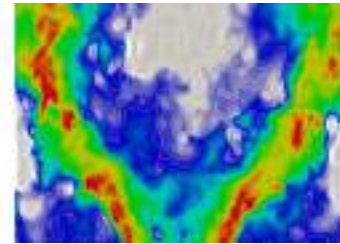


# RES events: networking & training opportunities (Around 1.000 attendees reached)



## 13th RES Users' Meeting 2019

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



6 Scientific seminars supported (2019)



2 Technical training sessions organized (2019)



# RES events: networking opportunities



14ª JORNADA DE USUARIOS  
JURES'20



The agenda includes:

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

WATCH VIDEOS AT:

<https://www.res.es/es/eventos/14th-users-conference>

# RES events: networking opportunities

## Scientific seminars

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



**Upcoming events** **Agenda 2020: [www.res.es/en/events](http://www.res.es/en/events)**

**19th European Conference on Computational Biology (ECCB2020)**  
 Scientific seminar - 31 AUG 2020 - Virtual  
 ECCB2020 welcomes scientists working in a variety of disciplines, including bioinformatics, computational biology, systems biology, artificial intelligence, biology, medicine, environmental sciences, and many more.

**1st Spanish Fusion HPC Workshop**  
 Scientific seminar - 27 NOV 2020 -  
 The 1st Spanish 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](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>





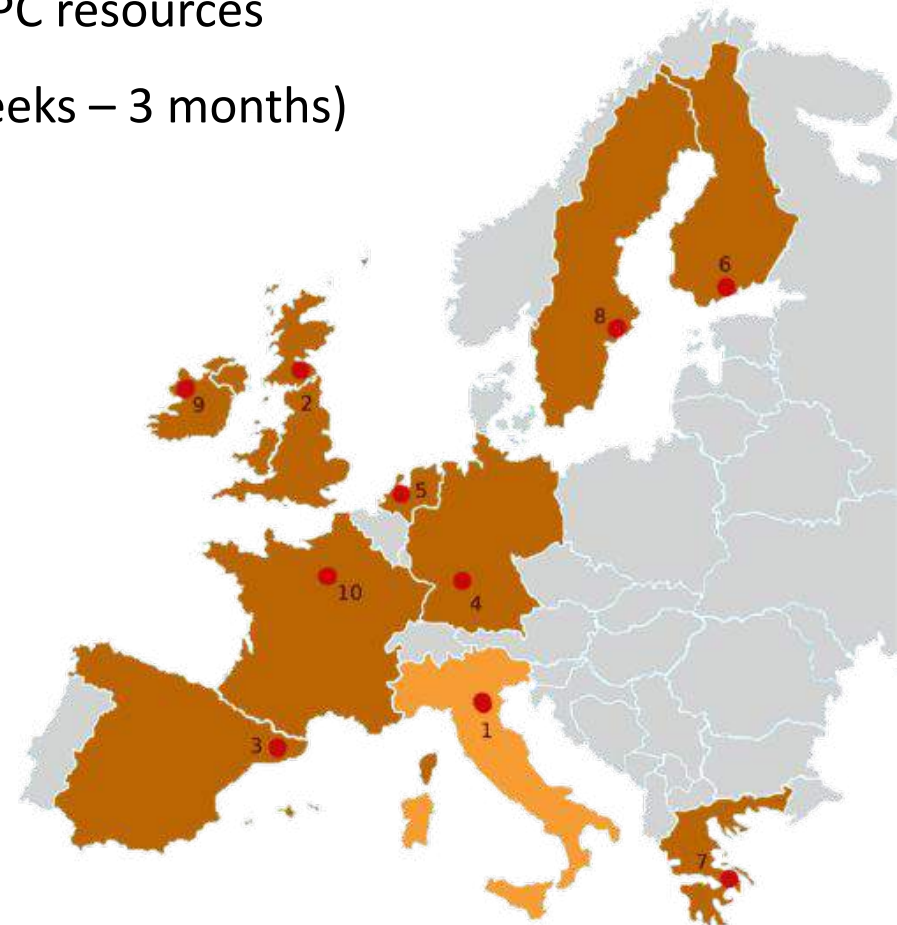
Infrastructure on High Performance Computing



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





Funding for research visits to build international networks in HPC

Network Compute Learn Travel

Home

The programme

Visitors area

Events

About

Main navigation

Home

▶ The programme

Visitors area

▶ Events

▶ About

## Next call for applications - open!

The twelfth call for applications has just closed and we are proceeding now with the scientific and technical evaluations. The next closing date will be on **18th February 2021 (23:59 CET)**.



**HPCEuropa3** @HPCEuropa3 · Nov 13

000

New call open! Apply by 18 Feb 2021.

- ➔ Access to world-class #HPC systems
- ➔ Scientific collaboration with host researcher in your field
- ➔ Technical support by HPC centres
- ➔ Travel & living expenses

@BSC\_CNS @Cineca1969 @CSCfi @EPCCed @grnet\_gr @HLRS\_HPC @ichec  
@SURF\_onderzoek



Barcelona  
Supercomputing  
Center

Centro Nacional de Supercomputación

# Collaborations with Industry



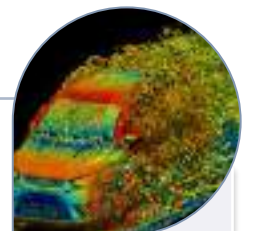
Research into advanced technologies for the exploration of hydrocarbons, subterranean and subsea reserve modelling and fluid flows



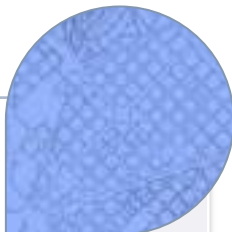
Research on wind farms optimization and wing energy production forecasts



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



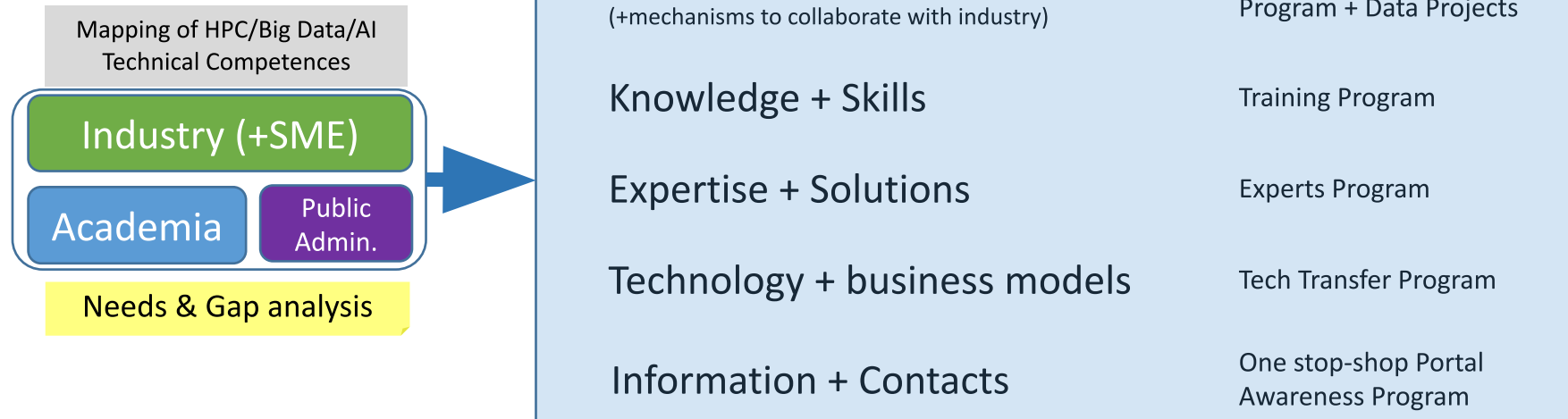
BSC's dust storm forecast system licensed to be used to improve the safety of business flights.

# RES as National HPC Competence Centre

Main aim:

- to support and increase the national strengths of **High Performance Computing (HPC) competences** as well as **High Performance Data Analytics (HPDA)** and **Artificial Intelligence (AI) capabilities**
- to close existing gaps to increase usability of these technologies in the different States and thus provide a European excellence baseline.

**RES** provides **ACCESS** to:





# Follow us for info updates!

**RES @RES\_HPC - 28 ene.**  
 DO NOT MISS! The 11th call for applications is OPEN until 20th February 2020. @HPCEuropa | @BSC\_CNS access to Europe's biggest Supercomputers #HPC + mobility program (travel grants, etc.)



**RES @RES\_HPC - 7 feb.**  
 El 12-13 de febrero nos encontramos en #Transfiere2020 #ICTSNew y empieza ya tu camino hacia la innovación en colaboración con una infraestructura eficiente y técnica singular (ICTS)



**RES @RES\_HPC - 20 feb.**  
 #HPC boosts research production in 2020. The first 10 papers of this year using @RES\_HPC resources: [res.europa.eu/investigaci...](https://res.europa.eu/investigaci...) @Pawlak et al. measured the force-induced changes at the single-monomer level in polymers bending and twisting around carbon-carbon single bonds #ICTSNews



**CénitS - COMPUTAEX @cenits - 21 feb.**  
 El nuevo Supercomputador de Extremadura, #ULSITANIAMI, ya se encuentra en funcionamiento. CénitS alcanza así una capacidad de cálculo de 93 TFlops más 120 TFlops de computación gráfica, sobre red InfiniBand de hasta 100 Gbps, y un total de 3.696 cores y 40.960 cuda cores.



**RES Newsletter**



**Newsletter Diciembre 2019**

Este último número del año recoge las noticias relevantes acontecidas, las convocatorias, premios, así como también los proyectos y eventos de futuro para el año 2020.

**Alfonso Teracón (UNIZAR, BFI) es galardonado con el PREMIO RES.**

La Red Española de Supercomputación (RES) convoca, el pasado 13 de septiembre, el PREMIO RES 2019 a la trayectoria científica en el ámbito de la supercomputación al Laboratorio de la Universidad de Zaragoza Alfonso Teracón, quien recibió el galardón de manos del Presidente Consejo de Controladores Distribuido y Tecnológico, José Ignacio Dorado y del Coordinador de la RES, Sergi Gilera.

**Entrevista a Alfonso Teracón, Premio RES**

RES ha querido entrevistar a Alfonso Teracón, con la entrevista en el mismo.

# Distributed supercomputing infraestructure

**26 members, including 5 Hosting Members**  
(Switzerland, France, Germany, Italy and Spain)

**110 PFlops/s** of peak performance on **7 world-class systems**

**>25.000 Mcore hours** for research awarded

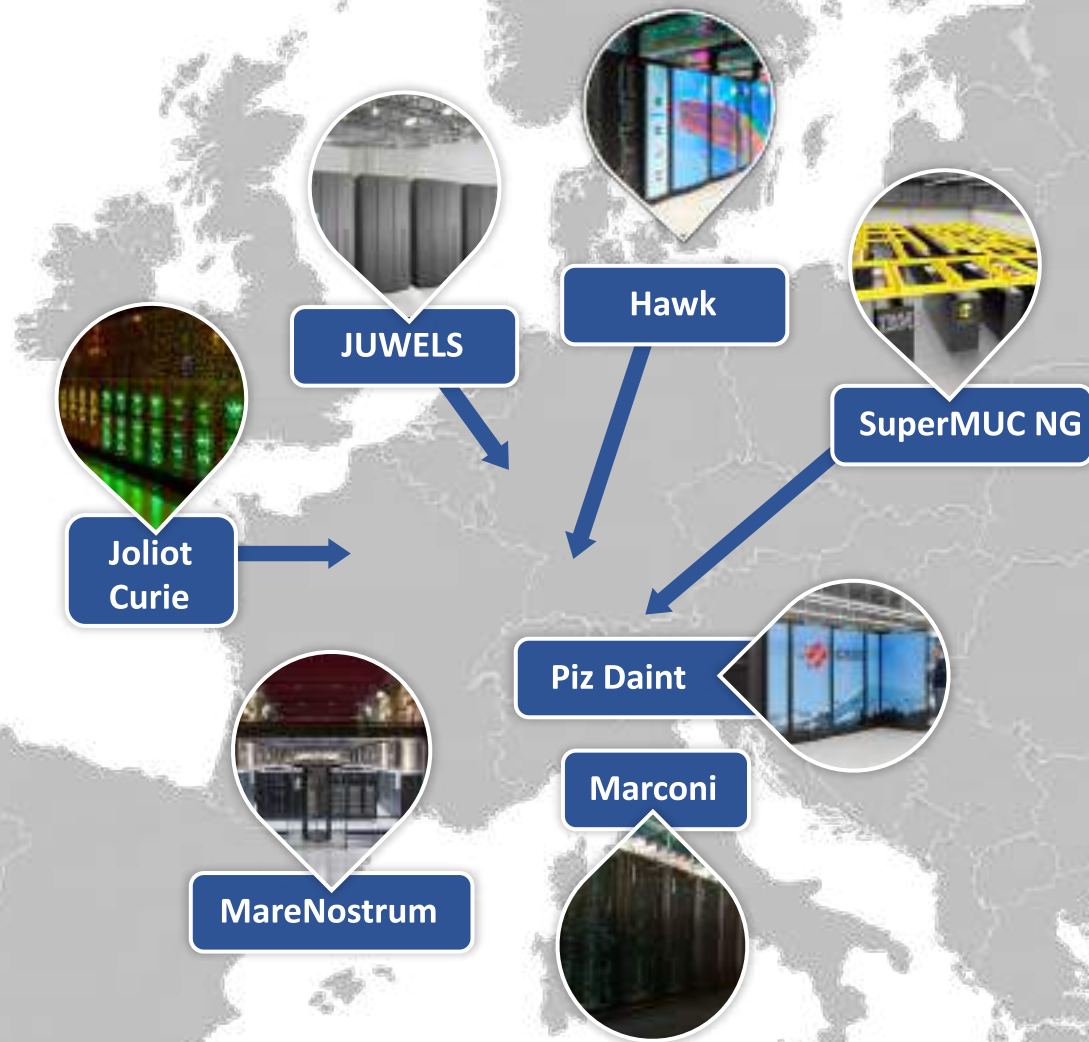
**779** scientific projects **enabled**

**>17.000** people trained

**>50** companies supported



Access [prace-ri.eu/hpc-access](https://prace-ri.eu/hpc-access)



# EuroHPC: to European HPC technologies



## EuroHPC-Ju members:

Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and Turkey



*“A new legal and funding structure – the EuroHPC Joint Undertaking – shall acquire, build and deploy across Europe a world-class High-Performance Computing (HPC) infrastructure.*

*It will also support a research and innovation programme to develop the technologies and machines (hardware) as well as the applications (software) that would run on these supercomputers.”*

## Contact us!



Visit our website: [www.res.es](http://www.res.es)



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**THANK YOU!**

