News

Upgrading MareNostrum
BSC is working to replace the MareNostrum supercomputer with a new version that will multiply its calculation capacity by 10. A part of this new computer already ranks 36 in the world.

Active participation of BSC at SC12
BSC was extremely active at SC12, the international supercomputing conference held from 12th – 19th of November 2012 in Salt Lake City (USA).
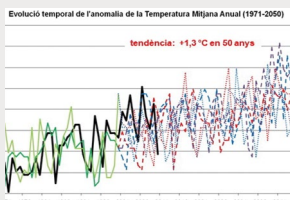
First CLL epigenomes deciphered
The study pools together the results from the complete sequencing of the epigenome and the genome of leukemia patients, and offers a new perspective on cancer research.

BSC to formulate climate scenarios for Catalonia
The BSC and the Meteorological Service have signed a cooperation agreement to formulate and analyse regional climate scenarios in high resolution for Catalonia in the 21st century.

HPC Services for Industry
The video on the industry's services prepared by the BSC's Visualization team was one of the attractions at the SC12 booth.

Spotlight on...

'Scientific visualization: exploring the Computational World'
By Mariano Vázquez, High Performance Computational Mechanics team leader

Thanks to the progressively larger computing power at the hands of the scientists, the "Computational Worlds" that simulations create are becoming closer to reality.

Directors' View

Although external conditions continue to be very tough, with growing difficulties for the country to keep up necessary investments in R+D, I am pleased to be able to say that even faced with these problems, BSC can continue to fulfil its mission to perform excellent research and provide supercomputing services to the scientific and business communities.

Events and Training

Nov 26 PATC Course: Parallel Programming Workshop
26 November Barcelona

Dec 13 PATC Course: Earth Sciences Simulation Environments
13 December Barcelona

Inside BSC

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- Photo competition
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This is reflected in the achievement extremely important milestone: the installation of MareNostrum 3. A system with a peak performance of 1PFlop/s made up of more than 48.000 processors, 100 TB of memory, 7 PB of disc and a 40 Gb/s interconnect with 0.7μs latency. It has not been easy, but we have made it!

It is important to highlight that MareNostrum has now become a European Infrastructure, open to the best European research groups after going through the filter of a European Access Committee.

Times are tough, and will continue to be so, and it will be difficult for us to change that. What we can do is to make a choice: either to resign ourselves to these circumstances or to keep fighting and working hard to carry out our job in the best possible way.

I want to share with you an anecdote by a journalist, Sidney Harris. One day he accompanied a friend to a newsstand. His friend greeted the newspaper seller and asked for the paper politely. The newspaper seller answered rudely but Harris's friend smiled and thanked him, and wished him a good day.

When they left, Sidney Harris asked if the man was always so rude, and his friend confirmed that he was. Harris asked him why he continued to be so polite with this person day after day.

The friend answered as follows: "That's easy, because I don't want him to be the one deciding how I should behave!"

Francesc Subirada, the BSC associate director

Calendar of Events and Training

Nov 26 PATC Course: Parallel Programming Workshop
26 November, 2012, Barcelona

Dec 13 PATC Course: Earth Sciences Simulation Environments
13 December, 2012, Barcelona

Jan 7 Copa-GT Barcelona Meeting & Training
7 January, 2013, Barcelona

Jan 21 Sixth Workshop on Programmability Issues for Heterogeneous Multicores
21 January, 2013, Berlin

Feb 6 PATC Course: Engineering simulation tools: ALYA, FALL3D & PANDORA
6 February, 2013, Barcelona

Mar 14 PATC Course: Simulation Environments for Life Sciences
14 March, 2013, Barcelona

Apr 17 PATC Systems Workshop: Programming Machine
17 April, 2013, Barcelona

May 13 PATC Course: Performance Analysis and Tools
13 May, 2013, Barcelona

May 15 PATC Course: Heterogeneous Programming on GPUs with MPI + OmpSs
15 May, 2013, Barcelona

May 17 PATC Course: Programming ARM based prototypes
17 May, 2013, Barcelona

Jun 3 PATC Course: Introduction to CUDA Programming
3 June, 2013, Barcelona

Jun 5 International Conference in Computational Science
5 June, 2013, Barcelona

Jun 17 ISC 2013
17 June, 2013, Leipzig

Jul 8 PUMPS Summer School
8 July 2013 Barcelona

News

MareNostrum 3

Upgrading MareNostrum

BSC is working to replace the MareNostrum supercomputer with a new version that will multiply its calculation capacity by 10. The replacement works will continue until the beginning of 2013, but a part of this new computer (70% of its total) already ranks 36 in the world and 12 in Europe based on the Top500 Supercomputer World Ranking which was updated on the 12th November coinciding with the SC12.

Mateo Valero, BSC director, was pleased by the results although he stated that *"the aim of MareNostrum 3 is not to occupy a prominent place in the ranking, but to be a useful tool at the service of the Spanish and European scientific community".*

The funding for this project comes from State contributions in 2010 through the current Ministry of Economy and Competitiveness in applying the 3rd additional clause of the Catalan Statute of Autonomy and also includes European ERDF Funds in addition to funds from the current consortium provided by both administrations.

By upgrading the MareNostrum, BSC will be able to offer a better service to its users and honour its commitments with the PRACE Research Infrastructure, which brings together the top supercomputing centres in Europe and leads the development of this area on the continent.
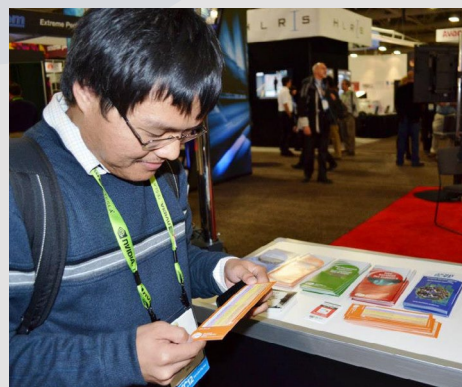
Read Press Release

Active participation of BSC at SC12

An SC12 attendee visiting the BSC booth

BSC was extremely active at SC12, the international supercomputing conference held from 12th – 19th of November 2012 in Salt Lake City (USA). BSC's researchers participated in the technical programme with a tutorial, a submitted paper, 3 workshops, a poster, 5 Birds-of-a-Feather sessions and various project meetings. The BSC was also well represented at the Educators Programme with various activities. Among these, Eduard Ayguadé and Rosa M. Badia introduced HPC topics in a very visual and interactive way to undergraduate students, which raised lots of interest among the attendees.

In the exhibition hall, BSC focused its booth on HPC services for industry, its programming tools and models, Exascale initiatives and the recently updated MareNostrum.

The conference brought good news to our centre. The first day, in the latest Top500 list announcement MareNostrum was ranked 36 in the world; the project Alya Red – one of the pillars of the Severo Ochoa Programme – received two international awards; and the Mont-Blanc project announced that it has selected the Samsung Exynos platform for its first integrated low power HPC prototype.

The photo album is avalaible here

News

ICGC Cancer Genome Projects

First epigenomes of Chronic Lymphocytic Leukemia deciphered

The study, published in Nature Genetics, pools together the results from the complete sequencing of the epigenome and the genome of leukemia patients, and offers a new perspective on cancer research. The researchers, which include **Modesto Orozco**, **Josep Lluís Gelpí** and **Romina Royo**, from the IRB Barcelona/Barcelona Supercomputing Center Joint Programme in Computational Biology, have identified the cells that give rise to the disease as well as new molecular mechanisms at play in its development, thereby improving diagnosis.
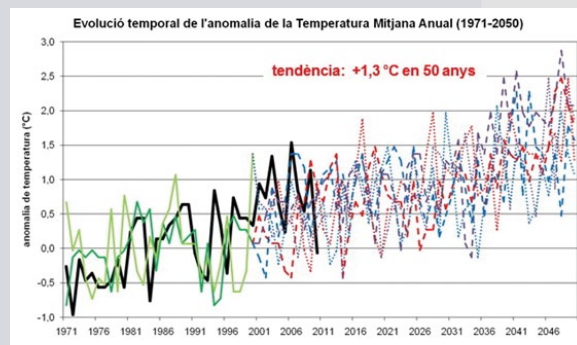
The research is conducted by the Spanish Consortium of Chronic Lymphatic Leukemia (which is part of the International Consortium on Cancer Genome- ICGC) and includes the participation of scientists from the European Consortium BLUEPRINT.   Read article | Read Ministery Press Release

BSC to formulate climate scenarios for Catalonia

The Meteorological Service of Catalonia (SMC) and the BSC have signed a second cooperation agreement to formulate and analyse regional climate scenarios in high resolution for Catalonia in the 21st century. This agreement will address two challenges: the formulation of climate scenarios in high resolution, and a detailed analysis of all climate data defined in these scenarios. In 2011, the BSC and the SMC worked on the ESCAT project, which consisted of the formulation of climate scenarios in high resolution (10 km) via dynamic regionalization. With the new agreement, the aim is to complement the simulation for 2001-2010, completing the period 1971-2050 in the process: the first 30 years are used as a point of reference and control, the next 10 years for probatory purposes, and the last 40 years for climate forecasts.

Graphic illustrating results of ESCAT project

BSC news website | Note from the Generalitat | Results of the ESCAT project

HPC Services for Industry

The video on the industry's services prepared by the BSC's Visualization team was one of the attractions at the SC12 booth. This is a cross-cutting team whose aim is to help presenting the simulations developed at BSC in an attractive way.

This video contains fragments of the different works developed by several departments. They have all been generated from data contained in simulation models.

You can see all BSC videos on Youtube!

Spotlight on...

Scientific visualization: exploring the Computational World

Mariano Vázquez, High Performance Computational Mechanics team leader

Since its inception, the steady progress of Science has decisively relied on the interaction between the careful observation of nature (experiments) and the analysis this observation produces in the mind of the scientists (theory).

But during the last sixty years, Science has progressively included a third stepping-stone right between experiments and theory: computer simulations. Computer simulations result from a wonderful mixture of Mathematics, Physics and Computer Science, developed under a young but very strong scientific discipline: Computational Physics and Engineering.

Thanks to the progressively larger computing power at the hands of the scientists, the "Computational Worlds" that simulations create are becoming closer to reality. But complexity brought new challenges, not only related in the large volume of data produced by simulations running in supercomputers, but also in the way we can extract useful information from them.
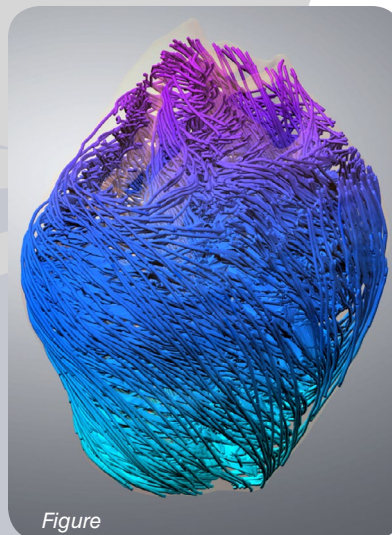
How can we present this information? Can we design new ways of representation that inspire scientists and engineers to improve their theories? This is the goal of scientific visualization (SV).

As the number of scientists using MareNostrum increases, so do their needs for a high level support on SV from BSC. This year, BSC has created a joint visualization group between CASE and Operations departments. This group's composition gives a perfect idea of what they do. Its members are a physicist, two computer scientists and a visual artist. With a strong and constant interaction with scientists from all BSC research departments and RES users, this group develops visualization strategies and tools to help the researchers to improve their "eyes" to explore the Computational Worlds.

Figure

Alya Red: A Computational Heart

International Awards for Alya Red

Alya Red has received one of the **HPC Innovation Excellence Award 2012.** In addition, the video "Alya Red: a Computational Heart" has been chosen as one of the top 10 of the year by the **NSF Visualization Challenge**. **More information here**

A heart made of spaghetti?

Your heart and your biceps are made of very similar muscular tissue. However, while your biceps just bends the arm, your heart is the most perfect pump that millions of years of evolution have created.

How come? Heart muscular fibers have a very particular design to transform their individual longitudinal contraction into a collaborative pumping action.

How could we visually represent this feature and the resulting functionality altogether?

We must see tridimensional information of the static geometry to study the anatomical fiber arrangement and, at the same time, the strains and stresses of the tissue as the electromechanical activation travels through the heart.

The best we found was this sort of thick "streamlines" of the fiber field (Figure). But relax; your heart is not made of spaghetti: this is no more than a representation of reality that help us to understand. This is no more than what scientific visualization does.

Newcomers

We would like to welcome new staff who have joined the centre in the last few months:

JAMES VIPOND
Research Support Engineer
Computer Sciences Dpt.

JEAN ANTOINE KORMANN
Postdoctoral Researcher / CASE Dpt.

JULIÁN DAVID MORILLO
Research Support Engineer
Computer Sciences Dpt.

EULALIA IGLESIAS
Research Project Officer
Management Dpt.

LAIA TRAVESET
Technical Support for Economic Management Project
Management Dpt.

CLAUDIA ROSAS ANDREINA
Postdoctoral Researcher
Computer Sciences Dpt.

ANTONI ARTIGUES
Research Support Engineer
CASE Dpt.

ANNA MANTSOKI
Research Support Engineer
Life Sciences Dpt.

STAMATINA FRAGKOGIANNI
Research Support Engineer
Life Sciences Dpt.

Mª CRISTINA MARINESCU
Postdoctoral Researcher
CASE Dpt.

FLORENTINO SAINZ
Research Support Engineer
Computer Sciences Dpt.

FELLOWSHIPS

OMER SUBASI
Researcher Fellowship
Computer Sciences Dpt.

UGLEJESA MILIC
Researcher Fellowship
Computer Sciences Dpt.

ANTONIO FILGUERAS
Researcher Fellowship
Computer Sciences Dpt.

GABRIEL ALEJANDRO FERNANDEZ
Researcher Fellowship
Computer Sciences Dpt.

CARLA SANTAMARIA
Undergraduate Student
Management Dpt.

XAVIER ORO
Researcher Fellowship
Life Sciences Dpt.

JORGE GARCÍA VIDAL
BSC Senior Researcher, Smarter City Initiative

BSC has created this new position to promote the application of HPC and ITC technologies in the framework of smart cities research and development

Photo competition

The winning image of the photo competition is "Cappuccino time" taken by **Daniele Lezzi**. You can find all selected pictures that will appear in the 2013 BSC calendar on the intranet.
Thank you very much for your collaboration!

New BSC Building

Last June 2012, the first phase of the construction of the new building that is to house all BSC staff was concluded. In spite of the crisis and the cutbacks, it is very satisfying to know that the last BSC Executive Committee meeting approved the continuation of the second phase and has authorized a new tender to contract the following works to complete the structure above ground and to make the building's roofs waterproof.

"la Caixa" – Severo Ochoa International PHD Doctoral Grants Programme

The Spanish Ministry of Economy and Competitiveness and "la Caixa" have signed an agreement for a new programme of "la Caixa" - Severo Ochoa International PHD Grants. The BSC, accredited as a Severo Ochoa centre, will receive 5 grants lasting 4 years each to develop a PhD in the field of Physical Science and Engineering research. For further information click here.

Lab "The energy that moves us" at CosmoCaixa

You can enjoy for free the Lab: "The energy that moves us" and it also includes an entrance to the Museum. The offer is valid until the 16th of December. Read full details here.

New "Ticket Restaurant" system

A new "Ticket Restaurant Card" system has been put in place. The goal of this new system is to make easier the delivery of the quarterly restaurant tickets, make it easier to update the balance and monitor availability using the online web www.ticketrestaurantcard.es. The card can be used at all food establishments affiliated to the Ticket Restaurant Scheme.

Job Vacancies

If you know someone who wants to join the BSC team, he/she can submit a CV for one of our current vacancies or fellowships' calls: www.bsc.es/vacancies. For further information contact rrhh@bsc.es.

Your participation is welcome!

We would like to encourage you to send us comments about the Newsletter and its content. If you have any suggestions for a new section or topic, please contact us on newsletter@bsc.es.