Two BSC researchers, selected for ERC ?Consolidator Grant?

BSC researchers Carlos Pérez García-Pando and Francisco J. Cazorla have been selected to receive two Consolidator Grants from the European Research Council (ERC) for their projects FRAGMENT and SuPerCom, respectively.

In the case of Pérez García-Pando, the goal of his project called FRAGMENT (Frontiers in dust mineralogical composition and its effects upon climate) is to understand and constrain the global mineralogical composition of dust along with its effects upon climate. The representation of the global dust mineralogical composition is hindered by our limited knowledge of the global soil mineral content and our incomplete understanding of the emitted dust sizes in terms of its constituent minerals that results from the fragmentation of soil aggregates during wind erosion. FRAGMENT is an innovative and multidisciplinary project that will combine theory, field measurements, laboratory analyses, remote spectroscopy and modelling to quantify the global mineralogical composition of dust and its effects upon climate. In addition to his research group at BSC, the team includes other world-class experts on modelling (Dr. Ron Miller, NASA GISS), aerosol campaigns and analysis (Dr. Xavier Querol; Dr. Andres Alastuey; Fulvio Amato IDAEA-CSIC), mineralogy analysis (Dr. Konrad Kandler, TUD), and spectroscopy (Dr. Roger Clark, PSI; Dr. Bethany Ehlmann, Caltech; Dr. Robert Green; NASA JPL).

Francisco J. Cazorla project SuPerCom addresses the huge challenge of providing high supercomputing performance covering the highest-ever computation performance needs of critical software with strong guarantees on sustainability for safe operation. This will be tackled for future mixed-criticality embedded systems.
computers comprising high-performance hardware with unprecedented complexity levels. To reach its goals, SuPerCom proposes a radical new approach by combining performance analysis, hardware design, and statistical and machine learning analysis. SuPerCom proposes innovative solutions that push the limits of current approaches for sustainable performance: novel hardware support for performance prediction that captures the sustainable performance requirements emanating from applications, with minimum or no impact on average performance. For hard-to-predict resources, SuPerCom eases performance modelling via novel hardware sensors. The latter are extended with statistical and machine learning analysis to automatically manage the high amounts of information provided by hardware sensors. This is coupled with advanced software techniques that generate adjustable load on resources to obtain hsperf under different usage scenarios.

The ERC Consolidator Grants are awarded to outstanding researchers of any nationality and age, with at least seven and up to twelve years of experience after PhD, and a scientific track record showing great promise. Research must be conducted in a public or private research organisation located in one of the EU Member States or Associated Countries. The funding (maximum of €2 million per grant), is provided for up to five years and mostly covers the employment of researchers and other staff to consolidate the grantees' teams.

**About Carlos Pérez García-Pando and his research project**

Carlos Pérez García-Pando came back to BSC in 2016, after eight years in the NASA Goddard Institute for Space Studies in New York. He then came back to take over the Atmospheric Composition group in the BSC and to manage an AXA chair dealing with mineral dust storms, which was granted to him by the AXA Research Fund.

Pérez García-Pando and his research group at BSC develop and apply complex multi-scale atmospheric chemistry models, which allows both to tackle fundamental scientific issues, and to generate applied air and climate quality prediction tools from local to global scales. Within this field of numerical modelling, Pérez García-Pando is regarded as a reference in mineral aerosols. These aerosols are emitted mainly in arid and semi-arid regions, they are the most abundant globally in terms of mass, they dominate the atmospheric aerosol in extensive regions of the planet, and their important influence in the climatic system encompasses a wide range of spatial and temporal scales. The extreme events of mineral aerosols are popularly known as “dust storms”. These pose serious health and environmental problems, and they also affect the daily live and economic activity of many countries, especially in north Africa and the Middle-East. The objective of the research led by Pérez García-Pando is to gain a greater knowledge of the mechanisms that facilitate mineral dust emission in arid zones, and their transport at a regional and global scale in order to improve the prediction models, as well as to understand its effects on the climate and its socioeconomic impacts.

**About Francisco J.Cazorla**
Francisco J. Cazorla is the leader of the CAOS research group at the BSC (Barcelona Supercomputing Center) and researcher in the Spanish National Research Council CSIC. He obtained his MS degree from the University of Las Palmas de Gran Canaria in 2001 and his PhD degree from the Universtitat Politecnica de Catalunya in 2005. He joined BSC in 2005 and in 2007 he created the CAOS research group, which he leads since then. His research interests are primarily centered around computer systems with emphasis on hardware (processor and memory) designs for real-time and high-performance systems, and timing analysis techniques. He has proven experience of independent research with several PhD theses co-advised and publications in top conference and journals in the areas of high performance systems, embedded computing systems and statistical analysis. Further he has led two EU research projects (with 5 and 11 partners respectively) and private-funded projects (IBM, ORACLE and the European Space Agency).

Barcelona Supercomputing Center - Centro Nacional de Supercomputación