



Instituto Universitario de Investigación
**Biocomputación y Física
de Sistemas Complejos**
Universidad Zaragoza

Sergio Pérez Gaviro

He started his research activity at BIFI in 2004 with his PhD thesis, “Phase transitions and critical behaviour of spin glasses”, under the supervision of Alfonso Tarancón-Lafita and Víctor Martín-Mayor. He completed stays at the EPCC-Institute (University of Edinburgh) and the University of California at Santa Cruz, and then completed three years of postdoctoral work at the University of Rome - La Sapienza with Prof. Giorgio Parisi (Nobel Prize in Physics, 2021). He has collaborated with industry in medical image analysis and is a full professor at the University of Zaragoza, as well as head of the ‘Dedicated Computers’ research line at BIFI since 2013.



Researcher profile

He is an R3 researcher and focuses on the study of spin glasses, complex magnetic systems with disordered behaviour at low temperature that show effects such as rejuvenation and memory. He also participates in the Janus Collaboration, where he has designed the ‘Janus’ and ‘Janus II’ supercomputers, based on FPGA processors to solve specific problems. In addition, he is researching the humanisation of antibodies using algorithms that reduce the need for laboratory testing and has developed an encryption algorithm for message encryption.

Importance of his research

Studies with the ‘Janus’ and ‘Janus II’ supercomputers have revolutionised the understanding of spin glasses and Complex Systems.

The resulting physical-mathematical theory has influenced fields such as molecular biology, neural networks and finance. In addition, the algorithms developed for the humanisation of antibodies have avoided numerous experimental trials, being useful in the elimination of fungal pathogens in vitro and reducing the required dose of drugs.



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