

# BIFI

## Institute for Biocomputation and Physics of Complex Systems

May 2019

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**+100** members

**+50** PhD

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**Research**

**Training & Teaching**

**Innovation & Transfer**

**The Institute**

**Biology & Biochemistry**

**Biophysics**

**Physics**

**Computing**



# Biophysics

Protein folding and molecular design  
Flavoenzymes  
Biomolecular Interactions  
Protein glycosylation and its role in disease  
Protein Misfolding and Amyloid Aggregation  
Clinical Diagnosis and Drug Delivery  
Enzymatic modulation & Reaction mechanisms

[www.bifi.es/biophysics/](http://www.bifi.es/biophysics/)

# Biochemistry & MCB

Mycobacterium tuberculosis  
Antimicrobials and Mechanisms of resistance  
Studies on Microcystin and its Technology  
Genetic regulation and physiology of cyanobacteria  
Genetics and pig metabolism  
Biogenesis and pathology of the OXPHOS system  
Evolutionary biology and comparative genomics of plants  
Stem cells and apoptosis

[www.bifi.es/biochemistry-mcb/](http://www.bifi.es/biochemistry-mcb/)

## Main Goal

Understand and control relevant biological systems for biotechnological, pharmacological and biomedical applications



# Physics

**Main Goal:** Promote interdisciplinary applications of physical methods and models.

Spin Glasses  
Complex Systems and Networks  
Statistical-physics of biomolecules  
Molecular dynamics and electronic structure  
Nonlinear Models  
Modeling of Complex Systems

[www.bifi.es/physics/](http://www.bifi.es/physics/)

# Computing

**Main Goal:** Provide advanced computing resources to researches, scientific communities and SMEs who have specific requirements.

Citizen Science  
High Performance Computing (HPC)  
Grid and Cloud Computing  
Special Purpose Computers  
Data Analysis, Advanced visualization and Software Development

[www.bifi.es/computation](http://www.bifi.es/computation)



# Bioresearch Facilities

## Molecular Interactions

Calorimeter AutoITC200 (MicroCal - Malvern)  
Calorimeter VP-ITC (MicroCal - Malvern)  
Calorimeter VP-DSC (MicroCal - Malvern)  
SPR Biacore T200 (GE Healthcare)  
Auto-PEAQ-DSC (MicroCal – Malvern Panalytical)  
Nanotemper Monolith NT

## Liquid Chromatography

HPLC (Waters)  
FPLC ÄKTA (GE Healthcare)

## Spectroscopy

Spectrophotometer Cary 100 (Agilent)  
Spectrophotometer NanoVue (GE Healthcare)  
Spectrofluorometer Cary Eclipse (Agilent)  
Spectropolarimeter Chirascan (Applied Photophysics)  
Light Scattering NanoStar DynaPro (Wyatt Tech.)  
MicroTime 200 (PicoQuant)

## Anaerobiosis

Anaerobiosis Box

## X-ray diffractions

X-ray Diffractometer (Bruker)

## Microscopy

Fluorescence Microscope DMI 6000B (Leica)

## Crystallography

Crystallization Robot NanoDrop (Innovadyne Tech.)  
Crystallization Farm Rock Imager (Formulatrix)

## Plate Readers - Screening

SPlate Reader FluoDia T70 (PTI)  
Multimode Plate Reader CLARIOstar BMG (LABTECH)  
Multimode Plate Reader Synergy HT (BioTek)  
RT-qPCR Mx3005P (Agilent)



# Computing Facilities

**Cierzo-  
Cesaraugusta 3  
HPC-RES**

*2080 cores- 8GPU  
7,31 TB RAM  
288 TB Storage*

**Colossus  
Open Stack Cloud**

*1800 cores  
20 TB RAM  
500 TB Storage*



**Memento  
Shared memory**

*3072 cores, 12 TB RAM*

**AraGrid  
Open Stack Cloud**

*1000 cores*

**Ibercivis  
Volunteer Computing**

*30000 volunteers*

**Janus I, Janus II  
Special Purpose Computers**

*256+256 FPGAs*



# Research outcomes



2013-2018



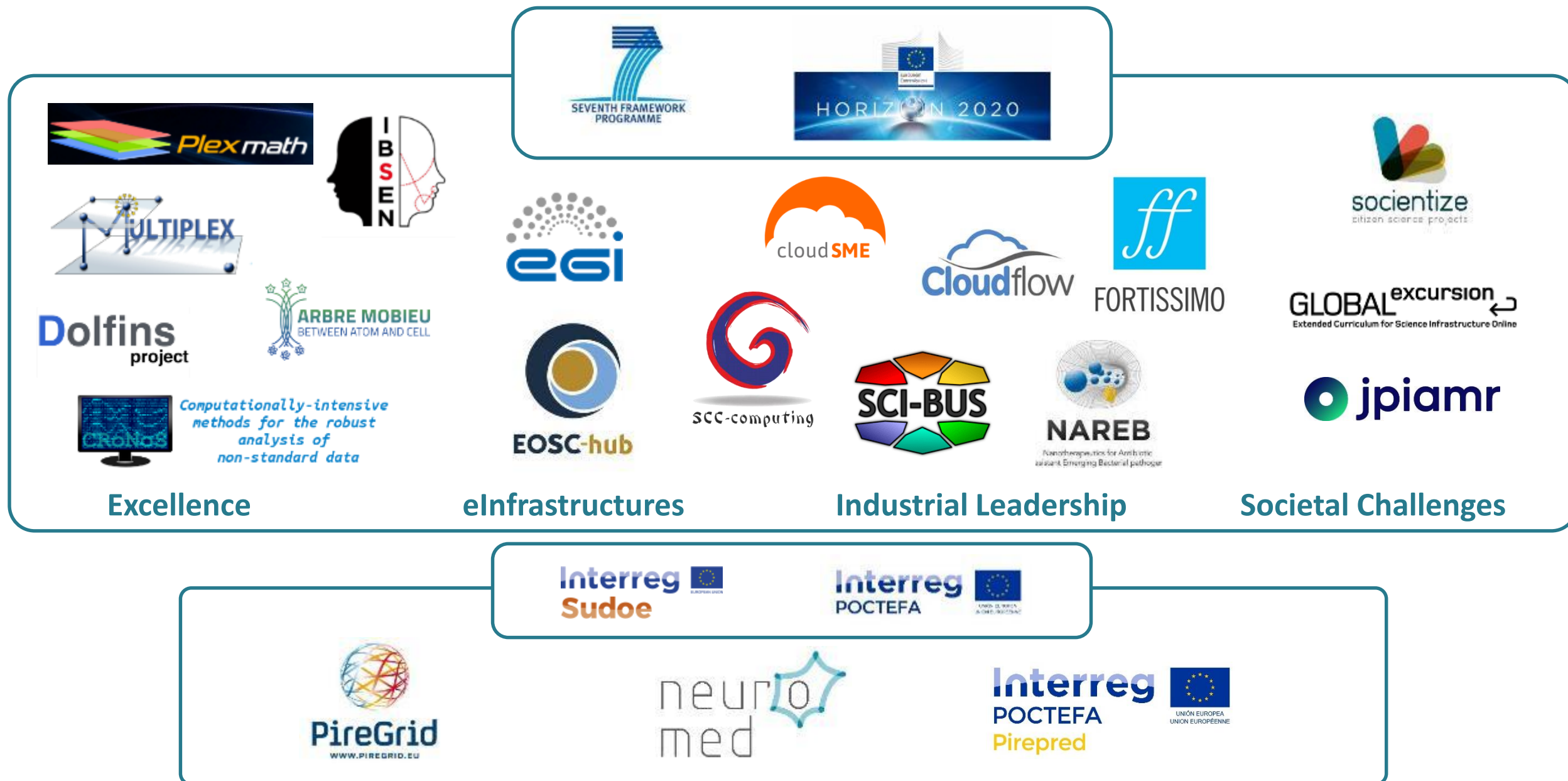
689 publications



48 theses

112 publications IF>6  
+400 publications Q1

# European Projects





# Innovation activities

2013-2018

**15** patents

**43** projects with companies

**1** spin-off

Public Services (BIO & HPC-Cloud)



SPIN - OFF  
Universidad Zaragoza





# Teaching and training





# BIFI & SOCIETY

*Citizen Science*



**Nectunt**  
MORES HOMINUM

SOCIAL DILEMMAS &  
HUMAN BEHAVIOR

**+10** experiments  
**+6.000** volunteers



Fundación

**ibercivis**

**+50** experiments  
**+10.000** volunteers

## Dissemination projects



**+10** projects



**1** White paper on Citizen Science



**3** crowdfunded projects

## Dissemination activities

**+100** student visits

**+2000** students







# Thank you



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