Fundamental research at IFPEN is hinged around the expertise of researchers **based in eight research divisions as well as the Economics and Information Watch and Management Division**. This expertise reflects the major families of disciplinary fields, the **diversity of which is an asset for IFPEN's R&I activities, as well as in terms of nurturing numerous platforms for exchange and collaborative links** with SFRI (French Research and Innovation System) and ERA (European Research Area) research communities. The expertise is channeled into cross-cutting research projects, positioned at various technological readiness levels (TRLs), serving IFPEN's strategic priorities.

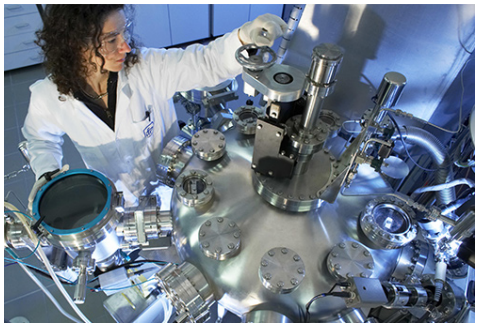
Thanks to the "Scientific Challenges" approach implemented within the context of fundamental research, this expertise benefits from a considerable decompartmentalization effect when it comes to tackling and resolving the scientific questions hampering the development of specific innovations.

Geosciences

- Geology - Sedimentology
- Geochemistry
- Geostatistics - Geological modeling
- Geomechanics
- Petrophysics and transfers in porous media

Chemical sciences

- Catalysis and reaction kinetics
- Organic and mineral synthesis
- Separation and adsorption techniques
- Theoretical chemistry

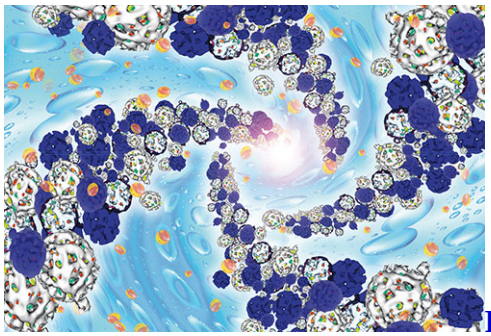


Analysis and characterization

- Chemical analysis
- Structural analysis and imaging
- Mechanical and thermal testing
- Microfluidics
- High-throughput experimentation (HTE)

Physical sciences

- Transfer and transport physics
- Rheology and behavior of materials
- Thermodynamics/Molecular modeling



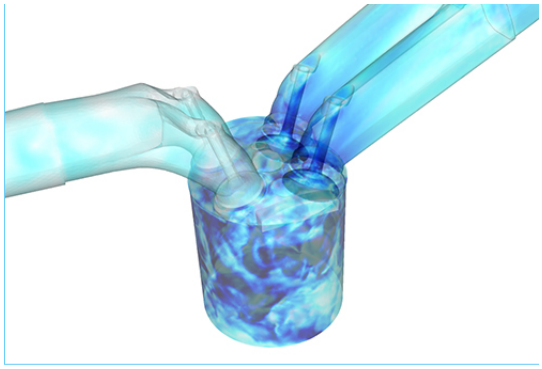
Physical chemistry

- Complex fluids, colloids and condensed matter
- Surface, interface and materials science
- Electrochemistry and corrosion

Biosciences and biotechnologies

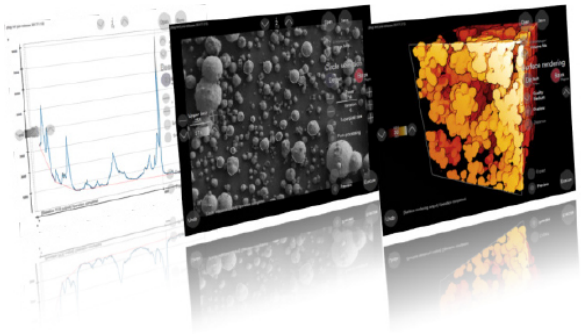
- Microbiology
- Genomics

- Biocatalysis
- Fermentation



Engineering sciences

- Solid mechanics
- Fluid mechanics
- Chemical and process engineering
- Combustion and engine technologies
- Electrical and electronic engineering
- Automation and control systems
- Systems modeling and simulation



Mathematics and IT

- Numerical methods and optimization
- Data science
- Meshing and visualization
- Software design
- Real-time systems
- High performance computing
- Bioinformatics

Economics

- Microeconomics and industrial economy
- Macroeconomics
- Economic modeling
- Forecasting and scenario modeling
- Econometrics
- Environmental impacts evaluation & LCA

Read recent issues of science@ifpen illustrating the mobilization of expertise relating to specific disciplinary fields:

Geosciences: issue 33, 35, 37, 41, 44, 46, 48
Chemical sciences: issue 31, 39, 41, 43, 47, 48
Analysis and characterization: issue 32, 35, 36, 39, 41, 42, 43, 46, 47, 48, 49
Physical sciences: issue 35, 37, 43, 44, 48, 49
Physical Chemistry: issue 31, 37, 39, 46, 47, 48, 49
Biosciences and biotechnologies: issue 35, 38, 40, 41, 43, 46, 47
Engineering sciences:
- Fluids mechanics: issue 34, 36, 39, 40, 41, 43, 48, 49
- Solid mechanics: issue 34, 49
- Chemical and process engineering: issue 31, 36, 40, 41, 48
- Automation and control systems: issue 30, 44, 46
- Electrical and electronical engineering: 32, 44
- Systems modeling and simulation: issue 32, 34, 40, 41, 43, 46, 48, 49
- Combustion and engine technologies: issue 32, 43, 48

Mathematics and IT: issue 30, 32, 33, 34, 35, 38, 40, 41, 43, 44, 45, 46, 48, 49
Economics: issue 29, 43, 44

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Expertise and resources

Link to the web page :