

# Petroleomics Applied to Fuels and BioFuels

## *Pau campus - Master or PhD level*

From July 2, 2018 to July 27, 2018



### Summer school divided in two thematics:

- \* **Theme A:** Mechanics and Physics in Porous Media
- \* **Theme B:** Petroleomic (Thermodynamics and Chemistry in Oil and Biofuels matrices)

**Organisation:** Isabelle Baraille, Brice Bouyssiére, Marielle Peyret

## School thematics A: Mechanics and Physics in Porous Media

**Contact:** David Grégoire - [✉ david.gregoire@univ-pau.fr](mailto:david.gregoire@univ-pau.fr)

This course focuses on the mechanics and physics in porous media. It encompasses experimental characterisation by indirect and direct techniques from the pore scale to the structural scale (mercury and gas porosimetry, X-ray and neutron tomography, SEM) and fundamental courses on poromechanical behaviour, transport properties, fluid-solid coupling and properties of confined fluids in porous media. These highly multidisciplinary courses will be taught by specialist in mechanics, applied mathematics, physics and civil engineering focussing on the same scientific object: the porous medium.

Rock material : Sandstone, limestone, natural coal and zeolite

- \* In-situ studies of reactive flow in context of CO<sub>2</sub> sequestration and industrial waste storages
- \* Synthesis of monodisperse and hierarchical polydisperse micro/meso porous media and experimental investigations on adsorption-induced swelling
- \* Pore pressure and confinement state estimation and upscaling for adsorption-induced swelling estimation and validation
- \* Nano-porous materials at the atomistic scale – size effect in elasticity and fracture properties
- \* Lattice modelling and upscaling strategies for elasticity, fracture and creep
- \* Hydrogen storage in innovative hybrid materials

- \* Use of seashells for environmental-friendly concretes and high-performance cement-based grouts
- \* Numerical simulation of haloclasty and experimental validation for coastal erosion estimation
- \* Experimental characterization and constitutive modelling of unsaturated soils
- \* Measuring fracture properties with scratch tests on rocks

## School thematic B: Petroleomic (Thermodynamics and Chemistry in Oil and Biofuels matrices)

**Contact:** Brice Bouyssiere -  [brice.bouyssiere@univ-pau.fr](mailto:brice.bouyssiere@univ-pau.fr)

Acquisition of general concepts to the study of oil and biofuels complex matrices. The formation is intended to be transversal between Physic (Thermodynamics), Analytical Chemistry (Speciation and Petroleomics) and Chemical-Physics/Theoretical Chemistry (Molecular Modeling).

- \* Porphyrins and Asphaltene
- \* Paraffin and Asphaltene
- \* Metallic Mercury and Asphaltene