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I have been a CNRS researcher since 2001 and I obtained my habilitation in physics at the University of Paris Sud in 2007. My field of expertise is flow in porous media. In the past years, I have developed different techniques enabling the visualization and the study of different flow processes. I also have a strong expertise in fracture mechanics. Currently, my key points of interest are flow of bacteria. I headed an International Franco-Argentinian Lab in Fluid Mechanics from 2012-2017 and was head of the porous media team of the FAST laboratory. I have taken the head of the laboratory since January 2020.

CURRENT POSITION **Senior Researcher** at CNRS, France Oct. 2012 – present

EDUCATION/  
ACADEMIC  
EXPERIENCE **Centre National Recherche Scientifique**, France  
**Researcher**, in Fluid Mechanics at Fluides, Automatique et Systèmes Thermiques (Orsay) Oct. 2001 – Oct. 2011

**Commissariat à l’Energie Atomique**, France (Atomic Research Center)  
**Postdoctoral Associate**, in Chemical Engineering at Service de Physique et Chimie des Surfaces et Interfaces Sept. 1999 – Sept. 2001

**Rennes University**, France  
**Ph.D.**, Physics at Groupe Matière Condensé et Matériaux Sept. 1995 – Sept. 1999

**Villetaneuse University**, France  
**Researcher in the Army**, Physics Sept. 1997 – Sept. 1998

AWARDS **Since 2018 Massachusetts Institute of Technology**, Boston, USA, research affiliate at the Ruben Juanes Group

**2015 American Physical Society**, Featured in Physics and Editors’ Suggestion of the publication: “Turning Bacteria Suspensions into Superfluids”.

**2010 - 2015 CNRS** Recipient of Ph.D. and Research Supervising Bonus.

RESEARCH  
HIGHLIGHTS **Flow of complex fluids in porous media:**

- Built experimental techniques to visualize flow in porous and fractured media
- Applied the technique to the characterization of flow of polymers, fibers, active fluids and reactive flows.

**Fracture mechanics:**

- Developed experimental method to create material of controlled micro structure
- Study of the influence of the microstructure on fracture surface roughness

PUBLICATIONS 57 Papers in International Review / H-index 20

CONFERENCES ≈ 5 presentations in international conferences per year / 7 invitations in international conferences

LAST 5  
PUBLICATIONS **Using Microfluidic Set-Up to Determine the Adsorption Rate of *Sporosarcina pasteurii* Bacteria on Sandstone**

Marzin T. and Desvages B. and Creppy A. and Lépine L. and Esnault-Filet A. and Auradou H., *Transport in Porous Media* 132, 283–297 (2020); *doi:10.1007/s11242-020-01391-3*

**A combined rheometry and imaging study of viscosity reduction in bacterial suspensions**  
V.A. Martinez, E. Clément, J. Arlta, C. Douarche, A. Dawson, J. Schwarz-Lineka, A.K. Creppy, V. Skultéty, A.N. Morozova, H. Auradou, and W.C.K. Poon, *Proceedings of the National Academy of Sciences* 117(5) (2020); *doi:10.1073/pnas.1912690117*

**Swimming bacteria in Poiseuille flow: The quest for active Bretherton-Jeffery trajectories**  
G. Junot, N. Figueroa-Morales, T. Darnige, A. Lindner, R. Soto, H. Auradou and E. Clément *EPL*

126, 44003 (2019); doi: 10.1209/0295-5075/126/44003

**Effect of motility on the transport of bacteria populations through a porous medium**

A. Creppy, E. Clément, C. Douarche, V. D'Angelo H. Auradou *Phys. Rev. Fluids* (2019); doi:10.1103/PhysRevF

**3D flow structures in X-junctions: effect of the Reynolds number and crossing angle**

P.G. Correa, J.R. Mac Intyre, J.M. Gomba, M. Cachile, J-P. Hulin and H. Auradou, *Phys. Fluids* **31** (2019); doi: 10.1063/1.5087641

SYNERGISTIC  
ACTIVITIES

**Organization of scientific events**

- Member of the organizing committee of summer schools (Cargse France 2005 - 2010 & 2015) and colloquium on transport in porous medium (Paris Sud 2009)
- Participation in national research activities on various aspects of flow in fracture and fracture mechanic: *CO<sub>2</sub>* sequestration, hydrology

**International collaborations**

- Schlumberger Cambridge: *particles transport in fracture*
- Facultad de Ingenieria, Buenos Aires, Argentina: *flow of active fluid, polymer flow, fluid-structure interaction*
- Pr. Ruben Juanes, Massachusetts Institute of Technology, USA: *flow of active fluid in porous media*
- Pr. Marco Dentz, Institute of Environmental Assessment and Water Research, Barcelona, Spain: *Modeling of bacteria in porous media*

**Activities for research**

- Member of the CNES (French spatial agency) scientific council
- Participation of recruitment boards
- Member of habilitation examining boards
- Member of examining boards of doctoral thesis (in France and abroad)
- Rapport of PhD manuscripts
- Referee for international reviews: *Nature, Physical Review Letters, Water Resource Research...*
- Referee for funding agencies: *ANR (National Research Agency), NWO (New Holland Research Agency)*

TEACHING  
EXPERIENCE

**University Paris South, Orsay, France**

- Manager of the teaching module "Transport and transfert of pollutants" (25 hours) 2006-2014
- Teacher for transport of contaminants (15 hours/year) 2012-2019
- Teacher for transport in porous media (10 hours/year) 2012-2020

RESEARCH MENTOR

- 13 PhD students, 4 PostDoc and 1 Engineer

PROFESSIONAL &  
LEADERSHIP  
EXPERIENCE

- Head of the FAST laboratory 2020 –
- Head of the International Franco-Argentinian Lab. in Physic and Fluid Mechanics 2012 – 2017
- Deputy head of the International Franco-Argentinian Lab. in Physic and Fluid Mechanics 2008 – 2012
- Head of the team Flow in Porous and Fractured Media 2008 – 2019

VALORISATION &  
CONTRACTUAL  
ACTIVITY

- "dispositif de mesure de la viscosité d'un fluide en particulier pour les fluides actifs", *patent application* 2020
- ACTIFS
- Separation of bacteria by a flow, *CNRS pathfinder projects* 2015
- Measurements of the rheology of active fluids, *Bpifrance - National bank for investisment* 2014
- Device and method for measuring the viscosity of a fluid, H. Auradou, JP. Hulin and B. Semin, *United States Patent 8,844,339* 2014