Curriculum Vitæ

Yves MÉHEUST, Maître de Conférence Hors Classe (Distinguished Associate Professor) Univ. Rennes 1 (Géosciences Dpt.) since 2006; **Senior Member of the IUF (2024-2029)**; 53 years old, married with three children (17, 14 and 11 years old), yves.meheust@univ-rennes1.fr; French national.
ORCID: https://orcid.org/0000-0003-1284-3251 scholar: https://scholar.google.fr/citations?user=f-wx-WwAAAAJ&hl
Professional web sites: at Univ. Rennes, at IUF.

SCIENTIFIC FIELDS: Environmental Fluid Mechanics, Hydrogeology, Rock Physics, Soft Matter Physics (2002-2010).

RESEACH TOPICS: Heat transport by flow in subsurface permeable media (2019-); Convective dissolution of supercritical CO_2 in subsurface brine (2017-); coupling between flow, transport and biological activity in porous media (2015-); link between electrical transport and solute transport in subsurface media (2014-); flow of non-Newtonian fluids (foams, emulsions, biopolymer solutions) in porous media (2011-); solute transport and mixing in 2D and 3D porous media (2011-); free surface flows of thixotropic clayey muds (2008-); solute transport in fractured media (2006-); physical properties of smectite clay minerals (2002-); two-phase flows in 2D porous media and fractures (2000-); single phase flow in fractured media (1998-2001 and 2009-2011); clay-based complex fluids (2002-2010).

APPROACH AND TECHNICAL EXPERTISE:
My work is **mostly based on laboratory experiments**, with complementing numerical simulations and/or theoretical models. Some studies are purely theoretical/numerical. My technical competences include flow and transport experiments in milli- and micro-fluidic setups, X-ray diffraction and small-angle X-ray scattering, rheometry measurements of complex fluids, image treatment to characterize liquid phases and measure concentration fields, velocity fields, and local reaction rates, as well as numerical modeling of (mono- or bi-phasic) Newtonian or shear-thinning flows by custom-written finite differences codes or using finite element or finite volume numerical frameworks (Freefem++, Comsol, Openfoam).
One of the specificities of my approach is that **I work at the hydrodynamic scale** (i.e., at the pore / fracture scale) where physical and bio-chemical processes take place, and **aim at upscaling the description of these processes to the continuum scale**. I have also done a significant amount of work investigating scales at which the hydrodynamic description is not valid (nanoscales), in particular in studies involving clay minerals.

EDUCATION: **Habilitation à Diriger des Recherches (2016, Université Rennes 1) in Earth Sciences**; PhD (2002, Laboratoire de Géologie, ENS Paris) in Hydrogeology; MSc in Statistical Physics and Nonlinear Phenomena (1998, ENS-Lyon), BSc in Fundamental Physics (1994-1997, ENS-Lyon).

TEACHING:
In charge of subprogram "Modelling of Hydrological Transfers" of MSc program "Sciences de l'Eau (SdE)" (i.e., Water Sciences) of Univ. Rennes 1 (2017-2022), and of subprogram Terre et Environnement (Earth and Environment) of the M.Sc. program Systèmes Complexes Naturels et Industriels (SCNI) at Univ. Rennes 1 (2008-2012). See the web site.
Current lecture, all at M.Sc. level: *Hydrogeological Modelling and Transport*, *Two-phase Flow in Porous Media*; *Fundamentals of Solute Transport in Subsurface Media*.
Past lectures (2006-2023): (i) at M.Sc. level: *Continuum Mechanics*, *Fluid Mechanics*, *Hydrogeology, Environmental Risks*, *Hydrological Risks, Flows in Fractured Media*, *Two-phase Flows in Porous Media*, *Surface Hydrology Field Trip*; and (ii) at B. Sc. level: *Hydrological Measurements.*

PROJECTS FUNDED (LAST 5 YEARS):
CEFIPRA (France-India) "Reactive mixing in porous media" (2025-2028, 200 k€, 96 k€ on French side, PI on French side).
IUF "StoCO2" (2024-2029, 75 k€, PI).
ANRs (France) "CO2-3D" (2017-2021, 268 k€, co-PI), "IMAGE" (2022-2026, 712 k€ with 160 k€ for my group, PI of WP3), and ANR/DFG (France/Germany) "2PhlowFrac" (2021-2025, 240 k€ on French side, PI on the French side).
Marie Skłodowska-Curie (EU) projects "GeoElectricMixing" (2017-2019, 176 k€, Supervisor), "UnsatPoreMix" (2019-2021, 197 k€, Supervisor), "expeCO2SolTrap" (2022-2024, 187 k€, Supervisor), and "HeatSIM" (2025-2027, 189 k€, Co-supervisor).
Bienvenüe (EU/Région Bretagne) "COsmerysh" (2022-2024, 198 k€, PI).
Région Bretagne (France) "CO2seq3D" (2018-2019, 68 k€, PI).
ERCs Consolidator (EU) "Reactive Fronts" (2016-2021, 2 M€, participant, responsible for lab experiments) and Starting "Concreter" (2022-2027, 1.5 M€, participant, new thermometry method based on colloid fluorescence).

SUPERVISION OF RESEARCH: **Co-supervized or co-supervizing 12 postdoctoral projects and 12 PhD students.**

MANAGEMENT OF RESEARCH AND INFRASTRUCTURES:
Jan 2022-Dec. 2024: **In charge of team TERA** (Fluids, Transport, Reactivity): 11 permanent researchers and professors, 3 engineers, 15 PhD students and postdocs: ~ 15 k€ per year of recurrent budget (projects not included).
Dec 2019-Dec2021: **In charge of team DIMENV** (Dynamics, Imaging and Modeling of Environmental systems): 20 permanent researchers and professors, 8 engineers and 37 PhD students and postdocs: $\sim$ 80 k€ per year of recurrent budget (projects not included).
2018-2021-: I**n charge of the Hydrology group within team DIMENV**: 9 permanent researchers and professors, 5 engineers and 23 PhD students and postdocs: $\sim$ 45 k€ per year of recurrent budget.
2008 - 2012 and 2018- : **Scientific responsability of the *Laboratory for Analog Modeling* of Géosciences Rennes**, for activities involving Fluid Mechanics.
2015-2021: In charge of action "Transport by Flows"of the Contrat-Plan-État-Région (CPER) "Buffon": writing of the initial

proposal and of the subsequent calls for bids; coordination of the choice of equipments with all lab users, coordination of their buying and installation. Budget: ∼450 k€ over 7 years.

PARTICIPATION IN PHD THESIS COMMITTEES AND SELECTION COMMITTEES (LAST 6 YEARS):
Reviewer for PhD theses of Bewi Komesse (Univ. Bordeaux, 2026), Konstanse Kvalem Seljelid (NTNU Trondheim, Norway, 2026), Joachim Brodin (Univ. Oslo, Norway, 2025), Christian Obina Oko (Univ. Pau, 2025), Clarice de Amorim (Univ. PUC Rio de Janeiro, Brazil, 2024), Qinglin Deng (Univ. Strasbourg, France, 2022), Sina Momeni (Sorbonne Université, Paris, France, 2022), MacLean Eneotu (Univ. Strathclyde, United-Kingdom, 2021), Romain Aranda (Univ. Bordeaux, France, 2020), Valentin Jules (IPGP Paris, France, 2020), Sofia Bouarafa (INSA Lyon , Lyon, France, 2019), Alexis Mauray (Laboratoire de Rhéologie, Grenoble, France, 2018), and Sandy Morais (ICMCB, Bordeaux, France, 2016). Examiner for Edouard Canot's Habilitation à Diriger des Recherches (Physics Institute of Rennes, Rennes, France, 2019), and for the PhD theses of Radjiv Bewi (Univ. Bordeaux, France, 2026), Adil Baigadilovand (Univ. Grenoble-Alpes and BRGM, 2024), and Xiaocong Luy's (Univ. Delft, Netherlands, 2021) .
Member of selection committees for the recruitment of an Associate Professor (MdC) in reactive transport in porous media at ISTO (Orléans, France, 2017), as well as in fluid mechanics at Bordeaux INP ENSMAC (Bordeaux, France, 2024).

EDITORIAL AND REVIEW ACTIVITIES:
M**ember of the Interpore Publication Committee** (2017-2021)**; Associate Editor for *Vadose Zone J.* (2011-2016) and *ARC Geophys. Res.* (2024-); Editorial Board of *Interpore journal* (2023-)**; referee for various Earth Sciences, Soil Sciences, Physics, Physical Chemistry, and Engineering journals (2003-); referee for 26 research proposals since 2010 (including 7 for the French ANR, 1 for the English EPSRC, 2 for the German DFG, 2 for the Fonds de Recherche Nature et Technologie du Québec, 2 for the Chilian CONICYT, 3 for the PRF of the American Chemical Society, 1 for the Canadian MITACS, 1 for the Swiss SNSF).

ORGANIZATION OF SCIENTIFIC MEETINGS/SESSIONS (LAST 8 YEARS):
Convener of sessions at Interpore (2 sessions in 2017, 1 in 2018, 1 in 2020, 2 in 2021, 1 in 2022, 1 in 2023, 1 in 2024, 1 in 2025, 2 in 2026), AGU (1 in 2016, 1 in 2017, 1 in 2023, 1 in 2025), EGU (1 in 2017, 1 in 2018, 1 in 2021, 1 in 2022, 1 in 2023, 1 in 2024, 1 in 2025), CMWR (2 in 2018, 1 in 2020, 1 in 2022, 1 in 2025)**; member of the Organization Committee for CMWR 2018** (Saint-Malo, France), as well as for the 4th (2018) Cargèse Summer School on Flow and Transport in Porous and Fractured Media (Cargèse, Corsica, France); **member of the Program Committee for Interpore2027 and Interpore2028**.

SCIENTIFIC COMMUNICATION:
34 invited talks (+2 planned for 2026) at international Conferences and Workshops since 2004, 252 contributed talks to international conferences, 91 of which presented by me.
30 invited seminars given outside of my home institution since 2002, including 17 abroad.

CITATION RECORD: 83 articles published, 4 manuscripts under review or revision.
Scopus / *Google Scholar* on May 3rd 2026: 3351 */ 4397* citations, 37.6 */ 49.4* citations per article, h-index 33 */ 36*.

INVITATIONS AND AWARDS (LAST 10 YEARS):
Nominated to Senior Member of the Academic Institute of France (2024-2029); <1% of all French academics have been selected in the last 33 years.
Member of the AGU's Unsaturated Zone Technical Committee (2023-).
Invited Professor at Univ. Bologna, Italy (2022, 1 month); Invited Researcher at NTNU Trondheim, Norway (2019 and 2020, one month per year), University of Lausanne (UNIL) (2014, 3 weeks), and the Center of Advanced Studies of the Norwegian Academy of Science (May 2012, 1 month).
Award for Student Supervision and Research (Prime d'Encadrement Doctoral et de Recherche, 2017-2029) and Award for Excellence in Research (Prime d'Excellence, 2013-2016), both awarded to the best 15% of applicants nationally.

8 KEY PUBLICATIONS (LAST 10 YEARS):
PhD students and postdocs (co-)supervized by me are indicated by * and †, respectively.

- B. Géraud†, S. A. Jones†, I. Cantat, B. Dollet and **Y. Méheust** (2016), The flow of a foam in a two-dimensional porous medium, *Water Resour. Res.* **52**, 773-790.
- J. Jimenez-Martinez†, T. Le Borgne, H. Tabuteau, & **Y. Méheust** (2017), Impact of saturation on dispersion and mixing in porous media: Photobleaching pulse injection experiments and shear-enhanced mixing model, *Water Resources Research* **53**(2), 1457-1472.
- R. Turuban*, D. R. Lester, H. Heyman†, T. Le Borgne & **Y. Méheust** (2019), Chaotic Mixing in Crystalline Granular Media, *J. Fluid Mech.* **871**, 562-594.
- J. Heyman†, D. R. Lester, R. Turuban*, **Y. Méheust**, & T. Le Borgne (2020), Stretching and folding sustain microscale chemical gradients in porous media., *Proc. Nat. Acad. Sci.* **117** (24), 13359-13365.
- J. Dhar†, P. Meunier, F. Nadal, & **Y. Méheust** (2022), Convective dissolution of carbon dioxide in two- and three-dimensional porous media: The impact of hydrodynamic dispersion, *Phys. Fluids* **34**, 064114.
- A. Lenci*, M. Putti, V. Di Federico & **Y. Méheust** (2022), A lubrication-based solver for shear-thinning flow in rough fractures, *Water Resour. Res.* **58**, e2021WR031760.
- O. Borgman†, R. Turuban*, B. Géraud†, T. Le Borgne & **Y. Méheust** (2023), Solute front shear and coalescence control concentration gradient dynamics in porous micromodel, *Geophys. Res. Lett.* **50**(5), e2022GL101407.
- R. Krishna, **Y. Méheust** & I. Neuweiler (2025), A Two-dimensional Depth-integrated Model for Immiscible Two-phase Flow in Open Rough Fractures, *J. Fluid Mech* **1011**, A43.

May 3rd, 2026.