

Simon Gravelle

Physicist in soft matter
and fluids at interfaces

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simongravelle.github.io

Current positions

2024-today

CNRS Researcher

Univ. Grenoble Alpes, CNRS, LIPhy, Grenoble, France

Nanoconfined fluids, soft matter, and molecular simulations

Team : Statistical Physics and Modeling (PSM)

- Starting Sep. 2025 : Scientific Secretary of Section 08 of the National Committee,
- Starting Feb. 2025 : co-investigator of the ANR MIAM-CO2 (Elise Lorenceau),
- Starting Feb. 2025 : lead PI of the ANR project MicroSep,
- Since Jan. 2024 : in charge of organizing LIPhy's internal seminars,
- Since Apr. 2024 : co-supervision of Pablo Grisanti, PhD candidate.

Past research experiences

2023-2025

MSCA Fellow

Univ. Grenoble Alpes, CNRS, LIPhy, Grenoble, France

Hybrid nanoporous materials for fluid mixture separation

Group leader : CNRS DR Benoit Coasne

2021-2023

Postdoctoral Researcher

Institute for Computational Physics, Universität Stuttgart, **Stuttgart, Allemagne**

NMR properties of water at interfaces

Group leaders : Pr. Christian Holm and Assistant Pr. Alexander Schlaich

2019-2021

Postdoctoral Researcher

Queen Mary University of London, **Londres, Royaume-Uni**

Graphene nanoparticle suspensions under shear

Group leader : Pr. Lorenzo Botto

2016-2019

Postdoctoral Researcher (FONDECYT)

Universidad Adolfo Ibáñez, **Viña del Mar, Chili**

Bio-inspired water capture systems by desert plants

Group leaders : Pr. Jacques Dumais

2012-2015

Doctorant

Institut Lumière Matière, Université Claude Bernard Lyon 1, **Lyon, France**

Fluidic transport in bio-inspired and synthetic nano-channels

Supervisors : Pr. Lydéric Bocquet, CNRS DR Christophe Ybert and Pr. Laurent Joly

Publication list

Scholar

My **full publication list** is available from Google Scholar and ORCID.

Grants

2025-2029

ANR MicroSep (JCJC)

Laboratoire Interdisciplinaire de Physique, Université Grenoble Alpes, Grenoble, France
Polymères microporeux pour la séparation de mixtures fluides : connecter les échelles moléculaire et macroscopiques

2025-2029

ANR Miam-CO₂ (Project lead by Elise Lorenceau)

Laboratoire Interdisciplinaire de Physique, Université Grenoble Alpes, Grenoble, France
Microalgae-foam reactors for CO₂ capture and conversion

2023-2025

Marie Skłodowska-Curie Actions fellowship (MSCA)

Laboratoire Interdisciplinaire de Physique, Université Grenoble Alpes, Grenoble, France
Hybrid nanoporous materials for the separation of fluid mixtures

2017-2019

Postdoctoral fellowship (FONDECYT-CONICYT)

Universidad Adolfo Ibáñez, Viña del Mar, Chili

A biomimetic membrane with highly asymmetric water transport properties

Outreach projects

[1] **MAICoS**

Co-developer of software allowing the analysis of the structure of confined and interfacial fluid systems from molecular simulations

<https://maicos-analysis.org>

[2] **NMRforMD**

Developer of a code allowing the analysis of relaxation T_1 and T_2 from molecular simulations

<https://nmrformd.readthedocs.io>

[3] **Github account**

FAIR¹ sharing of scripts and simulation data

Systematic sharing of research data maximizes the visibility of my work and ensures the re-productivity of results

<https://github.com/simongravelle>

[4] **LAMMPS tutorials**

Molecular simulation tutorials

The development of this site, which gathers about 2000 visitors per month, has increased my visibility and has even led to the launch of several collaborations

<https://lammpstutorials.github.io>

Expertise

Simulation moléculaire	Molecular dynamics Monte Carlo approach Free energy method (<i>Umbrella sampling</i>)
Other	Finite element method NMR relaxation time measurements
Experimental	Fluorescence correlation spectroscopy (FCS) Membrane characterization
Code	Python, Octave - data analysis and software development html/css/rST - online content sharing Git - collaborative work

Interests

Fields	Nanofluidics, Soft matter, Fluid at interfaces, Biomimetics, Statistical physics
Phenomena	Fluid transport, Adsorption, Collective effects, Input effects, Nuclear magnetic relaxation
Others	Outreach, Open science, Tutoring, Video production

1. FAIR : *Findability, Accessibility, Interoperability, Reusability*

Presentations

- 03/2025 **The first Tamtam meeting**, Aussois, France
Upscaling : Connecting molecular simulations to the real world
- 11/2024 **Invited seminar**, PHENIX, Paris, France
Probing NMR relaxation in nanoconfined fluids using intermittent molecular dynamics
- 02/2024 **Modeling workshop in Cermav**, Grenoble, France
Modelling fluid transport in porous materials : connecting nanoscale and macroscale
- 10/2023 **French/German Adsorption Conference**, Strasbourg, France
Separation of water and ethanol mixtures by nanoporous organosilica ; a molecular dynamics study
- 10/2023 **Invited seminar**, Kyung Hee University, Korea
Using simulations to design nanoporous materials for the separation of fluids
- 09/2023 **Thematic School in Soft Nanosciences**, Grenoble, France
Using molecular simulations to design nanoporous materials for the separation or fluids
- 06/2022 **International Society for Porous Media (InterPore)**, online
Water confined in salt crusts : insights from molecular simulations
- 10/2021 **Invited seminar**, LOMA, Bordeaux, France
Unidirectional water valve in Tillandsia plant
- 03/2021 **March meeting of the American Physical Society**, online
Adsorption of graphene-oxide nanoparticles at a water-vapour Interface : a molecular dynamics investigation
- 01/2021 **Physics at Veldhoven**, online
Fluid dynamics of a nanographene
- 11/2020 **Division of Fluid Dynamics of the American Physical Society**, online
Deviations from Jeffery's theory in the dynamics of atomically-thin sheet-like molecules in shear flow
- 01/2020 **Physics at Veldhoven**, Physics at Veldhoven, Eindhoven, Pays-Bas
Hydrodynamics of graphene suspensions : liquid exfoliation of multilayer graphene (poster)
- 11/2019 **Division of Fluid Dynamics of the American Physical Society**, Seattle, Washington, États-Unis
Liquid phase exfoliation of graphene : a molecular dynamics investigation
- 10/2018 **GdR Liquides aux interfaces**, Bordeaux, France
Design of a unidirectional water valve in Tillandsia
- 05/2018 **Séminaire invité**, LIPhy, Grenoble, France
Nanofluidics : a theoretical and numerical investigation of fluid transport in nanochannels

Presentations (following)

- 04/2016 **Séminaire invité**, Universidad Adolfo Ibáñez, Viña del Mar, Chili
Optimizing water permeability through the hourglass shape of aquaporins : From hydrodynamics to single-file transport
- 11/2015 **Soutenance de thèse**, Lyon, France
Nanofluidics : a theoretical and numerical investigation of fluid transport in nanochannels
- 12/2014 **Computer Simulation of Combined Fluids**, Londres, Royaume-Uni
Optimizing water permeability through the hourglass shape of aquaporins : From hydrodynamics to single-file transport
- 10/2014 **GdR Liquides aux interfaces**, Bordeaux, France
Pink noise of ionic current, theory and modelisation
- 07/2014 **Séminaire invité**, ICE group, Londres, Royaume-Uni
Optimizing water permeability through the hourglass shape of aquaporins
- 11/2013 **Division of Fluid Dynamics of the American Physical Society**, Pittsburgh, Pennsylvanie, États-Unis
Does the hourglass shape of aquaporins optimize water permeability ?
- 10/2013 **GdR Liquides aux interfaces**, Lyon, France
Optimizing water permeability through the hourglass shape of aquaporins

■ Education

2012-15	PhD in Physics Université Claude Bernard Lyon 1, Lyon, France
2010-12	Master of Science in Fundamental Physics École Normale Supérieure (ENS) de Lyon, Lyon, France
2007-10	Bachelor of Physics Université de Franche Comté, Besançon, France
2007	Scientific Baccalaureate Lycée Édouard Belin, Vesoul, France

■ Teaching

Starting 2025	Institut universitaire de technologie (IUT) de Grenoble, Grenoble , France Practical work in materials science for 1st year students
2021-23	University of Stuttgart, Stuttgart, Allemagne Design and supervision of practical assignments for Master's students 128 h in total, 2 students per group
2013-15	Institut universitaire de technologie (IUT) de Lyon, Lyon, France Materials science course for 1st year students 19 h in total, approximately 30 students per class
2012-15	Institut universitaire de technologie (IUT) de Lyon, Lyon , France Practical work in materials science for 1st year students 185 h in total, approximately 20 students per class
2011-13	Lycée La Martinière Monplaisir, Lyon, France Preparation and supervision of exams for first year students in "classes préparatoires aux grandes écoles" 2 hours per week, 3 students per session