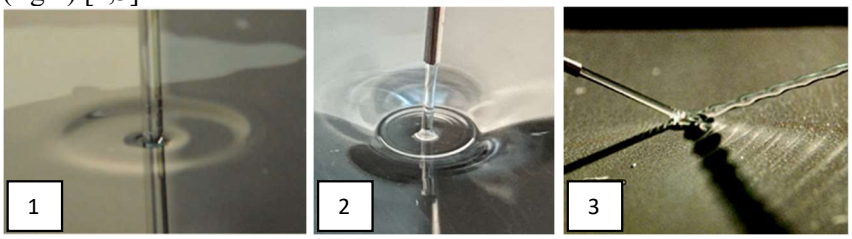
**Postdoctoral Researcher Position in Physics of Fluids at IEMN (Université de Lille):**

# Regime transition for liquid jets impinging a horizontal surface.

**Anticipated start:** first semester 2023
**Duration**: 18-24 months (depending candidate experience)

When a liquid jet impacts a horizontal surface, different regimes can be observed depending on the flow rate and wetting properties of the surface:
- At low-speed, a liquid puddle of uniform thickness forms over the surface (fig 1).
- At high-speed for inclined jets on a superhydrophobic substrate, a rebound may be observed (fig 3) [1].
- Finally at high-speed, jets with a low inclination and/or on a substrate rather hydrophilic, hydraulic jump can be observed (fig 2) [2,3].




While these regimes are identified in the literature, little is known on the transitions between the different regimes presented here. As an example, the transition between a bouncing jet and a hydraulic jump on a superhydrophobic has attracted little attention of the scientific community despite its potential applications such as a cooling mechanism.

In this postdoc, we propose to explore experimentally these transitions. The ultimate aim is to puzzle out a complete phase diagram of the different regimes and unveil the physical mechanism behind the transitions.

## Activities

The candidate will:

- Conceive and build up simple experimental setups. Acquire and analyze data
- Develop basic theoretical models
- Participate in the dissemination activities: publications in scientific journals, conferences, general public communication, etc.

The candidate can:

- Participate in the supervision of students
- Produce samples with controlled wettability in clean room facilities

## Skills/profile

The candidate (F/M) must have a strong background in physics of Fluids/ Soft Matter and a pronounced taste for tabletop experiments. In addition, experience in clean room microfabrication techniques will be considered as a plus.

## Working environment

The work will be carried out in the CNRS laboratory 'Institut d'électronique de microélectronique et de nanotechnologie' (IEMN) at Université de Lille, France.
The work will be supervised by Alexis Duchesne (PI) (alexis.duchesne@univ-lille.fr) and by Farzam Zoueshtiagh.

The project is funded by the ANR IJET, in partnership with INPHYNY at Université Côte d'Azur (Nice) and exchange are planned.

Candidates are invited to send their applications through the CNRS platform https://emploi.cnrs.fr/Offres/CDD/UMR8520-ALEDUC-001/Default.aspx

References

[1] F. Celestini, R Kofman, Xavier Noblin, and Mathieu Pellegrin. Soft Matter, 6(23): 5872–5876, 2010.
[2] E. J. Watson. J. Fluid Mech., 20: 481–499, 1964.
[3] A. Duchesne, L. Lebon, and L. Limat. EPL (Europhysics Letters), 107(5): 54002, 2014.