

Postdoctoral Fellowship in Advanced Droplet Impact and Phase Change Studies

Laboratoire Énergies & Mécanique Théorique et Appliquée, Université de Lorraine, CNRS

Starting date: No later than 20 May 2025

Duration: 12 months

Location: LEMTA, University of Lorraine

Contacts:

Application documents (CV, letter of motivation, references...) must be sent to:

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Offer Description

We are seeking a candidate with a Ph.D. in fluid mechanics, thermal sciences, or a related field. The ideal candidate should be passionate about experimental approaches and collaborate closely with our team to study the impact of droplets on surfaces under non-isothermal conditions. A proven track record in any of these areas is highly valued.

Project Description

Droplets play a crucial role in numerous natural processes and technological applications, from atmospheric phenomena like rain clouds to industrial processes such as spray cooling of electronics. Due to their ubiquitous presence, droplets have long been a subject of scientific inquiry. When a droplet impacts a solid surface, it can exhibit a variety of behaviors, including deposition, bouncing, or splashing, driven by the complex interaction of liquid inertia, viscosity, surface tension, and the properties of the solid substrate.

Despite extensive research on these phenomena, significant knowledge gaps remain, particularly when impact conditions are non-isothermal, especially at high temperatures. Under such conditions, boiling can manifest in several forms (such as bubbling, thermal spraying, or the formation of a vapor film beneath the droplet), which can significantly alter the spreading and residence time of the droplet, as well as the rate of heat transfer.

The postdoctoral researcher will contribute to several national projects, including an ANR project focused on the spray cooling of textured surfaces. The objective is to leverage and develop innovative experimental methods, such as infrared (IR) thermography, to obtain quantitative data on heat and mass transfer processes. Various types of surfaces will be compared, particularly those that modify wettability and nucleation site density, in experiments conducted at both the individual droplet scale and the spray scale.

What We Offer:

This position is for 12 months, with a start no later than 20th May 2025. The salary is based on experience and follows national academic rates for postdoctoral researchers. We will support candidates in applying for national and international postdoctoral fellowships. Our lab offers an international and highly collaborative research environment, access to cutting-edge facilities including advanced imaging systems and instruments. The lab is engaged in national and international collaborations and institutional programs, providing access to textured surfaces that show great promise for the targeted applications.