

Development and Study of Ultrasound-Sensitive Microfluidic Droplets for Controlled Release of Active Compounds

Internship Offer M2 (6 months)

An interdisciplinary project at the interface of physics, microfluidics, and biomedical imaging.

Context

Microfluidic droplets are ideal micro-systems for encapsulating and controllably releasing active compounds such as drugs, chemical agents, or fragrances. The use of ultrasound waves allows for non-invasive, localized, and tunable triggering of this release. This internship is part of an interdisciplinary project at the interface of physics, microfluidics, and acoustics, aiming to understand and optimize the physical mechanisms governing ultrasound-droplet interactions.

🎯 Internship Objectives

- Develop protocols for droplet production and characterization (size, stability, etc.).
- Study the effects of ultrasound on these droplets: release, deformation, fragmentation.
- Optimize ultrasonic parameters (frequency, power, duration) for precise release control.
- Quantify the kinetics of active compound release.
- Analyze experimental data and model results using Python scripts.
- Present results and contribute to the writing of a report or scientific article.

📌 Desired Profile

Education: **Master's 2** in physics, physical chemistry, process engineering, or equivalent.

- **Experimental experience** (setups, protocols, measurements).
- Proficiency in **Python** for data analysis and processing.
- Strong command of **scientific English** (reading and writing).
- Knowledge of **microfluidics** and/or **acoustics** is an asset.

👤 Supervision and Environment

The internship will be supervised by W. Urbach (LPENS) and N. Taulier (LIB), in collaboration with Maja Pakula (PhD student). It will take place across two top Parisian laboratories offering an interdisciplinary environment and access to state-of-the-art experimental platforms (microfluidics at ENS, acoustics at LIB).

🚀 Perspectives

Possibility of continuing as a PhD student depending on results and available funding.

📅 Application

Deadline : **December 1, 2025**

Internship period: Flexible, between January and June 2026

Please send: a detailed CV, a cover letter, academic transcripts (M1 & M2), contact details of an academic or professional reference.

Contact: Maja Pakula — maja.pakula@sorbonne-universite.fr

Supervisors :

N. Taulier au LIB & W. Urbach at LPENS : nicolas.taulier@sorbonne-universite.fr & urbach@lps.ens.fr

💡 Why join us?

- Work at the intersection of physics, microfluidics, and biomedicine.
- Join two top Parisian laboratories in a collaborative environment.
- Contribute to high-impact scientific outcomes (publications, potential PhD opportunity).