

## Sujet de stage

### Process development and optimization of ZnO nanowires (NWs) for hydrodynamic flow sensors application

**Key words :** Nanowire growth, ZnO nanowires, Micro-sensors

**Localisation:** CROMA and LMGP

**Supervisors:** Cécile Ghouila-Houri (CROMA), Gustavo Ardila (CROMA) and Vincent Consonni (LMGP).

**When? How long?:** Spring 2027, 5/6 months.

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**More information:** <http://croma.grenoble-inp.fr/>

#### Context:

The project explores new technologies of micro-sensors for hydrodynamic applications by investigating the potential of piezoelectric ZnO nanowires. More precisely, two key near-wall flow quantities are to be measured by the devices: the wall pressure and the wall shear stress. To achieve this goal, the project requires long, vertically aligned and highly piezoelectric ZnO nanowires that are selectively grown in localized place on the chip.

The intern will work with two ongoing PhD students: one working on the development of hydrodynamic micro-sensors based on ZnO nanowires (A. Serrure, PhD work started in November 2025) and the other working on the growth recipes development at LMGP and the electromechanical characterizations at CROMA (M. Azhar, PhD work started in October 2024).

#### Objectives:

- Development and characterization of gold seed layer deposition at CROMA (deposition in cleanroom) and LMGP (characterization)
- Developing, characterizing and optimizing ZnO Nanowires growth recipes for achieving long (> 15  $\mu\text{m}$ ) and vertically aligned nanowires at LMGP
- Adapting the processes for localized nanowire growth at LMGP including cleanroom processes at CROMA for localizing the seed layer
- Participating to the microsensors fabrication and packaging at CROMA
- Participating to the electromechanical testing on AFM bench at CROMA and processing data

#### Collaboration and Work Environment:

**Qualifications:** A student with a master's degree (or, in some cases, a M1 degree) from an engineering school or university, specializing in materials, micro- and nanotechnology, and/or physics. Knowledge of microfabrication and characterization (AFM, SEM) techniques, as well as experience in a cleanroom, is preferred.

**Application:** To apply for this position, please email (see contact information above) your application, which should include a cover letter, your resume, and copies of your grades and diplomas.