

# Internship : XSeaO<sub>2</sub> $\mu$ DIC Sense

**Expected Advisors:** Douglas KELLER, Vaibhav KUMBHAR, Joseph YOUSSEF, Cédric TARD

**Lab(s):** Laboratoire de Chimie Moléculaire and Laboratoire de Météorological Dynamique

## Description

The purpose of the stage is to help build the prototype microfluidic device (please refer to the equipment document of this application to better understand this one). It will also provide a great opportunity for the Master 1 (expected) student to learn about microfluidics, chemistry, and the ocean carbonate system in the lab at LCM, hands-on. I believe 10 weeks is enough for a student to play around with the tools and start building sections of the device. The majority of the methodologies to do this have been demonstrated in literature. Therefore, the student is in a structured experience, where they will have some prior demonstrated deliverables they can refer to (albeit with expected difficulties).

In more detail, the student will be expected to learn a little CAD (computer aided design; CAO) programming to make simple channels for the CNC mill to cut into the device substrate (glass, acrylic, polycarbonate). Joseph and I have experience in CAD and CNC machines to support the student. The student will then form the integrated bipolar and gas-liquid membranes within the device using the chemicals to be purchased by following the literature. I, Joseph, Vaibhav, and Cédric all can support the student with the lab efforts, however I only expect the first three to be mainly involved. They will then test the device to make sure the desired pH is created in the microflow.

If time permits, finally the student will start drafting and prototyping the mid-infrared sensing circuits to online measure the gaseous carbon dioxide off-gassing from the acidified microflow. Both Joseph and I can support the student in these final efforts.