



## INTERNSHIP PROGRAM FOR INTERNATIONAL STUDENTS

### INTERNSHIP SUBJECT FORM

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| Name of the Host Laboratory            | Hydrodynamics Laboratory (LadHyX)   |
| Website of the Host Laboratory         | <a href="https://www.ladhyx.polytechnique.fr/">https://www.ladhyx.polytechnique.fr/</a>   |
| Research Group                         | Plant morphogenesis   |
| Internship Supervisor                  | Arezki BOUDAUD  |
| Internship Subject                     | Hydrodynamics of plant dispersal by rain  |
| Student's level                        | <input checked="" type="checkbox"/> Advanced Undergraduate Students (3 <sup>rd</sup> or 4 <sup>th</sup> year)<br><input checked="" type="checkbox"/> Master's students (1 <sup>st</sup> or 2 <sup>nd</sup> year)<br><input checked="" type="checkbox"/> PhD students  |
| Proposed Duration                      | <input checked="" type="checkbox"/> 3 months<br><input checked="" type="checkbox"/> 4 months<br><input checked="" type="checkbox"/> 5 months<br><input checked="" type="checkbox"/> 6 months  |
| Prerequisites                          | Physicist/engineer with interest in biological systems OR Biologist with training in quantitative sciences  |
| Internship description (max. 15 lines) | <p>Plants have developed various strategies to take advantage of their environment in order to reproduce and propagate their progeny. Flowering plants may use insects or wind to spread pollen, or fruit eating animals to disperse their seeds. In some non-vascular plants like liverworts, rain is a major player in dispersal. In the genera <i>Marchantia</i> and <i>Lunularia</i>, part of the reproductive cycle is vegetative and each plant produces small seedlings known as gemmae that are dispersed by rain. Gemmae are stored in a conical-shaped cup (<i>Marchantia</i>) or in crescent-shaped cup (<i>Lunularia</i>) that are similar in size to rain drops. In some species, the cup is in addition decorated with crenellations. A drop falling on the cup leads to the formation of a jet that carries gemmae up to a few meters from the mother plant.</p> <p>The goal of this internship is to investigate the hydrodynamics of jet formation according to cup geometry of plants and to explore the role of different morphological features in this process. It will involve microscopy and image reconstruction to characterize plant geometry, as well as high-speed camera observation of drop impact on the plant and 3D-printed biomimetic cups. The project will be framed according to the interests and abilities of the student.</p> |

The boxes marked with cross implies eligible