

## Mechanical integration of the different machines

### General context:

The association EPFL Xplore wants to develop a 3D printed parts recycling machine. After one semester of development, a first version of the machine is ready. Nevertheless, to improve the capacity of the machine and the general understanding of the parameters, a lot of work remains to be done. This is why we offer semester projects to EPFL students. The recycling process of 3D printing filament can be decomposed in the following steps: grinding, drying, extrusion, cooling and spooling.

### Project description:

For the moment, all the subsystems are not integrated together but work separately. The objective of this project is to integrate the different machines already designed in a single machine with all the functionalities. Moreover, the machine must be as compact as possible so the student will pay particular attention to the size of the final design.

Furthermore, the student will be a part of the Xplore plastic recycling team, they will need to attend the team meetings as well as the working sessions.

### Tasks:

- Strong literature review and familiarization with different subjects:
  - o Actual production lines for plastic extrusion
  - o Mechanical properties of filament during the manufacturing process
  - o Heat transfers
  - o vibration reduction
- Design new interfaces between the machines
- Generation of integrated design for the whole machine taking into account maintenance
- Process optimization
- Miniaturization