Lab #4 – Rocket Design

In this lab you will design a 3D printed body for a rocket. These will then be printed, tested, and compared.

Materials list:

- A rocket engine capsule
- A ruler
- A laptop

1) Measure and document the dimensions of the rocket engine capsule. This will go lid-down in the bottom center of your rocket body. You must design a rocket into which this rocket engine capsule can be slid. (Leave a couple millimeters of extra space to make sure it fits!)

2) Run OpenSCAD. Using the concepts you learned in the last lab, design a rocket body! Think about how you can make a design which will go high.

3) Save all of the following to your user Documents folder:

a) The .scad file containing your design.

b) The .stl file containing the rendered model of your design. Press "render" before exporting the .stl file.

c) A saved png image of your design.

4) Load your design in Cura. Make sure you've followed the Cura setup steps first if you haven't set it up yet.

5) As part of your design you can also choose certain print parameters like "infill" which affects how much plastic is in the inside of the print. This affects part strength, but also part mass and weight (on Earth!).

6) Write down the predicted print time.

7) Write down the mass of the plastic Cura predicts will be required to print your design.

8) If the filament used costs \$23/kg, what is the predicted plastic cost of your print?

9) In Microsoft Word prepare a one-page description of your rocket. (You can use the free LibreOffice Writer if finishing this on your own computer if you don't have Microsoft Word.) Make sure the page includes:

a) A name for your rocket design.

b) Your name.

c) The image file of your design.

d) The expected mass of your design as given by Cura. Use the fact that the 1.75 mm filament we use has a mass per length of 2.98 g/m.

e) The height of your design.

10) On Cabrini Learn, upload your four files (.scad, .stl, .png, and .docx) for this lab.