Dynamics of 3D Printing: Reactor3D

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The aim of this engineering project was to design and construct a 3D printer that combats the current expensive price of many consumer grade 3D printers. I accomplished this by reducing the cost of my printer to $850, compared to the thousands of dollars that many other companies charge, without sacrificing quality or strength and also maximizing the printer's efficiency. I began the project by creating a design for the printer in Autodesk Inventor 2015. A major component of the printer is the motion platform that I decided upon. The motion of the printer in the X and Y axes is done through a CoreXY setup that allows for two motors to be mounted in the same plane and driven by two belts, reducing the overall weight of the print head and allowing for much faster printing. The main method for reducing the price of the printer was by using many 3D-printed parts that cost much less than other materials and do not affect the quality of the prints. For instance, the extruder, x-axis gantry, linear sliders, and linear rod mountings are mostly 3D-printed. Moreover, calibration of the stepper motors is a very important process in ensuring great print quality. This is done through testing the motors at varying currents and calculating the correct steps per millimeter of the motor in order to have dimensionally accurate parts. Lastly, my printer has an on board raspberry pi with a camera attached in order to control the printer wirelessly and have a wireless view of the prints. The 3D printing industry is rapidly evolving and many people are too timid to buy a 3D printer and learn about the technology due to the incredibly high prices and unknown benefits. However, I hope my printer can help destroy those beliefs and open the 3D printing market to everyone.

Awards Won:

Fourth Award of $500