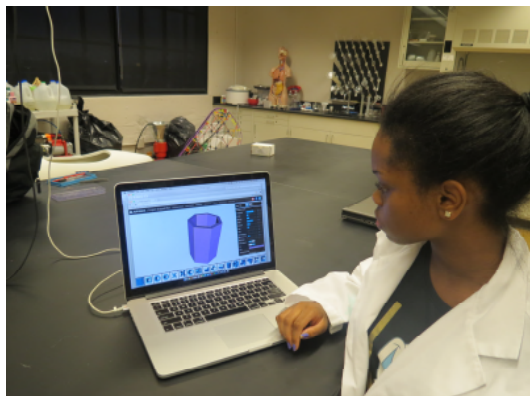


## Student Scientist Uses 3D Printer to Accelerate Product Design Process



**Above:** Bria Harris working in the lab on 3D prototype using Autodesk ShapeShifter software

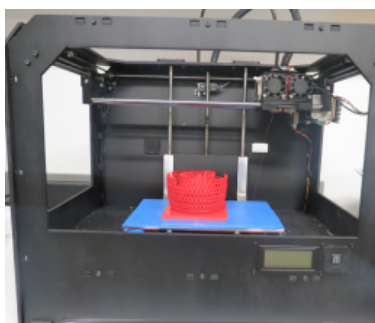
3D Printing has revolutionized the marketplace. It takes a lot less time to bring product ideas to market. Today, a company or individual can conceive an idea at 8am; have it designed using a 3D modeling software by 11am and have a working prototype of the product in hand by 4pm.

Bria Harris, a student scientist in Ecotek Lab and a 11<sup>th</sup> grader at Detroit Edison Early College of Excellence, is using her love of graphic design technology and art to investigate how 3D printers can be used to improve the product development process. There are many software applications that can be used in 3D printing (e.g. TinkerCad and Solidworks). Bria decided to use Autodesk Shapeshifter.

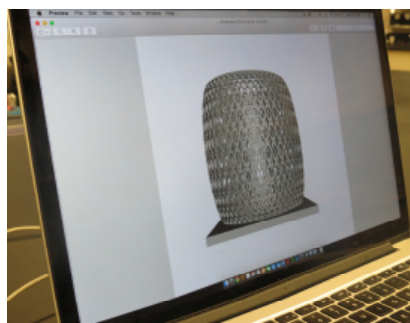
Bria is a strong self-learner. When it comes to advanced modeling technology, she is able to use her spatial analysis skills to determine how things fit together. She has demonstrated this talent before while building a virtual reality application using Unity3D. Bria's first 3D printing project was a pencil case. It sounds simple, but it required a fair amount of work. She designed the pencil case to resemble the 2016 Olympic stadium in Brazil.

One of the issues that Bria had to address was the physical design of the pencil case, such as optimizing the volume of the rectangular prism base and the volume of the cylinder. The next question that she had to answer was what materials to use to produce the object. There are three main polymer based filaments used in 3D printing, Polylactic acid (PLA), Acrylonitrile Butadiene Styrene (ABS) and Polyvinyl Alcohol (PVA). PLA is a biodegradable thermoplastic polyester made from renewable resources, such as corn starch. ABS is thermoplastic derived from acrylonitrile, butadiene, and styrene, while PVA is a hydrophilic linear polymer. Bria used PLA because of its biodegradability properties.

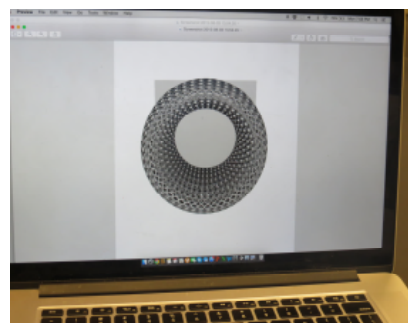
After completing the design phase of the project, Bria worked with engineers from Manulith Corporation, a leader in 3D printing technology, to print out a "copy" of the pencil case. Because of the complexity of the design, it took 12 hours to produce. The final product was quite impressive and has set the stage for Bria to further develop her skills in 3D printing.



Pencil case being printed on 3D Printer



Lateral view of pencil case in ProjectShape Shifter



Dorsal view of pencil case in Project ShapeShifter

### About the Ecotek Science Program

Ecotek is a science research lab program for young inventors and researchers in grades 5 thru 12. Student scientists work on projects aligned with the issues being addressed by world leaders at the United Nations. To learn more about Ecotek Lab go to <http://www.ecotek-us.com>