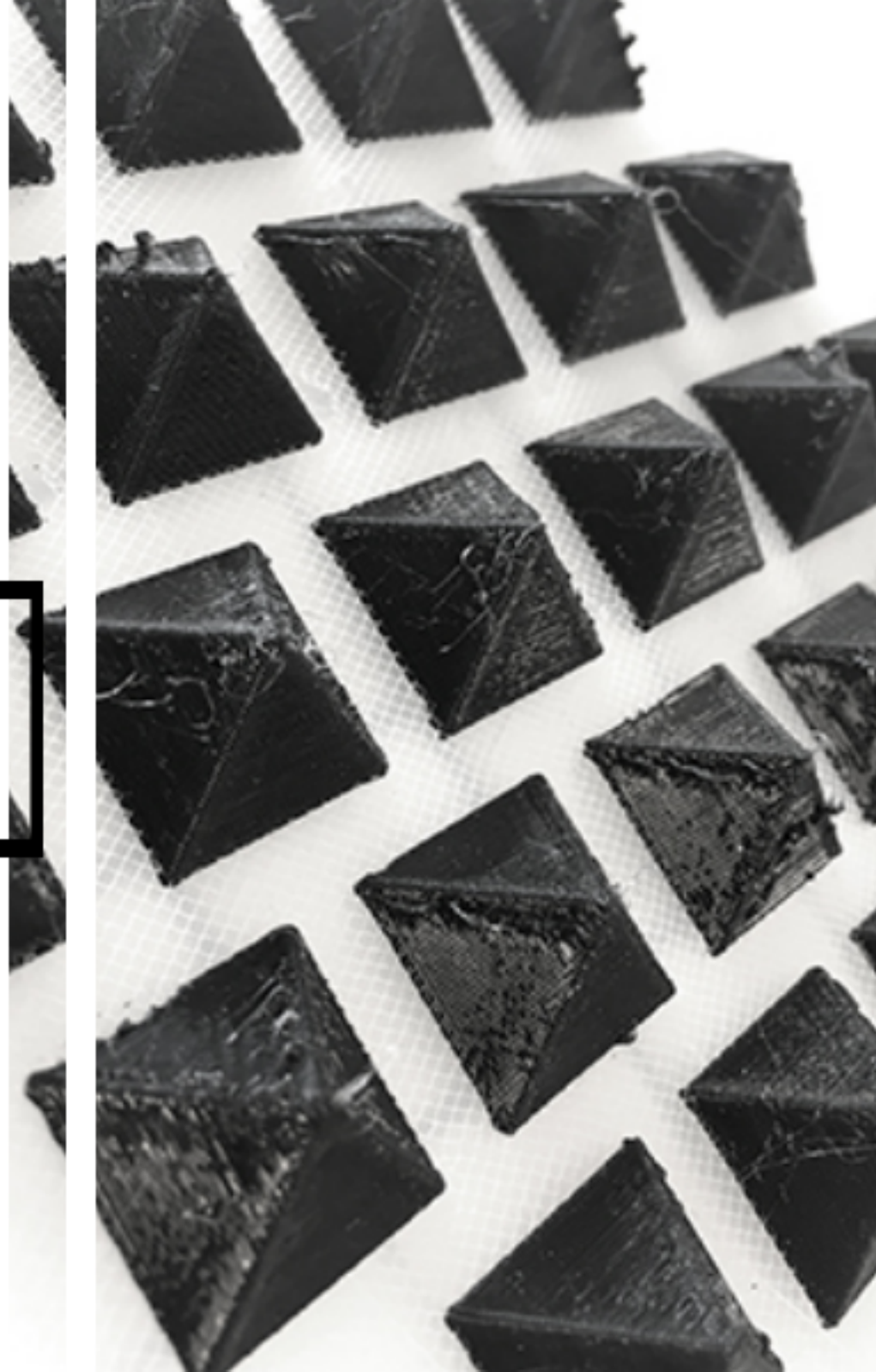


The 3D Printed Future of Fashion

FSAD6219

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Grace L. Lawson





Aim

- The aim of this study is to **provide evidence** that 3DP has the potential to disrupt the fashion industry and, as the technology improves, **could replace traditional techniques** with a new application of 3DP that merges 3DP with textiles.

3D Printing

What is it?

- Three-dimensional printing (3DP) has been defined as a combination of design, architecture, and software technology
- 3DP (also known as AM or additive manufacturing) is the process of making a 3D object from digital CAD model files by built up layer by layer.
- Each layer is created with only the required amount of material making it the opposite of traditional, subtractive manufacturing where material is removed to leave behind an object.
- The technology means that a company can print only what is needed and demanded by consumers

3D Printing

- Part of the Fourth Industrial Revolution: the technological combination of physical, digital and biological worlds
- The 3DP market has been forecasted to grow with an annual increase of 31.3% to 21 billion dollars by the year 2020
- In 2013, former U.S. President Barack Obama gave a speech on the potentials of the technology and said, "3-D printing that has the potential to revolutionize the way we make almost everything".

Objectives



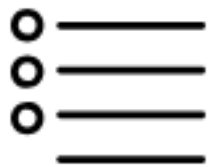
To identify the current use and applications of 3DP and identify the challenges of the technology in fashion applications.



To explain why the industry's involvement with the 3DP technology is important.



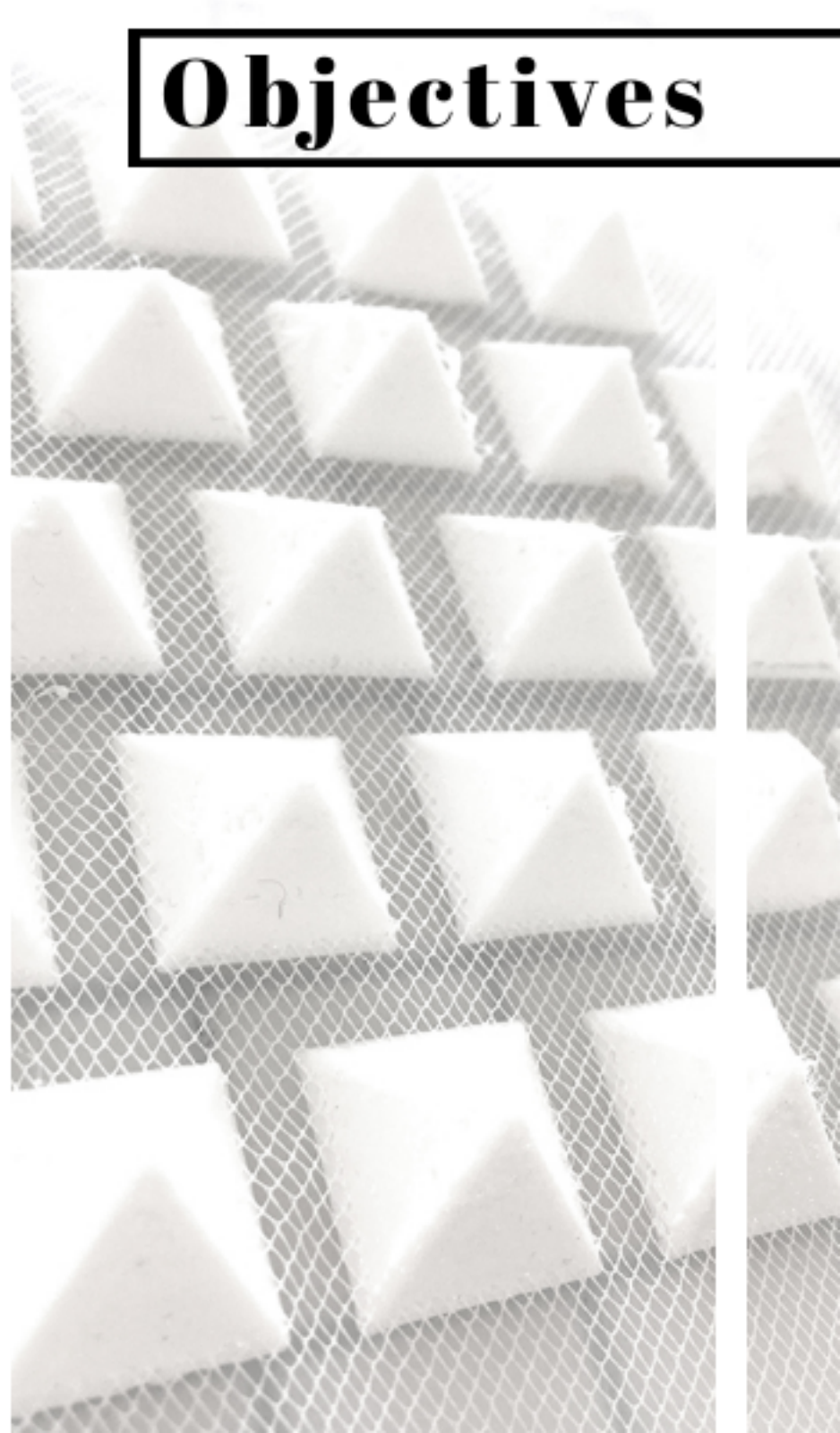
To understand the implications of 3DP on the future of the fashion industry.



To summarize new findings in 3DP related to fashion applications.



To compare 3DP techniques to traditional methods of surface embellishment in terms of aesthetics and functionality.



Background



**Industry and
Market Potential**



**Design and Product
Development**



**Industry and
Market Risks**



Education



**Technology and
Materials**

Existing Design Work



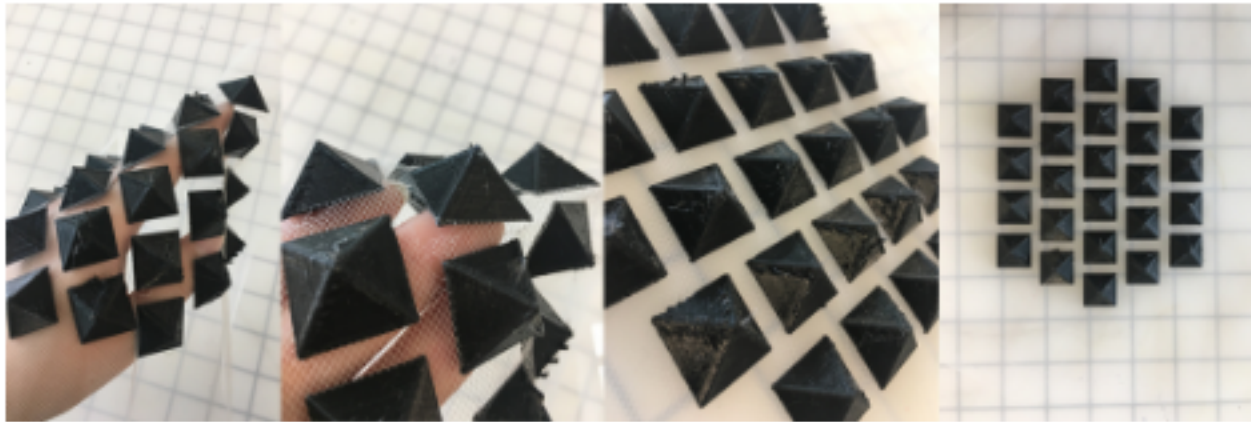
Method

Literature Review: Past Research in 3DP on Textiles

Two Key Outcomes

1. The polymer should not just lay on the surface of the textile but penetrate the fabric for firm adhesion (Pei et al., 2015). This can be ensured by using **open structure textiles** which allow the filament to seep through the fabric and stick to the fibers/threads by locking them within the melted plastic (See Fig 2) (Sabantina et al., 2015). As a double measure, by printing a few layers of 3DP directly onto the print bed first then pausing the print to lay down the fabric before continuing and essentially **sandwiching the fabric** between the 3D printed material
2. The bonding process of the filament to the textiles is dependent upon the **multiple variables** within the 3D printer (such as extrusion speed and print bed temperature) and the **compatibility between the chosen 3DP material and textile material**.

Test Results

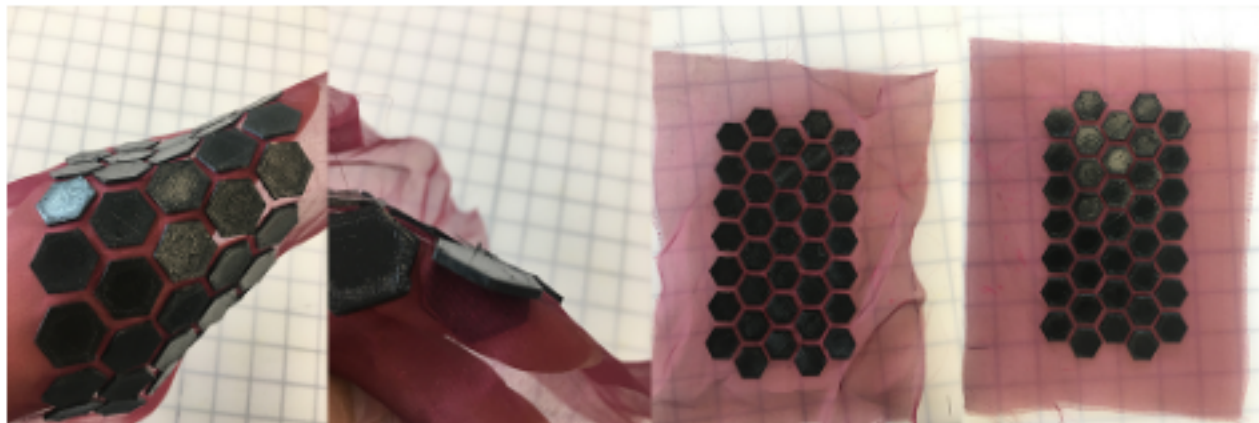


Thin Net: 3D print melted the net during the process and 3DP easily tore the net on handling.



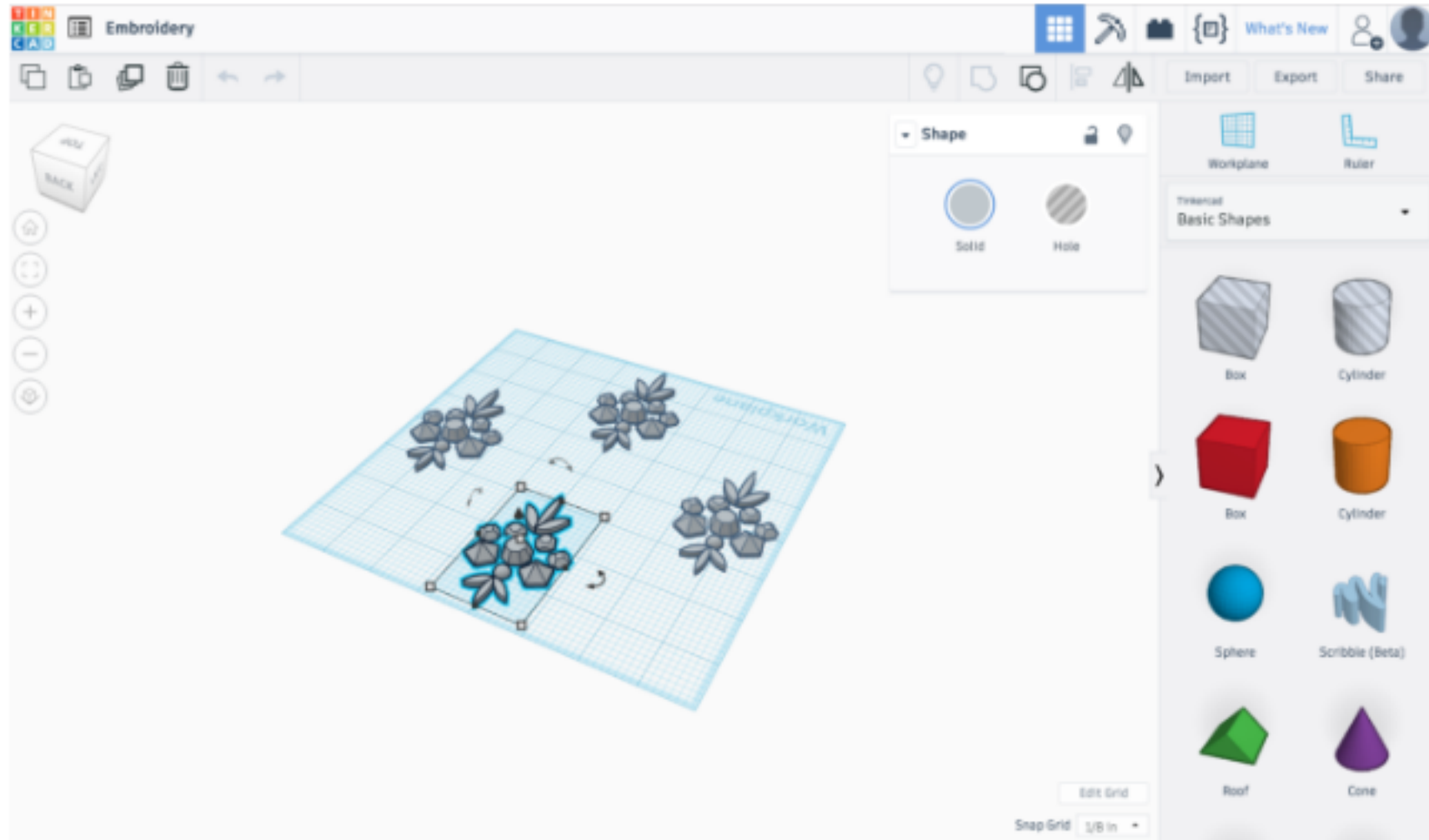
Thick Net: Strong adhesion of 3D print but drape was disrupted.

Silk Organza: Soft drape achieved, relatively strong adhesion and withstood typical daily-wear unless 3D print was intentionally forcibly removed.

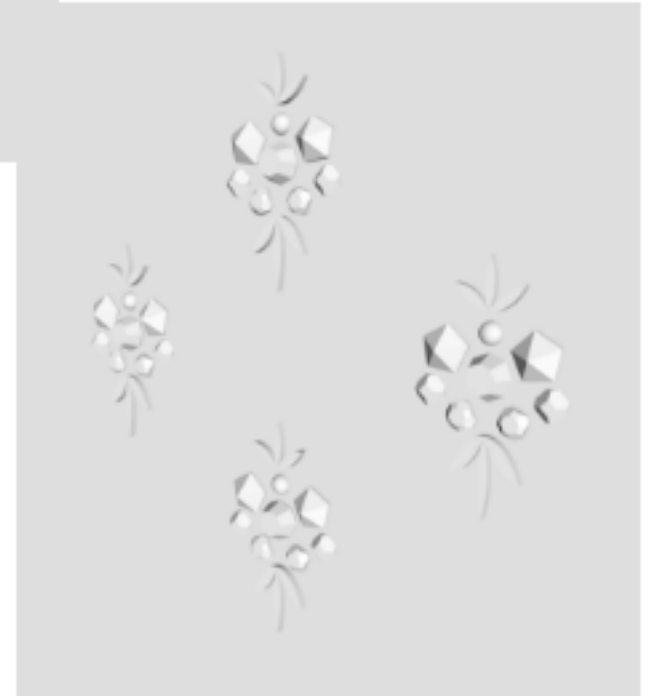
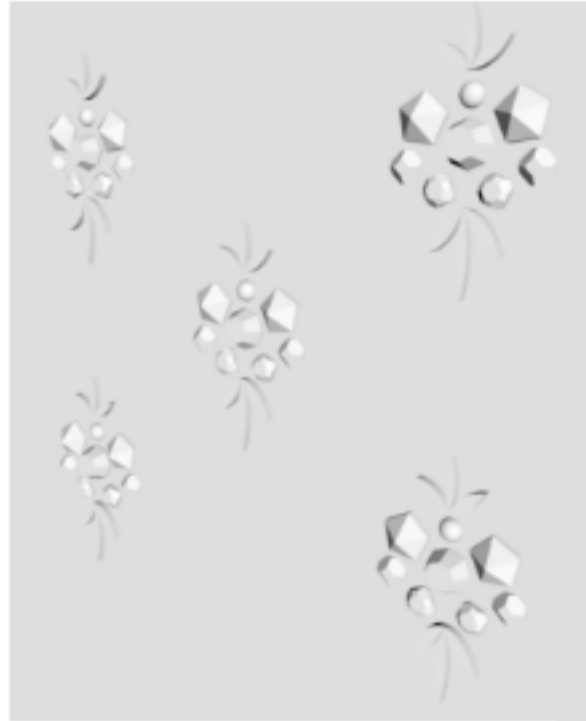
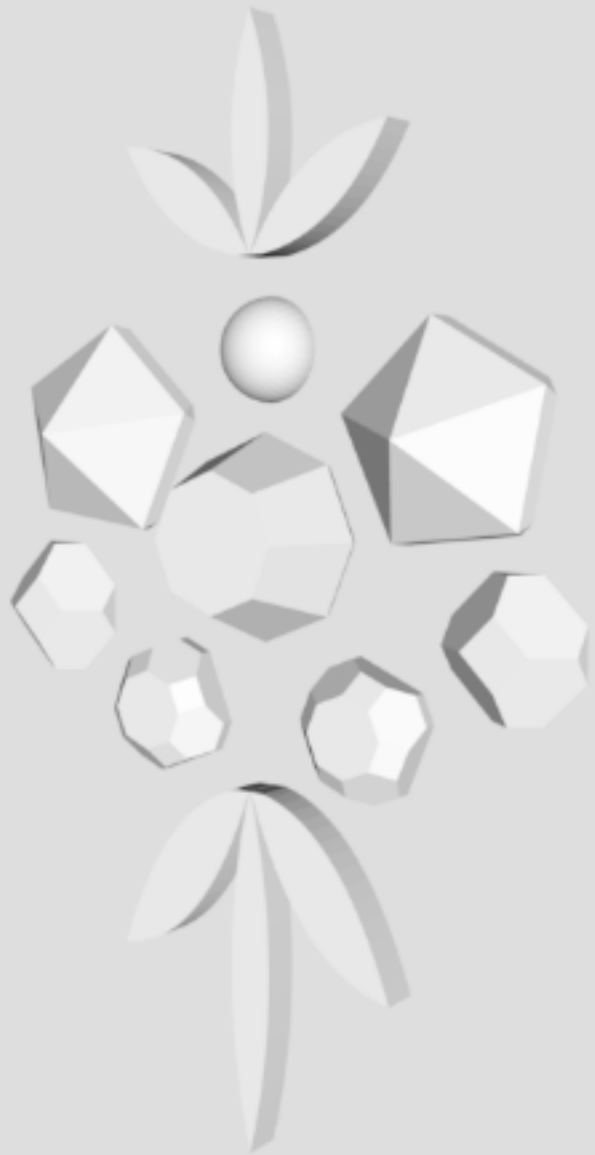


Design Process

TinkerCAD Modeling



Motif Design





**Thank
You**

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