

## Flowing Lines on The Fabric

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The practical history of optical illusion can be traced back to the conjurors' modern magical techniques, even back to the era when ancient Greek architects used subtle geometric techniques to modify the illusion that emerged in classical temple design (Tolansky, 1964). Optical illusion is a neuroscience-based discipline that involves understanding how we perceive (Sully, 2010). The primary inspiration for the *Flowing Lines on The Fabric* was the initial concept of the optical illusion, the use of still images to achieve dynamic vision, and the striking relevance of computer-aided design and drafting. The purpose of this design research was to demonstrate the usage of the innovative technology of laser cutting on creations of optical illusion motifs through two pieces garments in one wearable art outfit.

*Quadrado* of Rubem Ludolf (1955) and *Disfigured Circle* by Bridget Riley (1963) were used as the inspirational pictures for the top and the skirt, respectively. Both works of art express optical illusion in two dimensions with irregular lines, but in unique, transforming ways. The reason for selecting these two pieces was to create patterns with a stereoscopic vision through lines. The inspiration for creating the graphic pattern for the top was from *Woodwave* artwork of Eliza Mikus. Mikus cut a piece of wood into strips and then spliced the pieces together according to the original appearance of the wood to make a graphic pattern by the protrusion caused by the twisting of the wood strips.

The first step involved creating motif patterns for laser cutting. Two motifs were created separately for the top and the skirt. The designer experimented with different means for fabric manipulation, and then confirmed that the method displayed in Figure 1 should be the final technique used to create the top. The designer used Adobe Illustrator to make a stripe pattern with different widths as cutting lines and a sewing path (see Figure 1) for creating an optical motif. The actual effect of the graphic pattern was revealed after the garment was stitched. In this step, only the width of the line and the path of the stitching could be designed.



Figure 1. Fabric manipulation swatch and sewing path of vector lines for the top

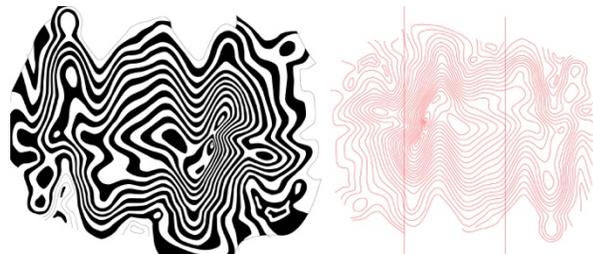


Figure 2. Water ripple pattern (left) and vector lines for laser cutting on the skirt (right)

The inspiration for creating the graphic pattern for the skirt was from the artwork *November 9, 2017* by “The World in Their Art,” and the lines were used to make a flow of water ripples. The original painting changed the direction of the two-color lines and the width of the wavy lines to give the static lines a fluctuating visual effect. The designer created a water ripple pattern with Adobe Illustrator for laser cutting the motif into three parts and then interlaced the parts. After drawing the motif of vectors in Adobe Illustrator, the pattern was deformed with a blending tool until a satisfactory water ripple effect appeared; then the pattern was adjusted to a vector line drawing and two dividing lines (see Figure 2) were added. The final motif was composed of two parts: the black color area and white color area.

The second step was implementation. The top was made up of two layers of fabric, one as the base for the silhouette and the other for creating a texture with fabric manipulation. The fabric of the silhouette foundation needs to support the fabric on the surface, even the surface fabric of a relatively heavy weight. At the same time, the foundation layer of the top should have certain draping capabilities, so that the silhouette of the top does not look stiff. The designer merged the front and back piece into one piece by combining the shoulder line, and divided the laser cutting lines into two parts to adapt to the size of the laser cutting board (48 inches by 24 inches). The edge line for cutting was a red color (R: 255; G: 0; B:0), and the line of the motif pattern for engraving was a blue color (R: 0; G: 0; B:255), which was used to guide the sewing position of the fabric strips (see Figure 5). The settings of cutting through were 100% power, 15% speed, and 1,000 PPI; engraving settings were at 8% power, 100% speed, and 300 PPI. The top layer for creating a texture of fabric manipulation was a “sandwich” fabric and consisted of a layer of white stretch denim fabric and black non-stretch crepe fabric with a fabric bond in the middle. After pressing, the “sandwich” fabric was completely bonded together; it was then cut into strips of different widths by laser cutting. The widths were respectively 0.2, 0.25, 0.3, 0.4, 0.45, 0.5, 0.6, and 0.7 inches. The setting for cutting through was 100% power, 8% speed, and 1,000 PPI. The strips with edges sealed by the laser were arranged side by side from the neckline to the bottom on the center front as the starting line, and each stripe was placed on the base fabric with pins (see Figure 3). After completing all the sewing, a visible white zipper was stitched under the neck of the center back and the length of each stripe was trimmed by scissors until the designer was satisfied.



*Figure 3.* The vector graph for laser cutting and engraving (left); the pinning process(middle); the separating process of two sets of patterns (right)

In order to create a more intense water surface effect, a fabric with a mirror effect was selected as the skirt fabric as part of the water ripple motif. The fabric of the motif part was made of a thin, non-stretch suede fabric. The fabric of the two sets of three-part motifs was taped together and placed on the mirror effect basis fabric and then strips were pressed on, one-by-one, to melt the fusible interfacing between the strips and the mirror effect fabric (see Figure 3). After confirming that the bonding was strong, the whole fabric was ready to sew. The sewing of all darts and the side seams was completed, and a zipper was stitched at the side seam to complete the skirt.

This design project demonstrates an innovative approach to exploring the application of optical art concepts to textile design through laser cutting techniques, which was rarely achieved in previous traditional manual cutting methods.

### References

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Image A- Front view



Image B- Front view



Image C- Back view



Image D- Detail view