Lenticular Blooming Flower

Kyung-Hee Choi, Hansung University, South Korea and Rachel Eike, Iowa State University, USA

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Contextual review and concept statement

Technologies today challenge us to think and practice in new ways to augment the innovative potential with greater variability in fashion design. Unlike traditional textiles with fixed and static expressions, dynamic textiles can change their aesthetic and functional expression during use, reacting to dynamic variables, such as computational technology or environmental conditions (Worbin, 2010). Without any electronic assistance, lenticular printing technology produces changeable or movement of printed images from different angles resulting in a 3-dimensional (3D) display (*Lenticular printing*, 2023). Lenticular printing can result in an animated or transformable effect. (Review this short video that presents lenticular printing and its holographic effect: https://youtu.be/fJ8TN_ptzfY.) Fashion brands like Adidas, Nike, and Lanvin Paris have adopted lenticular materials within their accessory collections, and Christopher Kane launched a fashion line with lenticular applications (*Lenticular Fashion*, 2013). Scholarly work connected to illustration, product design, and advertisement (Choi & Kim, 2010; Lee, 2009) have utilized lenticular printing, however, apparel and textile design scholars and researchers have not extensively explored it's technological and futuristic potential for wearable design application.

A modular design is a system subdivided into a small set of units of modules, which can be independently assembled, disassembled, and exchanged with the other units to create different constructions, or 'styles' within an apparel context (Li, Chen, & Wang, 2018; Ribeiro et al., 2014). A modular strategy can offer various creative design possibilities and achieve sustainability through extended use by redesigning/restyling a single garment (Hur & Thomas, 2011). In particular, prior apparel design scholarship has taken a geometrical modular design approach in which geometrical units, such as triangles and hexagons, were transformed into a creative and experimental fashion design (Chen & Lapolla, 2021; Hur & Thomas, 2011).

By integrating lenticular printing technology into a geometric modular design, this design scholarship challenge aimed to develop a dynamic fashion design building from prior research (Choi & Chen, 2018; Chen & Choi, 2019) to ultimately suggest an approach that would result in a modular and customizable fashion design. An additional aspect of the challenge was to integrate an advanced motion graphic image which emulated a blooming flower.

Aesthetics

In order to meet the design challenge of developing a dynamic geometric modular design ensemble utilizing lenticular printing technologies, *Lenticular Blooming Flower* was imagined. First, an animated GIF image (Protobacillus, 2021), sparked the idea to create the blooming

flower effect that could result in a dynamic fashion print and experience for a viewer. The resulting artwork shows a gradually changing flowering image with multiple frames. A ten-framed dynamic image was printed on PVC lenticular film sheets and integrated into octagonal modules, depicting a harmonious flower shape. To compliment the feminine aesthetic of the flower, a fit and flare silhouette was selected for the ensemble. *Lenticular Blooming Flower* consists of a fitted top fabricated from the octagonal lenticular modules and an eight-gore full skirt, digitally printed with the different flower frames/images onto polyester Mikado. The bodice of a dynamic lenticular textile was fabricated through a practice-led experiment and yielded a unique texture that brought emphasis to this area while providing balance with the simplistic pattern of the printed skirt.

Process, technique, and execution

Expanding the description of the blooming flower image development (see figure 1), the animating GIF file was dismantled into multiple layers for separate image editing in Photoshop. Ten frames were selected to present movements of a blooming flower. A motif embedded with the ten different flowering images was separately printed on transparent PVC lenticular film sheets using a UV offset printer, then cut into eight-petal modules. Slits were added to the center petal of each octagonal-shaped module to interlock the modules together to create a dynamic textile (see figure 2 for layout and interlocking process). To allow for customization for bodice fit, each module was slotted in two areas (at center and along both side edges of the petals). Finally, each lenticular printed module which was assembled and combined (via interlocking of the slots and slits) resulted in a dynamic flower-blooming 3D motion graphic effect. In addition, to support the overall flower shape in the original inspiration, a textile design using the ten flowering images was digitally printed on Polyester Mikado fabric for a skirt, which was patterned to produce an eight-gore full skirt with a scallop embroidery hemline (see figure 3).

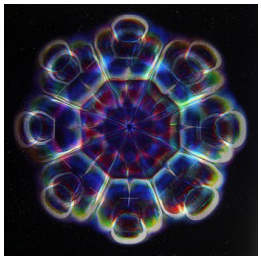

Figure 1. A transforming image of a flower blooming in the motion graphic artwork

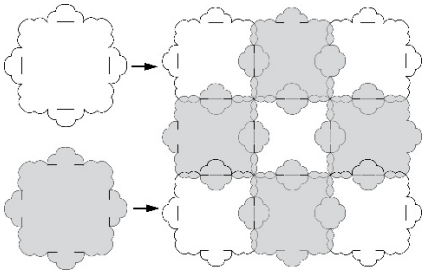

Figure 2. Octagonal geometric modular design and its combination method

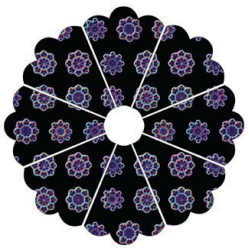

Figure 3. Flower-shaped eight-gore full skirt panels with flower DTP

Cohesion

The lenticular printing of a motion graphic image, integrated into a geometrical modular design, successfully displayed the organic movements of a living garment (click on the following link for video of *Lenticular Blooming Flower:* https://youtu.be/yG9G-LxWtDc). The

use of PVC material, rather than PETG, Acrylic, or Polystyrene, which are typically used materials for lenticular printing, provided the softness and flexibility needed for a wearable fashion ensemble. The modular combination technique in a four-direction, instead of an eight-direction of the octagonal modules, prevented each lenticular module from drastically bending which enhanced the dynamic effect of lenticular prints and overall 3D motion effect.

Design contribution

The lenticular printing technology suggested the potential of innovative fashion design presenting multiple variableness by transforming static images into dynamic motions without any computational plug-ins. *Lenticular Blooming Flower* demonstrated how lenticular printing through modular design can produce customizable fashions with a sense of novelty. Furthermore, utilizing the octagonal modular design approach for apparel presents a new type of geometrical modular design but also proposes a method that can be considered and further explored for sustainable fashion design. Sustainability can be realized in fashion through the use of recyclable materials (e.g., PVC in this design) that can be easily replaced/fixed through eco-efficient modular design features to create a customized (through lenticular printing) dynamic ensemble.

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