Ommatidia

Ashley Rougeaux-Burnes, Texas Tech University

Surface Design, Textile Innovations, Biomimicry

Biomimicry is an approach to innovation that seeks to improve human life by emulating nature's time- tested patterns and strategies. The Theory of Biomimicry, as referenced by Eadie & Ghosh in their 2011 study, *Biomimicry in Textiles: Past, Present, and Potential,* has become a blossoming source of inspiration for designers of many mediums, including architecture, textiles, technology, and fashion. The invention of Velcro is an excellent example of biomimicry in fashion. Velcro was conceptualized after the inventor noticed burrs stuck to his trousers and his dog's fur, which led to his creation of a new hook and loop fastening device, Velcro. Nature has already solved many of the problems with which we grapple. It is simply up to us to pay attention.

Ommatidia is part of a collection that uses creative research methods to marry science, technology, fiber arts and design, by investigating methods that nature (i.e., plant life, animals, etc.) has developed to overcome challenges and to adapt to the environment. This collection tests the influences that science and nature have on clothing aesthetics and how this positively affects the life of the wearer. The silhouettes, textures, patterns, and colors of these garments were inspired by methods of protection utilized by insects. Some characteristics in the collection include the interpretation of the chitinous exoskeleton and the compound eye in the design of flat patterns and the garment construction. Another significant aspect of this biomimicry collection is the creation and development of original textiles by modeling color and texture after biological entities and processes. These imitations are achieved through fabric manipulation, printing, dyeing, and surface design techniques.

Ommatidia is made up of a tent style dress and an oversized jacket. The goal of this design was to experiment with a variety of surface design treatments to create original textiles. The dress in this ensemble was inspired by the individual round sections of an insect's compound eye, or ommatidium, which function as separate visual receptors. Each ommatidium provides the brain with one picture element, which the brain combines to form a completed image (Land & Nilsson, 2012). This concept was used to create the original pattern on this dress, which was completed using an eight-color screen print. The process began by printing the multi-colored dotted foreground onto the textile using four different screens. Once the foreground was established, the solid rectangular shapes were printed onto the background with an additional four screens. Each print had to be strategically placed and aligned to allow the negative space to be filled without covering the dots. As each screen and color was printed, the ultimate design came into focus, creating the final print.

The jacket was inspired by the hard shell of an insect, like that of a beetle. These shells are often made of mesmerizing patterns and colors and serve as protection for their owner, much like outerwear protects the consumer. These patterns and bright colors are also used for

camouflage and mimicry. Camouflage involves the use of coloration or shape to blend into the surrounding environment. This sort of protective coloration is common and widespread among beetle families. Another defense that often uses color or shape to deceive potential enemies is mimicry. The colors and shapes are meant to resemble those of poisonous animals in order to ward off predators. Many beetle species, including ladybirds, blister beetles, and lycid beetles can secrete distasteful or toxic substances to make them unpalatable or even poisonous. These same species often have bright or contrasting color patterns that warn away potential predators. As a result, bright blue and pink were chosen to be placed on top of the dark purple jacket base to emphasize this contrast. Other beetle species will exhibit these same colors and patterns in order to mimic these chemically protected species. They may also combine their color mimicry with behavioral mimicry, acting like a species they already resemble (Evans & Bellamy, 2000).

This geometric pattern was first designed on Adobe Illustrator and overlaid on a sketch of the garment. The necessary shapes for the print were then laser cut from neoprene fabric and draped onto the finished garment. To complete the applique, each shape was hand stitched into place.

The dress is made from a 60% cotton, 40% silk blend, while the jacket is made from a 100% felted wool base and 92% polyester, 8% spandex neoprene applique.

References

Eadie, L. & Ghosh, T. K. (2011). Biomimicry in textiles: past, present and potential. *Journal of the Royal Society Interface,* DOI: 10.1098/rsif.2010.0487.

Evans, A. & Bellamy, C. (2000). *An inordinate fondness for beetles.* Oakland, CA: University of California Press.

Land, M. F. & Nilsson, D. (2012). *Animal eyes*, *Second edition*. Oxford, UK: Oxford University Press.