

A starry starry night: Integrating hand-painted textile surface design with wearable technology

Adrienne Howell, Jenna Matson, and Chaise Zahrt

Design Mentors: Ellen McKinney, David Bis, Samuel Vande Loo, and Colin Willenborg
Iowa State University

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Design Mentor Statement

This dress was completed in an upper level creative apparel design course, in a unit focusing on using technology in a wearable art garment. The teaching / mentorship process began with informational lectures and activities on design research and wearable technology. The garment design and creation process was guided through a series of assignments that built on each other. Students received both formative and summative feedback at each step. Steps included: (a) inspiration research and sketching, (b) creation of a sample notebook, (c) creation of a mood board, (d) pattern making, (e) sewing and fitting of a 1st sample, (f) selecting appropriate fabrics and electronic components, (g) writing and testing code, (h) constructing the completed ensemble, (i) photo documentation, (j) creation of an online portfolio, and (k) in-class presentation. By mentoring the students through these steps, design and technology knowledge were increased. This project was selected for submission due to its high quality of not only the art component, but also the technology component. An original design, based on inspiration of VanGogh, was hand painted on silk. Further, extensive process went into planning, coding, and constructing a circuit of approximately 100 LED sequins as the “stars” lighting up the painting. There were many challenges and problems along the way, but these students did not give up.

Design Statement

Statement of Purpose:

We were challenged to create a garment that contained wearable technology. There have been examples from the past Met Galas that were very popular in the mass media such as Zendaya’s color-changing Cinderella dress by Tommy Hilfiger (Pownall, 2019). Studio Rossegaard’s Intimacy collection with electrically sensitive transparency-changing foils demonstrates how the relationship between smart technology, fashion, and the human body can be made possible. Since we are students and higher tech materials are out of our reach, we chose LED sequins because it was the most economical choice as well as being the closest effect that we could have to the more expensive technologies exhibited on the red carpet. Previous works have used LED lights in garments (Chase, 2013; DuPuis & Sun, 2017). We not only wanted to create a piece of wearable technology, but also an art piece that would complement the technology used. For this, our inspiration was Vincent Van Gogh’s painting Starry Night. During our research, we found

that when Van Gogh's *Starry Night* was used as inspiration for printing on a garment it was always a literal transformation. This means that the actual image of *Starry Night* would be printed onto a garment with no personal interpretations or changes. Our purpose was to use *Starry Night* and paint it in our original style and then compliment it with the LEDs.

Aesthetic Properties and Visual Impact:

Our intentions were not to recreate his painting, but rather use the color scheme as well as the swirling brushstrokes that he used as our inspiration. We used silk fabric paint to paint on silk chiffon. To incorporate the technology we used sewable LED sequins so that it would appear that our garment's starry night scene would light up. Silk chiffon was useful to create a blank

canvas to apply the silk paint as well as the soft hand and drapability. While the paint itself is very pigmented, the fabric is still sheer enough so that the lights underneath still shine through. We used vibrant oranges and deep blues similar to his painting and applied it to silk by hand with expressive brushstrokes similar to Van Gogh. By using the gutta resist, we were able to create distinct lines that mimic Van Gogh's brushwork. When the opaque paint is filled in between the lines it creates the illusion of being printed instead of painted. This creates more visual interest for a viewer because it further invites them closer to examine and take part of the visual experiences that our dress has to offer.

Process, Technique, and Execution:

In addition to usual garment-making processes of research, pattern making, fitting, and so forth, new tasks were learning how to use smart technology in a garment and paint on silk. The serti process of silk painting was used. A gutta was used as a resist to create distinct lines and was then filled with the opaque colors of silk dye. (Moyer & Moyer, 1991). Next, coded the Adafruit Circuit Playground Express (microcontroller) using MakeCode to transmit the desired color to the LED sequins. We also wrote the code so that the LED sequins turn on and off in a way that visually simulates twinkling stars (Figure 1). The next step was to hand sew the LED sequins to the garment (Hartman,

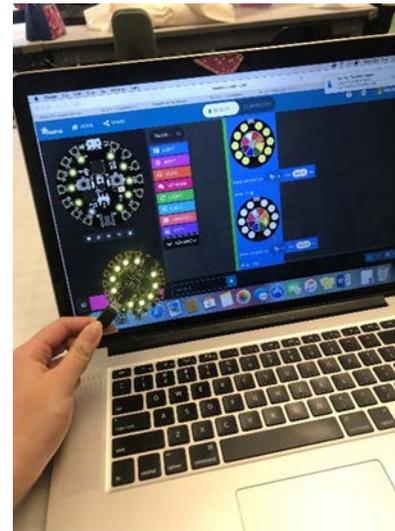


Figure 1 Programming the Adafruit Circuit Playground Express



Figure 2 Process of sewing the circuit of individual LEDs inside the dress

2014). We used conductive thread so each of the approximately 100 sequins was connected to one negative and one positive path, creating a parallel circuit (Figure 2). We intentionally placed the Adafruit Circuit Playground Express, which contained a ring of lights, underneath the sun. Once sewn, each thread had to be hand sewn down so that no threads would touch and create a short circuit. The circuit was built such that the battery and microprocessor are easily removed for laundering. The garment is fully lined and has an internal pocket to hold the battery pack. The Adafruit Circuit Playground Express was attached to a battery located under the left arm. It also contains a switch so that it creates easy access for turning the lights on and off.

Cohesion:

By pairing traditional painting techniques with smart technology, we created a garment that is a walking piece of art that contained elements of technology that elevated the garment to a wearable as well as functional one. This brought cohesion between these two elements because the LED sequins.

Originality and Innovation:

This garment adds to knowledge on combining wearable technology and wearable art. Challenges uncovered by this project with applying a large number of LEDs may be the focus of future research. The LED sequins were effective not only because of their availability, but also because they gave a three-dimensionality to a two-dimensional work.

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