# Creating Immersive Light Spaces

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## Abstract
This paper explores use of fiber optics for immersive light spaces created by Jinsil Seo and the collaborators (Greg Corness and Diane Gromala). Through *nite_aura* and *Lumibreath,* we examine how the fiber optic lights help to create a sensory immersive experience as well as how they can be controlled and transmitted by computers and light sources.

## Keywords
Fiber Optics, Light, Immersive Space

## ACM Classification Keywords
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## Introduction
The history of Interactive Art can be described as experiments involving new materials, media, methods and aesthetics. In particular, light has been considered one of the most important elements of contemporary art, ever since electricity was first used for art. Light is not a dangerous material for artists anymore. Albert Einstein solved the mystery of light's essence in 1905 through wave-particle duality. Light is both an electromagnetic wave and a current of particles. It is a form of energy that in a vacuum would travel at a speed of 299,792,458 meters per second.[1] Even though light is a scientific phenomenon, it is still being

used to develop new materials: LEDs, fiber optics, illuminating pigments, etc. In this paper, we explore the use of fiber optics in two immersive light spaces created by Jinsil Seo and the collaborators (Greg Corness and Diane Gromala). Through *nite_aura*[2] and *Lumibreath*[3], we will examine how the fiber optic lights help to create a sensory immersive experience as well as how they can be controlled and transmitted by computers and light sources.

## Tactile Light Space

*nite_aura* is an audio-visual, interactive installation exploring physical, auditory and visual motion within an immersive environment. In this project, we tried to create an alternative immersive environment focusing on sensual and physical interactions. The work investigates the effect of the visceral texture of space, light and sound in providing a comforting, relaxed immersion.

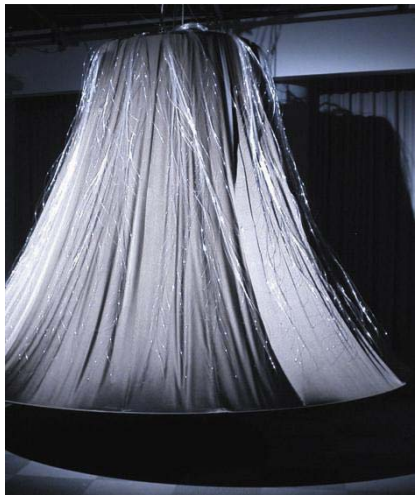

**Figure 1.** *Nite_aura(*2007) by Jinsil Seo and Greg Corness

The basic structure is a cloth bell hanging from a single point, which allows the structure to swing freely when users duck inside.

**Figure 2, 3.** Participant's interaction with fiber optic lights

*How the light is controlled*

An accelerometer attached to the top of the structure tracks the motion of the structure and relays the information to a computer. In response, the computer creates and sends manipulated light patterns. The information from the accelerometer relates to the motion of the space. This is used to morph an abstract color shape generated on the computer. The animated color pattern is projected on a tight matrix of fiber optics at the top of the bell.

*Fabrication of fiber optics*

The tight matrix of fiber optics then is then split into individual strands which are draped down around the outside of the structure. Each strand pierces back in through the fabric, making the light tip visible to the user on the inside. The effect is that of constellations of light specks covering the walls of the environment,

enveloping the user. The animated color shifts are perceived as pixilated, shifting textures like twinkling stars or the firing of synapses in some imagined consciousness.

**Figure 4.** Process to create a fiber optics structure

## Weaved Light Space

*Lumibreath* is an alternative immersive installation that explores the quality of immersion through light, space and physiological data of participants. *Lumibreath* embodies and brings into conscious awareness this internal experience, allowing for participants to be attached to the light structure through a biofeedback sensor. In addition, we tried to create a very playful interface between the external light installation and internal bodily states.

*Lumibreath* takes the womb shape as a metaphor for alternative immersive spaces. The womb implies a enclosed, safe, comfort space for babies and a playful interface between external environment and internal bodily state. It also offers the first “immersive” experience in our lives even though we mostly don’t remember the experience.

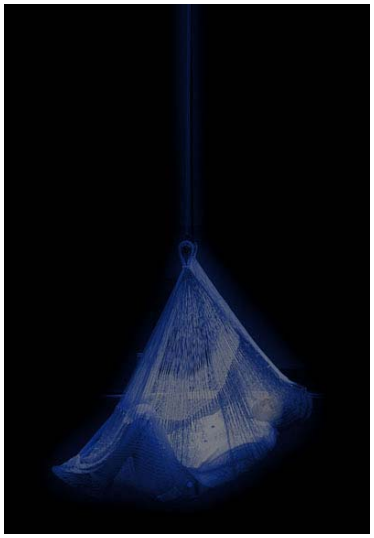

**Figure 5**. *Lumibreath*(2008) created by Jinsil Seo and Diane Gromala

*How the light is controlled*

Participants wear a vest that a breath sensor is embedded in. They then enter the suspended space and lie down like they do in a hammock chair. The glowing structure changes its color patterns depending on the participant’s breath. A main computer system receives the breath data and sends it to an illuminator. A color wheel of the illuminator turns based on the participant’s breath data and projects to the end of a woven fiber optic structure. We consider breath as a communication channel between the internal body and external environment.

*Fabrication of fiber optics*

The *Lumibreath* environment creates an organic and illuminating shape constructed out of side-glow fiber

optics. All fiber optic strands were woven by hand, creating patterns for different parts. Figure 6 shows one weaving technique for fiber optics.

**Figure 6**. Fiber optic weaving experiment

## Conclusion

I have been researching alternative immersive environments, focusing on interactive art forms, for my PhD. Based on my art practice. I found that new light materials support the desired immersive experience as well as creating texture and function. The fiber optics that I used for my immersive installations allowed the integration of computation and physical environments. They were very successful in reflecting computational expression. Based on the materiality research from *nite_aura* and *Lumibreath*, I will continue to investigate how light may influence participant's quality of immersion.


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