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SENIOR THESIS PROJECT

# TEMPUS

Defne Kansu

Industrial Design

Virginia Tech

19

I have had a special interest in lighting design for over ten years. When I walk into a room, the light fixture is often the first object that grabs my attention.

MOOOI, NEW YORK



RICH BRILLIANT WILLING, NEW YORK



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## What does design mean to me?

Born and raised in Turkey within a family of doctors and scientists, I was the odd one out, doodling during family reunions. My journey with creativity started at a very early age and brought me to Virginia Tech to study Industrial Design with a minor in Entrepreneurship.

I believe that design is a language rather than a profession. It is a form of communication that allows designers to understand humans and connect them with objects in a way to create better experiences, better environments and better opportunities. I strive to be multilingual in design.

I chose lighting as my focus for my industrial design thesis. My primary motivation was my awareness of how interlinked lighting and emotions are. Humans are wired to react and interact with light since their initial creation. In my effort to communicate through design, I found light to be the key feature to a holistic understanding of human centered design.



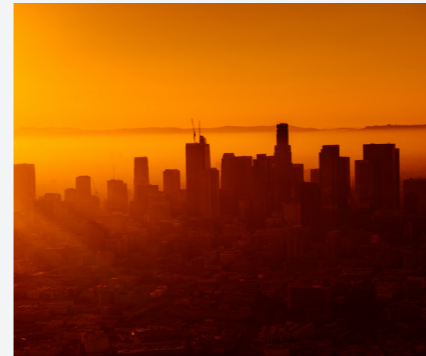
# CREATIVE MANIFESTO

# EXPLORATION OF LIGHT AND TIME WITH A FOCUS IN HUMAN CENTERED DESIGN.

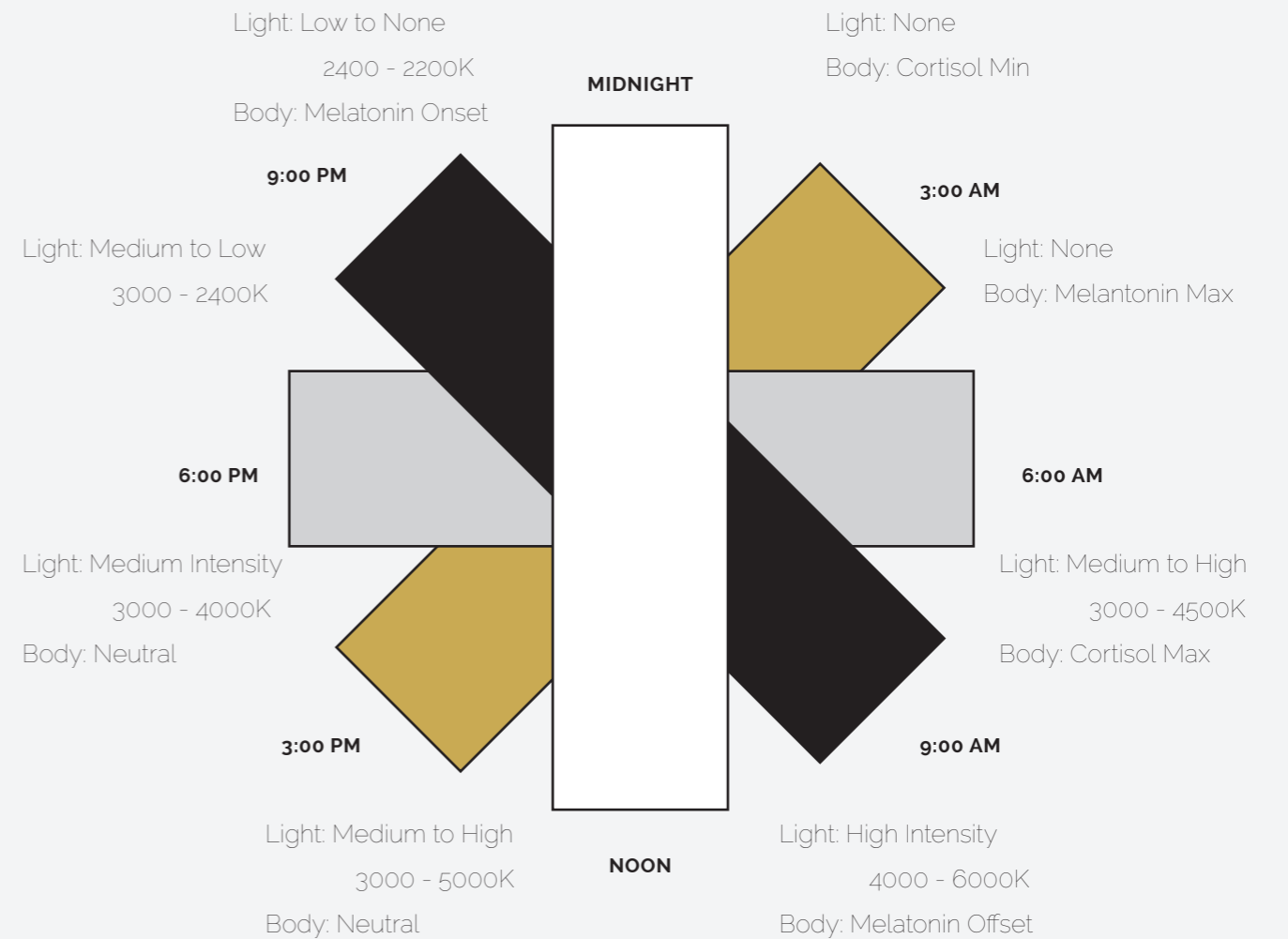
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**Before artificial lighting, humans accepted sunset as the end of the day.**



The movement of light is an indicator of time. As the sun's position changes, so does our perception of time. Our bodies are wired to react to the light levels through the biological clock called circadian rhythm. Circadian rhythm is a 24-hour internal clock that is controlled by the hypothalamus part of the brain in humans. It cycles between sleepiness and alertness at regular intervals and maintains the body's response to time of the day through the release of hormones such as melatonin and cortisol. Distrupted circadian rhythm (jet lag, daylight savings) can affect productivity, alertness and mental state.



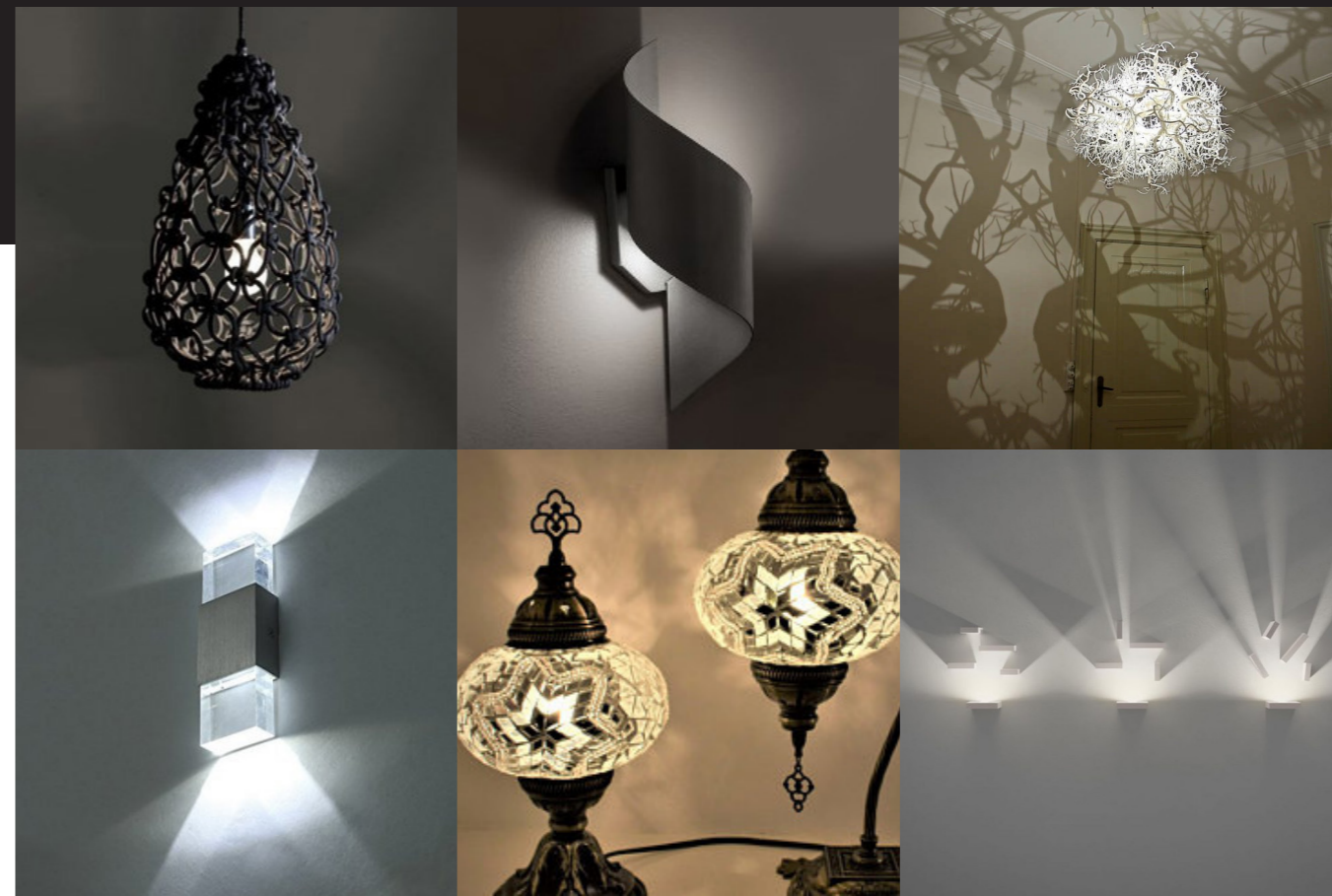
# Getting Inspired

Designers have experimented with movement and interaction in lighting fixtures through configuration of different setups made available to the user. These configurations are especially important in focus lighting where the area of work is illuminated. For suspension lights, however, the user interaction is limited to the setup that the user prefers and is susceptible to staying that way without further interaction as ambient lighting does not require targeted illumination.

**Interaction and movement lies on a spectrum of convenience where too much of either can be a hassle. I wanted to find the balance.**





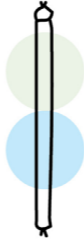



**Shadows that are created by lighting fixtures create a form of interaction where the room allows the designers intention to manifest by converting the room into a canvas.**



# Lighting Up A Space

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Due to their CRI, color temperature range and lifespan, LEDs became the focus of my study.

	<b>INCANDESCENT</b> Not energy efficient Short Lifespan 2700 - 3000K		<b>CFL</b> Energy Efficient Long Lifespan 5000K		<b>FLOURESCENT</b> Energy efficient Long Lifespan 3500 -5000K
	<b>LED LIGHT</b> Energy Efficient Long Lifespan 2700K - 6500K		<b>HALOGEN</b> Energy Efficient Long Lifespan 3000 - 3200K		<b>HID LIGHT</b> Energy Efficient Lifespan Varies 3000 - 10000K

Color temperature is stated in Kelvins in a scale of 1,000 - 10,000 and relates to the warmth that a light emits. The higher the number, the cooler the light appears. Color rendering refers (CRI) to the accuracy of the light being emitted compared to a reference light source. It allows humans to accurately see colors and their environment. An example is that although flourescents are excellent in color rendering, they are high in color temperature and emit cooler tones. Incandescent on the other hand are not ideal for color rendering as they are higher in CRI but they are also lower in color temperature and give out warmer tones.

I have decided to focus on ambient lighting for this thesis and decided on looking at pendant lighting for further inspiration.

### TASK LIGHTING



It adds brightness for activities like reading, studying, cooking are performed. Effective task lighting should be free of distracting glare and shadows.

### ACCENT LIGHTING



It is used to highlight certain objects or architectural features, such houseplants, paintings, sculptures, a decorative range hood or carved cabinet doors.

### AMBIENT LIGHTING

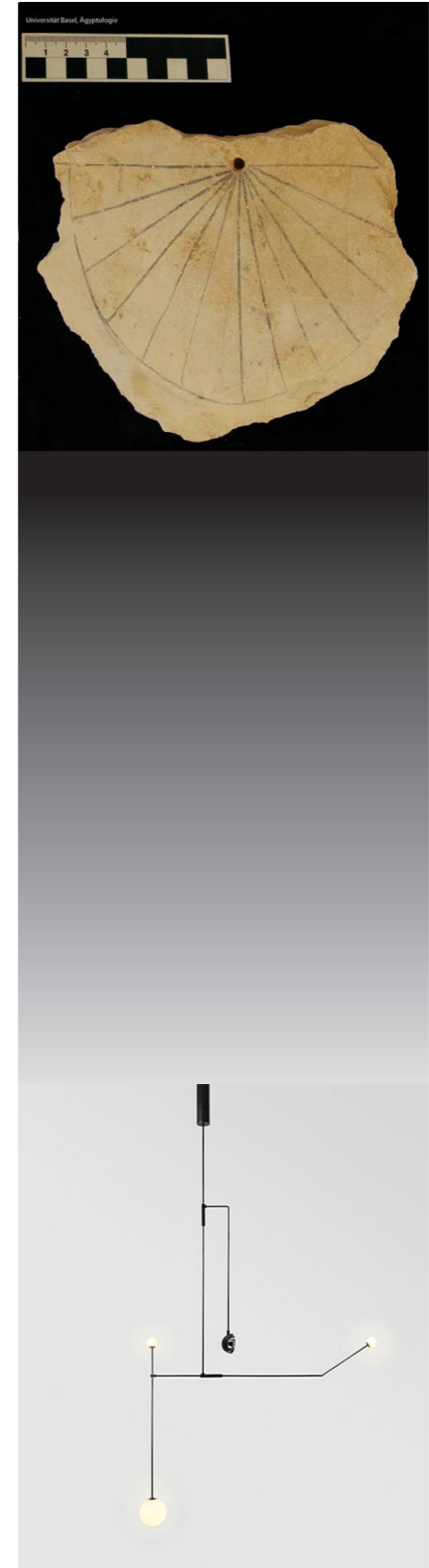


It provides an area with a comfortable level of illumination. Glare should be avoided in ambient lighting to maximize comfort. Usually placed in the center of the room.

# Light & Movement

**World's oldest sundial showed movement of light through shadows in 1500BC. Michael Anastassiades's Kinetic Light shows movement through the fixture today.**

Movement within the context of this thesis is inspired by the sundials used in early civilizations as well as the sculptural movement of light fixtures. Through the movement of the sun, the shadows had notified the humans of the time during the day, allowing them to understand time as we know it today. In contemporary world, kinetic light fixtures were explored by designers such as Michael Anastassiades.



**Kinetic Light Over The Years**

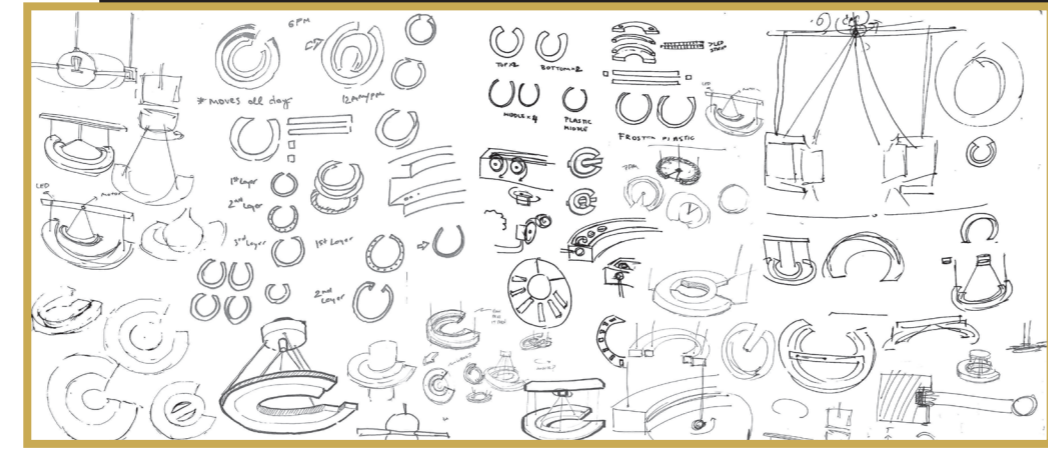


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# Form

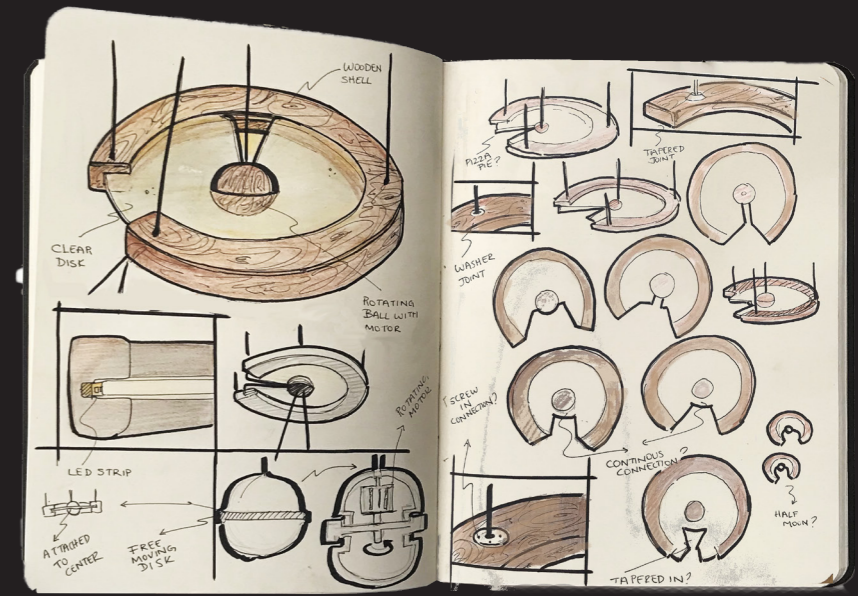
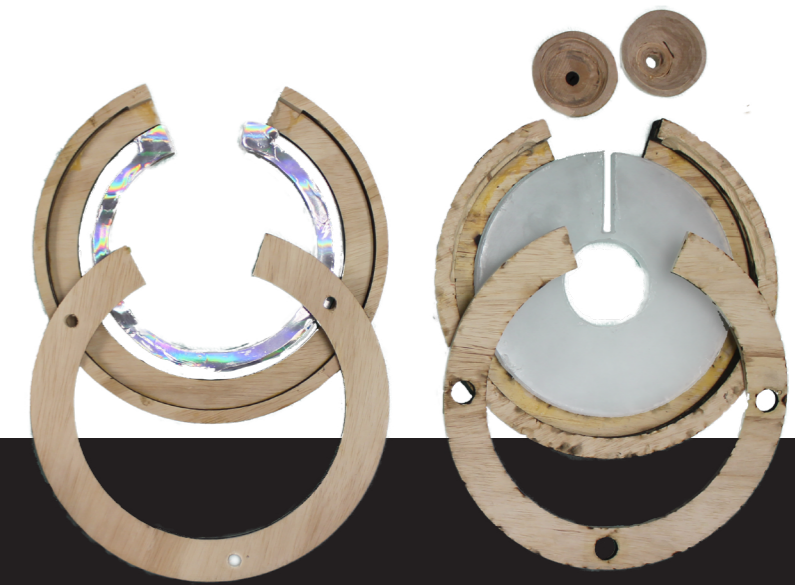


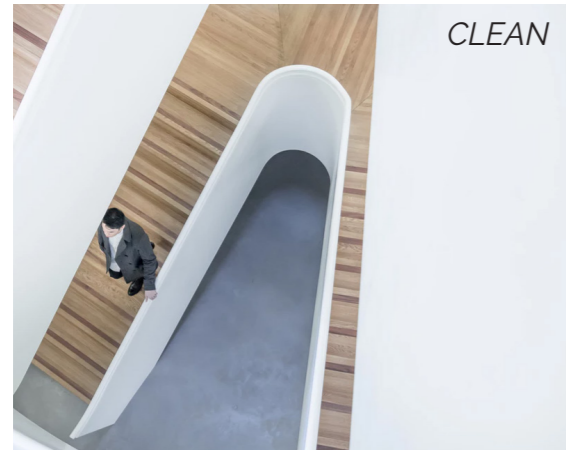
Earlier sketches evolved into the two following forms with similar design language. These forms were decided to be prototyped to understand scale, part to whole relationship as well as manufacturability.



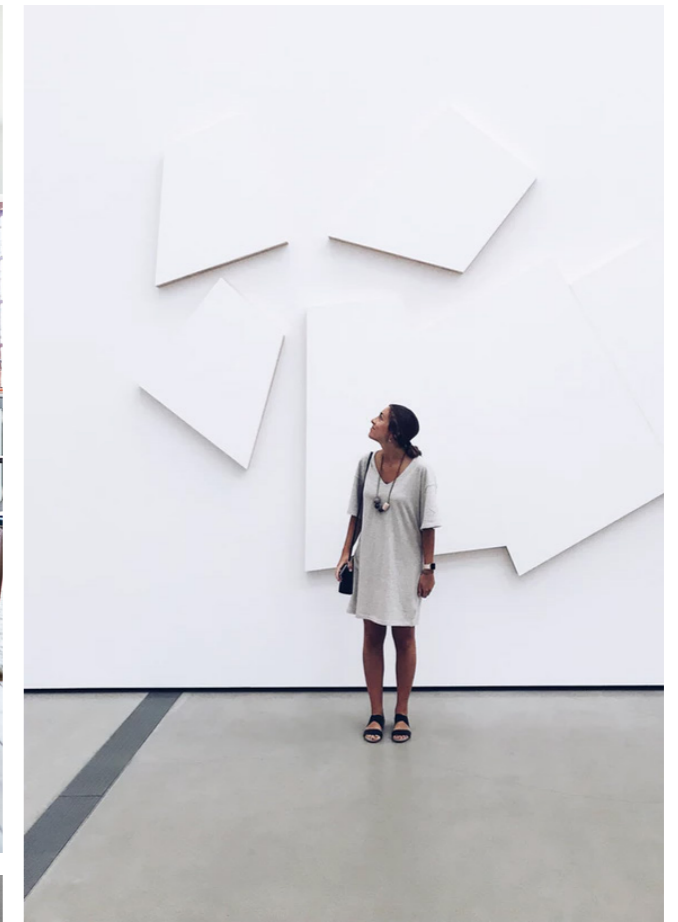
# Exploration

Limitations in rotational movement with the previous configuration has pushed for refinement of the form, without compromising on the design language.





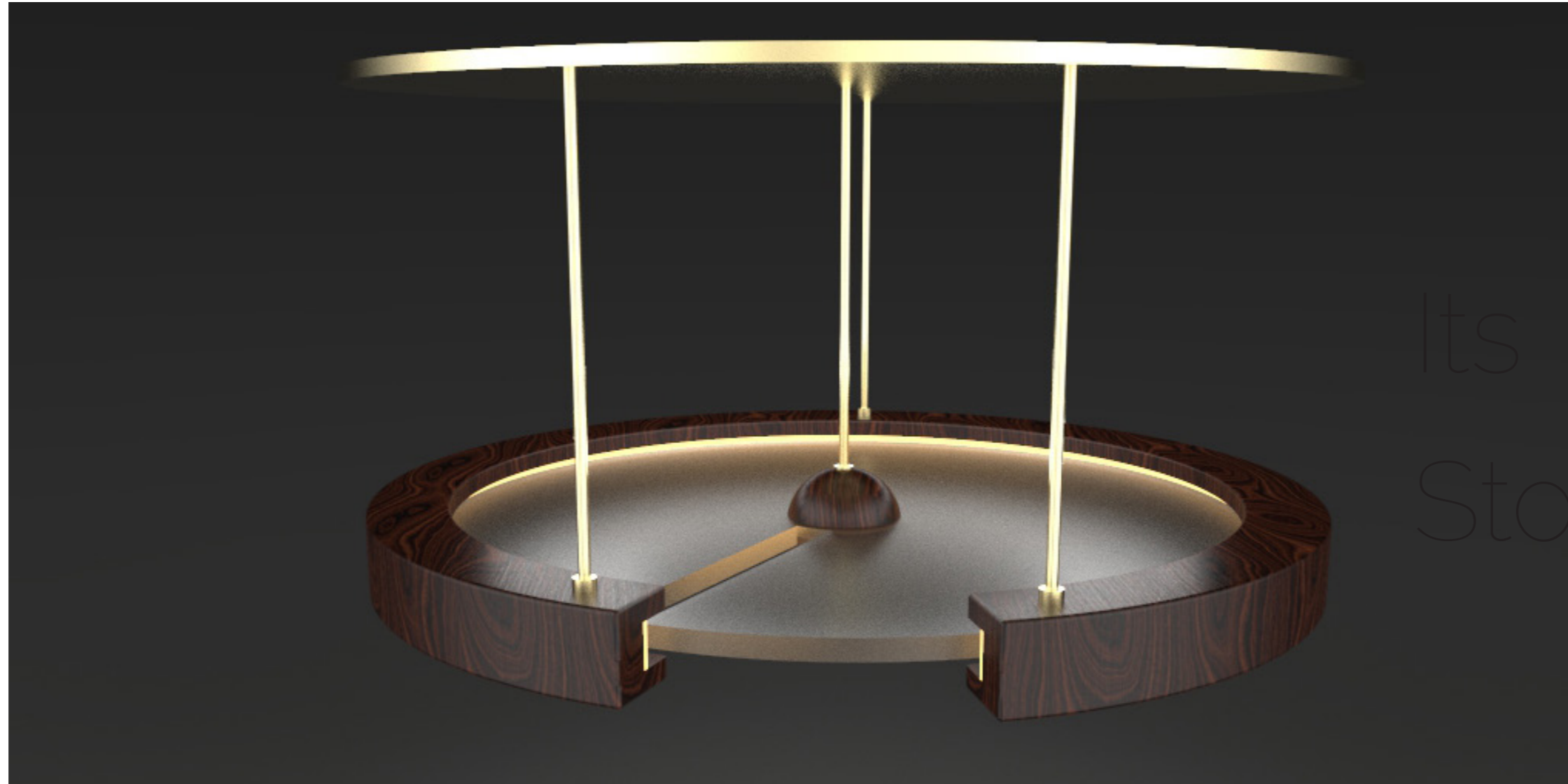
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# M o o d b o a r d







Its  
 Story

**Inspired by sundials,  
 Tempus brings the idea  
 of time and light together  
 both in form and function.**

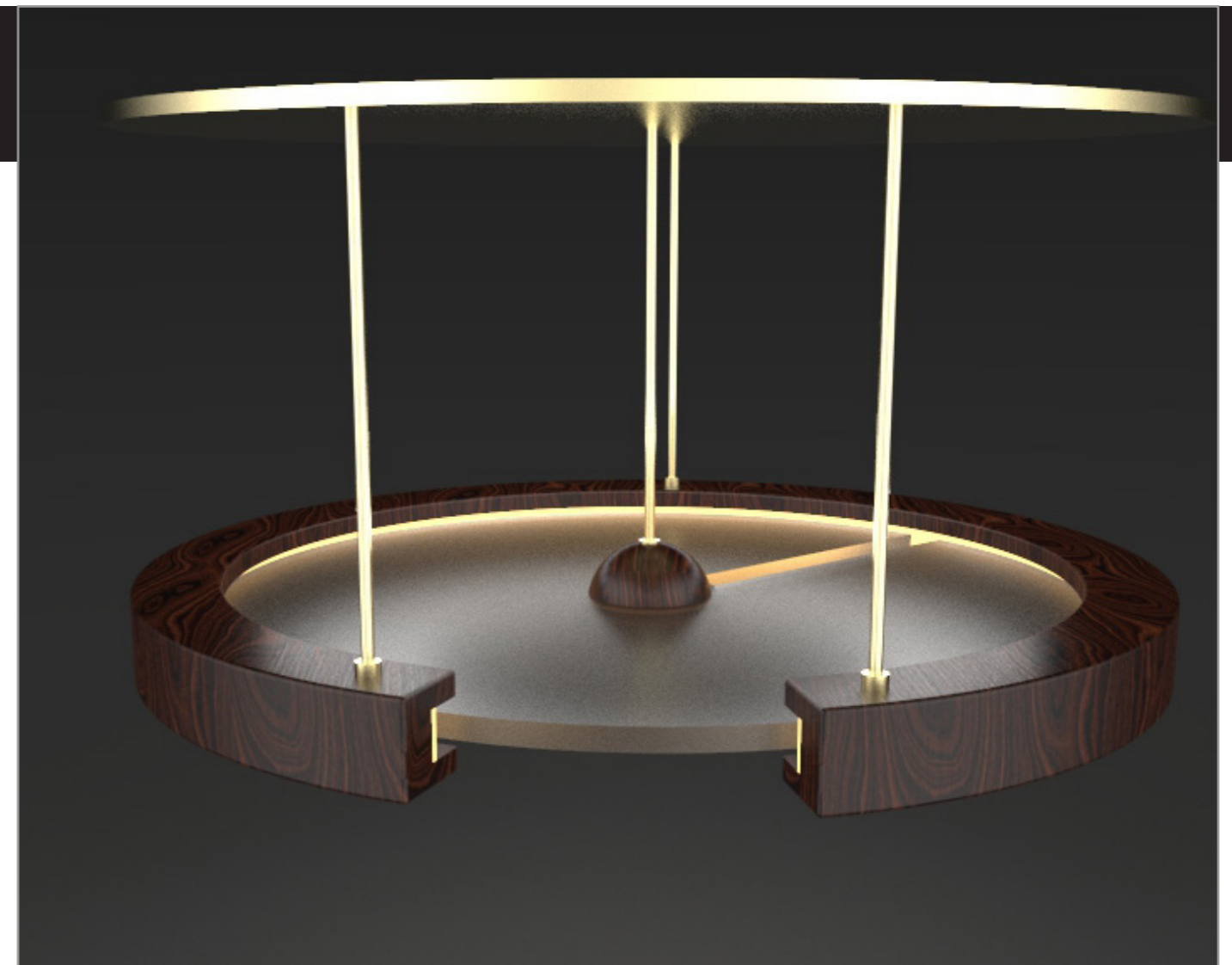
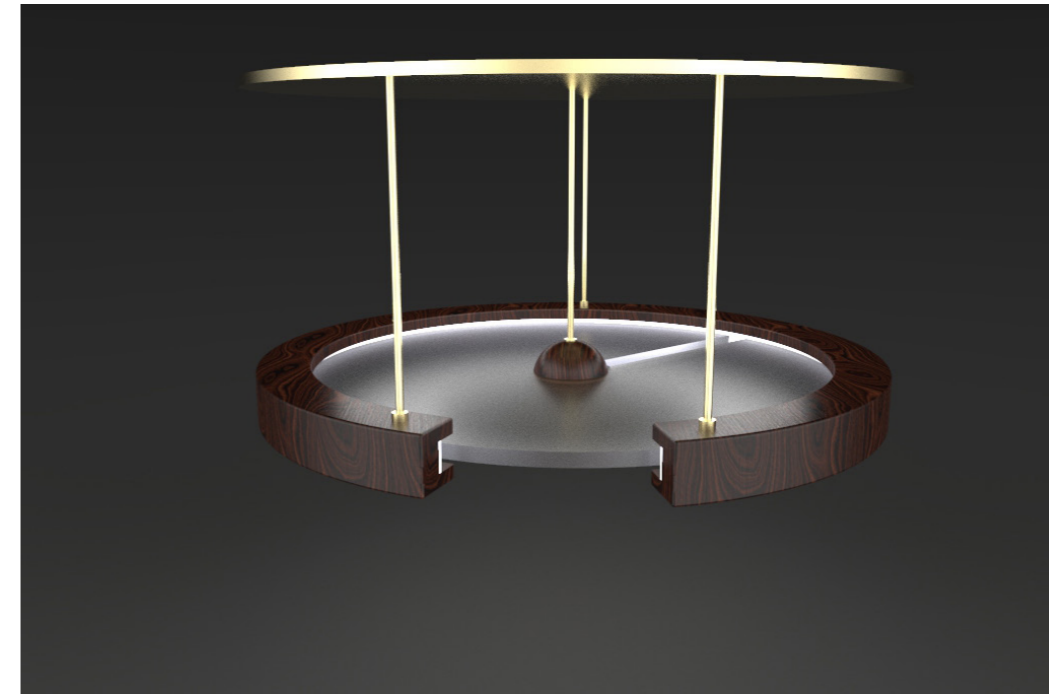
Tempus is revolutionary yet familiar in the way that it combines light and time together as they were meant to be since the dawn of creation. By tuning into the most primitive needs of human biology, it promises to produce light in a way that is meant for humans. By combining contemporary lines with the suggestive and utilitarian design of ancient sundials, it encourages the user to reevaluate the relationship between the two concepts. Tempus's defining feature is its mobile center,

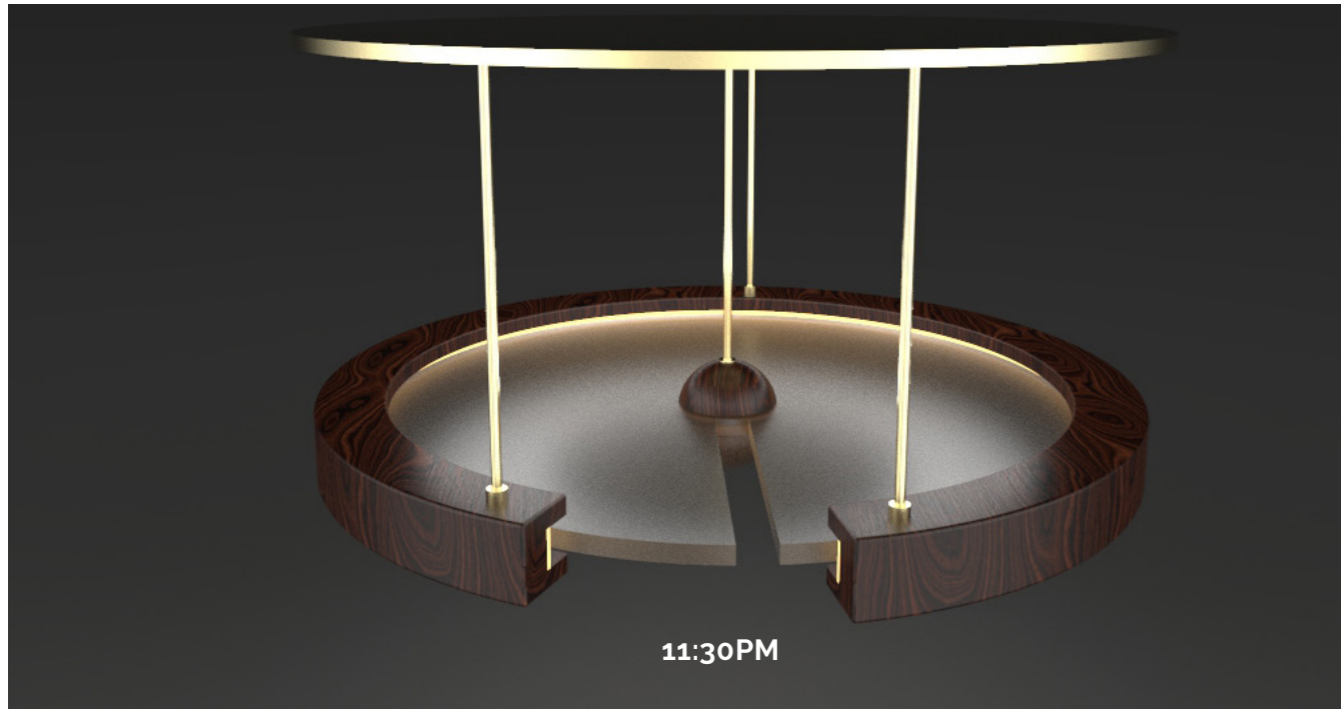
that rotates during the day and brings presence and value of lighting fixtures back into the environment by creating interaction between the user, the product as well as the setting. Tempus is controlled with a novel lighting switch, that allows the user to customize the mood when necessary or not, as Tempus is also equipped with the ability to decide *when the time and the light is right.*

# Considerate Design

The availability of a broad spectrum of color temperature options encourages productivity, comfort and utility when it is needed.

4200K  
2400K

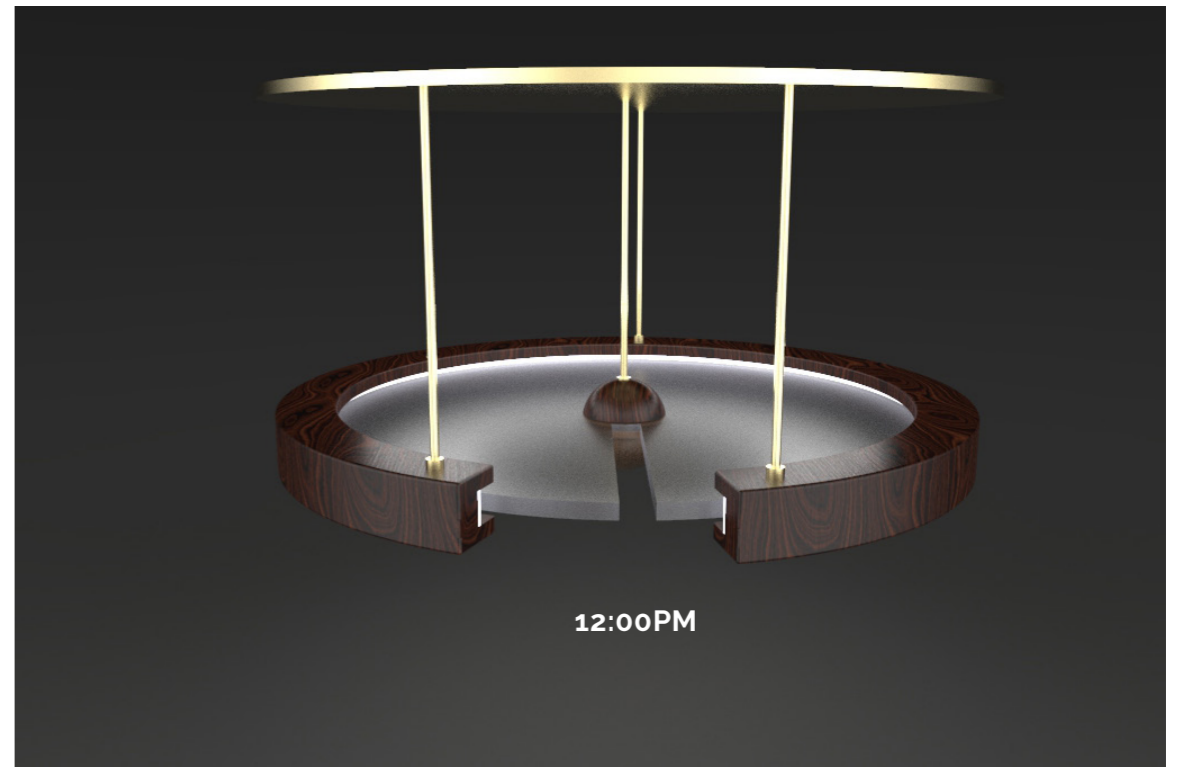
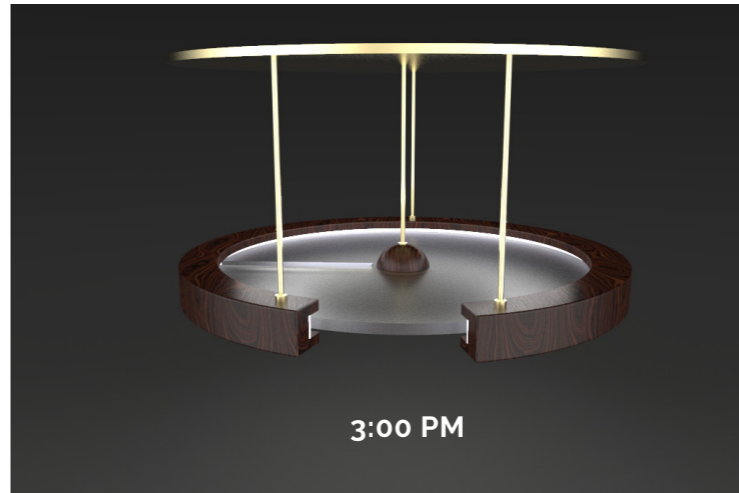
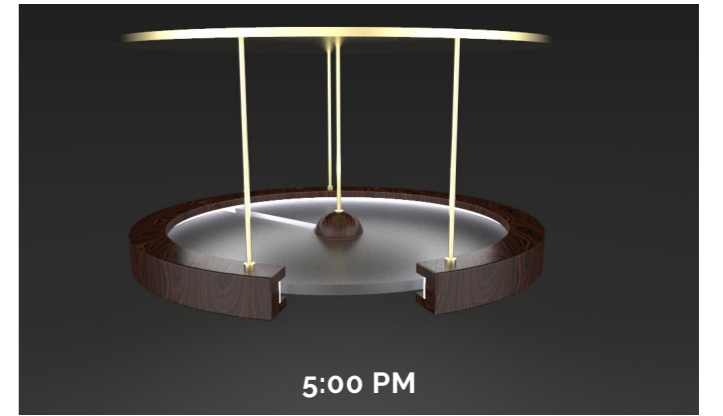




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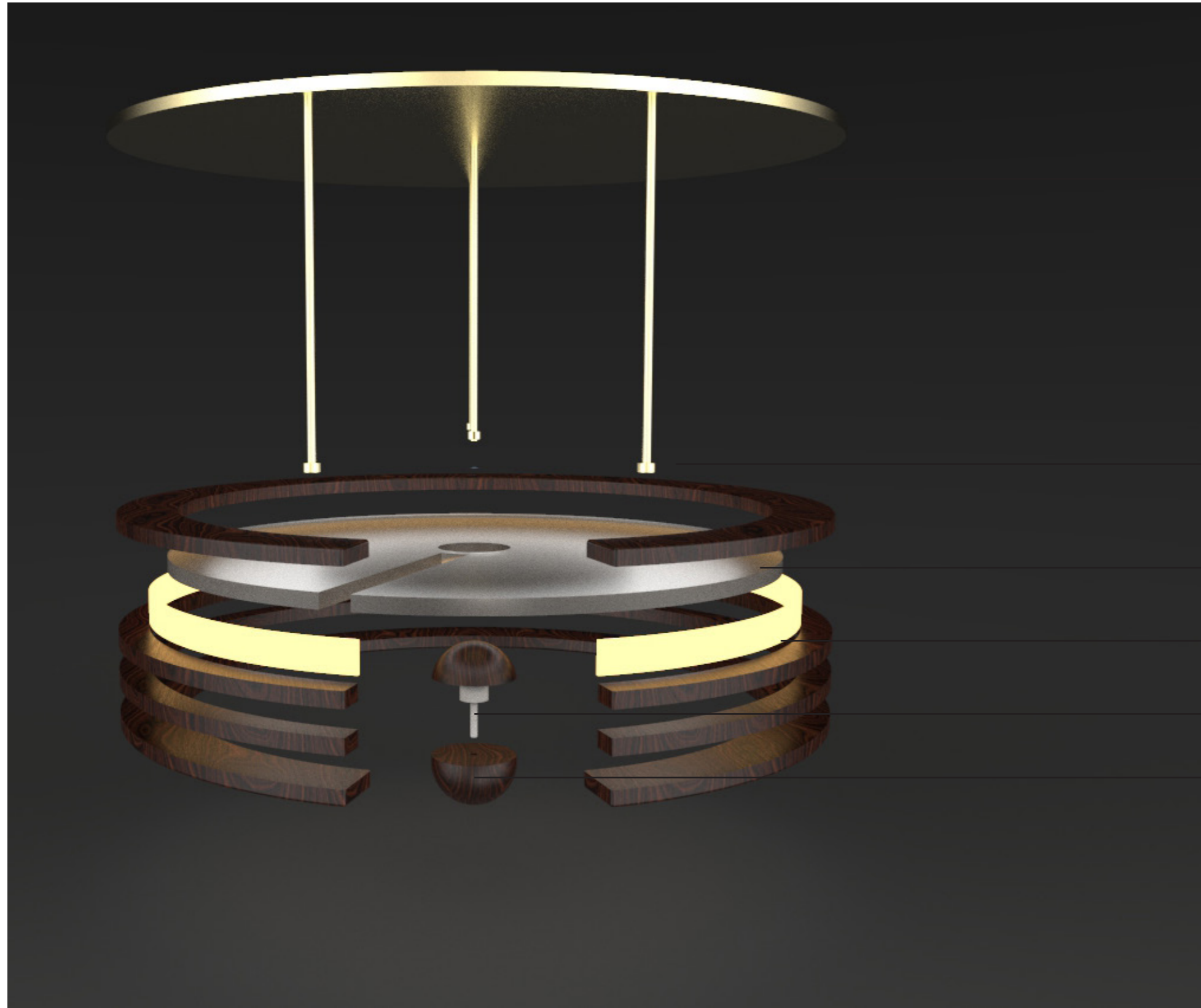


The rotating translucent disk brings a pleasant interactive experience to the user during the day without causing any distractions.



# Pleasant Interaction





Brushed Brass Disc

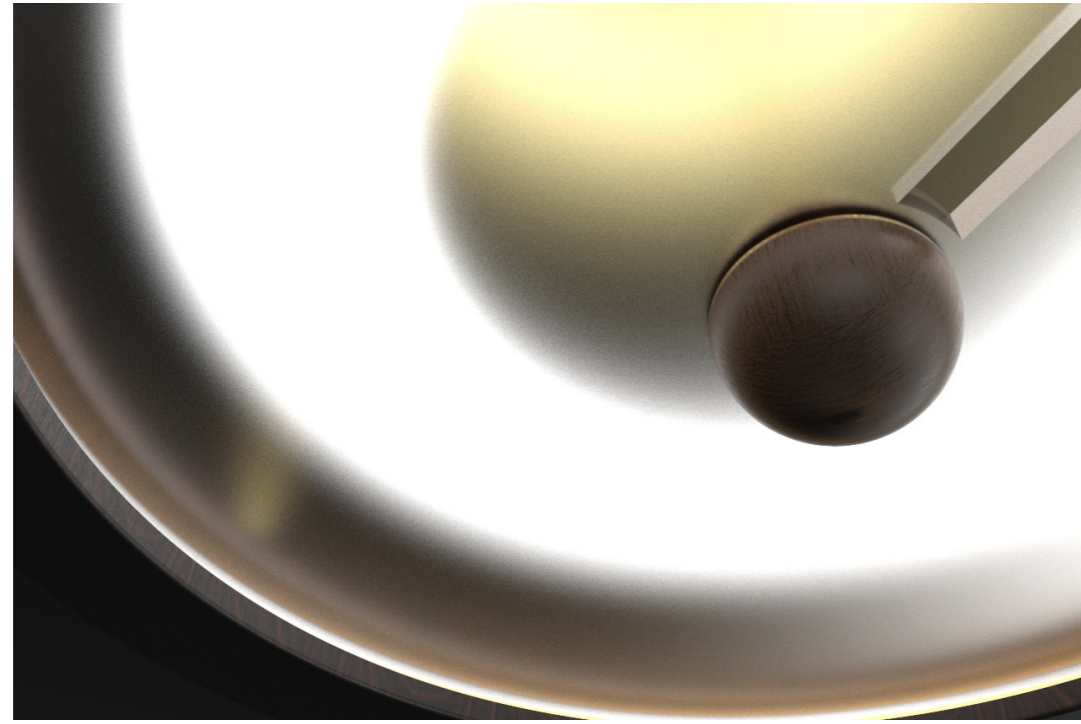
Brushed Brass Tubes

Blown Glass/Acrylic Disc

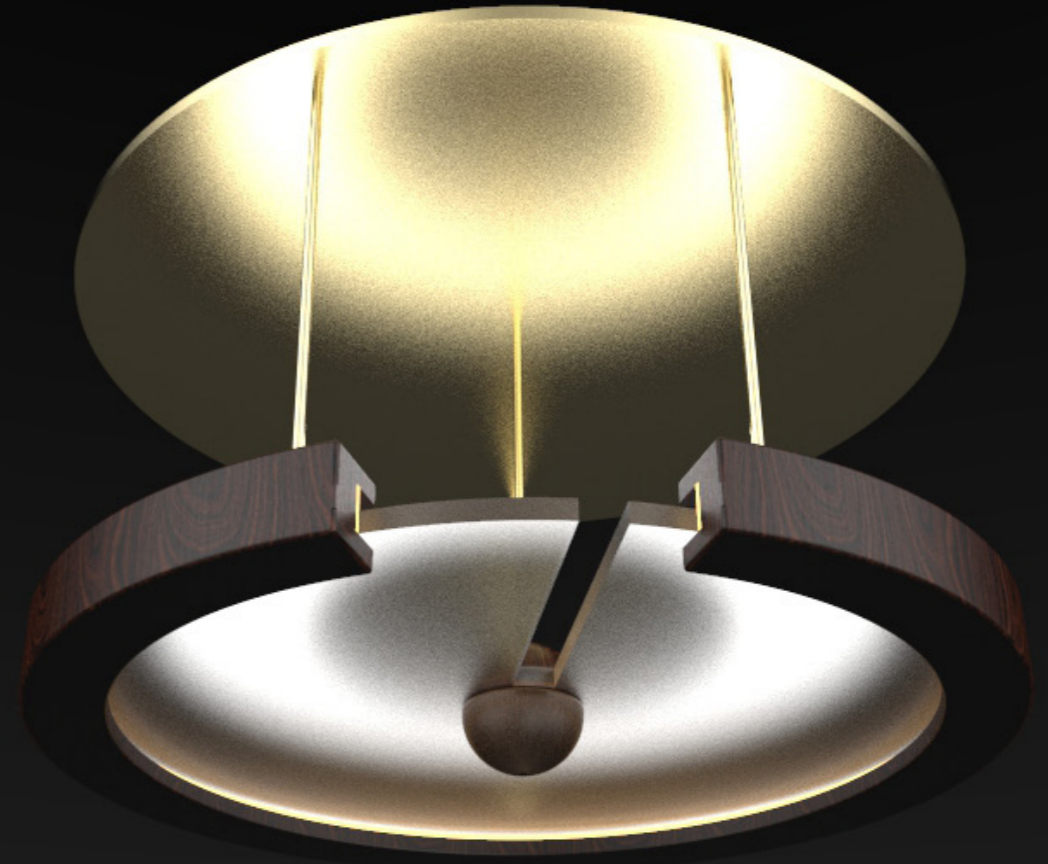
LED Strip

Rotational Motor

Wooden Sphere



# Illumination On Every Surface



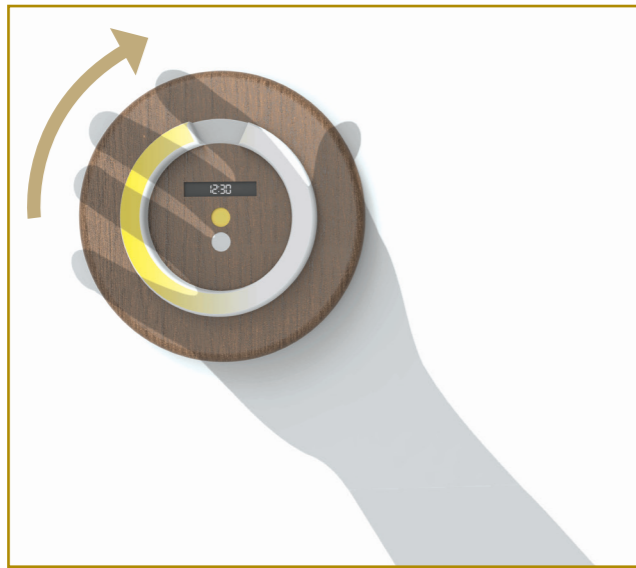


# Light For Every Occasion

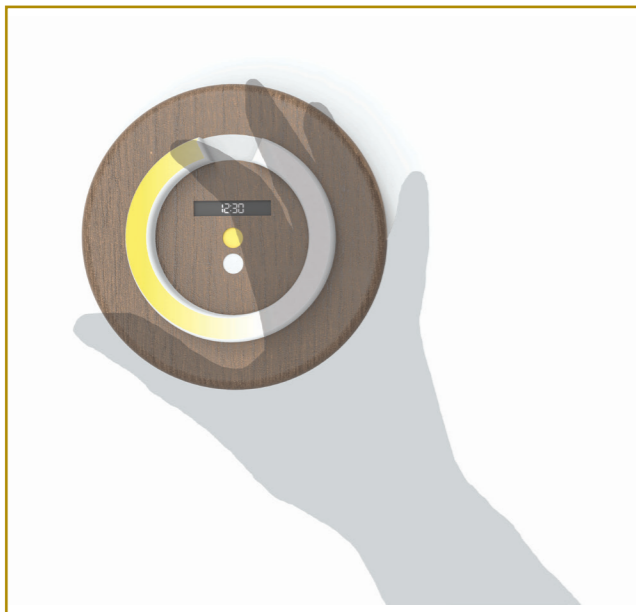


# Smart Switch

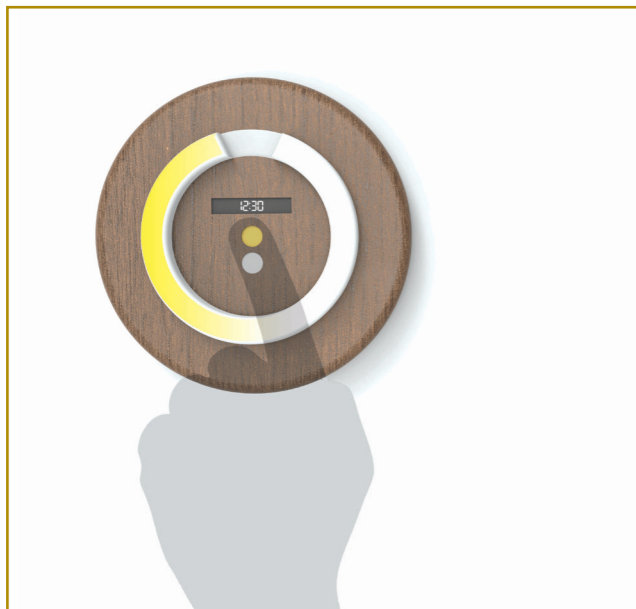




Turn the back side of the dial clockwise to turn the light on through a dimmer switch. Turn it counter clockwise to turn it off.



Reset the color temperature switch by sliding fingers on the inner dial to set the mood. To go back to automatic, simply turn the light off and on.



Switch easily from maximum color warmth or coolness by selecting from the two buttons on the center. Hold to activate and navigate the timer.

# Set The Light & Time

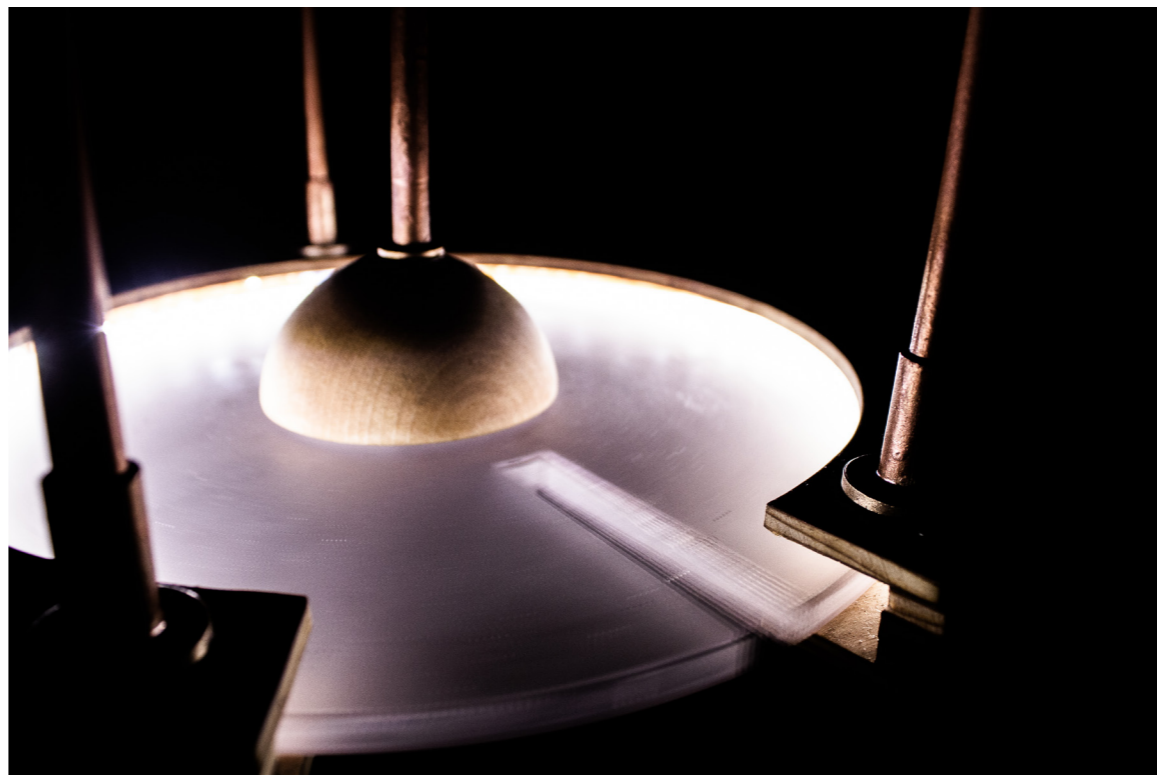
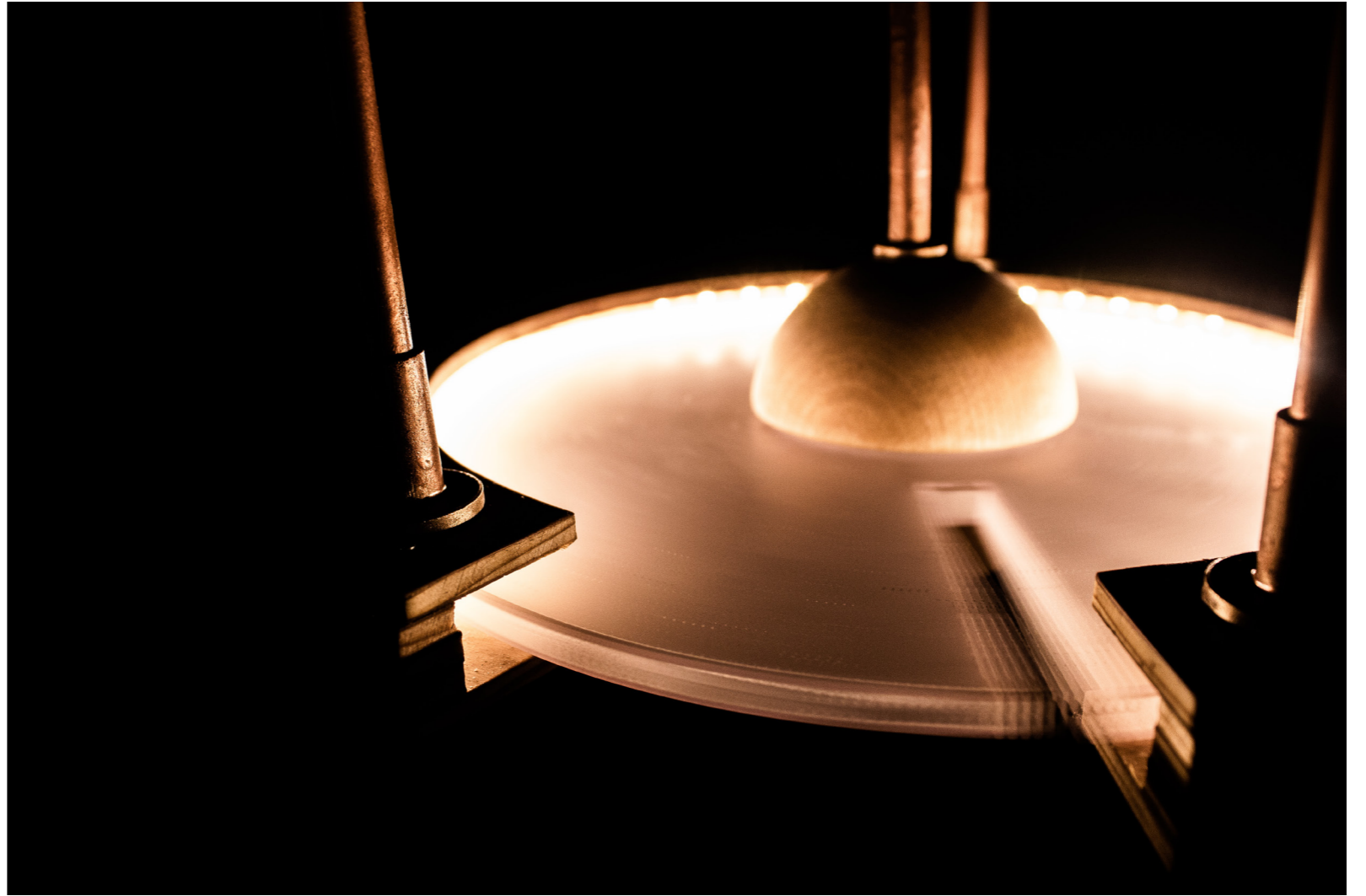


The smart dial will automatically adjust color temperature according to the time input and will rotate Tempus. The dimmer is not affected by time.





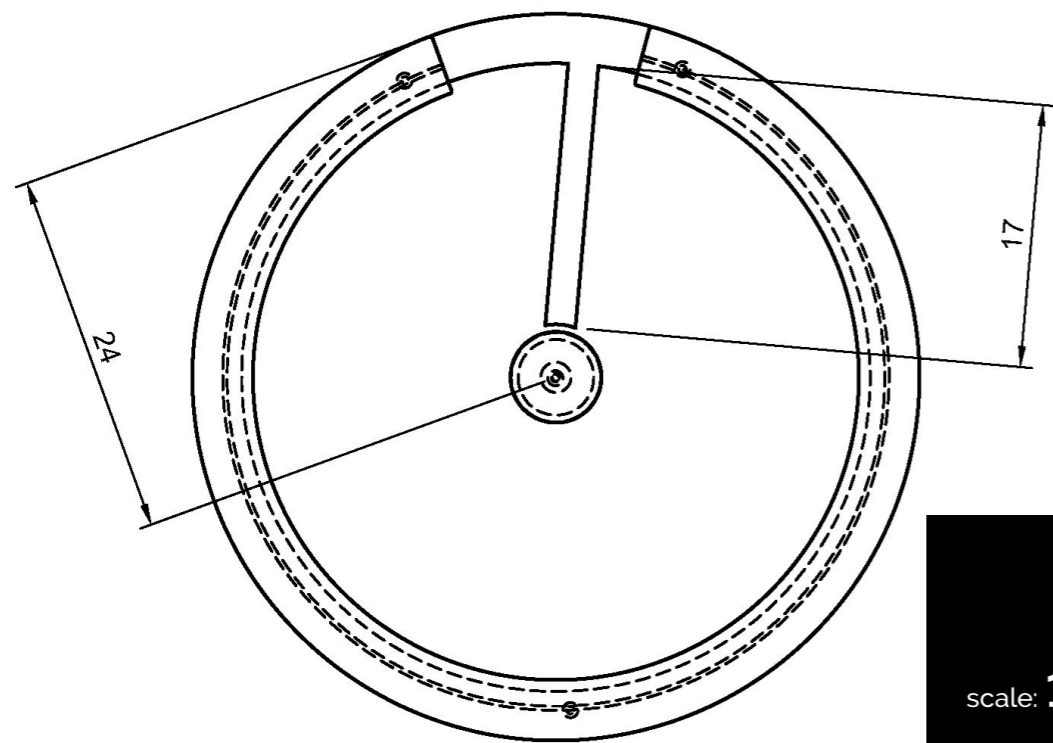
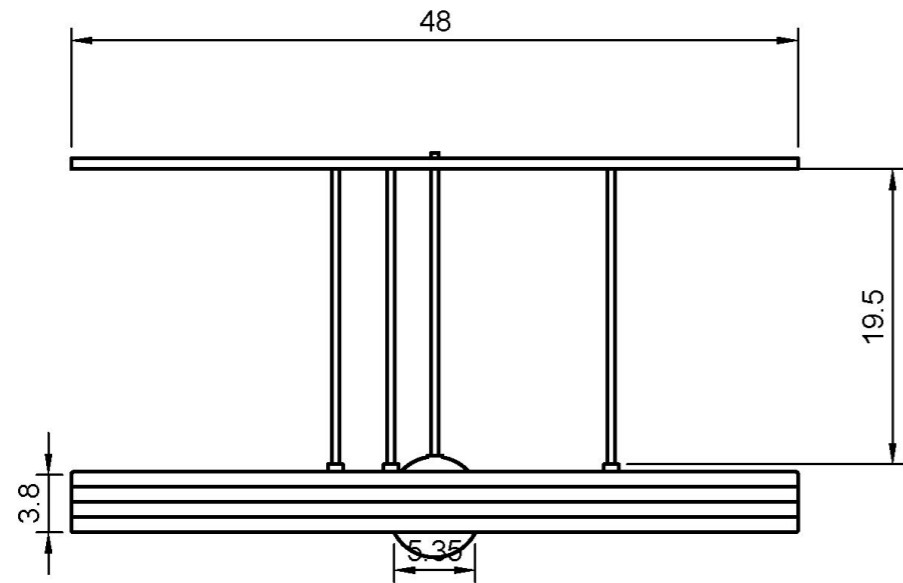
The prototype was successfully able to make a full rotation and change in color temperature.



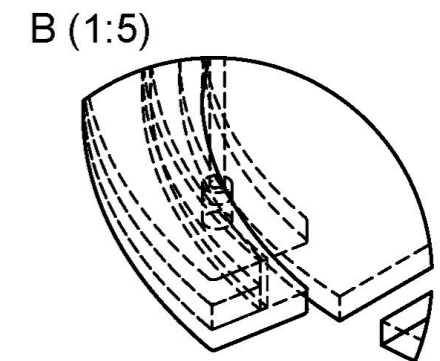
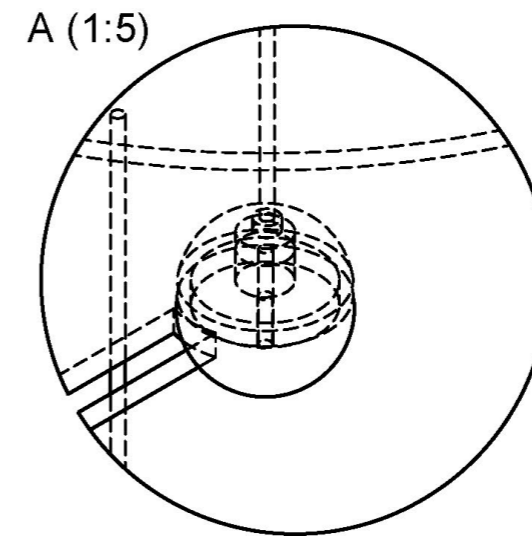
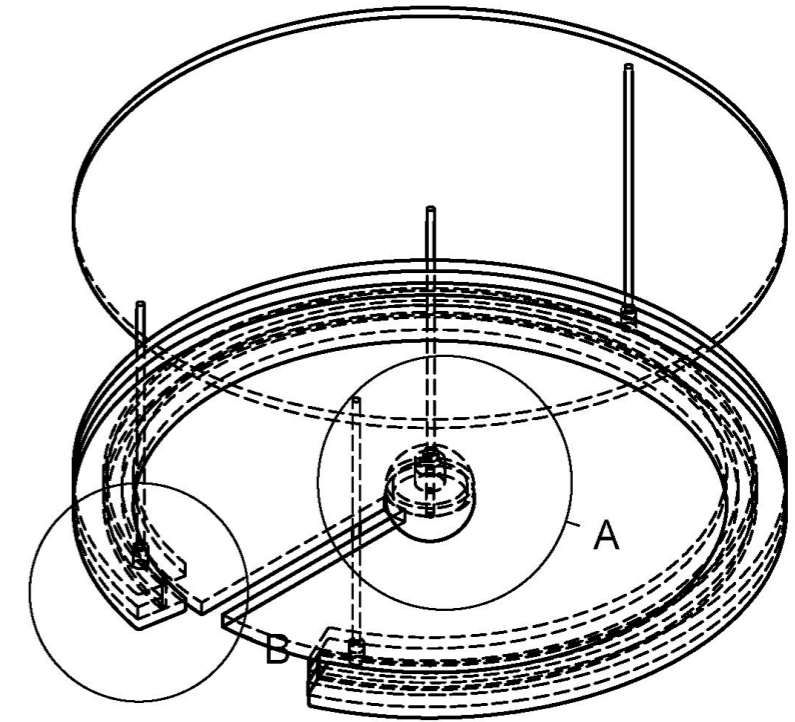
P r  
o t o  
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# Specifications

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scale: **1:8**  
units: **Inches**



**Finishes**

- Solid Mahogany
- Solid Oak
- Solid Maple
- Solid Redwood
- Veneer

**Materials**

- Wood Core
- Brushed Brass Accents
- Acrylic/Glass Disc
- Rotational Motor
- Wooden Sphere

**Specs**

- 12-24 V
- Pendant Cord Length 22"
- Acrylic/Glass Disc
- 3450 Lumens per reel
- Tunable LED Strip



A smart lighting project that not only addresses our most basic needs but also contributes to the environment it is placed in a meaningful way.

**Social**

[linkedin.com/in/defnekansu](https://www.linkedin.com/in/defnekansu)

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