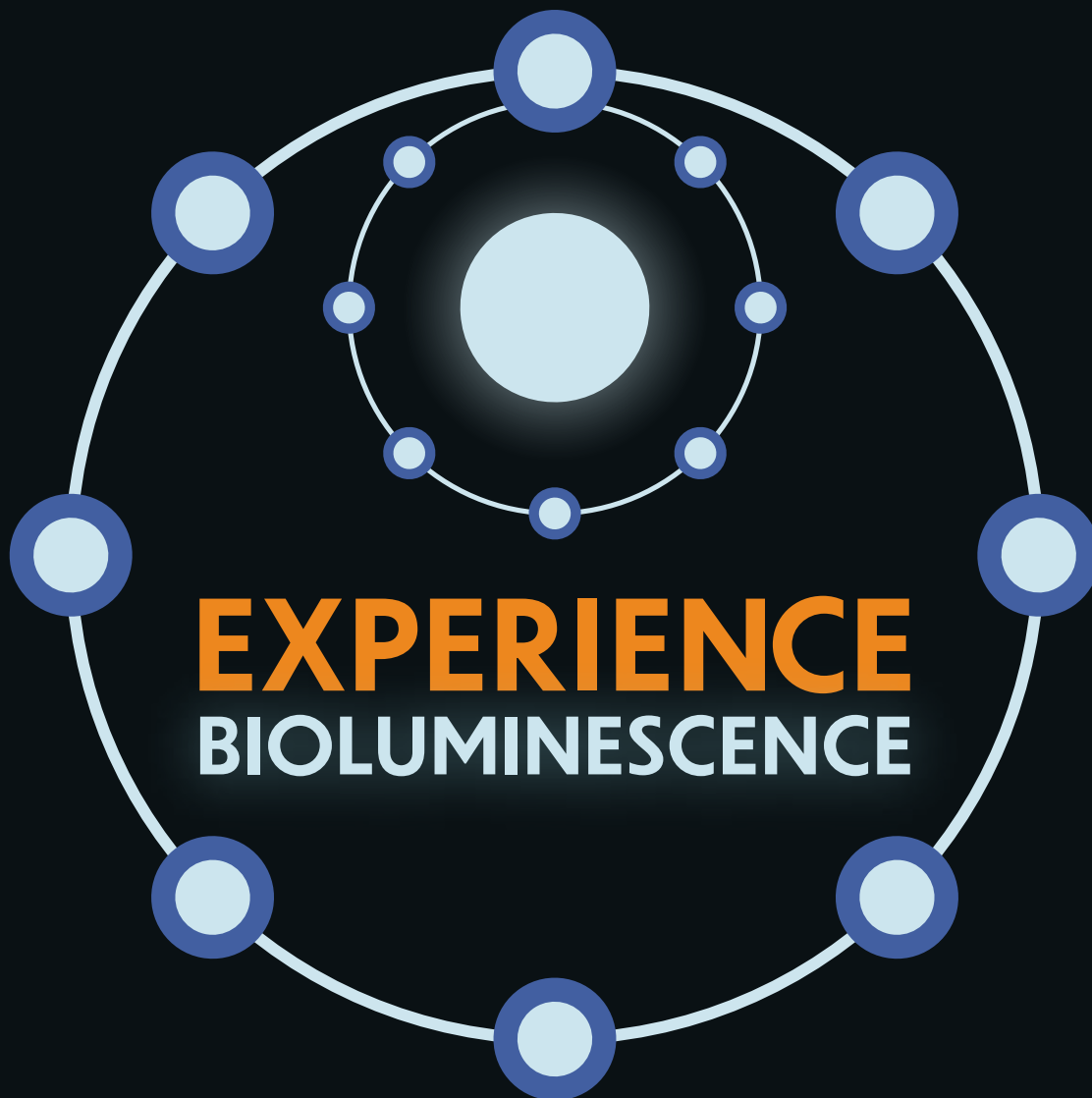




THESIS BOOK Jade Luther

Peer reviewed by Morgan LaFrate

Class
VC 403

Faculty Advisor
Patricia Murphey

3D Builder
Graham Hagerty



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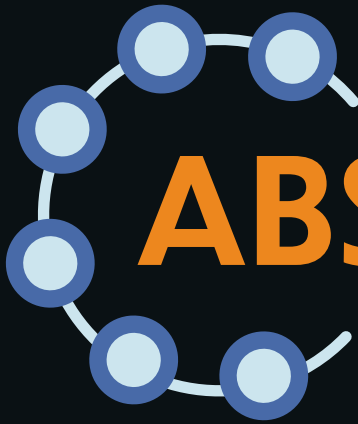
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ABSTRACT

Understanding and learning about the ocean and its creatures can be a fun and exciting experience. However, not all elements about specific animals and creatures are widely known. This project involves the creation of an interactive and fun learning exhibit of marine animals which utilize bioluminescence. This being, the natural emission of light by organisms. A combination of interactive screens, external designs, and center water table would be used to teach about the strange chemical reaction that causes this phenomenon.

Environmental wall / room signs would be made to display and support the interactive screens that would take users through the exhibit. This exhibit would also have and talk about the specific animals that use bioluminescence. Therefore, small environmental designs, like wall boards would also be made to describe the individual animals. The exhibit would most likely be displayed at an aquarium that is now advertising its new attraction.



PROPOSAL

What, Why, How

The deliverables in this project would be the mock up of environmental signs and a three dimensional space for users to “walk” through and learn more about what bioluminescence is and specific animals that use it.

Purpose

The main purpose of this project is to have people learn more about what bioluminescence is in a fun and easy way. Not many people know why exactly some animals glow, and what causes some beaches to light up and emit blue glowing waves at night. This exhibit would explain the science behind bioluminescence as an easy to understand walk through while also letting people discover more about how our world and its animals work.

Target Audience

The general target audience would actually be pretty big. Since this would be an aquarium exhibit / attraction, all types of viewers and people would inevitably become the target audience. Even if it was designed for a younger audience in mind, parents and families would still be with their young ones and would want to take a look at the exhibit as well. The goal is to make the science behind bioluminescence more understandable and fun to learn about, so the overall design would be pretty simple and aimed to be comprehensible to almost all ages.



VISION & GOAL

One of my longtime dreams as a child was to be a marine biologist. I always enjoyed learning about marine animals and all the strange and natural phenomena the ocean has to offer. Things like camouflaging invertebrates, micro organisms, plankton, deep sea vents, etc. always fascinated me. The purpose and goal of this new aquarium attraction would be to provide visitors with that same feeling I had (and still have) as a kid. Many aquariums and schools teach young children the basics of oceanography at a very easy and simple level. By the time they become older or past that stage of learning, there is no desire to learn more of the complex areas of marine life such as topics like bioluminescence.

The act of learning through wonder or admiration is powerful and can be a great starting point for young (and old) people. When people are interested in a specific topic due to the feeling of fascination, they are more likely to appreciate the subject or pursue more of that knowledge. We are automatically more motivated and encouraged to learn more because we have already been entranced by something. This is a key focal point "feeling" that I want viewers coming away with when they are walking through the exhibit and interacting with set pieces



RESEARCH

Doing research for this project was tricky for me. At one point, this project was going to require a lot of research and information. Before I changed this project's goals, it was all primarily focused on content and learning about the topic of bioluminescence. However, I switched this goal during the semester and focused more on what the exhibit looked like. For my research I used a combination of educational and credible websites with various aquariums and exhibits. The Creatures of Light Exhibition is actually another bioluminescent attraction focusing on the same topic as my project and many of my design choices for the 3D space were inspired by it.

Aquarium / Exhibit Inspirations

Creatures of Light - American Museum of Natural History, New York

Aquarium of the Pacific - Long Beach, California

Monterey Bay Aquarium - Monterey, California

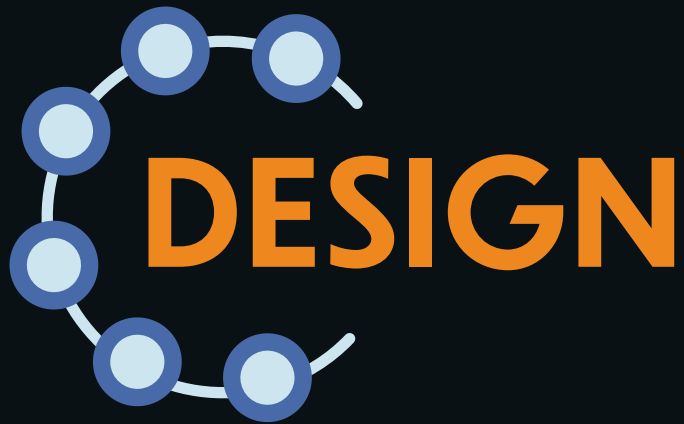
Content Information

<https://animals.howstuffworks.com/animal-facts/bioluminescence3.htm>

<https://bioluminescenceintromarinebio.weebly.com/reactions-and-systems.html>

<https://ocean.si.edu/ocean-life/fish/bioluminescence>

<https://skylandstourism.org/bioluminescent-beach-maldives>



06

Logo

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Colors

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Fonts

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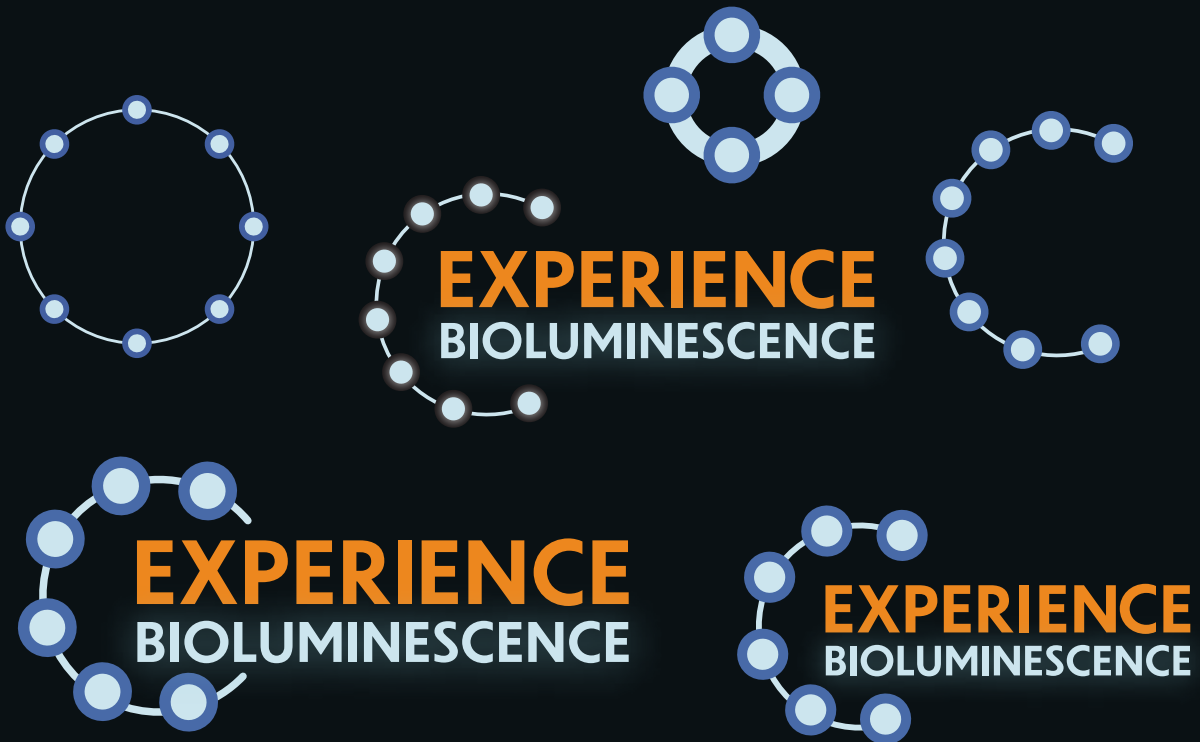
2D Design

11

3D Exhibit



When creating this project, the logo was actually one of the last elements I created. It was a key part of my project that wasn't really clicking and I had a hard time trying to think of a creative solution to "show" / "represent" bioluminescence as a whole. Once I had something going, I went through various iterations of what the circle elements could look like with the text. I didn't want something that looked too formal, but also I needed to keep it scientific.





The final designs I landed on were fairly simple, but complex too. The circle element allows two variations of this logo. The bottom logo is a more formal design for titles and information. The one above it is designed to be used for cover pages or environmental signage that people pass by.

A key element I wanted when creating the overall design and feel of this project was the feeling of wonder because of a scientific topic. The logo designs and layouts with the text and design elements let the logo breath more and be used for both formal and informal purposes.

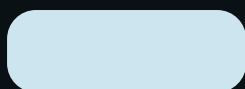




#cdcdcd

RGB: 205, 205, 205

CMYK: 19% 15% 15% 0%



#d5eef7

RGB: 213, 238, 247

CMYK: 15% 0% 2% 0%



#425faa

RGB: 66, 95, 170

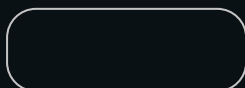
CMYK: 82% 68% 1% 0%



#f6901e

RGB: 246, 144, 30

CMYK: 0% 52% 99% 0%

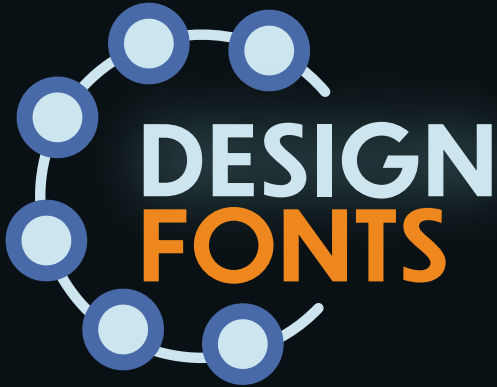


#0a1114

RGB: 10, 17, 20

CMYK: 78% 68% 64% 81%

When first thinking about color palletes to choose for this project I admit there are limitations when picking for an aquarium exhibition. Blues and neutral colors are often associated with these kind of attractions, however I didn't want this exhibit to be solely a monochrome set of blues. I knew blue was going to most likely be a significant color, but I added some more colors and pushed the amount I showed in comparison to the blue. Many of my backgrounds, while blue, are more of a tinted black instead and I use a bright orange to bring more color and contrast to the midtone blue I have. The orange also serves as the dominant accent color while also serving its subconscious role in color theory. Orange is often associated with encouragement and energy which helps reiterate the design choices of feeling wonder and fascination in science.



DUNBAR TEXT
Bold

Avenir
Medium

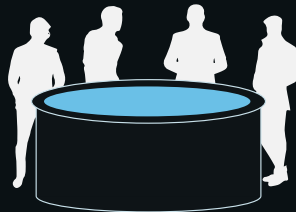
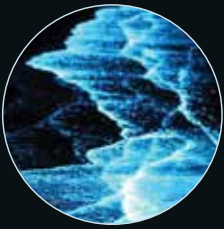
For the last design choice, choosing a font was also important. I knew I wanted to use a set of sans serif fonts, but I didn't know if I should go with something entirely formal or choose a font that had a more artistic design. I ended up choosing the more formal and simple fonts because I didn't want people to find wonder in the science because of the design. I wanted people to find wonder because of the science. So I went with more rigid and uniform typefaces that wouldn't distract from the actual science being presented to the viewer. Both are simple and easy to read without much variation in each character.

DESIGN 2D ELEMENTS

Ai

All 2D elements were made with Adobe Illustrator.

MICROSCOPIC LIGHT



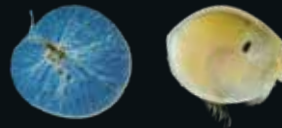
WATER TABLE

Discover and experience running your hands through glowing water and find out what creatures make them glow!

Rules

1. Do not jump in or on to the water table
2. Do not drink the water or splash it onto others
3. Do not run around the table
4. Please give others a turn if you've been at the table for a while

WHY DO BEACHES GLOW?



Answer ...

Microscopic Organisms

These tiny creatures emit a bioluminescent light when either disturbed or threatened by predators. Movement is also another element that will cause this glow, thus resulting in the magical effect we see.

WHERE ARE THESE BEACHES?



Tasmania, Australia

SEA JELLIES

Glowing Jellies

Most deep-sea organisms, including jellyfish, have evolved the ability to produce light. This is called bioluminescence. The light is produced by a chemical reaction that involves a molecule called luciferin and an enzyme called luciferase.



TAXONOMY

KINGDOM	animalia
PHYLUM	cnidaria
CLASS	scyphozoa
ORDER	rhizostomae
GENUS	cyanea
SPECIES	cyanea lilliputii



WHO AM I?



Glowing Jellies

ANGLER FISH

Habitat

Anglerfish live in the deep sea, where there is no light. They are found in the Atlantic and Pacific Oceans, and are known for their bioluminescent lures.



TAXONOMY

KINGDOM	animalia
PHYLUM	chordata
CLASS	actinopterygii
ORDER	stomatopoda
GENUS	stomatopoda
SPECIES	stomatopoda lilliputii

Feeding habits

Anglerfish are known for their bioluminescent lures, which they use to attract prey. They are also known for their ability to glow in the dark.

HOW IS IT USED?



Finding and Attracting Mates

Bioluminescence is a tool used by animals to attract and communicate with other and potential mates. The female Anglerfish often uses its body to move in a way that causes its body to glow in a way that attracts males.



Searching and Hunting for Food

Light in the ocean is a natural lure for animals and predators and prey alike. In the deep sea, where there is no light, bioluminescence is used by animals to attract and communicate with other and potential mates. The female Anglerfish often uses its body to move in a way that causes its body to glow in a way that attracts males.



Camouflage and Protection

Bioluminescence can be used to distract or scare off predators. The female Anglerfish often uses its body to move in a way that causes its body to glow in a way that attracts males.

WHAT COLOR IS BIOLUMINESCENCE?

While bioluminescence is just the emission of light, it primarily appears as a blue-green color due to the way light travels through water.

Some animals have evolved to emit a red light in the deep sea and are able to see more efficiently than others.



HOW DOES IT WORK?

Chemical Reaction

Bioluminescence occurs through a chemical reaction that produces light energy within an organism's body.

For a reaction to occur, a species must contain luciferin, a molecule that, when it reacts with oxygen, produces light.

This is what creates the bioluminescent light you see in animals!

When oxygen and luciferin come together, a chemical reaction occurs and a new molecule is formed called oxyluciferin.

MAKE A LIGHT MOLECULE

Move pieces to the correct location to create LIGHT!

Using: oxygen, luciferin, a catalyst

Reference Graph

PERCENT

Luciferin

Oxygen

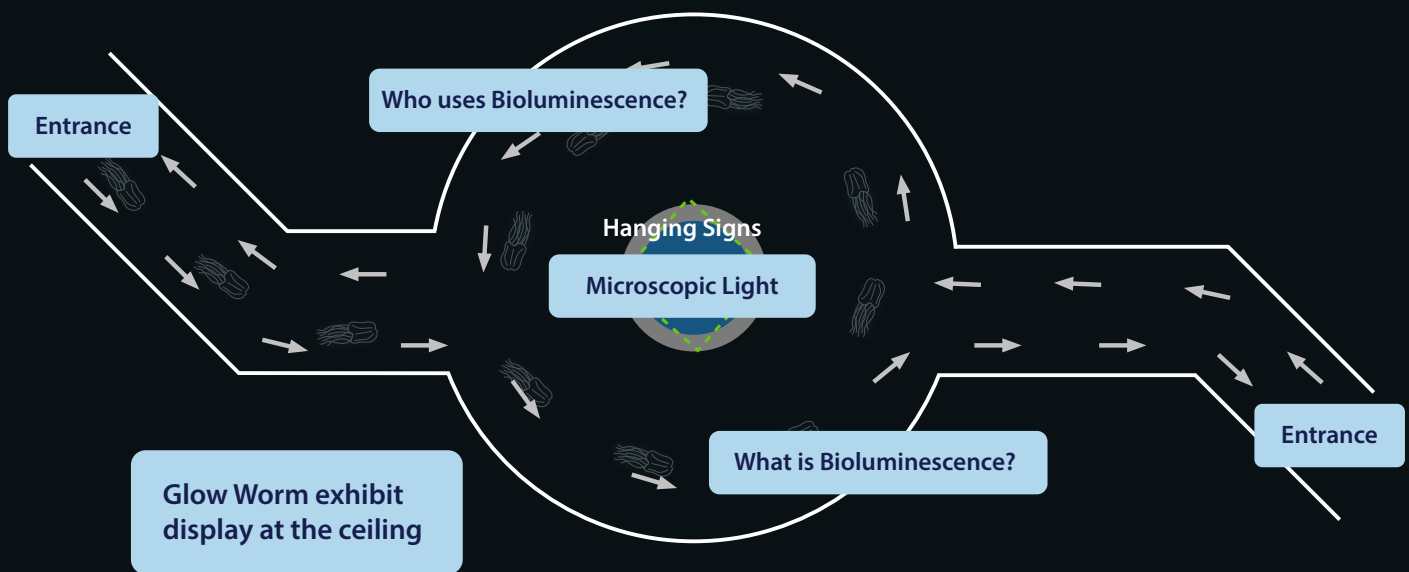
Luciferase

Oxyluciferin

Reference Graph

DESIGN 3D EXHIBIT

When creating the overall exhibit space I wanted it to be a quick, but efficient way for people to pass through. The two long hallways with curving entrances help give the viewer a sense of anticipation in the hallway first, and then turn the corner and see a display of glowing worms on the top of the dome with a



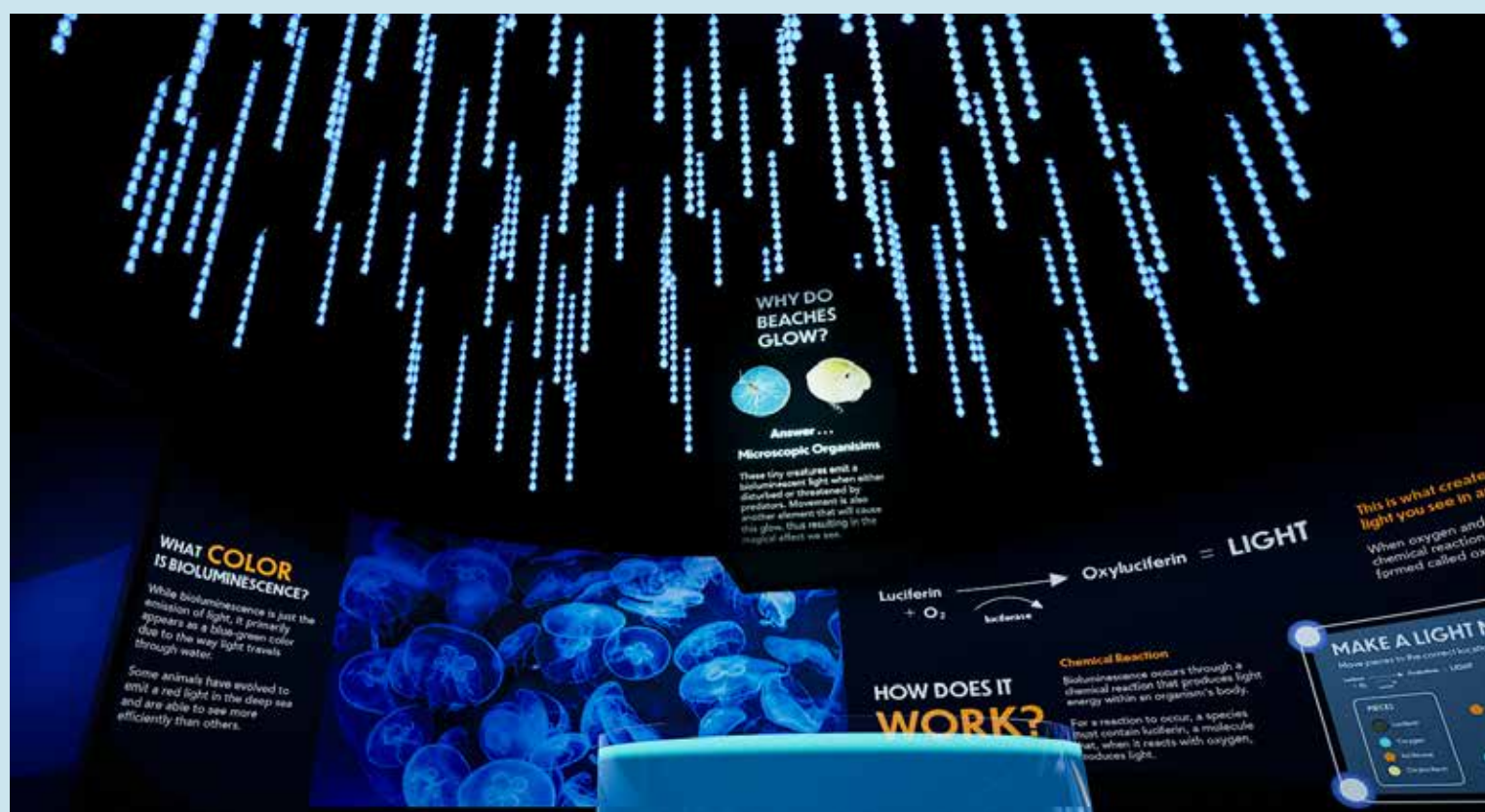
glowing water table on the floor lighting up the room. These are the first primary displays that help create the sense of wonder for people since the exhibit is mimicing the real thing. Visitors then walk through the door and then are greeted with glowing sea jellies on the floor. These will help direct people in the intended direction for people to help increase the flow of traffic as well as efficiency. The overall space is intentionally dark to immerse people in the world of light being presented to them.

DESIGN 3D EXHIBIT



All 3D elements were made with Unreal Engine 4







Link to 3D Exhibit Walk Through

<https://drive.google.com/file/d/1I4WA743qGo4ZmfbDHWaplxZyD9eJfBEs/view?usp=sharing>



CASE STUDY

This case study delves more into my thought process for this project. It gives an initial summary of the entire project and then goes into the strategy and challenges of the production phase. I talk more about what my initial goals for the project and how they changed based on the semester. Finally, the case study describes what my solution was to the challenges and pain points I encountered while creating this exhibit in the time I had.



NAU – VISUAL COMMUNICATION PROGRAM – FALL 2019

GRAPHIC DESIGN 5 PROJECT CASE STUDY

DESIGNER:

JADE LUTHER

3D BUILDER:

GRAHAM HAGERTY

TIMELINE:

AUG–DEC 2021

CLASS:

VC 403 GD 5

INSTRUCTOR/ADVISOR:

PATRICIA MURPHEY

PROJECT BRIEF

The Experience Bioluminescence project is the creation and production of a new aquarium attraction that focuses on the ocean's natural glow and the animals responsible for it. There are three main attractions and focus topics within the entire exhibit: *What is Bioluminescence?* *Who uses Bioluminescence?* and *Microscopic light*. This project was built out to show only a mock up design of what this exhibit could look like to a potential client. The final display includes flat files, and a three dimensionally built out exhibit space with the designs on top. Flat files will also come with a few pages describing the intractable attractions in the exhibit.

STRATEGY / INITIAL CHALLENGES

My original strategy was pretty simple, but also had a simple challenge. The actual complexity of the project itself in an entire semester. I have done a lot of surface level research on the topic of bioluminescence and have laid that out in the main designs. However, this exhibit is not entirely built out. The primary goal and focus of this project is now a "mock up" presentation of what an initial presentation to the client of choice (aquarium) would look like. This is often a key turning point for designers in the field doing this line of work and I believe the ideation and presentation of the concept to a client itself is a big part in the overall design process.

DESIGN SOLUTION

Taking into account how much content I originally wanted to create for this exhibition, my design solution changed significantly in how I approached the goal of the project. One of my original goals had been to have the exhibit content based. For example, one of the original parts of the project I had in mind was creating a mostly built out touch wall screens. While I would have

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GRAPHIC DESIGN 5 PROJECT CASE STUDY

DESIGNER:

JADE LUTHER

liked to build something like this out fully, due to realistic time constraints, I had to make a decision on what I really wanted for this project to convey.

3D BUILDER:

GRAHAM HAGERTY

When thinking about the different directions I could take with this project, I had two options. One was to focus on the content and build out the screens and interactive elements, the other was to focus on the overall experience and build out the three dimensional space. I believe both could have worked, but I made my decision based on the con the first option would have presented. Focusing on content and building the screen out would have been nice to show the research and design layout; however, it would have most likely resulted in me not having enough time for the exhibition space to be created (or would have been extremely low quality). I thought back to my original goal / purpose for this exhibition and then it was an easy decision. One of the main goals of my purpose for this project had been to create the sense of wonder and awe of what bioluminescence was like. I wanted to give visitors that child like wonder from learning something new, and that wasn't possible unless I was able to make the exhibit space happen.

TIMELINE:

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From then on, I put my efforts into the overall space itself, and let the content have a little more of a background role. I still built out the information, but none of it was written by myself. All of it has come from credible websites that are education focused and come from reliable sources. The 3D space was also something I was not the primary builder of. While the look and creative design decisions were still mine, I worked with a 3D designer to help me build out the space as he is more experienced with the software and building models.

EFFECTIVENESS

The effectiveness of this project works in giving the viewer a physical space to “walk through” and experience light in the dark. The entire space has been built to emulate being in the dark and seeing light all around you. It starts off walking through a hallway, turning a corner, and then coming into a room full of hanging, ground, and wall displays. The space also allows the flat designs to be viewed in their actual environment instead of on a 2D surface.

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GRAPHIC DESIGN 5 PROJECT CASE STUDY

DESIGNER:

JADE LUTHER

3D BUILDER:

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