GENE 499/ INTEG 375/ FINE 392

Major Project - *Pause*

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Olivia Carvalho
Dhruv Gupta
Katrien Jacobs
Saffiya Kherraji
Jaime Simons
Mitchell Snider

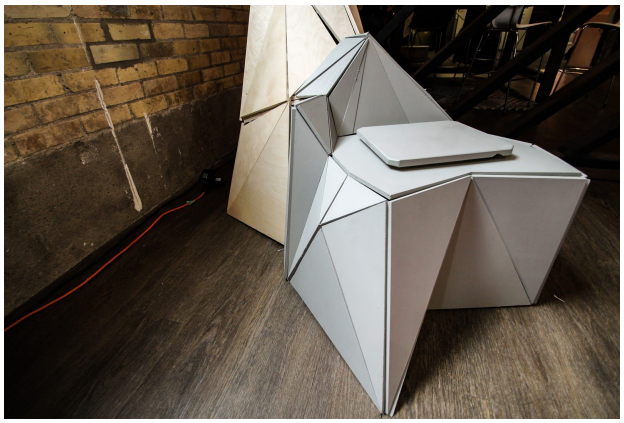
Artist Statement

If you have ever had a great idea come to you in the shower, while on a walk or in a dream, you can testify to the power of giving ourselves time to let the mind wander.

This work invites viewers to consider the *pause*: a momentary meditation that draws our attention away from the neverending "to-do" list in our minds and acknowledge the progress we have already made. As the viewer sits, the work reacts and responds to their presence: the lights come on in sequence and fill up the apple.

Challenging viewers to consider how a constructed environment can provide brief moments for introspection, this man-made tree does not attempt to recreate a natural environment, but rather works to highlight the calming feeling that is provided by being immersed amongst soft light and draped branches. Drawing inspiration from the story of Sir Isaac Newton and the falling apple that gave him the idea to formulate his theory of gravitation, *Pause* gives viewers the opportunity to sit, meditate and reflect. Perhaps this work will provide a space for your own "ah ha!" moment to occur.

Documentation



Materials used include: wood, vellum, wire, LED lights (pixel tape and light strings), arduino, power supply, paint, brackets, dowels, plastic balls, foam

Concept Development

Original Concept: This work invites viewers to take a moment out of their day-to-day schedule and *pause*. Viewers are given the space and time to sit, reflect and meditate in an immersive piece that aims to draw their attention to the pursuit of knowledge, amongst an inviting atmosphere created by the Tree of Knowledge.

Once seated, the leaves of the tree bend to create a canopy over the viewer. At the end of the leaves, the hanging fruit lowers once the viewer sits. The fruit fills up with light as it lowers down to meet the viewer. At the same time, other apples glow too. This happens in a multi-level formation, where there are three light levels among the apples. The first light level is slightly less bright than the moving apple - it signifies the close contacts and relationships that you develop as you learn. The second level is less bright than the first level, and the third level is less bright than the second level. These levels represent different types of relationships and their closeness to the person sitting as that individual pursues their further education. This mood change, that the action of the fruit dropping and increased light from inside of them, signifies acquiring new knowledge. When we pursue further education, we grow our minds and illuminate concepts, facts and information previously unknown to us.

The moment of pause for the seated viewer signifies the opportunity to reflect of the wealth of knowledge we have already gained in the time dedicated to watching the fruit fill up with light.

How it developed with changes/technical hurdles we encountered:

Due to technical issues and time constraints, we ended up not being able to illuminate any apples besides the one on the moving branch. This drastically changed our concept in regards to representing the relationships gained through the pursuit of higher education. We also were not able to create a moving branch due to the designs of the leaves - they were more fragile than expected, and we were worried that if we moved a branch, the movement might tear out leaves from the other branches and ruin the tree. Both of these technical hurdles/changes contributed to modifying our concept. While the core idea stayed the same (taking a moment to rest and reflect), the peripheral ideas like relationship levels.

How It Works

The piece starts once the observer sits under the tree. Once a person is seated, a button is pressed and a series of LED lights start chasing along the branch and into an apple, making the apple brighter as the LED lights continue chasing for approximately 10 seconds. Once the apple becomes “fully bright”, the LED lights in the apple start to fade, bringing the apple to its original state again. The entire interaction lasts for approximately 15 seconds.

A grove kit button was placed directly under the seat, which is protected using foam as an observer sits under the tree. The observer is immersed once the button is pressed. The LED strip lights are controlled using an Arduino connected to a power supply which is placed in the opening of the tree trunk. The LED strip lights were tapped to a branch closest to the observer sitting under the tree. White tape was used to maintain aesthetic of the lights along the branch, with a series of three strip lights coiled and placed inside the apple.

Process: **Testing + Building + Designing + Prototyping**

Seat/Button Ideas: We considered several different ideas in regards to seating, including a park bench, a triangle bench, and grass. We settled on the idea of a simulated rock to retain the authenticity of the experience of sitting under a tree. Using low-poly 3D models as our guide, we simulated a rock with sharp edges and a naturalistic-looking shape to keep the rock stylistically similar to our tree design but to also retain the essence of the rock shape and qualities. To construct the seat, we used plywood sheets and metal brackets. A stool was created using the plateau of the rock and 2x4s, with the rest of the rock attached much like skirting around the sides. For the button, a simple wooden slab was constructed. This slab rests on adhesive weather strip for support, is guided in its vertical motion by two sets of four wooden blocks, and is equipped with a normally-closed switch obtained from a Grove kit to provide input to the Arduino. This was a successful design, however more restrictive guidance to prevent the seat from tipping when users sit on it off-center would have been a good addition.

Rock "stool" before surrounding pieces were attached.

Leaves: Several different styles were considered for the leaves. We debated going with the more generic raindrop shaped leaves but found that the willow-esque style was more appropriate for our design. Most of our work on the leaves revolved around what length they should be and how they would attach to the branches. After prototyping many different length styles and considering multi-branched pieces we realized that the tree would look more natural with a gradient of lengths. We designed a total of 3 leaf lengths

with the shortest being organized in a multi-branch pattern so as to give more bulk and durability to the shorter sections of the leaf gradient. One of the main struggles with the leaves was finding an appropriate stem thickness. It took several prototypes to find the right balance between aesthetically pleasing leaves and those that were durable enough to survive transportation or human interaction. Most of our early prototypes would shed leaves if so much as brushed against. After several tries we finally found a thickness of stem which allowed us to actively rustle the leaves with minimal casualties and yet looked aesthetically pleasing to our group. We used vellum for its diffusion qualities, while leveraging laser cutting for rapid and easy bulk production.

Left: foliage order (L = large, M = medium, multi = small multiple, X = no foliage in that position); right: cut file for three different foliage sizes.

Limbs: The limbs for our tree underwent several revisions. We began by prototyping the limbs, using the paper model tree and several different thicknesses of wire. Through trial and error regarding the rigidity of the wire in relation to the expected weight it would bear, we settled on ⅛" steel wire. We decided to use two different styles of limbs, to replicate the variable sizes found on real trees. The thinner branches were made of a single strand of the ⅛" wire, and the thicker branches were made of three strands twisted together. The twisting of the branches was a challenge, and underwent several iterations. We began by using a small hand-drill to twist the wire, but the drill was not powerful enough. We then attempted various other hand-drills and clamp combinations, before deciding to hand-twist the wire. This lead to the most successful twisting, and was used in the creation of all of our thicker branches.

Apples: The apples also underwent several iterations. We began by looking for fake fruit with a thin enough plastic to allow light to shine through. We were able to find a few older fake fruits that fit this role, but not enough for the entire tree. No store had plastic fake fruits, as the trends nowadays is towards foam fruits (which were not suitable for our purposes). Due to these difficulties, we had to find a way to make the fake apples. After a brainstorming session, we settled on using plastic balls like you might find in a ball pit. Different sized balls were available for purchase, so two sizes were used to create a more natural effect. Since the balls were multi-coloured, we had to find a way to paint them

red. We started with paint brushes, but it was difficult to get an even coating. The light shone through any thinner areas, and was blocked by thicker areas, making it obvious that the fruits were painted. Some fruits were also sanded, as we felt that it might help with the diffusion of light. However, our hand-sanding led to distinct striations on the surface of the plastic ball, which were extremely obvious once the balls were lit. After more trial and error, we ended up spray painting the balls. The dappled look of the spray paint made the apples look more realistic when lit up. We added foam leaves to make it clear that the balls were apples, and not just balls.

Tree: Our final tree design was the result of many prototyping attempts. We began with several digital prototypes, including a natural version with green leaves, one with a white trunk, and another with white leaves but a brown trunk. We then attempted to prototype with a low fidelity paper copy. This lead to the idea of using a low-poly type of design for the tree, which would make constructing it a bit easier than if we went for a more natural version. We created several low poly versions, before settling on a fairly robust hollow version, which developed into the final design that we used. We began by making a paper prototype based on a net, like the ones used in elementary school to model shapes. This modelling was the one we used later on, and the paper version was very useful in constructing the final wood version. The final triangles were cut from ½ veneered plywood using a CNC router. Each pieces was labeled with a letter, which indicated the section of the tree that it belonged to, and a number, which indicated the order in which the pieces were attached together. Developing the design to have distinct sections allowed for easier transportation as well as installation, with each section sliding together using pegs. Like with the seat, each seem was initially taped using ducting tape to help with arranging and attaching, then each seem was more permanently attached by bending brackets to fit the needed angle.

Concept digital drawings for viewer experience/mood of the work.



Model evolution -- shape prototype, shape and branch interaction prototype, digital model.



Construction process -- labeling, cutting, attaching.

Installation & Exhibition Requirements

The tree is was built in four separate pieces that are easily attached/uninstalled to make for east transportation. The branches each come off and need to be rearranged when being assembled. Perhaps next time we could number the branches and their brackets before uninstalling to make the next install faster/more efficient.

- Requires one 120V AC outlet.

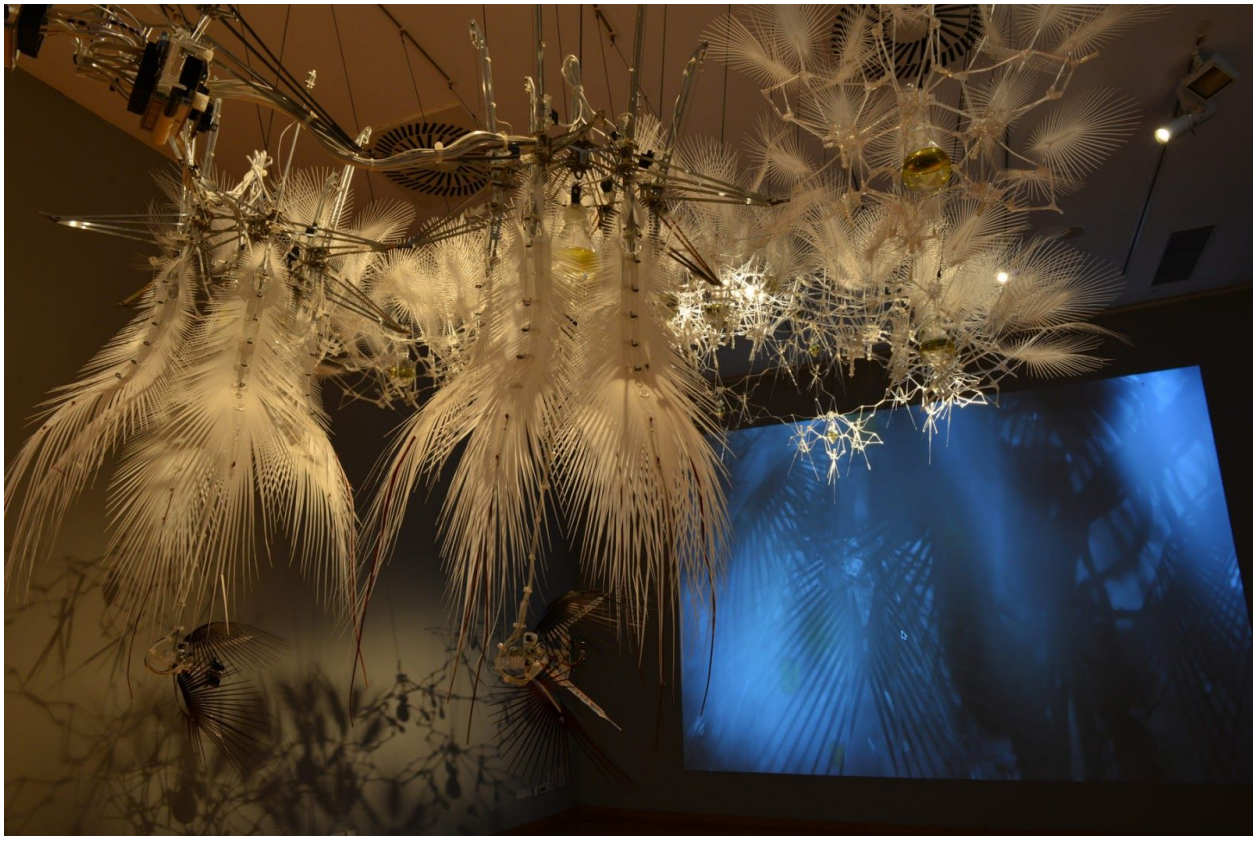
Conservation & Maintenance

Over time, the tree could lose “leaves”, reducing its visual appeal and exposing wiring and structural bracing. To remedy this, pattern files can be used to laser-cut new leaves which can be added back to the tree’s canopy.

Alterations to Consider

Changes that we would make include increasing the motion restriction for the seat (it tips as-is), adding dynamic peripheral lighting to the surrounding fruit in the tree, and spending time to remove structural braces and wires from view. Changes to the code to allow dimming when users stand up, rather than after the dripping sequence, would increase the sense of urgency and responsiveness the user feels when interacting with the piece. Finally, the materials surrounding the LED strip should cover the strip to diffuse light more effectively, to make the experience from the inside similar to the outside.

References & Inspiration



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