

PROPOSAL

THIS = THEN = THAT

'The Garden of E-den'

CASSIE SMITH

CART 360, FALL 2019

GITHUB LINK:

Project Description

The goal of this project is to create an immersive, interactive 'garden' or 'forest' of kinetic sculptures made with translucent folding paper, resembling abstract flowers or plants. Interaction will happen through *proximity/movement, light and sound*.

Movement and Light

Upon entering the installation space, participants are surrounded by total darkness. Paper sculptures are placed strategically throughout the space, as yet invisible. As people slowly move around the room, proximity sensors trigger the sculptures to 'bloom' with life. They grow, unfold, expand (breathe) and become lit from within by coloured LEDs that turn on slowly as the sculptures bloom. As the human participants move away, each sculpture becomes dormant, folding back in, collapsing, closing and going dark.

Sound

The sculptures are reactive to sound. If people talk to them or sing to them, they will change colour and respond. The person's voice will be processed as input and the sound procedurally manipulated, then output as a new sound or abstract message. A loud enough noise or a distributed input from multiple people at once could trigger a cascade of sound from all of the sculptures.

In the latter case it would be interesting to play with the input thresholds and see if the combined volume of all the sculptures 'singing' in tandem would recursively trigger the sound generation process. This would add an additional, emergent and rhizomatic layer to the interaction. However, it depends on timing and control parameters to prevent undesirable feedback.

Research Questions

Think about the kind of relationship you wish to foster between your users and the artifact or installation. How can you use your project to destabilize the users and make them reflect on themselves, their environment and society?

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Think about something meaningful. What are you trying to tell us with your project?

The movement of blooming and then folding inward, emerging and then hiding, is inspired by plants found in nature, such as the *mimosa pudica*, that close their petals and collapse their leaves in response to predators or harsh environmental conditions. I wanted to reverse this response, so that human proximity and interaction cause the sculptural 'plants' to bloom rather than hide.

Considering the destruction we have wrought on our environment, it would be easy to evolve a concept based solely on humanity's current adversarial relationship to nature (as propagated by dominant Western legacies of thought). However, I wanted to take a more speculative approach that leaves room for a positive reaffirmation of our symbiotic relationship to the environment, while remaining critical and interested by the complex role technology plays in that environment.

Technology is often heralded as holding the solutions to environmental crisis. Certainly, it may play a role. But, this techno-idealist approach often fails to account for the ways technological "innovation" and development remains tied to the capitalist modes of production that are helping to drive environmental collapse. This includes resource extraction, strategies of planned obsolescence, and (particularly in the global north) the *invisibilization* of heavily exploited labour that breathes life into our technological artifacts.

The increasingly urgent necessity for widespread systemic change feels like an overwhelming and impossible task, wrought with uncertainty even to those who stake their identity on the fight for a radically different future. The socio-historical matrix that informs our current moment can feel like a net from which there is no escape. But, as Ursula K. Leguin said:

"We live in capitalism. Its power seems inescapable. So did the divine right of kings. Any human power can be resisted and changed by human beings. Resistance and change often begin in art..."

This is why I have always loved speculative fiction. The ability to imagine and explore other worlds, worlds beyond what seems "inescapable". The act of speculation is the first step in manifestation, and it's only by embracing what feels alien, foreign, Other, that we can move beyond. How can we honour our connection to nature, while simultaneously rejecting the concept of what is *natural* as an arbiter of repressive norms and destructive inevitability?

With this project, my hope is to create an otherworldly landscape that conversely causes us to interrogate our relationship to our own natural and technological world(s), and to the increasingly blurry distinction between the two.

I chose to work with translucent paper as it maintains an ephemeral quality. I find it an interesting and rife juxtaposition to use the industrially-processed remains of dead trees in the construction of artificial 'plants', temporarily reanimated by technology. Translucence also helps to reveal the mechanized guts of each sculpture as the LEDs brighten. This furthers the uncomfortable juxtaposition and renders partially visible the labour that gives 'life' to each object, as well as the technology that creates the appearance of organic life.

While there's a lot of meaning and intention that I've considered, I would also like to preserve space for those who encounter the installation to engage in their own speculative narratives and unpeel many possible layers of meaning. That said, I am interested in finding ways to effectively disrupt and prompt participants to look *beyond*.

As I start to prototype the piece I will continue to consider the question: What is *revealed* when the sculptures bloom? I mean this on both a discursive and practical level, and expect answers to this question may result in additional elements as I iterate.

Think of a context and an environment where you would like to intervene. Where will you present your project? Who is it made for?

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Think about the notion of empowerment. Is your artifact really helping or challenging its users in any way or is it just another psychological prosthesis?

Specifying a context and environment for intervention is a bit of a self-referential question here, since the context *is* our environment, on a macro-level. I believe most of us are affected by the questions raised by this piece, and many people express a lot of anxiety over our current collective trajectory. This is true in terms of both the destruction of our natural environment and the role of technology in our lives. I hope that this installation can be a space that is both disturbing and cathartic, allowing some of that anxiety to be *engaged* and *released* by providing an eerily beautiful space for speculative enaction and empowerment.

In terms of the sound interaction, I was inspired by the cliché that talking or singing to plants helps them to flourish. It's interesting to consider what it would be like if plants sung along or talked back. I don't mean this in a cartoonish way. I love the idea that sound is a fundamental expressive quality of the universe. It certainly produces a uniquely visceral and emotional reaction compared to visual stimulus. In the context of my piece, I think the sound interaction offers the most potential for experimentation and unexpected, emergent experiences, revealing the individual personality of each sculpture.

Practically, this installation will be most aesthetically effective in a darkened, black space. Because of this, it lends itself to being set up indoors in a closed room. I'm currently looking into booking an appropriate space for my final presentation.

That said, I'm critical of "gallery" type spaces in terms of accessibility. I think this project could be interesting as a public intervention that appears temporarily in various spaces around the city. This would help to enhance the otherworldly and ephemeral quality of the work, and deepen its meaning by contextually situating it rather than performing it in an isolated space. It would have to be installed at night, and in spaces with low enough ambient light for the interaction to be effective.

One place I think might work is the sculpture park behind the Canadian Centre for Architecture. It's dark and already has an eerie, almost dystopian atmosphere. The sculptures currently there

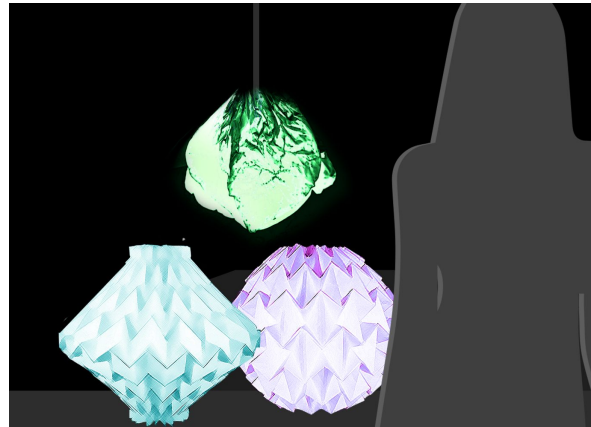
are also all aggressively static, made from industrial materials. Congregating these blooming, interactive and ephemeral sculptures around the concrete landscape could enhance the otherworldly and emergent quality of the piece (rather than detracting from it). The noise from the highway behind the park could also create interesting interactions at the level of sound, working to blend the two overlapping environments, merging the otherworld with our world.

Storyboard

The sculptures begin silent, unlit and collapsed in a dark space.



As they are approached, proximity sensors trigger them to unfold, expand and slowly light from within.



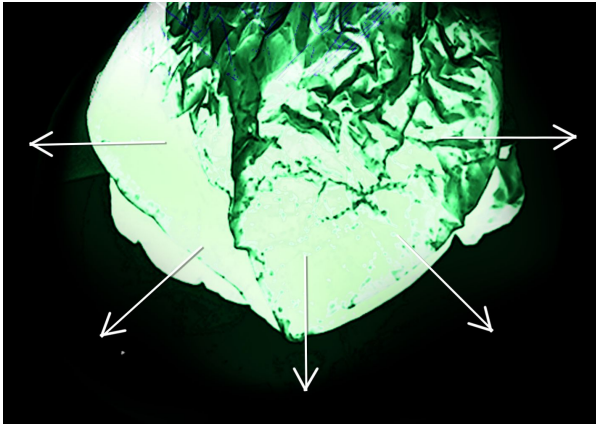
Certain sculptures will expand through a vertical motion:



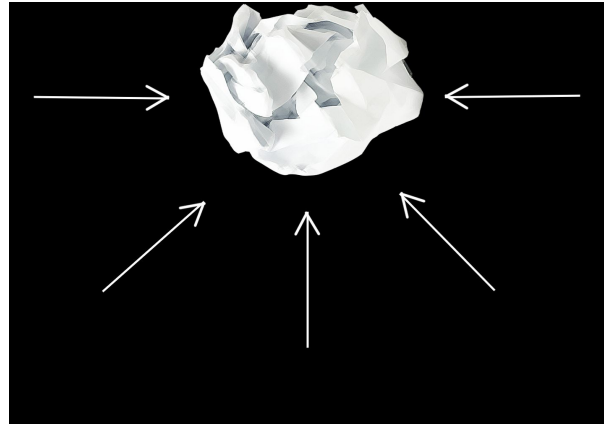
When the human participant moves away they collapse back down:



Others will expand outwards:



When the human participant moves away they crumple back in on themselves:

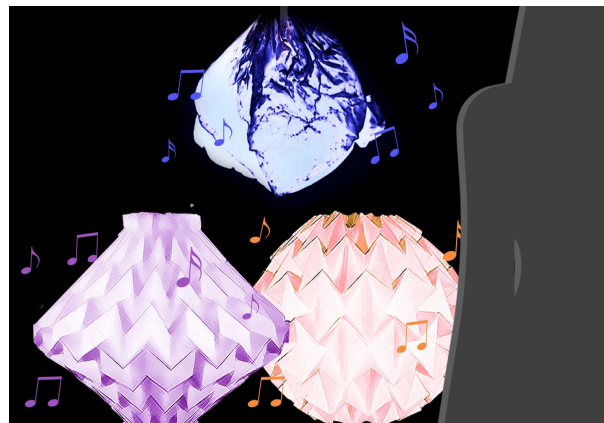
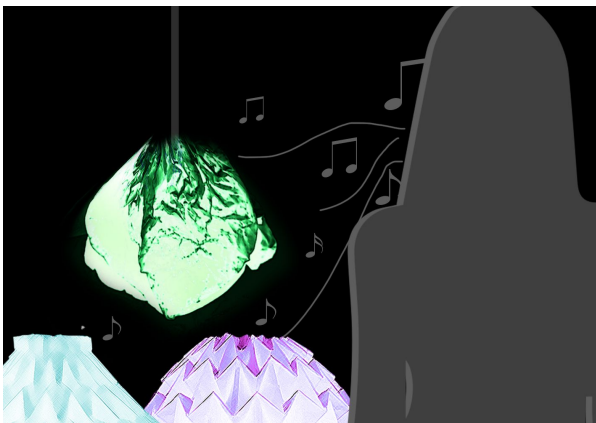


While the sculptures are in bloom, they are responsive to sound. You can sing or speak to them.

Sound input will be processed and manipulated to create a procedurally generated response.

The algorithm for each sculpture will be slightly different, so that they all respond in their own way.

As they emit sound, they change colour.



Practical Considerations

Scope

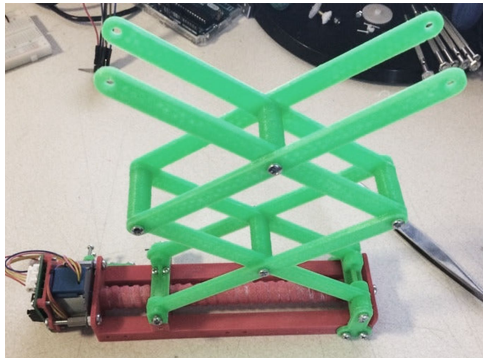
Because the execution of this project is potentially quite challenging, I've designed it flexibly in order to ensure I have an achievable end product. For the prototype, I'll focus on executing at least one variant of sculpture (and related motion) successfully. I'll work on sound after that.

I'm also aware that building a full installation, even in a small room, might require more than one microcontroller. If it ends up being too challenging or expensive to execute, I'll build a smaller-scale version. In a worst-case scenario, I'll make sure to create at least one well-done sculpture.

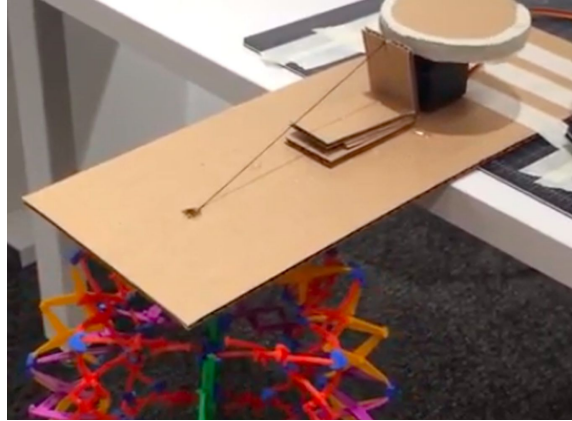
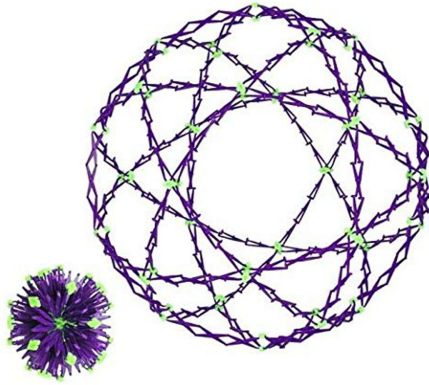
Sensors and Construction

The 'blooming' and unfolding of the sculptures will be triggered by proximity sensors. I'm approaching the mechanisms for motion in two ways:

For sculptures that expand upwards, my plan is to 3D print a jack screw and scissor lift that can be driven by a stepper motor ([reference here](#)). For this iteration I will use a stiffer paper, such as a rice paper or thin transparent vellum, and reinforce at the folds where needed to ensure the sculptures collapse and expand properly while maintaining their structure.

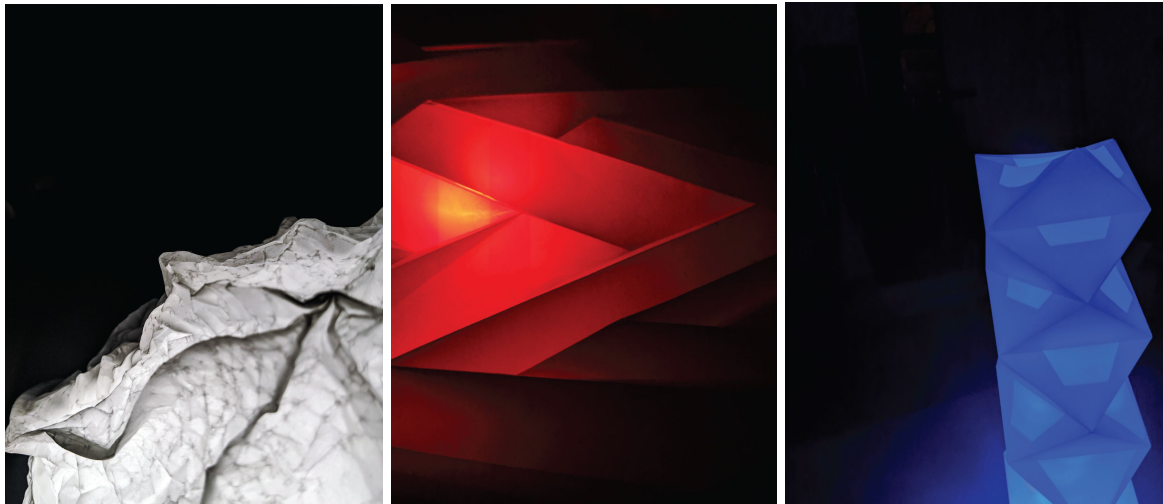


For the sculptures made with crumpled paper that expand and contract outwards, I plan to build a miniature Hoberman sphere that opens and closes via a wire attached to a wheel and stepper motor ([reference here](#)). For this iteration I will use a softer, thinner paper, that is more pliable and will be attached at key points to the sphere, in order to achieve a fluid expanding and contracting motion.



For the sound interaction I'll need a sound sensor module. A lot of the implementation challenges here will be at the programming level: determining thresholds, figuring out how to communicate between Arduino and another program to run the procedural sound manipulation/generation, etc.

Similar Projects



I was initially inspired by a previous piece I had created, which was a photography project on the subject of folding paper sculptures. The original goal of that project was to experiment with folding techniques from Paul Jackson's book *Folding Techniques for Designers: From Sheet to*

Form, and document the result using photography, playing with light and shadow. I added LEDs inside the paper as an additional experiment.

I thought that the resulting images looked like alien architecture or geological/planetary formations, so I constructed a loose narrative about fleeing earth on an interplanetary journey, and crash-landing on a planet to discover what appeared to be a perfectly-preserved alien civilization, empty of life. Why were we fleeing Earth and what caused this civilization to be abandoned? The full piece, titled *exoplanet*, can be found [here](#).

I won't be reusing any of the materials or (strictly-speaking) the narrative from this project, but I continue to be inspired by it. As students, we are frequently encouraged to iterate, but the semester structure often imposes limits on our ability to do so. So, I wanted to see how far I could push aspects of this idea in new directions, and experiment in the context of Tangible Media.

Three Similar Outside Projects

1. Interactive Garden by Moey Inc. (2015)



Interactive Garden is a piece created by design/build and technology firm Moey Inc. It consists of a series of 3D printed abstract 'flower' sculptures. I find that the 3D-printed flowers actually resemble origami structures in certain ways, but lack the delicacy and organic feeling of paper. The flowers are illuminated from within by LEDs.

Interaction is triggered by proximity. As people approach the sculptures, they change colour and emit a sound. When multiple people engage with the sculpture, it results in a self-composed piece of music.

To me, this piece intervenes fully at the level of aesthetics. The interactive experience is playful and interesting, but lacks meaning. This makes sense in the context of the artwork being created by a production company as a for-profit enterprise. The project website states that the garden has appeared at numerous venues including private parties, corporate events, and the *Macy's* flower show. Its uncritical installation in commercial environments for the purpose of profit and aesthetic gratification seem to highlight what is lacking in the piece.

2. *Kamiko* - Interactive Kinetic Sculpture by Karlen Chang (2013)



Kamiko is an origami-inspired interactive sculpture made from tear-proof synthetic fiber that resembles folded paper. The folding techniques are inspired by 'fortune tellers' - the classic folding paper game that many will remember from childhood. The final sculptures are suspended from the ceiling and resemble birds in flight.

Sensors in a central crystal hanging from each sculpture detect movement below, triggering a vertical motion from the center that causes the sculptures to move. They unfold and spread with movement resembling the flapping of wings. This movement is continually influenced by the motion of humans below.

The idea behind the project is to explore a future where objects are self-aware, as well as the myriad emotions that can be evoked with something as simple as folded paper. *Kamiko* blends past and present: "ancient animism meets the Internet of Things" ([reference](#)). Some viewer critiques of the interactive experience have suggested that the movement triggered by human interaction is too unpredictable to feel truly engaged in dialogue with the piece, as you're not really sure what the connection is between your movements and the movements of the objects. ([reference](#)).

3. *Mutual Symphony* by Keith Lam (2013)



Mutual Symphony was created as part of an exhibition called "Dynamic Livings", whose concept was to make something come alive. It consists of a series of origami flower sculptures that move in response to touch, mixing the seemingly disparate mediums of paper and electronics. Similarly to my project, they were inspired by "touch-me-not" flowers in nature, that close up to protect themselves when they are touched. Part of the goal of the project was to challenge the public perception of new media arts as cold, by creating something 'natural' and 'alive' ([reference](#)).

The sculptures are displayed in a gallery setting on pedestals. Upon being tapped, they slowly and slightly unfold, before contracting back down again ([reference](#)).

How My Project Will Be Different And Impactful

My project has certain characteristics in common with each of these artworks. However, I believe it goes a step further in terms of engaging multiple senses and modes of interaction. I also hope to create a more immersive, otherworldly experience (or the possibility of one, depending on what I can achieve as a starting point). Of the three pieces I researched, the one that comes closest to this type of experience is *Kamiko*. *Mutual Symphony* is displayed more as a collection of gallery artifacts than as an immersive environment, and *Interactive Garden* has a

level of immersion, but is ultimately subsumed and defined by the environments in which it is uncritically displayed.

In terms of interaction, *Mutual Symphony* generates motion in response to touch, but doesn't utilize sound or light at all. *Interactive Garden* generates both sound and light-based responses to proximity, and *Kamiko* generates sound and motion in response to motion. None of the artworks I researched incorporate all three - motion, sound and light - into the interactive experience. Of the pieces that utilize sound, neither utilize sound as an *input*. My strategy of procedurally manipulating and 'reflecting' back the voices of human participants adds additional layers of interactivity at the level of dialogue and symbiosis between human actor and environment.

As stated above, I believe *Interactive Garden* lacks any discursive depth, even in terms of materiality (it's made with 3D printed plastics, rather than organic materials). *Kamiko* successfully evokes the appearance and 'feeling' of paper, while managing to use more durable synthetic fibres. Only *Mutual Symphony* uses actual paper. While I understand the choice to use durable materials in order to increase the longevity of an artwork and avoid it being damaged or destroyed, I believe something is and would be lost in abandoning this fusion of organic and inorganic materials. It is essential to me that the handmade paper shell of the sculptures can be so easily destroyed, and would need to be painstakingly recreated (if they are recreated at all). The 3D printed mechanisms inside are more durable and could be identically reproduced by a machine over and over if necessary. The paper sculptures could never be remade as a perfect copy. One that is destroyed is forever destroyed. They are *delicate*, *susceptible*, *ephemeral*. Is this a limitation? Or rather a deeper consideration? If each sculpture is a symbiosis of these seemingly disparate elements, what is its essential character?