4-26-2022

Evolution

Yajing Yan
yy3201@rit.edu

R I T

Evolution

by

Yajing Yan

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Fine Arts in Metals and Jewelry Design

School for American Crafts
College of Art and Design

Rochester Institute of Technology
Rochester, NY
April 26, 2022

Committee Approval:

Thesis Title: Evolution

Thesis Author: Yajing Yan

Chief Advisor: Leonard Anthony Urso

Approval Signature: _____

Date: _____

Associate Advisor: Juan Carlos Caballero-Perez

Approval Signature: _____

Date: _____

Associate Advisor: John Aasp

Approval Signature: _____

Date: _____

Table of Contents

Abstract

My work is about how, as microplastic invades the earth, humans begin evolving, following the laws of natural selection. Plastic is attached in visual relationships to represent future mutations after decades of absorbing microplastic into the body. Many contemporary films and books discuss cyberpunk and steampunk from an evolutionary perspective. Technologies such as artificial intelligence and mechanical organ transplantation allow humans to evolve. However, I do not want to discuss the impacts of external technology. Instead, I am concerned with how the intrusion of microplastics influences humanity's slow self-evolution.

I divide my work into different stages to explore how humans could evolve to integrate microplastics. In my thesis, I have crafted wearable jewelry, interactive life-size, and kinetic body sculptures that symbolize supporting aspects of microplastic evolution. I used different expression techniques and layouts to distinguish how these aspects are embodied at different stages. Interactivity is also central to my thesis. I wish to persuade the audience to believe in the development of microplastics, and installation art can help me accomplish this. Regarding the choice of materials in my collection, most of them are, of course, finished with plastics, and resin, silicone, metal, wood, and glass enrich the materials. Decay is another metaphor I employ in my theory. I apply design elements such as repetition, rhythm, contrast, and balance. I also extracted the most common colors in plastic pollution. They are transparent, matte, and metallic, creating a sharp contrast.

Introduction

The natural environment refers to the natural areas and conditions in which organisms live. It consists of various natural geological elements, including topography, climate, water, vegetation, and soil and is a form of expression relative to the human environment. We can think of the earth as the natural environment on which all living things depend. All organisms, including humans, must exchange material and energy with the natural environment to survive and develop.

Humans obtain energy and matter from nature, and these energies create a waste tone that cannot be utilized and digested, so it must be released into the natural environment. Human interaction with the natural environment creates environmental problems. Humans' great demand for materials and energy from the natural environment leads to resource shortages and ecological damage. Moreover, humans discharge too much waste into the natural environment. When the natural environment's self-purification capacity is exceeded, environmental pollution occurs.

Motivation

My cultural background gives me a different perspective. I was born in China, I finished my undergraduate degree in Georgia. At that time, I was curious about how American families recycle plastic grocery bags. In my observation, every family would use at least ten plastic bags each time they went to the supermarket. During my four years in university, I amassed enough grocery bags to fill an entire cabinet, and I continued to consume them. My experience when I went to RIT in the cafeteria was even more surprising. During my first year of graduate study, the cafeteria used plastic boxes for every meal, whether one ate in the cafeteria or took the food to go. In only half a semester, I collected more than 20 plastic boxes, not including those I threw out. Thus, in my first year of graduate school, I created a work called “Smother” about plastic pollution, specifically how it destroys marine ecology.

Plastic is the most common unnatural substance in ocean pollution today, covering one-fourth of the world’s ocean surface. Eighteen billion pounds of plastic waste enter our oceans every year, and this pollution has a profound impact. Plastic does not easily decompose, and marine animals often mistake it for food. More than 100,000 marine animals have been killed by plastic. Marine mammals often die from swallowing plastic, which causes internal injuries. They may also become entangled in or suffocate on plastic. Ocean waste takes many years to decompose: 80 years for Styrofoam, 200 years for aluminum, and 400 years for plastic. Chemicals in heavily polluted waters can re-enter our bodies and harm our health, causing reproductive and hormonal problems. Driven by greed and profit, people refuse to stop using non-recyclable plastics, ignoring how plastics harm marine life and the species themselves.

When I began working on my thesis, I was drawn to this topic, so I researched further and discovered microplastic, a substance I had never heard of, but that is now ubiquitous.

Concept and Focus

Microplastics are very small pieces of plastic that pollute the environment.[1] Microplastics are not a selected entirely plastic, but rather any plastic fragment less than five millimeters long, consistent with the US. Microplastics are present in numerous products, from cosmetics to clothing to plastic bags and bottles. Many of these products readily enter the environment as waste. Microplastics are not biodegradable. Thus, once in the environment, primary and secondary microplastics accumulate and persist. Microplastics have been found in various environments, including oceans and freshwater ecosystems.[2] Microplastic pollution is usually created by the disintegration of plastic litter and is ubiquitous across the planet. Researchers find microplastics everywhere they look: in the air, soil, rivers, and the deepest oceans. The average person eats at least 50,000 microplastic particles a year and breathes in a similar quantity, according to the first study to estimate human ingestion of plastic pollution.[3] The actual number is probably much higher, as only a few foods and drinks are analyzed for plastic contamination. The scientists reported that drinking a large amount of water greatly increased the number of particles consumed. The scientists then used US government dietary guidelines to calculate how many particles people would eat in a year. They estimated that adults eat about 50,000 microplastic particles a year, and children eat about 40,000.[3] The health impacts of ingesting microplastics are unknown. Microplastics might release toxic substances, and some pieces are sufficiently small to penetrate human tissues, where they might trigger immune reactions. Scientists do not know what happens when microplastics are inhaled. Moreover, humans do not find the substantial damage microplastics do to the human body and ignore it like they ignore pollution in the environment.

So let me make a bold assumption. If humans eat microplastics every year, and microplastics are slowly occupying every part of the earth, then humans will live with microplastics for several generations. Will this gradually change the human body? We are uncertain what our future will look like and what humanity will become. However, from an evolutionary perspective, humans evolved from different species. Let us examine the concept of evolution. Evolution describes changes in the heritable characteristics of biological populations over successive generations.[4][5] These

characteristics are the expressions of genes passed from parent to offspring through reproduction. Different characteristics tend to exist within any given population due to mutation, genetic recombination, and other sources of genetic variation.[6] Evolution occurs when evolutionary processes such as natural selection (including sexual selection) and genetic drift act on this variation, resulting in certain characteristics becoming more common or rare within a population.[7] Under the pressure of natural selection, organisms become better able to survive, which is called adaptation.

Therefore, to adapt to the environment, a species will make genetic changes. After decades or even thousands of years, I assume that changes in the environment and the spread of microplastics will cause humans to slowly evolve to integrate with plastics. Different environments lead to other evolutionary processes and changes in body structure. For example, the giraffe's neck became longer because of environmental changes. Human evolution will change because microplastics have invaded the earth, and humans must evolve or adapt to survive.

My thesis intends to create microplastic "viruses" with organic shapes unnatured in the future, depicting what will happen if humans continue absorbing microplastics. In addition, I provide a storyline showing what happens, beginning with a human infection that leads to a virus outbreak that no one knows about. This thesis calls for greater awareness of plastic overuse and pollution. Focusing on the consequences of inhaling plastic, my work will profoundly impact the audience's understanding of the significance of protecting the environment.

In my work, I have divided this evolution into several different stages. First is the current stage, which will continue for a long time. Microplastics have not yet had any substantial impact on human beings, so microplastics are not known to humans. Although everyone has observed microplastics, people are ignoring their effects. In the second stage, humans gradually discover how microplastics damage the body. However, microplastics have already permeated the entire planet. Thus, to adapt to the environment, humans have progressively merged with plastics to create a standard form. The final stage is the unraveling of human beings after death.

Influence

Mutant Baby Doilies Series: A Luxurious Skin Disease

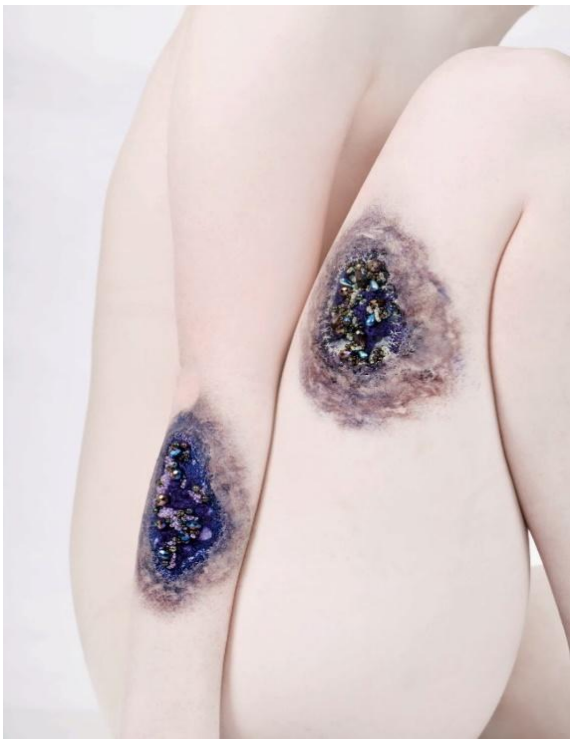


Fig. 1, Eleven Mutant Baby Doilies/Bejewelled Scabs, 2015（group collection）

Freehand machine embroidery and beading by Allison Bell

Beading and crochet by Adel Ng

Photography and post-production: Mel T

Make-up by: Nicki Models: Jacinta, Kat, Jess

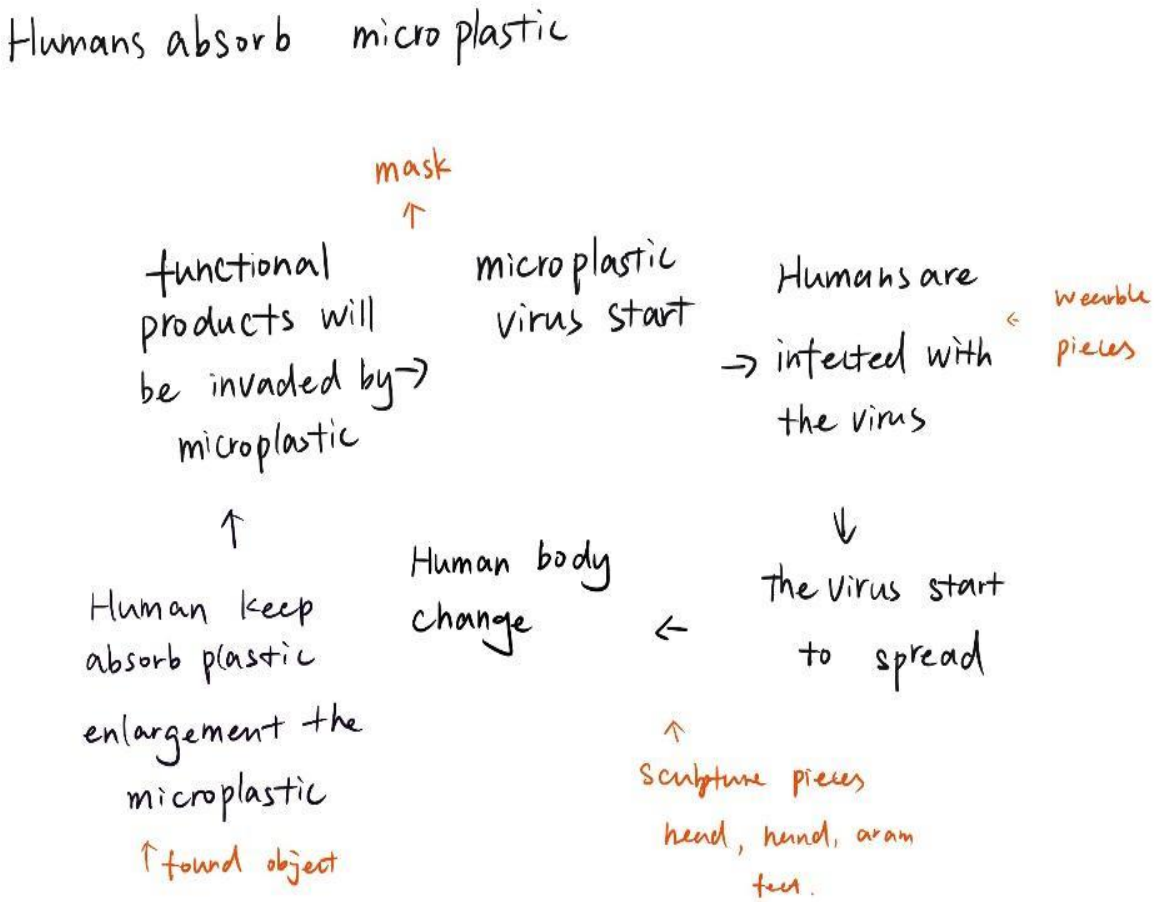
This series imagines luxury fashion techniques being applied as a luxurious skin disease, death/disease/decay vs. Will people still use these luxury fashion techniques as fashion or status symbols? The series cleverly uses makeup techniques to mold to the skin to intuitively convey the ideas. This series' concept is similar to mine, but also causes disease using bold colors and ample gems and beads. These pieces can also be regarded as wearable jewelry. Although people know the disadvantages of this luxury technology, they are still attracted to its appearance and beautiful jewelry and ignore how it harms the body.

Fig. 2, Yuichi Ikehata, Fragment of Long Term Memory, 2014

In his ongoing surreal series “Fragment of Long Term Memory,” Yuichi Ikehata bridges the gap between reality and fiction, examining the fragmentation of memory and the decline of futurism. Ikehata begins with a sculptural body made of wire, clay, and paper. He then digitally adds realistic parts such as skin, eyes, hair, and nails. According to Ikehata, “Many parts of our memories...are often forgotten, or difficult to recall. I retrieve those fragmented moments and reconstruct them as surreal images. I gather these misplaced memories from certain parts of our reality, and together they create a non-linear story, resonating with each other in my photographs.”[8]

Body of Work

After researching evolution and the literature on microplastic pollution, I began considering how to outline this long evolutionary process. I first conceptualized plastic pollution as a viral mutation that causes human systems to absorb plastic and evolve. In drafting this process, I divided it into different stages. I have tried to distinguish and refine these stages in my manuscript.



Evolution1, Sketch and Note, 2020

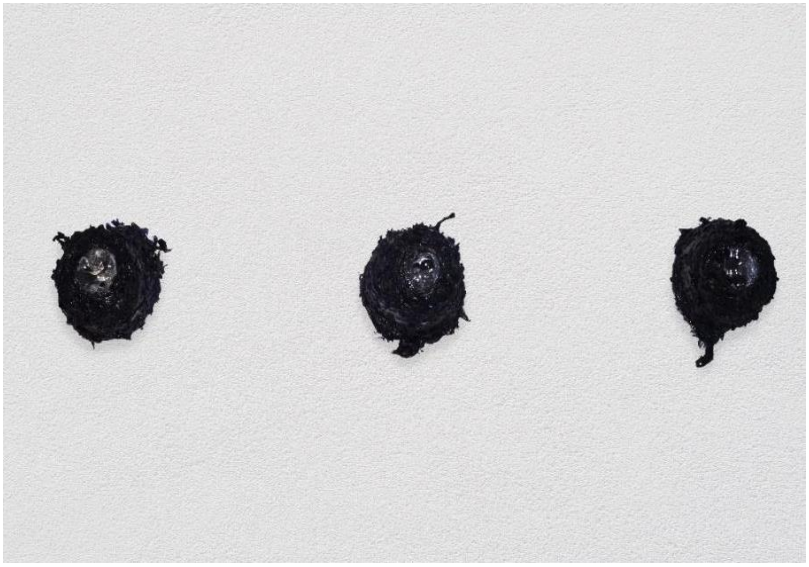
First Stage: Awakening

In the first stage, I mainly want to depict the gradual recognition of microplastic evolution and the apparent changes to the human body. In this stage, humans awaken to reality, become vigilant, and begin to understand themselves and the changes to their bodies. This stage concerns the emergence of self-awareness amid human transformation or evolution. Human beings begin engaging in self-examination; they perceive themselves and their state as well as their physical activity, thoughts, consciousness, fear of the unknown, and novelty. From there, they face the slow evolutionary process of uneasiness, fear, relief, and understanding that are inseparable from self-exploration. I began by using simple, straightforward shapes. My first works use circles, which have no direction, no beginning and no end, and have a centripetal effect. I wanted the viewer to interact without feeling overwhelmed, instead experiencing a natural sense of change, a feeling that the earth is changing as a result of environmental change.

The first work I designed was an installation that allowed viewers to see their faces through the mirrors, with a glass enclosure separating the mirrors from the viewers and filling the mirrors with plastic as if to swallow or merge with the viewers. I wanted to let viewers feel and choose their relationship with the plastic. The round glass cover separates the viewers and the plastic material. They seem to have no intersection, but the black material outside the glass cover seems to bring them closer. Through the mirrors and plastic, the viewers can feel the emotions they would experience if plastic, as part of evolution, grew and spread into the human body and face, thus leading the viewers to embody it in my mind.

Evolution2; Awakening; Glass, Wood, Silicone, Plastic; 2020

Three almost identical installations will connect viewers as each person looks at his or her own face simultaneously. Each person has unique insights and a different degree of understanding. There is a different amulet in each person's mind. Through the medium of the mirror, the audience is given room to imagine. The audience's communication and different imagination and understanding will also bring new meaning to this work.



Evolution3; Awakening; Glass, Wood, Silicone, Plastic; 2020

Second Stage: Equilibrium

In the second stage, humanity realizes that microplastics have shaped evolution. Every species has a long process of evolution. Human development began about 7 million years ago with the Chad Shah, leading to Homo sapiens about 200,000 years ago and resulting in modern humans. In this stage, I want to reflect on a balance between microplastics and human evolution.

In this work, I used an oxygen mask as the base and added a large amount of plastic on top to show a kind of suffocation and parasitism. The plastic cover can protect people from outside air pollution; however, the microplastics are massive, aggregated, and multiplying on the oxygen cover. I use the oxygen mask as a symbol because air is indispensable for human life, but is now polluted and unsafe to breathe without the mask. Ironically, the oxygen mask is also a plastic product. Thus, human beings have no right to choose. Instead, microplastics force humans to evolve. This work covers a large portion of the face, with many plastics gathered and concentrated on the oxygen mask. I attached a silver piece for the model to bite down on, but it is uncomfortable to wear, and the mask is difficult to breathe in. This depression, discomfort, and pain are what I want to convey to the audience.

Evolution4; Equilibrium; Silver, Silicone, Plastic; 2020

The next piece is a brooch meant to embody organ changes caused by microplastics. In my imagining, microplastics are like viruses that consume human beings and force them to evolve. I considered how to represent microplastics devouring organs, researching how organs are attacked by substances. For example, in the trending article "E-Cigarette or Vaping Product Use Associated Lung Injury," the lungs take on a popcorn shape after absorbing vapor from e-cigarettes. "Popcorn lung disease" is an irreversible obstructive lung disease caused by inflammation or fibrosis that narrows or obstructs the fine bronchial tubes. It has many causes, such as viral infection, transplant failure, or exposure to toxic chemicals. In this disease, the lungs have irregular holes created by external substances, and the exterior of the organ is damaged, appearing blackened. Taking this as inspiration, I thought about incorporating microplastics to represent this kind of lesion/evolution. I used silicone, which is soft, malleable, and can adhere to the organ part. I did not want to make it too much like an organ, but wished to create an irregular, organ-like shape. I chose to use a hard plastic shell that was heated and deformed to encase the soft silicone. I also had some thoughts on how to wear this work. I wanted the pin to blend in position to highlight and sublimate my ideas. I used a long wire to pierce the piece from the top left, so the entire work conveys a sense of brokenness. Both sides are sharpened wire, giving the audience a sense of oppression and making them wonder how the piece can be worn and whether the wearer will be harmed.

Evolution5; Equilibrium; Steel, Silicone, Plastic; 2020

Evolution6; Equilibrium; Steel, Silicone, Plastic; 2020

"Feeling" is the second phase of a small series of works that use almost the same materials and production techniques to make these patterns and shapes repeatedly visible to the viewer. I made them for different locations on the body: the ears, mouth, eyes, and back. I wanted to portray the fusion of human and plastic, and the first thing that came to mind was the face, which is most representative of human thought, pain, and pleasure. Plastic and human fusion first evolved organically and then in the external contours of human beings. In this series, I divided plastic boxes

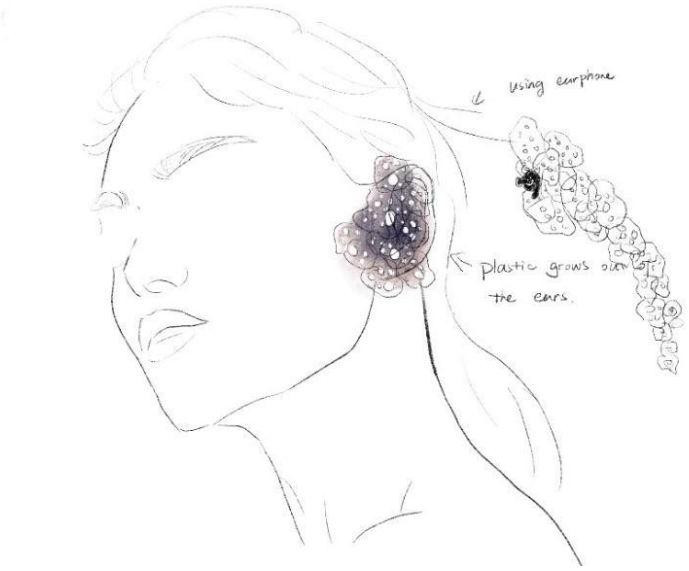
into different sizes, drilling densely spaced holes and heating the boxes to deform them. I then heated the paint, dyed them, and shaped them.

The first piece reflects my thoughts about how plastic accessories have evolved to merge with the human body. I heated and perforated soft plastic to deform it and drilled densely spaced holes to allow the plastic to create positive and negative space. I did not dictate how the piece should be worn. It could be a necklace, headpiece, or worn on the shoulder.

Evolution7; Equilibrium; Silver, Silicone, Plastic; 2020

With the experience from the last piece, I created an ear accessory. I chose a dark red color to give the plastic a new look and life. Inspired by the in-ear headphones we often use in daily life, and the body of the headphones is also made of plastic. By duplicating the plastic, the piece reflects a sense of derivation. My initial idea was to support the piece by using in-ear headphones as the base. However, the headphones' contact surface was too small and could not support the volume of the

piece. I then decided to make silver ear contours to support the piece on the ear using the strength of the metal.



Evolution8, Equilibrium, Sketch, 2020

Evolution9; Equilibrium; Steel, Silicone, Plastic; 2020

In my next piece, the plastic diffuses from the mouth. The esophagus and mouth are essential parts of the human body. To highlight the teeth and mouth, I used a flaring medical device, which allows a better view of the inside of the mouth. My idea is that the plastic spreads from inside the esophagus to the mouth and extends to the whole face.

For this piece, I cut the plastic into different sizes to create a diffusion effect before deforming and gluing the plastic into the shape I wanted. The transparent tooth retainers do not interfere with the piece, so I employed the traditional method of using metal to put them together. The uneven surface of the piece creates a nice three-dimensional effect, and the superimposed progression creates ample negative space and allows for more light and shadow effects.

Evolution10; Equilibrium; Silver, Silicone, Plastic; 2020

The last work in this small series is a plastic piece on the body. The difference between it and the previous works is that I used silicone, which has a texture similar to human skin and fits well with

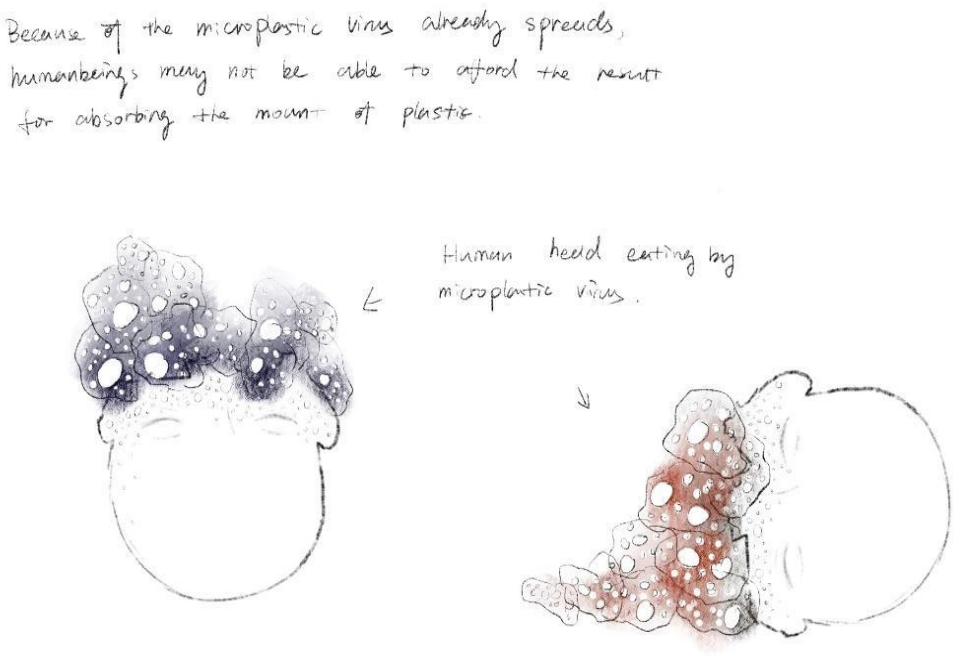
the skin. I wanted to create a fusion of plastic and the human body, using silicone to make the plastic appear to grow out of the body.

Evolution11; Equilibrium; Silicone, Plastic; 2020

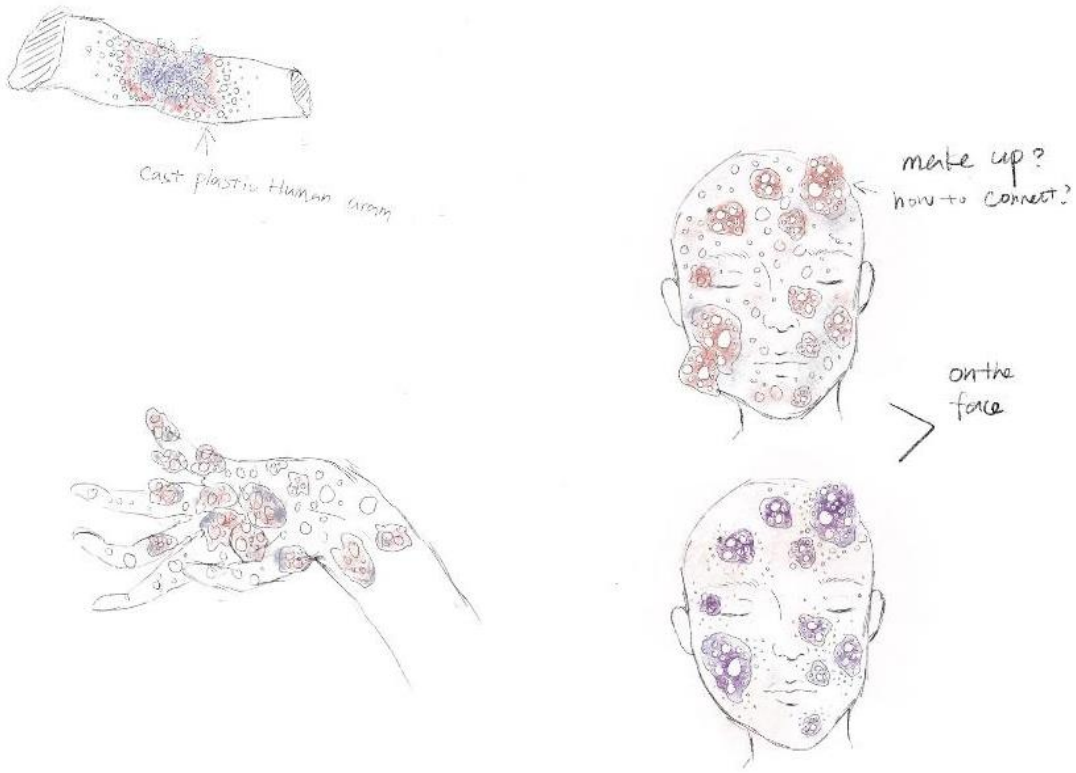
This work on the model's body does not look like low-quality plastic, but has volume and shines like onyx. I did not want to embody a sense of plastic because the plastic that evolves with the human body will not be the same plastic we now see everywhere. I do not know how it will be. Still, in my imagination, the fusion of the human body and plastic has evolved over time. The plastic will be absorbed and developed by the human body, growing into a different material. Thus, I do not want the audience to see only plastic products in my works. Instead, I want to transform these plastics into other "materials" through color, light and shadow, and volume.

Third Stage: Death

In the third stage, after the extinction of humans, will a new and more powerful civilization take its place, or, as I imagine, will humans adapt to environmental problems, replacing current humans with new, more powerful humans? Sixty-five million years ago, the ruler of the earth, the dinosaurs, became extinct. Sixty-five million years later, modern human civilization reigns. We go through the fossils to study them, these formers masters of the earth. How did their bodies change after the extinction of humans or after the evolution of new humans? How are they different from today's humans?



Evolution12, Death, Sketch, 2020



Evolution12, Death, Sketch, 2020

The next works reflect my interpretation of humanity's future. For this stage, I stopped making wearable jewelry and used sculpture and installation art instead. Fashioning parts similar to the human body conveys a more profound concept, and because of the similarity, the viewer can feel the same way. I made three pieces by combining the technique of plaster casting. I made the plaster casts of the palm, arm, and head using silicone to cast the plaster. In all three pieces, I used the same shape as in the previous pieces—densely spaced holes—in the parts combined with plastic. The concept of microplastic evolution is an extension of the infectious virus.

Evolution13; Death; Plaster, Plastic, Silicone; 2020

In making the palm, I want to show humans' control over plastic or evolution. Even after being forced to evolve, new humans still want absolute mastery. It can also represent the struggle and desperation of evolving and the fear created after growing out of plastic. In the two hand pieces, one hand struggles with the five fingers open as if to grab something, and the other is a five-finger clenched fist expressing complete certainty.

Evolution14; Death; Plaster, Plastic, Silicone; 2020

For the head work, I only molded half of the head so the audience can see the extension and multiplication of the plastic on the head. At the same time, I used silica gel to depict blood or blood that can be understood as dissolved plastic. In this photo, I let the model hold the work close to her head. When modern humans hold the bones of the new humans, what do we think about? Do we reflect on the abuse of plastic? The effect of light and shadow shows that modern humans have left the earth to be replaced by new humans.

Evolution15; Death; Plaster, Plastic, Silicone; 2020

In my approach to the previous works, I wanted to strengthen the viewer's sense of identification and enhance the vicariousness. The three works used plaster cloth to create different character traits. Elongating the neck and arms of the body shows different degrees of human evolution. As I mentioned before, the length of the giraffe's neck was also obtained through continuous evolution. Thus, in this final set of works, I depicted standard genetic evolution alongside my idea of plastic evolution to complete this set of pieces.

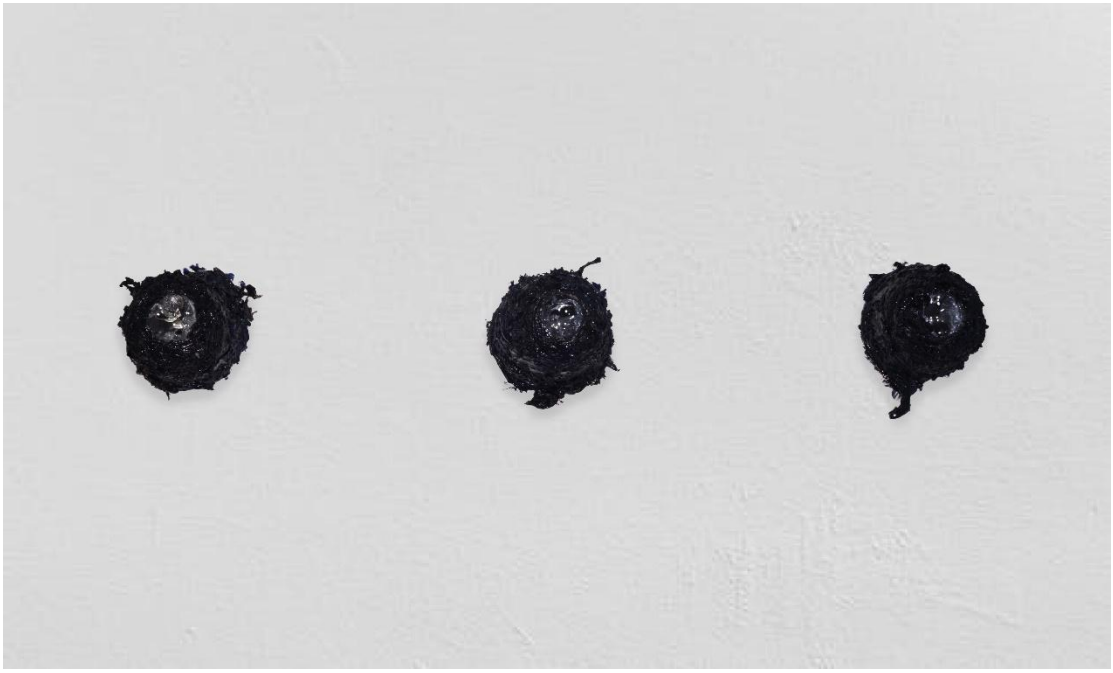
Evolution16; Death; Plaster, Plastic, Silicone; 2020

Conclusion

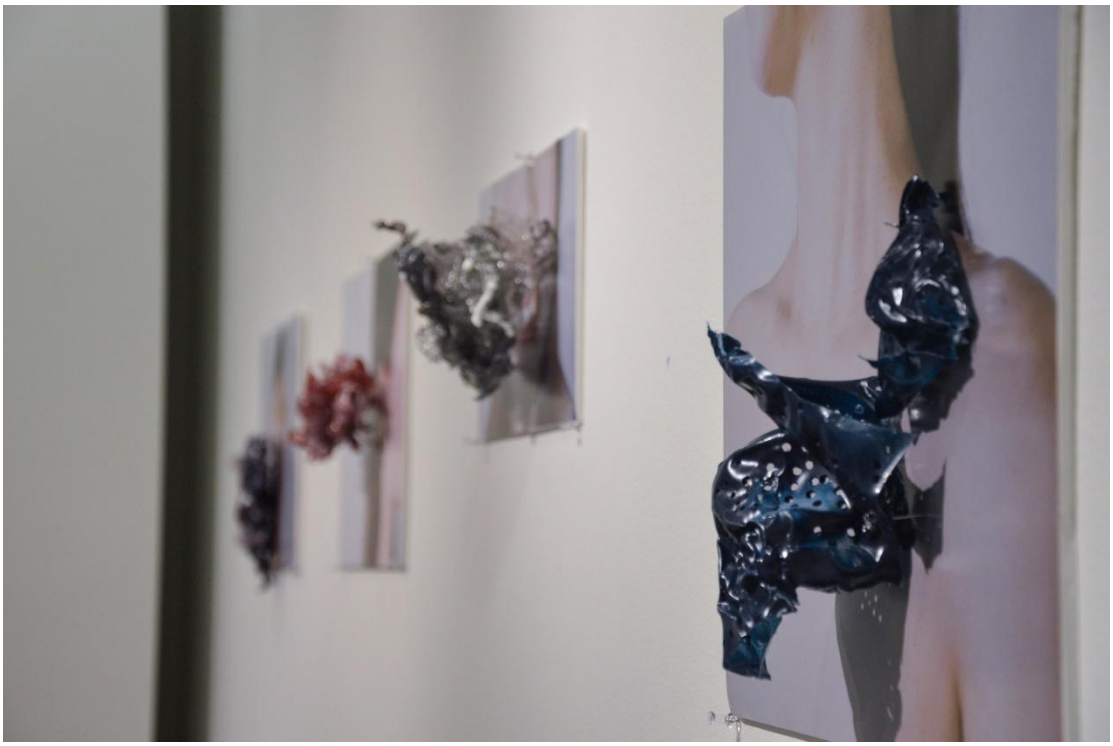
My thesis inspiration came from the excessive plastic waste I encountered in my own life. After learning about the production and spread of microplastics, I began thinking about where humanity's ongoing evolution will lead. In this thesis, I discuss the development of human beings, both the extinction of modern humans and the evolution of new humans. I argue that human evolution has changed course because of the intervention of microplastics. I present microplastics as a virus that spreads to the whole human race, allowing humans to evolve over millions of years to achieve peaceful coexistence with plastics.

I discuss three different stages of evolution: awakening, equilibrium, and death. Within these three stages, I use 11 pieces to show the newly-evolved human being. Throughout the process, I studied extensive literature, artworks, and conclusions to articulate my thoughts and consider the balanced relationship between plastic and human ecology. These works and experiences give me a voice as an artist, designer, and maker. My pieces break the traditional forms and conventions of jewelry, and I refuse to limit myself to precious jewelry materials to express my concepts.

INSTALLATION



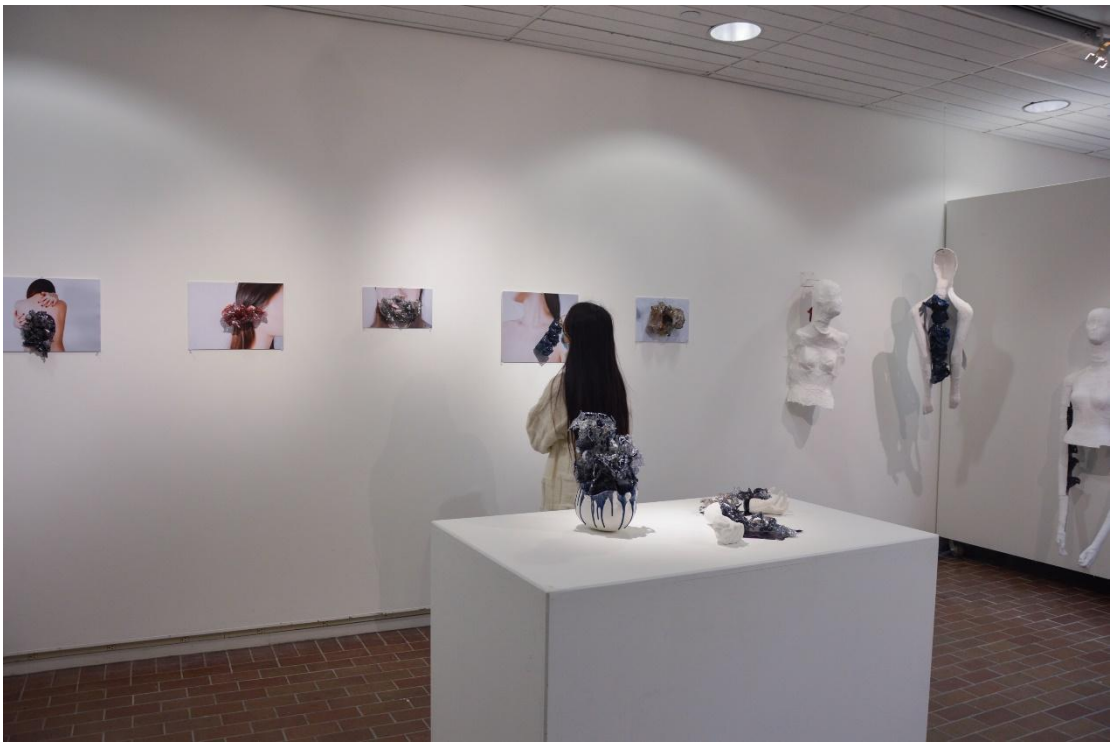
Installation image 1, 2020



Installation image 2, 2020

Installation image 3, 2020

Installation image 4, 2020



Installation image 5, 2020

Installation image 6, 2020

LIST OF IMAGES

BIBLIOGRAPHY

[1] Blair Crawford, Christopher; Quinn, Brian (2016). Microplastic Pollutants (1st ed.). Elsevier S cience. ISBN 9780128094068.[

[2] "Microplastic" Encyclopædia Britannica, Inc. , 2020. Britannica.com. Web

[3] Damian Carrington Environment editor.This article is more than 1 year old People eat at least 50,000 plastic particles a year, study finds[EB/OL].https://www.theguardian.com/environment/2019/jun/05/people-eat-at-least-50000-plastic-particles-a-year-study-finds,2019-6-5.

[4] Hall & Hallgrímsson 2008, pp. 4–6

[5] *"Evolution Resources". Washington, DC: National Academies of Sciences, Engineering, and Medicine. 2016. Archived from the original on 2016-06-03.*

[6] Futuyma & Kirkpatrick 2017, pp. 79–102, Chapter 4: Mutation and Variation

[7] *Scott-Phillips, Thomas C.; Laland, Kevin N.; Shuker, David M.; Dickins, Thomas E.; West, Stuart A. (May 2014). "The Niche Construction Perspective: A Critical Appraisal". Evolution. **68** (5): 1231–1243. doi:10.1111/evo.12332. ISSN 0014-3820. PMC 4261998. PMID 24325256. Evolutionary processes are generally thought of as processes by which these changes occur. Four such processes are widely recognized: natural selection (in the broad sense, to include sexual selection), genetic drift, mutation, and migration (Fisher 1930; Haldane 1932). The latter two generate variation; the first two sort it.*

[8] Ikehata, Y. (n.d.). *Disturbing Works Of Yuichi Ikehata*. Ignant. https://www.ignant.com/2017/04/10/disturbing-works-of-yuichi-ikehata/