

Digital Handmade: How Digital Fabrication Diversifies How We Interpret Craft in Art

Integrative Project Thesis

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The Emergence of Digital Artisans

We are in the post-industrialization Renaissance of art making, where the ‘digital handmade’ is still perceived as a contradiction of principles. The intersection of the ever-rational nature of computer technologies and the human touch of the craftsman is now being applied in unconventional ways. Previous artistic forms that would have been impossible to craft by hand are now achievable. A new group referred to as “digital artisans” are creating works that retain the essence of the material and the skill of the human hand, though benefiting from the precision and efficiency digital fabrication provides (Johnston 8). This new aesthetic builds upon a modern exploration and understanding of the connection between the designer and the maker. The one common element in this style is the manipulation of new forms through innovative techniques. This new media is challenging what we know and consider to be fine art and design. On the other hand, traditional artisans are questioning the authenticity of the work that these new media artists are creating. How does the "digital handmade” alter what we consider to be craft and does it change the meanings of the artwork?

What is Digital Fabrication

Digital fabrication is “a process whereby an object design is created on a computer, and the object is then automatically produced by a machine” (Zoran 5,6). Digital fabrication machines can be sorted into two categories: subtractive and additive. Subtractive processes include CNC milling and laser-cutting whereby the machines subtract material from its form. Additive processes include 3D printing by which the object is created layer by layer. Artists and designers use a variety of 3D modeling software or computer-aided design (CAD). Thus individuals can create their object digitally and program the machine to output their work. The digital fabrication processes can be used to make a final piece, but it can also be integrated with traditional material and techniques. Digital fabrication provides insight into the relationship among “traditional craft, modern technology, art and design” since it requires a diverse skill set to fabricate successful works (Zoran 2). In Glenn Adamson’s “Thinking Through Craft,” he explains craft ranges “widely across media, from lock-making, wood-carving and iron-casting to fashion, architecture and design” (Adamson 6). Therefore craft is not limited to one discipline, it is possible for digital fabrication to be considered a new form of craft.

What is Craft

In fine arts, ‘craft’ is believed to be about having control the whole process from beginning to end while developing, adapting and improving tools as needed (Shillito 10). The author Ann Marie Shillito, in the book *Digital Crafts*, explains that the artistic process is often viewed as intimate “active loop where experience informs action” (Shillito 10). Thus, when the digital fabrication tools disrupt the experimental loop, it has the potential to add value and inspire

artists and designers to extend their range of work. However, with these new technologies it is important to discern the “close relationship between digital work and craft practice” (Malcolm McCullough, 1996). In Malcolm McCullough’s 1996 book titled *Abstracting Craft*, he argues that those two processes are interconnected considering “hand and brain activities involved in computer use are analogous with making activities involved personal commitment and tacit knowledge” (Shillito, 10). Therefore, having a knowledge and applying those skills to the technology becomes an instructive part of artistic process. Just like every paint stroke contributes to the larger image, the digital process cannot be overlooked, rather it should be considered as part of the art making. In the end, these machines are not separate entities of humans, rather it is humans that program and instructs the machines.

The idea that craft is a *human* process is a crucial element in evaluating how the digital changes the connotations of the artwork. Some individuals place emphasis on resultative rather than the process and vice versa. Richard Sennett, an NYU professor of economics, defines craft broadly as “any process in which the practitioner is deeply invested in the outcome and takes *care* to do excellent work” (Zoran 6). On the other hand David Pye, a professor of furniture design at the Royal College of Art, defines compares craft “risk-taking, useful and evocative” (Zoran 6). Therefore, digital fabrication processes can fit into this specification since the process of digital fabrication involves a large amount of risk. Digitally fabricated work still reflects the skills of the craftsman, their own perspectives, and values. I find David Pye’s definition of craftsmanship most useful:

[Craftsmanship] means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on the judgment,

dexterity and care which the maker exercises as he works. The essential idea is that the quality of the result is continually at risk during the process of making; and so I shall call this kind of workmanship “the workmanship of risk”.

The essential quality of craftsmanship is being “continually at risk during the process of making” (Zoran 7). On one hand, digital fabrication can reduce the chances of risk since the artist or designer, in theory, has an infinite amount of time to work on the material without it drying or physically breaking. Unlike handcrafts, there are undo features and one can backup one’s work. Most of the time these digital pieces are infinitely reproducible. For example, if an individual models a flower on CAD than they could print that same object hundreds of times. Yet, if they had sculpted that flower with clay, it would be much harder to replicate an identical form. Additionally, any time that they wanted to reproduce the form they would have to start from the beginning. In contrast to the growth of machine-driven production, rapidly reproducing repeatable designs, crafted objects became a consistent quality and cheaper. Consequently, the belief that these objects also become less personal and unique emerges. The process of making a unique object is associated with intimacy between the maker and the artifact. The disconnect between craft and digital fabrication is also attributed to the perception that the use of machinery and craft cannot be intimate.

Precedents Draw on Context

An artist that plays with the idea of traditional objects being combined with digital fabrication process is Iranian-American artist Morehshin Allahyari’s series *Material Speculation: ISIS* (2015-2016). In this series she 3D models and 3D prints 12 original ancient

artifacts that were destroyed by ISIS at the Mosul Museum in 2015. The goal of this initiative is to create “a practical and politically possibility for artifact archival, while also proposing 3D printing technology as a tool both for resistance and documentation” (morehshin.com).

Morehshin process of restoring artifacts in order to preserve the history behind the artifact while at the same time acknowledging the material change. The artist is not trying to mask the fact that these are replicas of the objects. It could have been possible to cast these 3D renders in material that would mimic the original, in fact, all the reconstructed sculptures are printed in clear resin. Alternatively, the artist could have craved these relics out of similar material the originals were made of hundreds of years ago. The use of 3D printing technology is intentional and aligns with the message of her project. Furthermore, Allahyari’s work is having a dialogue with this particular time in history. We are at a pivotal point in history where 3D printers are becoming more accessible. She provides a new form of appreciation of artifacts of the past.

On the contrary, not all digital fabrication artist strive to infuse the digital and traditional. There are many subdivisions of postdigital artwork based on the artist’s intention. Ronald Labaco wrote his book *Out of Hand* is based on a 2013 exhibition at The Museum of Art and Design in New York. The goal of the exhibition was to demonstrate the impact of digital fabrication in contemporary art, architecture, and design. The collective of artist’s works demonstrate the relationship between materials and techniques through the emerging 21st-century aesthetics. The book is divided based on six themes of postdigital work: Modeling Nature; New Geometries; Pattern as Structure; Rebooting Revivals; Remixing the Figure; Processuality.

Cheating the Art World

When there is such a strong association between craft and the handmade, there is a struggle to create a connection between craft and digital art. Harry Rand in “The Other Side of Digital Art” writes that “the novelty of digital art is upon us; now we wait for the quality” (544). He argues that as any new medium, there are questions about its artistic validity. The quality of the work is not just defined as “the potential of an art,” but also what separates it from “useless messing around” (Rand 544). He brings up a valuable point that every artistic age utilizes “the best and comparatively most advanced technology of its time,” nevertheless the adherence and admiration for the traditional arts remains. However, Rand is not arguing that new technologies cannot cultivate new expressions and new forms of art, rather he does not believe that it has achieved its qualitative best.

Although some artists and designers solely use digital fabrication to create their projects, there are a multitude of artists that also use traditional methods in their processes. Even so, these patterns, designs, and forms are grounded in nature and ideas from traditional imagery. Each artist and designer uses digital processes for different reasons. For example, cinnamon Lee designs explore the relationship between hand and machine, or Japanese artist Nendo who produces ceramic pieces that employ both digital fabrication and ancient traditional methods (Johnston 120). Digital technologies are in continual generation, therefore it is significant to consider how these new methodologies fit into the definition of craft.

Digital Antique: Chinese Bronze Mirrors

As seen in the work of Moreshin Allyhari, some artists want to combine the traditional with new technologies. Similarly, for my investigation, I wanted reimagine an artifact of the past through digital fabrication.

Chinese artisans commonly embellish their work with designs that convey special meanings. On these mirrors are written motifs that communicate messages, while pectoral

elements often impart ideas more subtly. For example, imagery is derived from popular myths, fables, and historical events, and allude to the moral characteristic. Still, others rely on word-play to impact complex ideas and puns. Much of Chinese symbolism is intended to convey wishes for longevity, good health, happiness, and prosperity (Todd). To further my research I made an appointment at the UMMA to get a closer look at 18 Chinese bronze mirrors from their collection. The earliest bronze mirror was found in north-eastern China and dates from the late Neolithic period (Todd). In the Eastern Zhou period, mirrors become very popular and were produced in large numbers. The backs of the mirrors were decorated with a wide variety of beautifully cast intricate design and usually had a knob in the middle for a silk tassel (refer to Fig. 5).

Mirrors were imbued with mystical meanings beyond their practical use in daily life. The round shape of mirrors symbolized the sun and moon; their reflections, a metaphor for the other world. The backs of mirror featured mythical animals, cosmological diagrams (showing the



Fig 4. - Chinese Bronze Mirror , 206 BCE - 220 CE. UMMA. Ann Arbor

fastening points linking the domed sky to the square earth), and in the Eastern Han, Daoist deities. What initially attracted me to this form is that I could CNC the back of the mirror, and then laser the front. The back of the mirror has great potential for storytelling, a place where I can infuse text, imagery, and pattern.

In the Daodejing, the meaning “the way” references a way of living to manage ethical and moral issues in both the personal and public life. The female is also associated with “the way.” It can be interpreted as emptiness, nothingness, and nameless. The force is “silent and void” and is characterized by this stillness (Lau XXI). It is the virtue of nothing that makes the Dao possible, meaning that the absence of quality can also be representative of a presence of another. Lau’s equates the female to the “mysterious mirror,” an object that reflects everything but does not have the ability to hold on the image of anything.



Fig. 5. - Chinese Bronze Mirror, 8th century. UMMA, Ann Arbor.

Pride in Identity: Making Work that Reflects Culture

The beginning of my investigation process I planned on making digitally fabricated relics in order to juxtapose the notion static antiques. The goal of the project was to help me investigate my own dichotomy of heritage and upbringing. Initially, the project aimed to answer the following question: How can I convey the essence of antiques while subverting the meaning? I attempted to answer this questions by researching meaning/uses of some popular American and Chinese common household antiques. The outcome of this experiment revealed the multitude of

complexities and connotation of identity through personal objects, which contributed significantly to my understanding of the projection of narratives.

Finding a specific antique to concentrate on, I made digitally fabricated Chinese mirrors. By recreating them I am activity de-contextualizing the history of their making, stripping an object of its inherent value. Through this, I investigated the history of Chinese bronze mirrors and the reverence people give them. The inspiration of this project was to compensate for the part of my childhood I missed out on, and the little of the past that remains of the memories. I was born in the poor mountainous area of Changting, China, amidst the economic instability of the Post-Mao area. Adopted in Fujian at the age of two, I grew up in Miami, Florida. When I arrived, both my grandparents lived in senior homes. I never got to visit them in their own homes and the objects they surrounded themselves with. The objects in my current home are detached from the people and places where they once resided. Antiques have associated with storytelling or family narratives, they have an ethereal quality surrounding them, that I did not access to. I am still aiming to redefine how we think of relics by using modern materials.

In the search for something more personal to my family history, I scavenged my mother's old letters. I found a series of letters she sent to her parents while teaching in Hong Kong between the years 1972-1975. My mother at that time was about the same age as I am now, and her correspondence between her and her parents illuminates her own fears and insights in a new country. In a later conversation, my mother revealed to me that her trip to China inspired her to adopt later in life. I went through each one of these letters and picked out significant sentences and imagery. I initially planned on incorporating more of her letters into my pieces, however in the

end, I decided to laser engrave only a select number of mirrors to have her handwriting displayed.

Until recently, my work has not been centered around my identity. This is a result of not believing my story was worth telling, and not knowing how to reclaim my own narratives. As someone with mixed cultural identities, I struggled to claim ownership of both my American and Chinese identity. My racial phenotype is Chinese but culturally American. Speaking with other students who do not have a singular background, it can be difficult to find their voice. To find their voice in their activism, artwork, and outwardly expressions. This is because often people bearing multiple identities don't feel "enough" of either side of their individuality. It was only until college that I have learned that being Asian or American is not about the traditional garments or food, but rather the way we all center ourselves in the world as human beings.

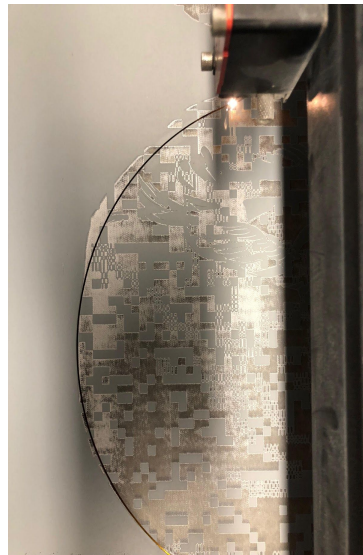
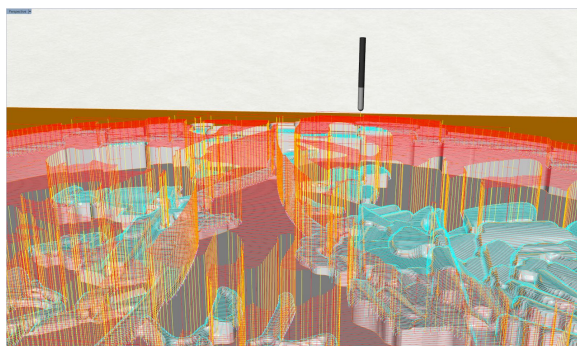
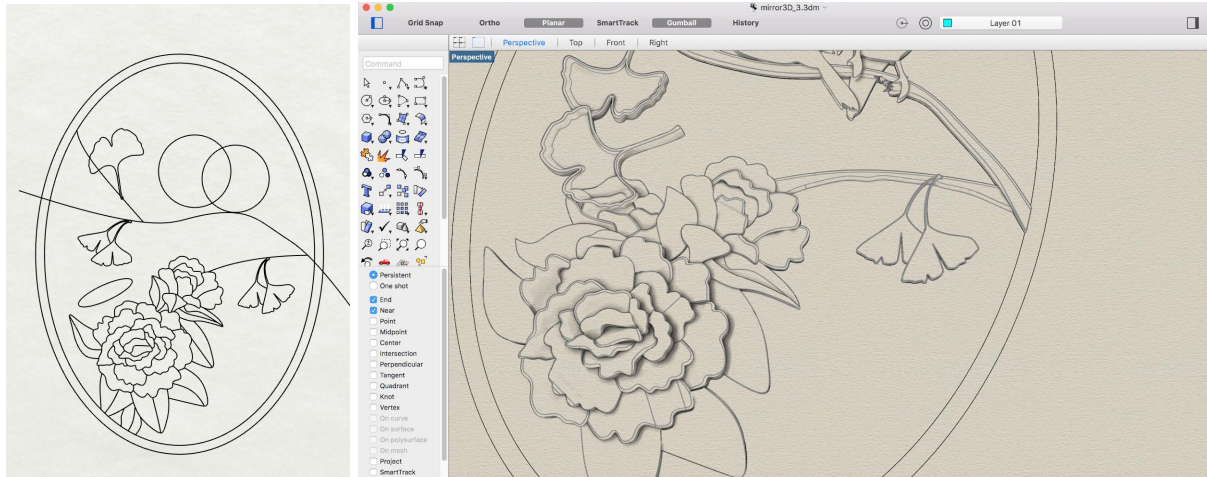
Design Process

I used the CNC mill and 3D printers for the back reliefs of the mirrors. First I sketch out an idea of what I want the design to look like based on historical Chinese bronze mirrors and imagery from my childhood. I then draw design in a 2D digital format. From the lines of the design, I add a more volumetric shapes. Once I have the desired form, I have two options: 1) set it up as a 3D print on the Fusion 3 or Formlabs printer, or alternatively 2) prepare the file for CNC milling. After these processes, there is some degree of polishing that needs to be done to achieve a more finished product. For example, CNC pine requires sanding and a wood stain but CNC MDF requires a fresh coat of paint. For all my 3D prints I painted them with acrylic or spray painted them. Utilizing mirrored acrylic, it is possible to laser etch digitized hand drawn

designs. I had to multiple tests with this material to get the desired look of the etching. I increased the intensity of the raster engraving so that the color of back would show through the etching (ref. Figure 6). The following page demonstrates the step by step process I used for most of my mirrors.



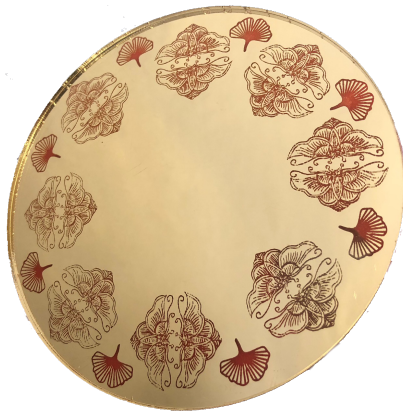
Fig. 6 - Engraved Mirrored Acrylic with Red Peeking Through



Creative Work

My work brings out the “hybridity” between my Chinese heritage and my American upbringing as an adopted child through digitally fabricated artworks inspired by Chinese bronze mirrors. These objects blend traditional Chinese and American symbols with digital fabrication design. My project considers how the digital handmade alter what we consider to be craft and how it changes the meaning of the artwork being constructed.

This series aims to celebrate multifaceted heritage and beauty in multicultural narratives while warding off negative perceptions that might blind-side us. As early as the Han Dynasty, Taoist monks wore bronze mirrors on their backs to ward off evil spirits (Todd). They believed that evil destroys itself on recognizing itself (Museum of Fine Arts Bulletin). These works are a visual representation of my journey to finding my voice, reclaiming the stories of my heritage and past and infuse them into new objects to share.



The exhibition of the work is intended to emerge the viewer into the multitude of the digitally fabricated mirrors. The title of the work references a passage in the Daodejing in which the female is described as the “Valley to the Empire.” I pulled imagery from the Chinese classic to mimic the metaphorical passageway viewers could go through. The red string that holds up all the mirrors allude to the ropes and silk that were originally fastened on Chinese bronze mirrors. Twenty mirrors are hung on each side, and each mirror is unique in the combination of its relief design and mirrored engraved design. Imagery ranges from lotus flowers that symbolize purity and enlightenment, dragons for good

fortune, phoenix for peace and prosperity, crane for longevity, peony for virtue, and bats for happiness.

Although the text is limited, one mirror specifically has the saying “一切为了孩子” which translates to “Everything for the children.” I first saw this slogan when I went to Beijing’s most accredited adoption agency. At this site, there were hundreds of bound folders with children’s names and histories. This text and my adoptive name 汀福芳 is the only Chinese text that is featured in this project. It has taken me years to start identifying myself with my Chinese name, and the only times that I am addressed by my Chinese name is in my Mandarin class.



There is a dual purpose of having 40 mirrors hung up with different sequences of designs: 1) to emphasize the capabilities of digital fabrication, and 2) to engage the viewer to piece together the multifaceted narrative. The use of multiple types of material explores the diversity of forms. Yet all the mirrors are tied in with a gold or bronze mirror acrylic back. I want to show in my work that digital fabrication does not have to remove the personal and unique qualities compared to handmade work. The value of the craft does not have to degrade because it is not made by the human hand, rather the importance lies in conceptual reach and process.

Conclusion

London-based curator, Lucy Johnston in an interview with Wired Magazine in June 2015 exclaims that “the digital world isn’t replacing humans, it’s enhancing what humans can make.” Digital processes and handmade art can work together to create pieces that could have been made just by hand or just by machine. Johnston found particular sentiments on the internet about digital work, stating that when artists use computers to make their work “a lot of people think you’re cheating.” On the contrary, what these critics disregard is the hundreds of hours of skilled work to create the final piece. The digital handmade alter what is considered to be craft. It should not change whether an object has craft if the skill and risk are still present.

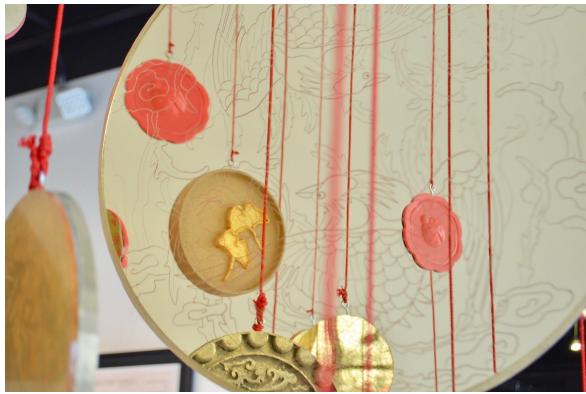
We are all natural storytellers, and cross generations we construct new methods of sharing knowledge with one another. A large piece of my project was a yearning to speak in multitudes. Digital fabrications aided me in telling 40 unique stories through the Chinese bronze inspired mirrors. I believe the role of the artist is to teach people about ideas, things, events that are often overlooked or misunderstood. Rapid manufacturing not only improves conservation and research but also increases and democratize knowledge (Solberg 412). Digital fabrication offers news ways to interpret the world around us, and now the audience is not limited to physical accessibility. As new emerging technologies develop to produce art, there is a worry that digital technologies dehumanize the making process, however through these machines there is evidence of the artist’s technical and emotional expressions.

Documentation



At the Stamps Gallery Opening for Thesis





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