

Sarah Jane Post

Heat Beats for the Motherboard

Video sensor, Java Code, Sound, Porcelain, Bronze, Wiring, Wood





I. Introduction

In the beginning of this year I set the goal to create an interactive sculpture combining traditional materials with digital software. I wanted to bring these inanimate, traditional, sculptural objects forward in the modern technological world by applying digital software and giving them simulated life. I wanted to work with sculptural materials I was familiar with while learning more about new digital technologies. Ideas of the digital realm had already started to embed into my work, I was creating images of biblical stories and replacing characters with futuristic cyborgs. I wanted to go deeper with these interests and find a mutual ground between my 3D and digital work. I wanted to create a space where the virtual and reality, technology and humans, can connect.

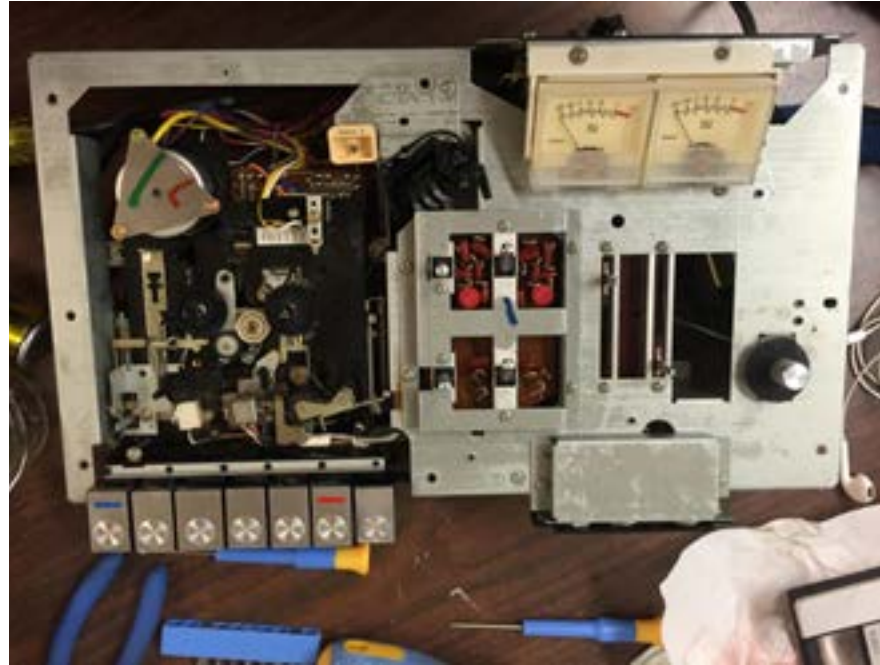
II. Methodology & Creative Work

We are constantly surrounded by technology whether we want to be or not. We also do not understand the technology we make, which can perpetuate our fear of technology. Our relationship with technology is mutual: Without humans there would be no technology and without humans there would be no need for technology. Therefore, our interaction with technology should not be a negative experience. As a millennial, issues with our relationships to technological devices are increasing tremendously as we are more distracted by these devices. Sherry Turkle, a personality psychologist who graduated from Harvard University and now a professor at MIT, has dedicated her profession to investigating humans' relationship to technology. She has written multiple books on the digital age including her most recent, *Reclaiming Conversation: Power of Talk in a Digital Age*, which investigates the psychological influences digital devices have on our human-to-human relationships and relationships we have with ourselves¹. Turkle discusses how the distraction of devices does not allow the time we need to become intimate with others and ourselves. We fill our past time with mindlessly checking our devices. The time we would use to reflect or converse with others is used looking at these virtual devices and their different social platforms online². We use these devices to have control over our identity. Online you can retouch, edit, and create your perfect profile to communicate with others. When online we are alone together. We are using these devices to hide from each other in real time³. With my piece I wanted to create a space where you can relate to technology, together. The piece does not fully function without multiple different people standing in front of it. It is important to me that people discuss their relationship to technology with others to shed light on their own feelings towards the changing technological advances. When they stand in front of the piece they are connecting with technology and with the others around them.

1. Sherry Turkle. "Connected, but Alone?" TED Talks. February 2012. Accessed December 2016. https://www.ted.com/talks/sherry_turkle_alone_together?language=en#t-269050.

2. Sherry Turkle. "Connected, but Alone?"

3. Sherry Turkle. "Connected, but Alone?"



Taking apart a Stereo Cassette-Corder



When I started to explore technology as a subject I began observing technological objects that required human interaction to properly function. Objects like a landline telephone, DVD player, stereo cassette-corder, and an external CD drive. I chose objects that had some element of sound and were obsolete because of the inevitable advancements of technology. I decided on sound because I was observing how people communicate by speaking to one another and read into each other's emotions by listening to different tones in their voices. Sound provides the human emotion so that the viewer can connect and try to interpret. These objects require a person's interaction for them to start and play sounds.

I started with literally cracking open and exposing the wiring inside the objects. Their circuit boards were what interested me the most. I was drawn to their green color, their design, and the layout of these objects. I was interested in the organization of visual space these complex objects had and how it related to the functionality of the object. The idea of the circuit board fascinated me. To me, the circuit board is the foundation of the technological object, its "brain", controlling how it works, how it communicates with itself, its center. I wanted to continue exploring these circuit boards as a physical form.



Digital Collages



Marecelo Coelho
"Six-Forty by Four-Eighty"

The circuit board's physical form is very similar to a tile, flat, thin with little relief. While I was taking apart these circuit boards I started to play with their tile like forms as a collective. Using digital collages I tried to find ways to organize them as a whole. While creating these digital collages, I started to research artists who also make interactive tiles. Marcelo Coelho's interactive work, "Six-Forty by Four-Eighty", is a tiled lighting installation that breaks pixels away from the screen, physically immersing viewers into an interactive computing experience⁴. Each "pixel" is a tile that is an independent computer capable of displaying different colors. The color changes in response to touch from the viewer. The pixels are magnetized to the wall so the viewer is capable of changing and rearranging the pixels⁵. They become a medium for the viewer to create different compositions of color. Coelho's piece creates a space where people come together and interact with computing technologies. I think this piece solves social issues that Turkle discusses because it requires people to collaborate together to create different images by interacting with the computing devices. It relates to my work through the use of tile repetition and use of space. Coelho is using the same pixel form but changing it through light and allowing a large interactive space where the viewer's interaction becomes part of the piece. I am using repeating tiles sculpturally and creating a space where sounds can only play if there are viewers in the space. The technological sounds mimic the human heartbeat connecting the viewer to the sculpture.

4. Marcelo Coelho. "Six-Forty by Four-Eighty." Marcelo Coelho Studio. Accessed October 15, 2016. <http://www.cmarcelo.com/#/six-forty-by-four-eighty/>.

5. Marcelo Coelho. "Six-Forty by Four-Eighty."

I wanted the piece to remind the viewer of what they were looking at through electronic sounds. While creating these sounds I was inspired by the work of Steve Reich. In the beginning Reich was known for using technologies of tape deck recorders that would slowly go out of phase with each other⁶. As these recordings would go out of phase with each other, they created very interesting and complex interactive sounds. The tape decks and sounds were interacting with themselves. Reich was using early machinery to create these sounds. He has another piece called "Pendulum" where electronic microphones and speakers create sounds using movement from a human interaction⁷. The microphones hang from their cord and a person would start the pendulum motion with the microphone. The microphones would swing back and forth above a speaker creating rhythmic feedback sounds. The cords of the microphones were of different lengths, causing different rhythmic patterns in feedback sounds. I found this related to my piece because of the initial human interaction with the technology to create the sound. Without the person, the pendulum would never happen. In order for the piece to play sound it requires human interaction with the technology. It changes rhythmically when a new person is added to the space.



Steve Reich
Pendulum

For my piece to play sound, a person has to be standing at the left, right, or center of the motherboard. A computer software called Processing 3 plays the sound using a webcam video feed. The software code splits the webcam screen into three different columns. There is a small hole above the heart in the center box where the webcam is. If the viewer stands to the right, center, or left of the piece, the webcam will register the person's face and activate the sound from where the person stands. As viewers interact and walk around in this space, all of the sounds will activate. There are three different sounds that play. When enough people are interacting with the space, all three sounds will sync up and play. While creating these sounds I was inspired by when I had to rip open the older machines to get to their circuit boards. I began to look up random homemade YouTube tutorials of people exposing old technologies and running them⁸. In the videos you can hear these exposed circuit boards and hard drives being powered. In Final Cut Pro I took these electronics sounds from the homemade tutorials, cut, and edited them down to mimic a heartbeat and humanistic rhythmic sounds. I was breaking down these sounds and the objects at the same time.

6. Steve Reich. "Steve Reich: Playing Music/Talking Music." YouTube. 2014. Accessed December 13, 2016. <https://www.youtube.com/watch?v=kI25bqbzzNs>.

7. Steve Reich. "Pendulum Music Steve Reich 1968." YouTube. 2014. Accessed December 13, 2016. <https://www.youtube.com/watch?v=fU6qDeJPT-w>.

8. DimensionDude. "Old Loud Hard Drive." YouTube. 2007. Accessed February 05, 2016. <https://www.youtube.com/watch?v=2pB6Yjlv4gE>.



To Err is Human; As well as Divine

I started to research what foundation materials made up the circuit boards. That is where I found a common ground in material that matched my traditional sculptural background. Most circuit boards begin with a ceramic foundation. Ceramic is used as an electrical insulator in circuit boards so that they will not over heat⁹. In a previous project, I had used the circuit board as a muse as a reflection of our modern technological world today in a different context. The piece was titled To Err is Human; As well as Divine and was about how people are not like machines because of human error. I created multiple plaster molds of the same circuit board. I used clay and plaster so I could make multiple tiles at a time. It was this process that really fascinated me. I became part of the machine by pressing clay into the mold and mass-producing multiple tiles of this circuit board. I wanted to expand on this idea and to go deeper with the process it took to create these molds.

9. Edvard Csanyi. "Ceramic (Porcelain and Glass) Insulators | EEP." EEP Electrical Engineering Portal. 2012. Accessed September 17, 2016. <http://electrical-engineering-portal.com/ceramic-porcelain-and-glass-insulators>.



Circuit Board, Mold, Porcelain Circuit Board



Slip Casting with Plaster molds

To create these plaster casts, there can be no undercuts in order for the clay to come out of the mold. This requires preciseness when prepping the circuit board to make a proper mold. I would press an oil-based clay into all of the undercuts of the circuit boards. I would become very intimate and particular with these exposed circuit boards. I found that creating these molds was very similar to programming a code. In order for a computer to function, it needs an exact code telling it every thing it needs in order for it to correctly perform. I had to make sure everything was exact in order for the mold to be a success. Once I created the mold, I used porcelain slip cast to create the actual tile. Porcelain is the most popular electrical insulator, found in the knobs of high-voltage electric lines¹⁰. Slip is a liquid form of clay, which when poured into a plaster mold the plaster absorbs the water from the clay leaving just a clay cast. The slip is a sensitive material that also requires an exact chemical balance to create a successful cast and also a time sensitive material. I pour the slip into the cast. I set a timer so that I know just when the slip is thick enough on the edges to pour the excess slip out. I flip the pieces over and set another timer to know when the clay cast is ready to be taken out of the mold. I then clean up the edges and face of the tile for it to be fired in the kiln. It was important to me that I was using raw and organic material while also matching traditional sculptural techniques. Porcelain also matches the original material the circuit boards are originally made of.

10. Csanyi, "Ceramic (Porcelain and Glass) Insulators | EEP."



Another common element found in these circuit boards was copper. Copper is an electrical conductor found in hardware and wiring of technological objects¹¹. It is what gives these circuit boards their electrical pulse to function. It is also one of the main elements that make up the traditional sculptural material, bronze. In the center on my piece is a human heart composed of bronze. To create the heart, I used the traditional sculptural technique of the lost-wax process¹². The human heart ties the viewer to the piece with themes of human relations to technology. The heart is literally connected to the circuit board tiles by exposed copper wiring. All of the raw elements are connected to one another, forming unity between insulators and conductors, porcelain and copper, circuit boards and the human heart.

The heart is also in the center of this triptych piece, giving it a sanctified sense. After working on this project for four months, I found that my piece was beginning to connect to religious art through material and through my own beliefs about technology. Both bronze and porcelain have been used for centuries in religious art. Bronze is a noble and very durable material that can last through the ages. It has been seen as a divine material in representational religious art since the Bronze Ages¹³. Porcelain also was seen as a divine material because of its toughness and durability¹³. The process of making these pieces using such materials required a great deal of time, dedication, and patience to complete the work. I continued to think about people's relationships to technology during this time. I believe that technology is a divine power and with power comes responsibility. Today we are using the power of technology to connect with each other virtually. The piece uses technologies to create a space where people could connect in real life.

11. Discovery Channel. "How It's Made - Microchips." YouTube. 2013. Accessed September 17, 2015. <https://www.youtube.com/watch?v=J3oL3KfqHKI>.

12. Sculptureworks, Inc. "The Story of Sculpture: From Clay to Bronze." Sculptureworks, Inc. Accessed September 22, 2015. <http://www.gobronze.org/from.html>.

13. "The Bronze Age." The Bronze Age. Accessed October 13, 2015. <http://www.cybele2.com/TBA.html>.

14 "Origin of Chinese Porcelain." China Culture. Accessed January 20, 2016. http://www1.chinaculture.org/gb/en_artqa/2003-09/24/content_37884.htm.



Christian porcelain triptych vase with gold leaf

I wanted the viewer to feel this divine and powerful space, which is why I chose the triptych display. The term triptych, which stems from Greek for “three- folds”, is a display that dates back to early Christian art. With three-panels, the central panel is generally the largest with two wings on either side. I used this triptych display as a shrine to technology. The notion of a shrine helps create this sacred space where humans and technology can connect. I also used liquid gold-leaf paint to pick up the small details of the circuit tiles. The gold paint mimics gilding, another material and technique used in early Christian art¹⁵. The gold details draw the viewer in closer causing the sound to trigger. At that moment when the sound goes off a connection is made between the viewer, the sculpture, and the space.

I. Conclusion

During installation week it was as if everything was coming together at once. It was the first time I had seen the piece mounted on the wall with the lighting perfectly highlighting the gold accents on each porcelain tile. Hearing the sounds play from the hidden speakers as it recognized my face is a moment I will never forget. As I watched the piece come together as a whole, I awaited people to come and interact with it. During the opening show I was very attentive to see how people interacted with the space. Before the show, I had no idea of how people would interact with the space but could only attempt to predict how people would react. During opening night, it was very crowded and loud. People would come up to the piece and press their ears against the boxes and against the bronze heart wondering where the soft rhythmic sounds were coming from. They would ask question about how the sounds started and I would have to show where the hole for the webcam was hidden. I had to explain that the inside of the wall had a computer running the software which detected people’s faces and played different sounds according to where they stood. I enjoyed watching how people reacted to this information because they would start looking for how the computer was connected. The piece successfully blended the technology into the sculpture.

15. Annie Sloan and Geoff Dann. *Annie Sloan’s Decorative Gilding: A Step-by-step Course*. London: Collins & Brown, 1996.

After observing people and the piece together, I paid close attention to how people interacted with each other in the space. They would discuss how the piece functioned as a whole and helped each other understand how the technologies worked and examining the detail of the circuit boards. This outcome was what I hoped for and worked tirelessly to facilitate. People would pan across the webcam making all of the sounds go off at once. After observing how people interacted with this digital and sculptural object, I started thinking about how we relate to and identify with these objects.

Donna Haraway, a feminist studies Professor at the University of California wrote the essay, *A Cyborg Manifesto*. The essay contemplates the future of socialist feminism by applying the concept of the cyborg as an identity¹⁶. Through my thesis, I was exploring human’s relationships to these technological objects. Now I have stated to think about how these object have become a part of our identity. Instead of Turkle’s idea of how we relate to these objects, I have started to shift ideas of how we have started to become the technological objects. Haraway’s cyborg theory rejects the previous beliefs of essentialism and proposes a new identity that fuses humans and machines¹⁷. Identifying as a cyborg will allow humans to break away from the patriarchal model of the “organic family ” and evolve with the progression of technology¹⁸. Identifying as a cyborg gives people the fluidity they need to break away from the boundaries of Western patriarchal society. Cyborg is a wide-ranging term that allows multiple people to fall under this identity and eliminates the previous social concepts of gender. People who need prosthetic body parts, who get plastic surgery, who surgically alter their sex organs, can all identify as a cyborg. Because of such technological advancements, people who alter their bodies are able to identify as whom they truly perceive themselves without previous gender binaries and limitations. With this progressive theory, I have started to think about how the fuse of humans and technology as an identity can help people progress as technology progresses, too. I will start by creating more digital collages of portraits of these cyborgs and embedding them into historical photographs. I would be virtually changing history by applying the Cyborg model as an identity. I would also like to incorporate interactive elements into my future projects. My thesis was the first time I had made interactive art. Trying to predict how people interact with the space then actually watching them interact was remarkably rewarding and satisfying. Humans can be unpredictable and studying them through an art lens is something I would like to continue.

16, Donna Haraway, “A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century” in *The Feminism and Visual Culture Reader*, edited by Jones, Amelia, (London: Routledge, 2010),587-608.

17. Donna Haraway, “A Cyborg Manifesto”

18. Donna Haraway, “A Cyborg Manifesto”



T@k3 @ BIT3
Digital Collage
Sarah Jane Post

Sarah Jane Post

Heat Beats for the Motherboard

Video sensor, Java Code, Sound, Porcelain, Bronze, Wiring, Wood



This interactive triptych sculpture of wall-mounted circuit boards is composed of video sensors and porcelain tiles as well as a bronze heart in the center of the piece. As you listen, allow yourself to drift deeply as the programmatically generated rhythmic sounds play. Take notice in the shift of sounds while others join you in this experience.

Watch the video at <https://www.youtube.com/watch?v=JLPrCELg8hY>

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DimensionDude. "Old Loud Hard Drive." YouTube. 2007. Accessed February 05, 2016. <https://www.youtube.com/watch?v=2p-B6Yjlv4gE>.

Discovery Channel. "How It's Made - Microchips." YouTube. 2013. Accessed September 17, 2016. <https://www.youtube.com/watch?v=J3oL3KfqHKL>.