Representation of a Jazz Drum Solo

by

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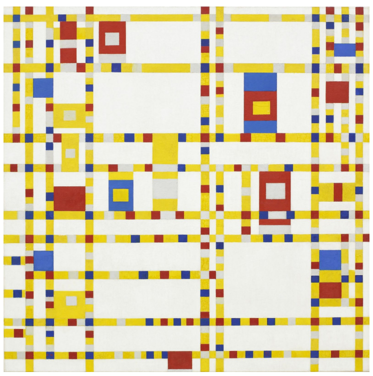
ABSTRACT

Music and art have had a tendency to both influence as well as turn their backs to each other. In some periods, music has influenced art and in others, there are clear disconnections. Obvious connections can be made to examples of classical music and classical painting, in which both visually and sonically they are considered the "highest" form of their respective fields by many and have similarities in their form and history. A more specific example is of the Jazz



scene, which influenced painter Piet Mondrian who created his self-proclaiming piece, "Broadway Boogie-Woogie (1943)" which was meant to reflect the everchanging jazz music community in New York City, as well as the rhythm of the music. The emergence of Sound Art explored new ways to think about sound outside of a musical context. John Cage's famous piece, "4'33"" changed the world's perception of performance and music, creating a piece that featured absolutely no sound or music that focused the attention to the ambient sounds of the room. I noticed that there are a lot of sound artists who do not incorporate "musical" techniques in their work and disagree with the modern rules of music, such as utilizing tempo, pitch, structure, and rhythm. I am interested in the way that music and sound art coexist and the ways in which I can bridge the gap between the two. My project, titled "Representation of a Jazz Drum Solo" seeks to connect both the musical world and the sound art world together to create a visual/audio installation. I aim to explore ways in which the drums can inspire visual art, as well as the connections between the two. Utilizing drums rigged with transducers to play-back audio and real-time audio/visual

Processing, "Representation of Jazz Drum Solo" will provide viewers with an experience that will leave them thinking about sound and rhythm in a colorful, visual manner.

BACKGROUND

Sound has consistently played a crucial role in my life from an early age. I have always been interested in the ways sound affects myself, as well as how others interpret sound. Coming from a musical background, I have always associated sounds with rhythm and music. Having played drums for over 15 years, along with other instruments such as guitar and piano for a similar amount of time, it was inevitable that I would develop an ear for music. Before deciding to declare my major as New Media at SUNY Purchase, I auditioned for the Jazz Conservatory program. After not being accepted, I decided to take an interest in the different fields New Media had to offer. Studying sound art and field recording allowed me to develop a new sense of interpreting the sounds I was hearing.

In the Spring of 2019, I realized one of my first sound sculptures titled "DigiPhysical Waves", which consisted of a plastic bin filled with beach water, rigged with transducers to play back the sounds of the actual waves in their physical form. After showcasing this project in the Junior New Media Exhibition, I realized my love for sound sculpture work, in that the work itself would be performing even if I wasn't there. This is a concept that I really wanted to employ in this work which I will discuss further. Along with this, I want to

explore the ways in which people interpret music by using visuals along with sound to enhance the understanding of what is being played/ what sound produces what.

INTRODUCTION

"Representation of a Jazz Drum Solo" consists of an object-based sound sculpture accompanied by a visual processing sketch. I aim to question the ways in which music and art have influenced each other, as well as the ways they have disagreed. Specifically in the sound art world, the use of musical techniques such as a steady tempo, chord structure, harmony, and composition are generally disregarded. The project will provide a direct translation of music into visual art, with the use of computer processing. When beginning to develop this project, I knew I wanted to develop a way to represent sound in an interesting way. During my research, I was drawn to the connections made in Piet Mondrian's "Broadway Boogie Woogie", who painted representations of the Jazz scene and the flow and rhythm of the city. This led me to create a real-time Processing sketch influenced by the painting, which is interpreted and created through sound.

The idea of performance without performing is also a very crucial idea to the project. As a musician I have performed on stage many times, but have been drawn to the idea of being able to have my work perform for me without being in attendance. I am also questioning what it means to be performing. For example, if I perform a drum solo in my basement and record it, and then play the recordings back through the same drum set in a gallery setting, would this count as me performing? I would argue that it is performance, but technically it is the computer that is doing the performing. Overall, "Representation of a Jazz Drum Solo" seeks to find a way to create visual art by means of playing the drums, as well as represent those drums in a sculpture type setting to be able to recreate the sound of the original performance.

INSPIRATION

Performance art, sound art and music have all influenced the ways I perceive sound. Sound art has played a crucial role in the development of myself as an artist. Early sound art works provide examples of ways sculpture artists were thinking about and utilizing sound as a material in their works. Some notable early sound sculptures are Bernard Baschet's "Structures

Sonores"(1968), which consisted of a sound sculpture/instrument made of glass tubes which led to a metal sheet "speaker", as well as Harry Bertoia's "Sonambient Sculptures" (1960-70), which were mostly metal sound sculptures that were inspired by his furniture fabrication. When watching a film of Baschet's "Structures Sonores", it was very interesting that when Baschet was presenting his work, the reporter asked "can you play classical?", and Baschet proceeded to perform a classical arrangement on his sound sculpture. This relates back to my thesis, in which I am questioning the relationship between music and art. Baschet created an entirely new instrument out of uncommon materials, and the only thing the reporter cared about was whether or not Baschet could perform classical music on it. Nonetheless, these works are early examples of sound being used as a medium in sculpture based work. The relationship between art and music is interesting in works like these, because these artists were trying to stray away from the rules and boundaries of music as much as possible.

Other sound artists such as Liz Phillips and Max Neuhaus have used sound as a material in their works in different ways. Liz Phillips, a pioneer of sound art, utilizes sound and space in sculptural forms to allow for interactivity amongst viewers.

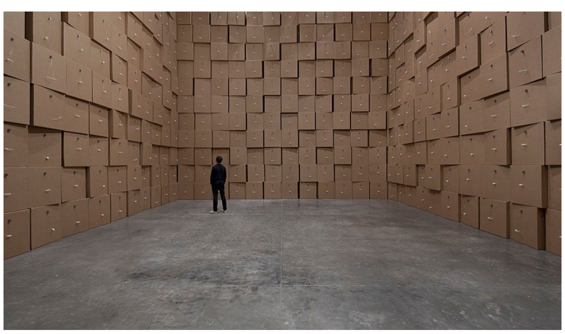
> *" As an artist, I use open systems to collaborate with audiences and to interact with the natural environment. Sound in my work functions as a material (like steel or wood or clay) and is both signal and music as it describes activity in space. I began as a sculptor and migrated into music as electronic music opened up to include natural and electronic sound and space. Sensing and harvesting sonic material allows for dynamic transformations in composition"*- Liz Phillips

Phillips' project " Sunspots" allowed observers to interact with her sculpture using movement and touch to change the sound being produced. Phillips was very interested in the correlations between space and sound, utilizing a Theremin synthesizer, which is able to conduct how far a person is/ what movements they make without making physical contact based off of radio waves (Phillips). This way of thinking about sound inspired a lot of my ideas about sound art. For example, thinking about how people

are going to interact with your work and the way it will inhabit space both physically and acoustically is something I thought about a lot when devising my piece. Another interesting point about Phillip's work is that she inhabits both the art and music realm. She cites music as a way to describe the sounds that are behaving, as well as working in the electronic music field. It is interesting to note that commonly in sound art, artists like Francisco Lopez for example, who is a sound artist as well as composer and DJ, usually separate their work into different categories. Lopez has a discography of albums ranging from foley-sound recordings, field recordings, as well as musical scores for video games. Another work of Phillips' is "Wave Table", which featured a metal table filled with water, rigged with a transducer to playback tones and frequencies into the table to create a visual effect in the water. This piece really inspired me to start messing around with transducers, after seeing the beautiful representations of frequencies that emerge in the water when triggered by the vibrations.

Max Neuhaus, also a pioneer of sound art and percussionist, created many public installation works that emanated sound from unusual places, such as a sewer grate in the middle of Times Square, and the roof of a museum gallery. Neuhaus, was formerly a classically trained percussionist, however he took a liking to electronic experimental work and sound sculptures. Just a couple years before his breakthrough into Sound Art, Neuhaus was touring with Pierre Boulez and Karlheinz Stockhausen, as well as performing solo at Carnegie Hall (Cox). Neuhaus has created many recordings of percussion and electronic music, as well as different sound pieces for sculptural work. His piece at DIA Beacon, NY titled "Time Piece" (2006), plays an emerging bell drone sound that crescendos over five minutes (Cox). The sounds resonate around the building, coming from rooftop speakers. The idea of a piece being durational and time based is something that I have taken into my own project as well, incorporating a time based construction of the piece that will allow it to perform specific parts at a minute of the hour. Neuhaus had many views on music and sound art, stating “The important idea about this kind of work is that it’s not music. It doesn’t exist in time. I’ve taken sound out of time and made it into an entity” (Cox). I find this quote to be an important example of the dissonance between music and sound art, In the ways in which artists like John Cage and Max Neuhaus were trying to go against traditional musical forms and disagree with them. As I mentioned earlier, this sort of separation of work into categories remains true for Neuhaus, having a wide discography of many different types of work. Ranging from installation work, music, electronic music, sound art etc. It is interesting that there is usually a clear separation between music and sound artwork.

More recently, sound artist Zimoun has been creating colossal sound installations (Rose). Zimoun, a contemporary Swiss artist, utilizes low budget materials and electronics to create interesting soundscapes and installations. What I found really interesting about his sound



installation utilizing cardboard boxes, was that it was meant to represent the digital duplication process that is done with ease when producing music electronically. Zimoun used a manufactured object to represent the accuracy of a digital replication, which in this case was a cardboard box. The idea of representation with object based sound installation is something that has inspired me a ton with this project, as well as my junior project.

As far as visual inspirations for the processing side of my project, I was really inspired by sound maps, which are visual representations of sound art pieces. Similar to sheet music, these maps draw out the sounds of the piece, and provide a visual score of the sounds occurring. Sound maps come in many different shapes and sizes, all according to the artist's choice of dimension and quite literally how they decide to visualize their work. Notable sound artists who produced these visualizations for their sound work were John Cage and Iannis Xenakis. Both composers, it is interesting to see how they write down these sound pieces with notation so they can be performed. Xenakis' "Metastasis" consists of an anxiety inducing composition which slightly resembles a plane taking off, however the visual sound map of the piece is quite beautiful. I find his visual work very enticing, as he was also a notable architect. The connections between these different facets of his life are very evident in his work, in which he is combining his architecture, composition, and visual skills in one body of work.

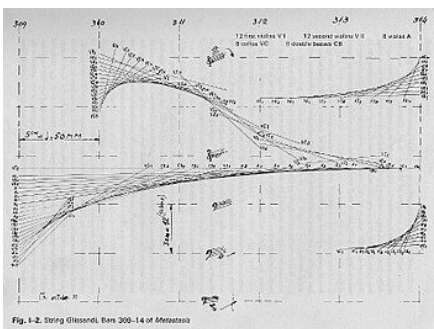


Fig. I-2. String Glissandi, Bars 309–14 of *Metastasis*

Early on in my research I came across Norman A. Anderson's "Normanodeon" (1983), which is a phonic sculpture that utilizes kinetics to play different instruments (Anderson). It comes off as very robotic and mechanical. This is an interesting piece for me, because it sort of inspired me to create something completely against his views. For example, Anderson's use of kinetics heavily influences the visual and auditory elements

of the piece. Anderson highlights this, and uses it to further enhance the meaning. However, when thinking about the technology I wanted to use, I was thinking about ways to represent and replicate a performance in the most accurate way, while also hiding the technology. Anderson's piece does the opposite of this, in which the mechanical noises and non-traditional sounds being played by kinetics are the focal point.

"My sculptures are powered by electricity and produce sound. The works are not traditionally musical but focus on sound quality or character, often including mechanical noises that are natural to the systems I devise. Though my sculptures are of contemporary materials, much of my technology is primitive, dating back to the medieval water wheel, the Roman hydraulis and even the African slit drum." - Anderson

Anderson's work also provides interesting commentary on the relationship between art and music, in which he explains the choice he made to not include any recognizable "music" in order to allow viewers to fully focus on the sonic qualities of the objects. Anderson states, "the mixing of these separate structures is erratic and unpredictable, producing results more closely related to noise than to music." I find his view doesn't quite align with my own, in that for this project I am trying to show ways in which improvisation, along with predetermined boundaries in music, can act as a tool for other mediums of art, such as visual arts. Anderson is sort of extracting the musical components and placing them into a scientific realm.

CONCEPTS

When beginning to decide what exactly I wanted to discuss with this project I thought a lot about what sound and performance meant to me. Coming from a music background, the ways I interpret reality have been concurrent with the sounds I hear in daily life. One of the main ideas I wanted to tackle was finding a way to represent sound and rhythm. I thought about utilizing lights and sensors, but was drawn to visual representations such as paintings and drawings. Piet Mondrian's 1942 painting "Boogie-Woogie Nights" really caught my attention upon researching works that were inspired by music. Following this, I thought about ways in which a musical performative action, such as performing a Jazz drum solo, could produce a similar result while also expressing the patterns and rhythms of a performance.

I began by questioning why art and music sometimes have uncanny relationships, as shown in the examples of my inspirations. Sound Art is definitely one of the fields notoriously known for being separated from music. In the simplest terms, Sound Art can be defined as any work that utilizes sound as a material. Music can be defined as work that utilizes sound as well as follows some sort of form, in which there are pre-set rules that every music maker subconsciously follows. Things like having a beginning and end, a steady tempo, a melody that follows the rules of music theory, etc. Most of my sound pieces I have created over the last three years in different courses have had little to nothing to do with music. I myself have seperated my work, in which I make music in my free time with no expectation of producing anything. Creating a sound piece is an entirely different entity for me; I have a clear concept (usually based on the experiences and field recordings I have gathered), and I execute it without looking back. As I discussed earlier, many sound artists separate their work in a similar manner, grouping works into different genres and categories. In a way, this project is attempting to create something musical, but also entirely structural and conceptual as well.

To me, this project provides a direct relationship between music and art, in which the drums are my paintbrush and processing is the canvas. Every single hit is accentuated via real-time processing that allows the viewer to recognize patterns in the shapes as well as the sizes of them. What they are actually looking at is the dynamics of the drum playing, or rather how hard or soft they are being hit.

One of the biggest concepts I like to explore with my work is the idea of performance without performing. Coming from a musical background, performance had always had a certain meaning to me. Practicing for months to perform for one performance that may or may not be filmed, thus only being able to be experienced once. As a music maker, I have spent a lot of time recording and jamming to loops and virtual instruments, but the sound and effect of acoustic instruments playing definitely produces a more profound effect. This is why I spent so much time fine-tuning exactly how the drums would sound when being played back in a room. If I can get these instruments to sound and behave exactly like they would in an acoustic place as if I were playing them does it suffice as a performance? Well, maybe. In terms of the effect of acoustic drums yes, but in a band setting there is no one there to improvise, adjust the tempo, or change anything. I think that in terms of using my project to perform a pre-recorded drum solo that was captured in one take; and includes human errors, allows for them to feel more human and realistic. Professor Thayer had discussed turning this project into some sort of "*drumming beast that could play something no human could",* but I felt that using a one-take drum solo would provide the human element I was looking for. It would've been easy to punch in a MIDI drum solo, speed up the tempo by 100% and simply play it back. I was also interested in the way a visual representation would look of an organic jazz drum solo.

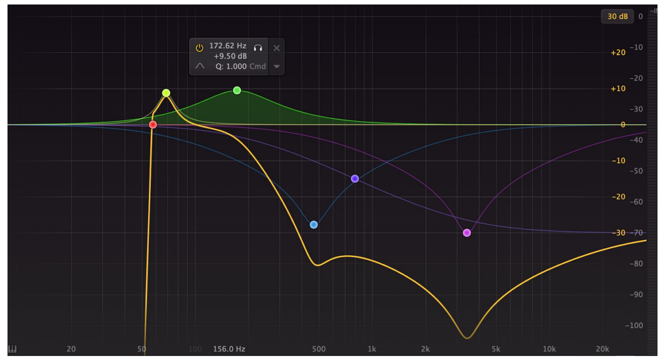
PROCESS: Recording and Playback

After deciding on the concept for my project, the first step for my project was getting the actual drum solo recorded so I could start using that audio to create visual processing sketches, as well as start figuring out how to get the correct sound I needed to be able to playback through the drums. I started recording back in November 2019, as I was home for Thanksgiving break and decided to record the first drum solo I would begin to experiment with. I have a background in recording and production, so I had a decent microphone selection to choose from. I wound up using a Shure SM57 Dynamic microphone on the snare drum and a Shure BETA 52 microphone on the bass drum. These microphones are designed to be placed very closely to loud sound sources and capture certain frequencies. I put a lot of thought into how I was capturing the initial drum solo, as the audio would not be used for a typical speaker setting. Since I would be playing back the sounds through the drums with vibrations, it was important that I correctly placed the microphones to

capture as much of the fundamental tone of the drums as possible, as any other frequencies were not necessary and would cause the transducers to distort and make a buzzing sound. In order to do this, I used only close-mics, which are microphones placed 1-2 inches away from the drum skin. I also pointed the microphones directly at the center of each drum, where the fundamental tone is the loudest. The result of these techniques when playing back through transducers is a realistic acoustic sound. Since only the fundamental is being played back, you hear the actual drum itself making the sound, as opposed to hearing the recording played back like it would be through a speaker. As a matter of fact, if you listen to these recordings on headphones or speakers it sounds atrocious.

One of the first acoustic variables I tested was the actual tuning of the physical drums. I tested tuning the drums higher than normal and playing back the sounds through them to see which tunings would produce the best acoustic result. I also tried tuning lower but found that when the drum head was tuned to the fundamental pitch of the wood (yes, the wood shell itself has a pitch) and was perfectly in tune with itself, that the transducers were able to clearly and prominently recreate the original sounds of the drum. Another acoustic element I had to take into account is that the transducers being placed on the drums heads would inevitably "muffle" the sound of them. In order to compensate for this, I purposefully used muffling on the snare drum so that it would sound the same as having a transducer attached to it. I also used heavy muffling on a cymbal, which is not typically common. I had originally planned on using 3-4 drum instruments in my installation, consisting of a bass drum, snare drum, hi-hat and cymbal. However, once I began creating processing sketches I realized it would be a lot more cumbersome to use more than 2 outputs. I am using processing's audio library Minim, which supports stereo audio. Upon realizing this, I decided to re-record the drum solo using only bass drum and snare drum. This posed more of a musical challenge to me, as I was limited to only two instruments. However, I found that limiting to two sounds made the processing sketches more defined and I noticed that patterns were forming more cohesively.

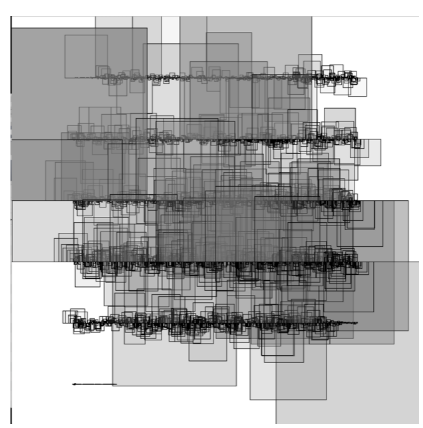
The next step after recording the audio was figuring out how to get an honest, natural sound back out of the drums to the point that if I closed my eyes and walked around, it would sound like there was someone playing them. In order to achieve this, I experimented a lot with equalization processing, which I have included a screenshot of my exact plugin specifications for the snare drum channel. Equalization or EQ, allows you to sculpt the frequencies out of sounds in order to completely change them. This is really the only audio processing I used, as the drums themselves would do the rest of the work. It is important to note that while I am including this screenshot to show the drastic changes that were applied to the drums, this does not serve as a visual representation of my work. It was interesting to mix audio through acoustic drums, as normally you would be listening through headphones or speakers. I found that I had to completely abandon everything I knew about recording and processing drums in order to get the sound I wanted. Transducers work a lot differently than speakers, in which they use vibrations and material to make sound. For example, when a transducer isn't attached to an object the sound playing through them is barely audible. They also react differently to different materials. A plastic bin provides a lot of low end and bass, whereas a cardboard box doesn’t provide much acoustically. The materials of a drum lend themselves nicely to transducers, as they utilize plastic drum heads and wooden shells; both of which allow sound and vibration to travel through them.



Since I’m using acoustic drums, the placement of the transducers was equally as important as everything else so far. I found that placing the transducers directly in the center of the drum head allowed for the most realistic playback, as that is where the drum stick strikes the head. I experimented with changing the placement of the transducer to the edge of the drum head and found that this placement produced more overtone or ringing from the drum, which was not the same as a normal strike. I also tried attaching the transducers to the wooden drum shell and found that the plastic surface amplified the transducers much more.

PROCESS: Visuals

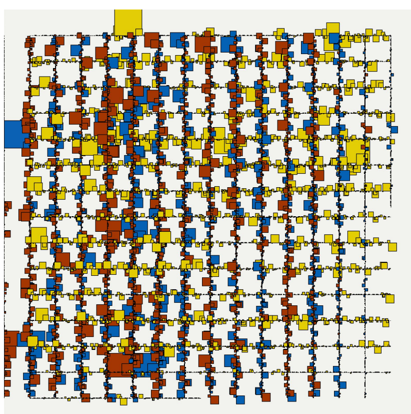
After getting the drums to sound the way I wanted, I began researching ways to use audio to draw things in processing. This is something that I had done before, but never to create an actual sort of “painting”. I came across several methods of utilizing audio for visuals in Processing such as making a volume meter, a graphic eq, or triggering shapes to appear. Trying to find a way to cohesively show the drum patterns as well as relate the end result to Piet Mondrian’s painting was quite the feat. I knew that I wanted squares and a grid form, but every sketch that I was making seemed much too random. Eventually, I came across an amazing pdf tutorial from an artist named Manuel Kretzer, titled “Instructions for the Creation of Computational Art”(Kretzer). Kretzer created a sketch that reads the amplitude of mp3 files and maps out the audio. This was exactly what I was

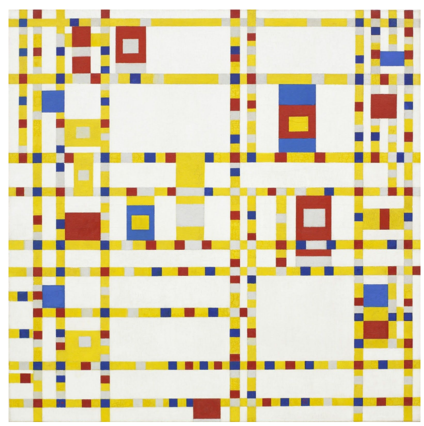


looking for. The tutorial features many interesting ways to use mp3 files to generate art via processing. In order to create my sketch, I utilized Kretzer's algorithm to be able to have my drum solo mapped out based on the amplitude of the mp3 file. I spent a lot of timing tweaking the variables and sizing of the shapes to produce an end result that wasn't too cluttered. I have included a screen capture of one of my earlier attempts at creating the visuals.

One of the more difficult things when creating the sketch was trying to find a happy medium between an audio mix that sounded good through the drums, as well as coherently being represented in processing. If the amplitude was too high, the sketch would be extremely cluttered and hard to decipher. Since I am using real-time processing, I am using the audio from processing to play through the transducers. So in other words, I can't use two separate mixes for each application, but rather have to find a middle ground. Some of the issues I was running into were that the bass drum visuals were appearing much bigger and more frequently than the snare drum, due to the fact that the bass drum was mixed louder in order to be heard in conjunction with the snare drum during transducer playback. It was a little tough to keep mixing in logic, exporting, then listening and viewing back in processing, but eventually I found a mix that I was happy with. After numerous mixing attempts I ended up with a much more cohesive visual effect.

After getting feedback from my senior seminar, I decided it would be beneficial to add color to the sketch. Since I was trying to reference Piet Mondrian, I chose yellow, red and blue, which are the same colors he used for Broadway Boogie-Woogie. In order to get it to look more inspired, I used the color swatch tool in Photoshop to get the exact RGB code for each color. To me, the grid-like structure and emerging squares of the processing sketch represent the city in a sort of bird's eye view, similar to how Mondrian's painting represents the city life and jazz swing. I wanted to make sure that the composition of Mondrian's painting translated into my Processing sketch, which is why I implemented the use of squares and rectangles in a predetermined grid form. Here is the final result compared to Piet Mondrian's painting.



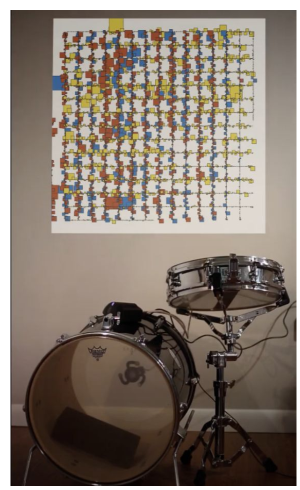


While my rendition is more complex and cluttered compared to Mondrian's, I feel as though it is more representative of the times we are living in now.

PROCESS: Installation (Documentation)

While my project was originally created with the intention of being a public installation, our New Media senior show got moved to online. Initially, I was planning on setting up the drums in the space with a projection hitting the wall directly over it. This hit my project particularly hard as it is an acoustic sound sculpture and projection based work, which obviously is meant to be heard and experienced in person. Another aspect of the project that also had to be given up was the Max Neuhaus reference. I had planned on programming the piece to only perform at five minutes to the hour, every hour, inspired by Max Neuhaus' "Time Piece". I would've liked to have this reference in my work, but obviously this wouldn't make much sense from an online perspective. A lot of my work also went into fine tuning the sound of the drums in an acoustic space, so I decided to roll with it and record the sound of the project as it would've been heard with a ZOOM H5 handheld recorder. I chose to use this as I find it represents the sound of things very organically. I thought about just using the initial recorded sounds in my video documentation, but it would not be an ideal representation of the piece.

After capturing the audio of my project to be presented online, the next part of the equation was capturing video of my drums and projection. I decided to deal with the projection and the video separately, as there would be no feasible way to record both at the same time. To do this, I used QuickTime to screen capture the processing sketch so that I would be able to insert it directly onto the video of the drums. I then imported everything into Premiere and created a mask for the screen capture so that you could only see the actual sketch. The next step was finding a good position for the sketch to live above the drums. I tried to set up the video in Premiere exactly how I would've envisioned it looking in a real space. I also adjusted the transparency of the sketch to provide a more authentic look.

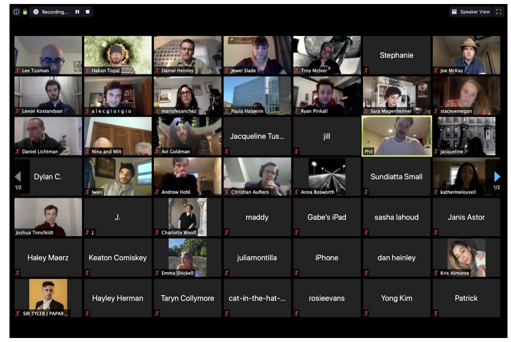


One part of doing this that I overlooked was getting the sketch visuals and the audio signal to match up. Since I screen captured the processing sketch, there was no audio to line up to. I had to sync up the audio to the visuals manually, which was a lot harder to do considering processing would be handling both the audio and visual, so there would be no need to sync anything. For some reason, even when the sketch was synced to the audio in the beginning, somehow it would become out of sync half way through. I did my best to find the best placement for the visual/audio syncing. Overall, I am very happy with the way my documentation turned out, and can't help but feel that the switch to an online presentation pushed me a lot harder to get my documentation looking professional.

PRESENTATION/RECEPTION

I should start off by saying how much I appreciate all of my peers who helped put the website and online exhibition together. Putting together an art exhibition is never easy to do with such radically different types of works and ideas. Take into account a global pandemic and distanced learning and you have a whole new set of issues. However, after meeting over Zoom weekly leading up to the show, we all were able to come together to create a special experience for all of us. I am very proud of the work that everyone did to finish up their projects as well as put the show together despite the circumstances. It was a very stressful time as myself and several others had to make significant changes to or even completely ditch their projects they had been working on all year.

When I first heard that our exhibition would be online, I felt relieved in a way. I was glad that I would still be able to show my work to people, however I didn't realize how nerve racking presenting work online would be. I guess that this experience made me realize how important being able to talk about your work is, which I find that I often underestimate. Being the anxious person that I am, I was very nervous to talk about my work to the 90 plus participants at the Zoom meeting that night. What was also anxiety-inducing was that you could see the names and pictures of every single participant. On top of all this, it's quite weird to be having public speaking anxiety while sitting in a basement alone on your computer.



The online show was set up into two segments; brief introductions of ourselves and projects as well as a longer segment for presentations and performances. I chose to do a longer presentation, which I at first regretted because I had to wait longer to go (similar feeling to waiting in line too long for a roller coaster you're scared to ride). Now I am glad that I chose to present my work, as it was beneficial and exciting to be able to see and read reactions and critiques from people. While I had prepared a paragraph to read, the second that I heard "And next we have Steven Lomangino" all hell broke loose. I tried my best to give some information and explanation of my work, but all of these variables had made me extremely anxious. However, it felt good to know that my work had been received and people enjoyed my piece.

Overall I am extremely grateful that I had the opportunity to present my work despite the circumstances. It was a very emotional night for all of us, as we are dealing with graduating during this difficult time. Coming to Purchase College as an undeclared major, I am very proud of the work I have done at Purchase. I feel as though this project was able to encase a lot of what

I have been working on throughout the years. In the future, I plan on finding a way to showcase the project publicly as it was originally intended. I also plan on continuing my work in sound art and developing new installations that incorporate aspects of music.

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