A Visualist's Practice:
Explorations of Interfaces and Exercises for Live Video Performance

by

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ABSTRACT

This thesis investigates the use of live video performance within a musical context. Live video performance involves projected video imagery that is digitally manipulated through the use of software in real-time. A performer of live video may use hardware interfaces that permit a level of expressiveness on par with that of a musical instrument. Artists have been creating and refining different interfaces for interacting with light and images in a musical context for centuries. Early interfaces relied on an idea of directly connecting musical elements, such at pitch, with abstract visual elements, such as color. Modern methods of interacting with video do not require these direct connections to musical elements, and instead allow the video to be an independent contributor to the experience of a new kind of multimedia performance. I give an example of an interface for live video performance by detailing my own expressive visual instrument. I also outline the use of live video in the culmination of my thesis work, a performance of five multimedia pieces that explore the various relationships between projected video and music.

Keywords: Visualist, Visual Music, VJ, Audio-Visual, Visual Performance, Live Interactive Video

1. Introduction

1.1 Motivations

This paper describes different methods of performing live video in a musical context. It also serves as a platform for me to work out some of my thoughts involving the combining of two very different, but very interconnected media. By no means am I the first to experiment in this realm, as the idea of combining some form of light and sound goes back hundreds of years. However, I am aiming to explain and advance some of the theories and practices behind using interactive video performance as it becomes more mature in an age of powerful, portable and accessible computing. Light and projected video have the capacity to be as expressive as music, and my work has been focused on making a visual instrument that I can use to match the abilities of my fellow musicians.

This work is important because it seeks to question the way we view different kinds of connected media and how they affect each other. As I type this, a friend is watching TV in the next room, and I feel like I am taking breaks every 5 minutes to click around on the internet to something totally unrelated. Often my first action in the morning is to reach for my iPod to check my email. In such a time of rapid media bombardment, it is therapeutic for me to be able to actively question the media I am consuming (or being devoured by). If I believed combining live video and music served as another yet another mindless distraction, then I wouldn't be doing what I'm doing. I believe there is something there, something not totally uncovered yet. In the right situation, live interactive video alongside music can result in an amazing multimedia performance that reaches levels of expression not achievable by music or video alone.

Additionally, a new kind of multimedia performance can be developed when music and live projected visuals are involved. This audiovisual performance can make a show a little more accessible to an audience that may have dismissed the concert as "too strange" if it were solely an experimental music performance. I have seen many friends dismiss really engaging musical performances because it strayed just a little too far outside of their comfort zone. I admit that things like free improvisation require a certain learning curve for someone who has never experienced them before, and I still struggle

with them myself. By performing with live video, I am able to communicate very effectively with our more visually centered culture. This opens up a greater chance for the projected images to connect emotionally with the audience in ways that may not have been possible with music alone. Additionally, projected images can act as a tool to help uncover deeper structures that are occurring, structures that may not be immediately obvious to the average listener. A friend of mine recently related to me a story of how watching images of dancers accompanying Steve Reich's *Piano Phases* really helped him understand the process of the piece better. In the piece, two pianists play the same melodic phrase in sequence, but gradually one slips out of phase with the other. In the performance he saw, two dancers were backlit and their shadows filled a screen. The dancers had a very choreographed loop they were following, but gradually they got out of sync with each other, just as the two pianists did. His story is a good example of how live visuals can help uncover some more hidden elements in a performance that would not have been easily recognizable in sound or image alone. I am not saying that all forms of experimental music and abstract sound should require live interactive video, but rather suggesting that working with that visual layer could more easily pique a curious, but casual audience member.

Finally, as I have done more and more research into this subject, I have realized that the use of light and projected imagery can often be unbalanced in relation to the musical performance. On one hand, live interactive video can exist as a mere background element or visual wallpaper, as I mention in section 1.3. On the other hand, light and projected images have the potential to overwhelm the entire performance experience if not handled carefully. Not as much work has been done in the past in terms of making the live interactive visuals be of equal importance in relation to the music. Much of the historical work, which I cover in section 2, has often been about creating a mapping from the music, or interpreting the sounds in some way. This early work places music in a primary creative role, which I claim is unnecessary. Luckily, more and more artists are working towards making live interactive video a more important, or even an essential part of a performance. It is intriguing for me to dig deeper into the question of what sorts of differences there are between the two media, especially in their presentation and physicality. Both sound and image have tremendous power to stimulate

us intellectually and emotionally, but in very different ways. By considering sound and image equally in the creation of new works, a unique and robust form of multimedia performance can be developed.

1.2 Synesthesia

A word that comes to most people's minds when discussing the simultaneous perception of visuals and music in concert is synesthesia. The real concept of synesthesia is actually a psychological or neurological phenomenon. The condition of true synesthesia occurs in the minds of a few rare individuals. Neuropsychologist Richard Cytowic defines synesthesia in his article *Synesthesia: Phenomenology and Neuropsychology* as "The involuntary physical experience of a cross-modal association," or when one stimulated sense triggers a sensation in another sense . People with synesthesia are typically able to experience only one kind of cross-modal sensation, such as tasting colors, smelling words or seeing sounds. Typically synesthetes have very simple one-to-one mappings between senses such as one color to one sound. These relationships remain constant throughout their lives, although the mappings typically differ between synesthetes. These experiences are not seen by the mind's eye but are actually projected onto the world. The occurrence of true synesthesia is actually quite rare, although different studies claim it occurs in 1 in 20 people to 1 in 20,000 (Whitelaw 5).

However, synesthesia is more of a metaphor for what I am discussing in this paper. The kinds of connections that one notices in a music video or flash of lights at a concert are more of an "artificial" or "induced" synesthesia. This type occurs when imagined relations between two stimuli are forged in the mind of someone who is not a true synesthete. Neuroscientist Peter Meijer has investigated this phenomenon with his vOICe system that provides aid to the visually impaired by interpreting video as sound (Meijer). His work implies that a normal brain is not hardwired to interpret senses in individual channels, but allows for multiple remappings and reinterpretations, an idea also known as neuroplasticity (Zuger). In Meijer's words: "Our assumption here is that the brain is ultimately not interested in the information 'carrier' but only in the information 'content'" (Sandhana).

I am not suggesting that someone experiencing induced synesthesia is able to make the same kinds of hardwired, one to one connections between two stimuli as someone with true synesthesia. Instead, I am pointing out that the average person's mind is able construct relationships between seemingly disparate objects and events. This ability is both physiological and cultural, and my work touches on both of these types. On the physiology side, Stein et al claim that auditory signals take the brain just a few milliseconds to process, while visual events take much longer to process. However, our brain has evolved to consider these two modalities as working together in harmony, "and although the combination of two dissimilar physical cues, say light and sound, may have little direct effect on each other in the external world, they can profoundly alter each other's influence on the brain" (Stein et al. 55). Artists working with live interactive video can exploit an audience member's innate ability to connect sounds and sights that are actually being generated from two difference sources.

The difficulty lies in making these intrinsic connections move past the more effortless (i.e. sound event = corresponding visual event) like video being cut to a drum beat, to more complex relationships. Luckily, this is where cultural conditioning can help. It is ultimately up to the audience member to forge any meaningful relationships between what is going in their eyes and what is going in their ears. These connections, however, are in no way fixed in the same way they might be for a true synesthete, because these links are continually shaped by people's social and cultural interactions. An artist must be aware of this ability when working with material. By juxtaposing discordant elements together, like combining a performance of a joyous dance piece with horrid images of war, a different kind of meaning is communicated. This new meaning does not arise from our neurons alone, but rather is a result of our learned associations with cultural material.

1.3 Term Definitions

This paper will benefit from clearly describing a few terms that can easily be misunderstood across different artistic disciplines. Live interactive video is a more specific way of describing the concepts I am exploring in this paper. Another common term for this work in the field is "visuals", although that can be a confusing catch-all in

some cases. The term “visuals” could also easily apply to the lighting, stage design, actual performers or video projection during a performance. When I am discussing live visuals in more historical terms like in section 2.1.1, visuals are more related to lightbulbs and colored gels. However, as they stand in the present, I consider visuals in the context of this paper to primarily be video projection that is being manipulated live by a performer. The video can come from a live camera, tapes or disks, or from a hard drive. The video may also be completely generated inside a computer or device.

I am also going to explain the use of a new term for a person that performs with live interactive video. There are few labels to define the work of an artist that works with live interactive video performance, but after going through many readings on the subject, the most common name for this type of performer is a VJ, or video jockey. The word VJ has become a loaded term through its connection to popular culture, and its relation to the electronic music and rave scenes. Perhaps a better-known use of the term comes from its use on the MTV network. MTV used the term in the early 1980’s to describe the bubbly announcers who introduced their play lists of music videos. Its use on MTV closely aligns it with radio DJs, or disc jockeys, who also have very little expressive control. The origins of the term VJ being used to describe a performing visual artist are unfortunately quite spotty, but it seems to have come around sometime in the 1980’s or 1990’s. The word gradually gained popularity as the number of live video performance artists increased through the 1980’s and early 1990’s. At the same time, DJs, performers that mix and sample records for a live audience, were also rising rapidly in popularity. Many VJs still make use of public domain films and other pre-recorded elements in their performances, in the same way a DJ often works with material that is not wholly of their own making.

Both DJ and VJ culture were growing up alongside each other in the burgeoning dance club scene. Unfortunately a dance club is often a place for getting intoxicated, and not necessarily the best place for a developing art form. In particular, the rave scene that popularized the use of VJs at concerts is often identified in popular culture by a large amount of psychedelic drug use. This environment resulted in the production of a fair amount of “eye candy.” As a brief aside, I’d like to expand a bit on the word “eye candy.” The common definition is something that is visually attractive or pleasing to

look at. I don't have a problem with something being visually beautiful, but there is a risk of lacking any additional depth or meaning if being visually stunning is the primary goal. I prefer visuals that fit the music they're performing with. Otherwise, the visuals can be distracting or even detrimental to the overall experience. Those kinds of visuals certainly have their place and can still be useful for creating a mood or an atmosphere around a performance, but they are not the focus of this paper.

In recent years, artists that perform with live interactive video have been able to make live visual performance into something with more significance and meaning. The art form has been able to move away from its initial use as eye candy and psychedelia in the niche market of nightclubs and warehouse raves. Admittedly, the club environment exposed some people to a kind of video art that they may not have sought out on their own, but it has since moved on to different kinds of venues and has interfaced with many different genres of music. Granted, the term VJ has a function in that it is easy for the average person to figure out what a VJ is by connecting it to the DJ idea. However, just as all musicians are not DJs, not all live interactive video artists are VJs. Unfortunately, calling everyone a live interactive video artist is a bit of a mouthful, so I prefer the term "visualist." The word is a little more general, but is also more fitting of the art form. The popular technology blog "Create Digital Motion" uses the term frequently to describe artists working on the latest visual technology and with new kinds of visual performance. The site has an entire category of posts tagged with "visualist." Additionally, Paul Spinrad's book "The VJ Book" (published in 2005) states:

> VJing, like other emerging creative fields, has no established canon or pantheon. There's no consensus about what the territory covers and how it's mapped, and people haven't even agreed on what to call it. (This book prefers "VJ" as a general term for both practitioner and practice, but some restrict "VJ" to the dance club, and prefer Video Art Performance, Performance Cinema for the more general practice, and Visualist for the practitioner). (Spinrad 28)

Many visualists are still looking for materials that look the most visually engaging and stunning, but many more seem to be asking themselves why they are interacting with their material this way, and as a result some very provocative and refreshing work is being developed. The word can apply to a wide range of visual performance practices, from videos taken off Youtube and sloppy hardware mixing, to sharp generative visuals

in high definition and projection mapping onto whole buildings. I'm not going to be the one calling Merriam-Webster's submissions department, but I do find it helpful to have some word to describe artists working under this umbrella, a term that doesn't have the same awkward, loaded connotations as a word like VJ does. The Spinrad quote also introduces another problem of how to describe the art form itself. The kinds of work being done with live interactive video is very expansive, and it ranges from very structured narrative based works (sometimes called "Live Cinema"), like Toni Dove's *Spectropia,* to more abstract, improvisational performances that are too vague to be defined. I have not settled on a name for my own practice. My own work is still continually evolving, so it is helpful for me not to have a pine box to seal it in quite yet.

2. A BRIEF HISTORICAL OVERVIEW OF VISUAL INSTRUMENTS AND PERFORMANCE

The mixing of visuals and sound has a history that reaches back hundreds of years. Many artists, scientists and other practitioners have contributed their view to the field with varying degrees of success. Unfortunately, a large amount of them are lost to history and very few are covered in a typical overview of musical or visual art history. The relationship between the two also exists in an in-between world between science and art, as the combination of the two can be seen a special kind of data representation as well. It is still puzzling to me why so much of this fascinating history seems to be largely ignored by either side, but one reason could be that it exists in a place between, and has not quite found its own home yet. Still, there is something very captivating about making a solid connection between visuals and music that draws musicians and visual artists back to explore anew again every few decades. With the increase of low-cost computing power, easy to use software, and possibility of real-time visual expression of recent years, we are at another wave again (hopefully rising, and not just crested). It is very important to look back on the history of the art form to discover the spectacular successes and intriguing failures through the years, and to get a better sense of where we are headed now.

2.1 Audiovisual artists and technology before the computer

2.1.1 Color music instruments

Ancient Greek and Roman philosophers were some of the earliest to hint towards a mysterious relation between sound and color. They believed that musical harmony was due to the relation of various colors (Peacock 400). Initial thoughts focused around the idea that both sound and light were comprised of the same vibrating waves of energy, just that one was operating in a higher register. The idea carried for many years, and in his 1923 book “Marcotone: The Science of Tone Color” Edward Maryon posits that if a middle-C could be raised 28 octaves, one would be able to see red light (23). Maryon even goes so far as to say:

> Fundamentally, all forms of vibration are generated by and are transmutable into sound; therefore sound is the origin, even as it is the architect and builder of form. Sound is the creator, preserver and also the destroyer of all forms; because all things depend upon the multiple variety of sound for their infinite variety of form (6).

Maryon may be taking his idea further than the typical artist or scientist would, but the point stands that many people thought there was a definite correlation between the two. Isaac Newton even believed that there may be a simple relation between the seven colors of the rainbow and the seven notes of the C-major scale (Peacock 400). Tone color relation is an easy assumption to make, as both light and sound are viewed as oscillating waves of energy, yet light functions quite differently from sound from a scientific point of view. Nonetheless, Figure 1 is a compilation of several tone color scales devised by different scientists and artists over the years.

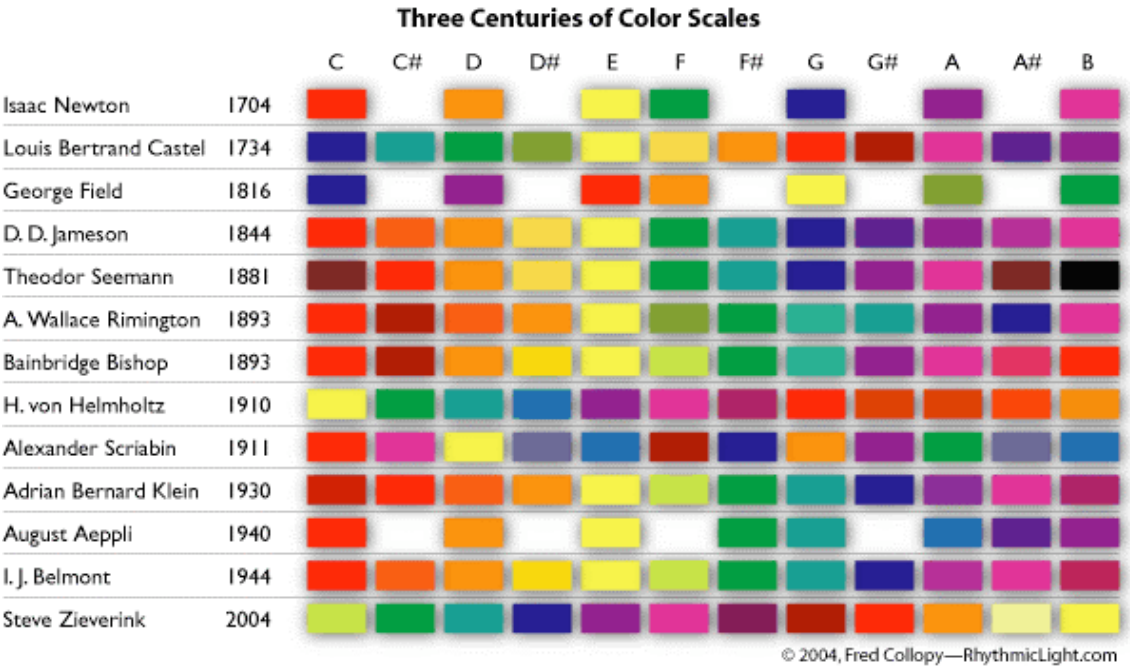

Figure 1 - Chart of Color Scales by Fred Collopy

2.1.1.1 Louis Bertrand-Castel – Ocular Harpsichord

The often-cited first person to combine both music and light into an idea for a physical instrument is Louis Bertrand Castel, an 18th century French Jesuit monk. Castel was primarily a mathematician, but he had a few writings on an instrument he hoped to build called the *clavicin oculaire* or ocular harpsichord. Around 1734 he made an effort

to build a model of the instrument (Moritz). The evidence is spotty on whether Castel actually ever made a fully functioning light instrument, but it would have included mechanisms attached to a normal harpsichord that raised and lowered screens between a candles and colored squares of glass (Peacock 401). Thus as a key was sounded, a modest splash of color would appear to the player or audience. However, one can imagine the difficulty of dealing with an instrument full of lit candles.

Developments on similar types of color organs continued through the 19th century. Artist and philosophers writing or producing instruments included D.D. Jameson, Erasmus Darwin, Frederic Kastner and his Pyrophone, and Bainbridge Bishop and his color organ. Alexander Remington also created a Colour-Organ in 1893, and was particularly well known for his writings in his 1911 book *Colour-Music: The Art of Mobile Colour* (Lazell). All of these used the same basic ideas of projecting light (from flames, electrical arcs or sunlight) through colored panes onto screens or into the room. The Composer Scriabin even used a form of Rimington's Colour Organ in his piece *Prometheus: Poem of Fire* (1910). Scriabin, an actual tone to color synesthete, called for specific color cues to occur during certain moments of the piece (Wiseman and Zilczer 73). Many artists continued to work with the idea of a light instrument through the early twentieth century[1], and I am going touch on a few of the more personally interesting ones.

2.1.1.2 Thomas Wilfred - Clavilux

The number of visual instrument experiments really expanded at the beginning of the 20th century with the improvement of electrical and optical technology. Many of these instruments were not designed to produce both sound and image simultaneously, but rather to interact as a separate layer of the music. They all vary in how their

[1] The artist Amanda Stegell has actually returned to the idea of a color organ with her piece "The Emotion Organ" (2007) that involves a restored pump organ, a lit up propeller, flashing lights, software and scent spraying airbrush guns that all react to how the participant is playing the augmented organ. The sound comes from the original pump organ components.

inventors chose to physically interact with the light and different filters. Additionally, they began to move away from pure color mappings, and began to toy with notions of form and to a lesser degree, motion. One particularly notable instrument is the Clavilux, designed by Thomas Wilfred. Initially Wilfred had sought out to find a pure mapping between visuals and sound, but grew frustrated with his efforts. Commenting on his 1926 collaboration for a performance of a Rimsky-Koraskov piece, he rejects the idea of an exact relationship between music and image:

> The only way to combine the two arts will be through the conceptions of individual artists….Thus, in composing a visual setting for *Scheherezade* to be played on the Clavilux, I have been striving to create an atmosphere around each movement, and not by any means to follow the music measure for measure (Wiseman and Zilczer 76).

Many of his performances, then, consisted of working with visuals, but without sound entirely. He performed what he called *Lumia*, which were light compositions that could be controlled with a keyboard and special switches. The result was a beautiful, slowly morphing field of colors and abstract shapes (see Figure 2). He even made a few Clavilux systems that could be used without a performer, and they would gradually unfold one of his "compositions" automatically over weeks or months (Wiseman and Zilczer 82). To create the ethereal Lumia imagery, his system used a series of electric lights, mirrors, color wheels and special prisms (Peacock 405).

Figure 2 - An image of Thomas Wilfred's Lumia *Opus 161*

2.1.1.3 Mary Hallock-Greenewalt - Sarabet

Another well-known color organ developer is Mary Hallock-Greenewalt. She called her instrument the Sarabet and she was also working in the early 20th century. With her instrument she did not seek to modulate color along with music, but rather felt that

brightness was a far more important component to consider (Peacock 404). However, like Wilfred, she refused the idea of there being an absolute relationship between what we see and what we hear. She writes about this in *Nourathar: The Fine Art of Light-Color Painting*, her chronicle of the Sarabet, and she asserts:

> To seek to fasten the form of one art on the form of another art is, on the face of it, a mistake, if not an impossibility. They are organically different things. They will speak in different ways. (qtd. In McLean)

Figure 3 - Mary Hallock-Greenewalt at the Sarabet

She is certainly making a strong statement here, and it is hard to agree with fully, but it definitely stands out in contrast to the dream of a direct tone-color relationship that earlier color organists were chasing. The Sarabet instrument itself was a large tabletop console with several sliding rheostats or potentiometers. Hallock-Greenewalt had invented the rheostat specifically to have control over smooth fades of light. With her setup, she controlled the mixing of seven lights shining onto a screen, and even developed a notation system for performing on the Sarabet (Peacock 404).

2.1.1.4 Oskar Fischinger - Lumigraph

Another notable color organ developer of the 20th century was the famed painter and filmmaker Oskar Fischinger. Fischinger had been interested in exploring the relation between music and visuals in various abstract films for many years, but in the late 1940's he began work on his own version of the color organ. His Lumigraph (see figure 4) was used in several performances and in a 1960's science fiction film, The Time Travelers. The Lumigraph is a very different beast from the Clavilux or the Sarabet. Abstract film expert, William Moritz describes the mechanisms of the Lumigraph like so:

His Lumigraph hides the lighting elements in a large frame, from which only a thin slit emits light. In a darkened room (with a black background) you can not see anything except when something moves onto the thin "sheet" of light, so, by moving a fingertip around in a circle in this light field, you can trace a colored circle (colored filters can be selected and changed by the performer). Any object can be used: a gloved hand, a drum stick, a pot lid (for a solid circle), a child's block (for a square), etc. (Moritz)

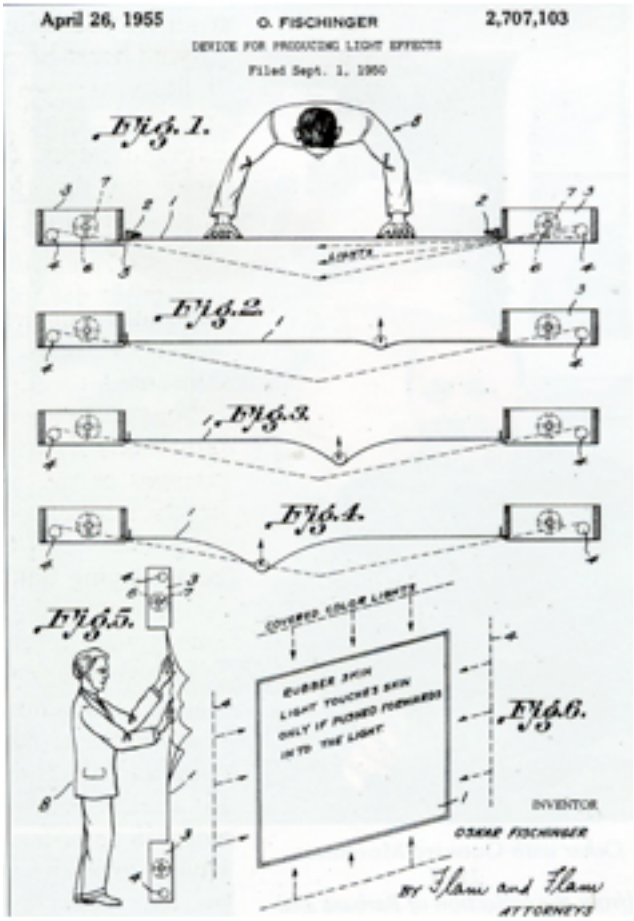

Figure 4 - Diagram of Fischinger's Lumigraph (Burdette)

So instead of using sliders to control the light, performers were able to press any number of objects into an opaque, rubberized screen, which then caught the modulating light and showed the object's outlines. So far, this iteration of an interactive light instrument has the most possibilities in terms of form and motion. Unfortunately a Lumigraph screen could only be as large as a performer could reach, and elements of color modulation were only so flexible. Additionally, a performer could not really see what was happening on the other side of the screen from the audience's perspective, and

Fischinger himself affixed mirrors on top of the Lumigraph so that he could see the front of the device (Levin, 26).

2.1.2 Abstract Film

While the development of light instruments continued through the 20th century, the development of film opened up exciting new possibilities for working with images and sound simultaneously. Artists now had access to an almost unlimited palette of colors, forms and types of motion that they could access and relate to music. They were not limited by lightbulbs and colored gels, and did not have to spend months or years engineering a completely new instrument to explore some kind of new relationship between image and sound. There was one important tradeoff that was made for this additional freedom, and that was losing the ability to create the images simultaneously with the music. There was barely any room for real-time improvisation like there was with the various color organs. Nonetheless, artists working with the idea of visual music in cinema made some rather astounding pieces that range from feats of absolute precision, to more abstract representations of a musical world. There are so many artists who worked with abstract imagery and sound with film including Len Lye, Mary Ellen Bute, Hy Hirsh, Jordan Belson and Stan Brakhage, but unfortunately chronicling all of them would fall outside of the scope of this thesis. In the following sections I am going to describe the processes used by the influential artists Norman McLaren and John Whitney to create their visual music experiments, and analyze one of each of their works in more detail.

2.1.2.1 Norman McLaren

Norman McLaren is an experimental Scottish-Canadian animator that pioneered many film based animation techniques around the 1950's and 1940's. Many of his films involve directly linking sound and image through different types of animation. His techniques involve drawing, painting or etching directly onto the film surface, then carefully aligning these animated sections with music. He also draws the sounds in the optical track of the film itself (Curtis 176). McLaren's method is very meticulous and

painstaking, and requires working frame by frame for months at a time to complete a single piece. His films range from creating sound and image simultaneously in one to one relationships, as in 1971's fabulous *Synchromy* or, to animating existing musical pieces in a more surrealist fashion, as in 1958's *Le Merle* or 1962's *Lines Horizontal*.

One of his most famous synesthetic films, *Synchromy*, is a very literal union of sound and image. To prepare for the piece he drew rectangles and lines on cards and calculated the spacing needed to produce a certain pitch (high pitches are tightly spaced rectangles, low pitches have much larger spaces). The volume of a note was determined by how short or tall the rectangles were. These sequences were then painted onto the section of the filmstrip designated for the sound recording (Curtis 180). Once the soundtrack had been composed, it was recreated exactly on the optical portion of the film (Hobbs). The result is a flickering dance with an electronic sounding boogie-woogie accompaniment. The electronic tone of the piece comes from the fact that he was drawing rectangles that were interpreted as harsher square waves. Initially, there is only a single blue line of flashing white rectangles in the center of the frame. As the piece progresses, the number of lines increases to represent the changing dynamics and building energy of the piece, and the colors arbitrarily change for different transitions. By the end of the piece there are eleven different lines working together to create rapidly varying harmonies.

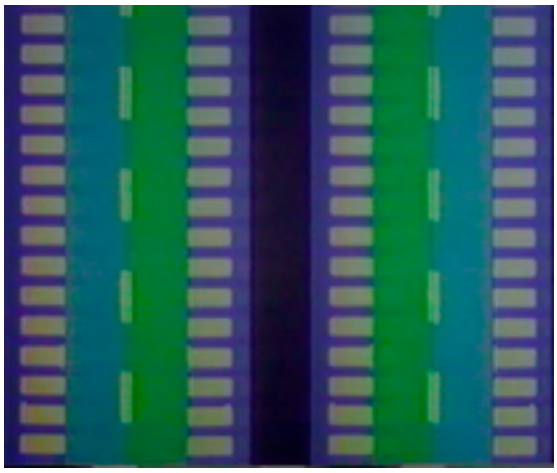

Figure 5 - Still from the climax of *Synchromy*

Although McLaren's work has some very direct relationships between sound and image, it is still a very technically primitive version of what synesthetic art is capable of. Unfortunately, technical restrictions and the momentous amount of time needed to create a finished piece limited his abilities to experiment with different methods of cross modal sensation. He would have to choose a method of interpreting the sounds beforehand, and essentially run with it for an entire piece. He tried to compensate for this indirect method of composing pieces with his method of drawing directly on the film, and avoiding the

camera as a possible extra step of removal from making a connection with the music. In an interview about his process, McLaren says:

> I try as much as possible to preserve in my relationship to the film the same closeness and intimacy that exists between a painter and his canvas. In normal filmmaking, everybody knows there is an elaborate series of optical, chemical and mechanical processes, and these stand between the artist and his finished work. How much simpler it is for an artist and his canvas. So I decided to throw away the camera and instead work straight on the film with pens, inks, brushes and paint. If I don't like what I do, I use a damp cloth, rub it out, and begin again. (McWilliams)

McLaren's efforts and desires to work with sound and image in a more real time fashion are evident. Unfortunately, the nature of film does not allow for simultaneous interaction and creation of both sound and image, and this impairs his ability to improvise visuals while hearing the music. His available visual and musical content was also quite meager. When producing sound and image simultaneously for *Synchromy*, the tone qualities and ranges available to him were pretty limited since the spacing and shape of elements in the sound track of a film could only be placed within a certain degree of precision. When working with images that were not exact copies of the music, he was of course limited by what he could reliably etch or paint onto a 16mm or 35mm film frame, for example the abstract dancing characters in his 1948 film *Boogie Doodle*. He could only reach a certain degree of depth and detail with these images, even though he could remain very precise about their relation to the music. McLaren notes that if he had had access to better tools when he began, he would have made use of them to enhance his work:

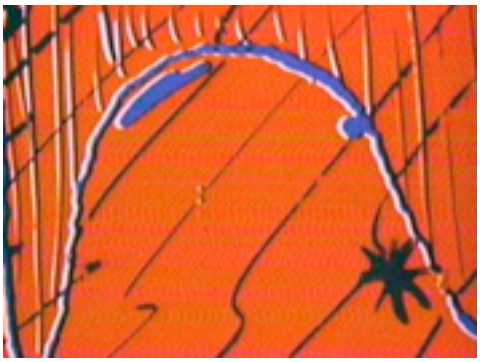

Figure 6 - Still from McLaren's *Boogie Doodle*

> If there's a technical thing invented, a person with an artist's nature is likely to take that thing and use it. We're getting young artists using computers to make a new kind of animation and a new kind of film, and that's only right and proper. That's the way it should be. I know that if I had been growing up now, I would have gone right in and tried to get hold of a computer and started doing things with it, but one is a child of

one's age. One is born at a certain time, and one uses certain things. (McWilliams)

2.1.2.2 John Whitney

Another artist who was working on synesthesia ideas in film around the time of Norman McLaren, is the American artist John Whitney. In some way's Whitney's work is a bridge between film based and computer based synesthetic art. Initially Whitney had worked with his brother James on a homemade machine that involved an optical printer and a series of pendulums. In early experiments, these pendulums and printer would work in sync to create both sound and music simultaneously, like in the Whitney's Five Film Exercises from 1945 (Wiseman and Zilczer 125). Years later, John began working on his own using an analog and then eventually a digital computer for his visual experiments. Using different filming techniques and clockwork mechanisms he was able to create various abstract imagery that was the representative of the music. For Whitney, music was highly patterned and structured media, which lent itself well to visuals that were created with various geometric constraints (Whitney 16).

In one of Whitney's most famous films, *Arabesque* (1975), an improvised Indian music piece is played by a solo instrument while different geometric shapes dance and transform themselves in different relations to the music itself. This piece begins very slowly with different curves intersecting and disconnecting to form circles and sine wave patterns. As the energy of the music builds, the complexity of the shapes and their speed of movement build along with it. The visuals relation to the music shifts from appearing to match with the precise rhythm of the music to almost taking a deaf ear and moving by themselves in psychedelic patterns with no regard for the music at all. There are several jump cuts that occur that also

Figure 7 - Still from Whitney's *Arabesque*

throw off some of the visual connections to the music as well. Unlike McLaren, Whitney was not always striving to make an exact one-to-one relationship of music with visuals. He was more interested in expressing the inner tensions and structures of the music, and this certainly comes across in Arabesque (Whitney 73).

Whitney himself, in his book *Digital Harmony*, admits: "I was never fully content with the relations of my own films and their sound" (94). He seems to struggle with the fact that some of his methods have flaws rooted in the areas of unsatisfying technology and the lack of real time experimentation. He laments his inability to experiment in real time in relation to the difficulty of coloring his own films:

> Rarely have the best ideas lived up to expectations. Color for the painter is normally an intuitive experience of direct one-to-one interaction between three components – pigment, hand and eye. These intimate hands-on interactions call upon a part of the creative mind other than the reasoning channels needed to work creatively with color film. My efforts to achieve painterly control of color film processes were too often frustrated. Lab and printing stages interpose processing time as a kind of insulation between the intuition of the moment and the actual color effect. (90)

However, these obstacles do not completely dishearten Whitney because "soon, full control of the profound experience of color in dynamic transformations will become a visual tensional force and an instrumentality of art" (90). Whitney is implying that he is looking forward to a future when all elements of a digital image are controllable in real time, when the "active association with music is bound to become a lively issue" (91). In a review of the 1963 Belgium Experimental Film Competition, Whitney also speaks about the role of abstract cinema in relation to computers, and how there is an effort to "modulate complex design fields in time, much as musical chords succeed one another." He says that the art of abstract film in relation to music at that time is intriguing, but not quite where it needs to be: "Stated bluntly, abstract film (so-called) awaits the computer to be born" (166).

2.1.3 Audiovisual artists in the age of video

As early as the 1960's, artists were using video techniques to create more spontaneous reactions with music, due to the more real-time nature and immediacy of video. One of the earlier examples of this kind of work is Scott Bartlett and Tom

DeWitt's (a.k.a. Tom Ditto) 1967 piece *OffOn*. *OffOn* is an early crossover of using both film and analog video techniques in a very improvisational and experimental manner, which contrasts sharply with the more meticulous film work of McLaren (Youngblood 318). The piece leans pretty close to the line of psychedelia, but, as an audiovisual work, the imagery and connection with the sound can be surprisingly visceral at times, despite the fact that both were created separately. Of course there is also the work of Steina and Woody Vasulka who were interested in exploring new ways of interacting with the video signal for creative ends (Sturken 110). They used many different devices and techniques to manipulate images in real-time. Some of their experiments even led to them using an audio signal as a means of manipulating the video feed in the 1970's. Steina's 1978 video piece *Violin Power* is a particularly nice example of this technique, as it uses the sound of the violin to distort various images of Steina standing in front of the camera playing her violin. These early experiments began to establish video as an exciting medium to use for live visual expression, as it allowed an artist to manipulate a captured image in real-time. Around the 1980's, more cheap video equipment began to be available to artists, and this opened the door for more experimentation in concert with music. Artists could now use a very wide range of video imagery alongside musicians, and could have the option to manipulate the imagery live, alongside the musicians. Before video, artists[2] working and performing with film projectors, could change between different projectors or rapidly switch out film reels, but there was still a limit of how much one could change about the images in real time. Video switchers also allowed for new kinds of effects that could be applied to the images in real time. Admittedly many of these effects became overused and cliché over the years, but the real time aspect of applying effects is still an important one.

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[2] Tony Martin is an early live visual performer who was working at the San Francisco Tape Music Center in the 1960's. He often used film projection in live performance with music. He used multiple projectors in his 1963 piece *Desert Ambulance*. However, he also used other kinds of technology such as slide projectors, and overhead projectors with colored oils and paint.

The list of VJ's and video artists working live with musicians in the 1980's and 1990's could fill a book, so it is difficult to pin down one particularly influential person or group, especially since the style of work varies so much. As discussed in previous sections, this was a time of great experimentation with visual equipment, and oftentimes this led to pieces or performances that may have looked cool, but in the end were not much more than that. In an interview for the short VJ documentary *Ctrl Alt Shift*, Mike Faulkner of D-Fuse remarks: "In the earlier days it was much more about moving wallpaper in a club, and it was very dumbed down or seen as secondary" (Moore and Lane). Luckily, there were a few groups working with this audiovisual idea that helped to keep it more meaningful during this time of experimentation. The group Emergency Broadcast Network (EBN) did have some intriguing, heavily political work that involved visual sampling, a technique that involves taking small snippets of video footage and sequencing them into a songlike structure. EBN's piece *Commercial Entertainment Product*, released in 1992, involves cut up news footage and images of pop culture for the purposes of re-contextualizing them. The still active A/V group Hexstatic also made some visual sampling work in the mid to late 1990's, and have released a few A/V albums (Arber). As an example, their audiovisual piece *Timber*, made in 1997, uses the images and audio of very short clips of logging and native rainforest dwellers to create a subtle commentary on rainforest devastation. These short clips are cut up and arranged so that a beat and music is made from the audio within the video clip itself. Even though much of EBN and Hexstatic's work wasn't originally conceived in a live situation, I have mentioned them because of how their work engages with both audio and video elements equally in order to forge a piece with a new level of meaning. Through the 1990's, more and more artists began to take a step back and realize that there was a great potential for combining images and music to create a new kind of experience, and as computing power increased, more of this kind of work could be created live.

Regarding visual performance interfaces, in the 1980's and 1990's most people were still interacting with video with large video switchers that sat on a desk, and only had buttons or a few control knobs to interact with the video, severely limiting their ability to experiment with gestures. Additionally, it often kept them secured in some box or room, far away from the stage. The visualists were more or less invisible performers.

Software slowly began to crop up that allowed artists to interact with the video with MIDI controllers, such as keyboards and drum pads. Some artists even worked on creating their own software and hardware.

2.1.3.1 Jay Smith – The Viditar

In the early 2000's, musician and artist, Jay Smith, developed his own video control instrument called the Editar, which was later renamed to the Viditar. There are several iterations of the Viditar, but they all revolve around the design of a guitar shaped plastic case that included a large array of buttons and sliders positioned all over the neck and body of the instrument ("Livid"). In some models, a small video screen was mounted in the body as well. Using MIDI, Smith was able to control custom software on his laptop that affected the video in several different ways.

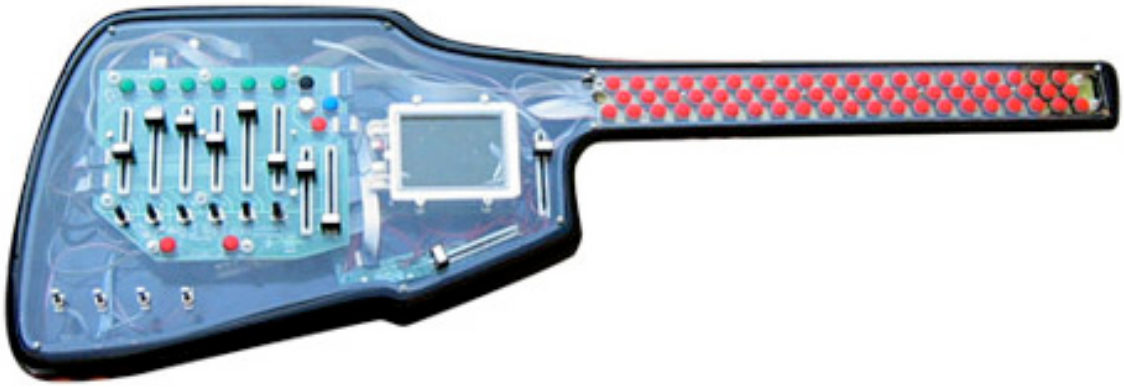

Figure 8 - Jay Smith's Viditar

The array of buttons on the neck trigger different stored video loops, and the sliders and buttons on the body allow for simultaneous control of effects and other modulations. This configuration allows Smith to perform on stage alongside fellow musicians. He uses the Viditar with his rock band Sinch, and with his more experimental/ambient act Ocular Noise Machine (Eaton).

More than the imagery or music he is involved in making, I am intrigued by his idea of featuring the visualist as a performing member of the band, and his mission to bring that presence on stage. Through the use of his interface, it becomes much more transparent to the audience that he is not just behind a laptop checking email, but he is really performing the visuals with the same expressive gestures a guitarist might use. In an interview I had with Smith, he said he was really interested in bringing the idea of

live visuals, and visual performance to a more mainstream audience. The best way to do this, he said, was to make it really clear the to audience that he was controlling the video. People saw him rocking out with this odd looking electronic interface, saw the projection, and quickly made the connection. He said he was dissatisfied with interfaces like keyboards and MIDI drum pads that didn't really read as a way of controlling video, and were too musically connected, although one could argue a chunky guitar shaped controller is another story. Additionally, with his setup he can practice routines with his bands, and become more of an integral part of the songs they develop. Smith is not just the visualist for the Sinch, but he is actually a full time band member.

2.1.3.2 The Light Surgeons

Another group that I have found particularly influential in recent years is the UK based multimedia collective The Light Surgeons, founded by Chris Allen in 1995. They work with many different tools and media when constructing their live performance pieces. Laptops, 16mm film projectors, slide projectors, video mixers and live camera feeds all play a part in their work (Faulkner 168). Part of their performance are assembled and edited beforehand, such as complex motion graphics and animations, but other parts are composited and improvised live. The content of the pieces typically involves spoken word, recordings of musicians playing instruments, archival or self-documented footage, and even live musicians. There is also usually a strong political message tied into the work.

Chris Allen describes one of their most recent pieces, *True Fictions: New Adventures in Folklor*e, as a live performance work that explores the role of myth in society, and "how truths are created or distorted" (Makela). In the piece, there are several different "songs" that coordinate live video, motion

Figure 9 - Image of the stage setup for the Light Surgeons' *True Fictions*

graphics, and other collected footage. The piece is projected on a very unusual projection rig that involves a large transparent scrim that is hung in front of the performers and, a more opaque screen is mounted behind them. There are three video projectors, and some slide and film projectors on the outside of the rig. This projection setup allows them to display and layer many visual elements at once, and create a lot of motion and interplay between elements. When asked about the relation of the audio to the video, Chris Allen explains "the two have been made together pretty much, all of the audio in the show has been recorded on video and we have mixed and arranged both at the same time." (Makela). Infrared shots of musicians playing, spoken words flashing up, and other tightly synced audio visual elements are all used to augment the relationship between the visuals and the music and to enhance the message behind the piece.

While the Light Surgeons do not have the same kind of interface setup as the Viditar, and there are several of them running the live show at once, they still consider the live performance and improvisation aspect as an important component of their work. When asked about how live playing influences their work, Allen says:

> I'd say its central. Improvisation is at the heart of a lot of our work - being intuitive and playful with media that were not designed with this use in mind. Ideas are formed through being experimental, and playing live is where you can gauge an audience's response. I think it's very different from being an editor and sitting in a room on your own cutting away at a time line. Playing live allows you to feel that time-line in a very different way. If you fuck it up then it's done, gone; you can't keep going back and fixing things later. It's intuitive. It's more real. (Faulkner 87)

Their pieces are largely structured and have a lot of pre-composed elements, but it would be very easy for them to just drop all of the elements in a timeline and sync everything exactly and play it back without the performance element. That performance element affords them the ability to make slight changes on the fly from night to night. Cueing visuals live also gives them the chance to screw something up, an ability that can heighten the kind of spontaneity and emotion that is not present in a show where someone just hits a play button. In an interview I conducted with Allen, he felt that his work on *True Fictions* was not as improvised as it could have been, and that it would have been a bit more adventurous to leave more to chance. By interacting with the video

content and the music in this way, they are able to engage the viewer on a different level. Their concert experience may not be solely about flashing colors and shapes dancing to music, but more about creating a stronger message by showcasing the rich, complex relations available between music and visuals. Allen contends that its not about producing eye candy with these expanded technologies, but that "you can have all the technology on earth, but without a message, some form of engaging content, its like a chainsaw in the hands of a baby. Very messy indeed" (Faulkner 87).

3. AN OVERVIEW OF MY OWN PERFORMANCE INTERFACE AND THOUGHTS ON VISUAL PERFORMANCE

3.1 Interacting with video

An initial challenge of working with live video performance is deciding how to interact with the moving images. Video, as a medium, is very set and unchangeable in the sense that a performer of live video can't easily go in and actually change the composition or content of the images in real-time (at least not yet). Video is an incredibly complex data stream that moves tens of thousands of pixels at about thirty times per second, and there aren't tools for quickly reaching into an image and animating a single object with a fine degree of detail. In real-time one couldn't easily take footage of a car driving across the street and transform it into footage of a horrible wreck. The same could be said for an audio recording of an orchestra, as there is such a dense amount of musical data packed into a file. It would be nearly impossible to go in and make a single recorded violin change from a slow sorrowful melody to a loud, noisy, col legno solo. Another challenge of working with video is that there is a long history of humans using their bodies to create sounds, yet there is no equivalent history of humans creating light with their bodies. We can clap out hands and make a sound, but we can't make light. As a result, performers of live video must come up with their own analogies of using their bodies to manipulate the imagery.

My musical background gave me a certain kind of toolset for working on this issue. I have always had an obsession with attempting to play many different instruments. Guitar would be considered my primary instrument, but I have also spent significant amounts of time practicing drums, banjo, trumpet, clarinet and sitar. Working with these instruments gave me not only insight into their sonic characteristics, but it also gave me a wide vocabulary of different ways of using my body for expressive actions. This vocabulary is always in the back of my mind when I am developing new elements for my visual instrument. My ideal visual instrument would have very similar characteristics to that of most musical instruments in that one can easily pick it up and make things happen, but nuances present themselves over time. Many people can play

trumpet with some degree of proficiency, but the ones who really understand the interaction with the instrument are able to control it and are able to forge their own unique tone. If the interaction with the instrument is too simple and one-to-one it can get tiring very quickly, but subtleties can present a challenge that begs to be mastered.

Despite my vocabulary for working with different kinds of musical instruments, it is still important to understand that I am working with projected light, and not sound. There is a completely different performance language that comes with video, and it is necessary to embrace these unique characteristics in order to make a worthwhile performance interface.

3.2 History of my own interface

I have been continually updating the interface used in my thesis performance since late 2005. My curiosity was initially sparked when I decided to use my newly learned Max/MSP skills to control live video simultaneously with a noise band I was in at the time. I ran the drum machine in the band and could use the MIDI signals from that and an additional foot pedal interface to automatically follow along with the beat of the music. The effects and video content were fairly crude in these early stages. Additionally, controlling both music and video simultaneously in a more structured band format often resulted in missed or awkward cues. My access to video clips at the time was very limited and often low resolution. These early experiments helped me learn more about how to work with video in a live musical situation, and helped me figure out that controlling both at the same time would require much more work and a great degree of concentration.

My next experience with tuning my interface came from an undergraduate class project where I planned to perform video along with my now fellow MFA student Kyle McDonald's semi-composed electronic music pieces. For this project, I asked Kyle to give me five words that he felt described the underlying idea or feeling of the songs we were going to play. I then took these five words and went out and videotaped my own interpretations of the words. As I recall, the words were pretty vague, like "order," "night," and "red." I was trying to somehow make a stronger connection between my

visuals and his songs, rather than just using arbitrary clips I had obtained from the internet or other sources. However, since Kyle's songs had mostly been composed beforehand, they only had a few moments of spontaneous action or improvisation, and already had an established structure to them. As such, I was essentially interpreting his music in a visual sense, but with very little communication between the two of us as performers. Also, looking back on a video sample of the work, most of the visual changes happen on cue with the beat, or with slight dynamic changes, with very little expressiveness. At the time I was using a Korg PadKontrol for interfacing with my program, which was a 4x4 grid of percussion pads, a couple dials and an X-Y touchpad. Most elements of the system were controlled like a momentary on-off switch, or changed based on how hard I was hitting the pad.

Figure 10 - Korg PadKontrol Midi interface [29]

I continued using this system for a year or so after that, using it to perform alongside DJ's and some other live bands in the Troy area. I still was working primarily with footage I had obtained from the internet because I often didn't know what kind of music I would be playing with. I decided to keep my options as versatile as possible and rely on interesting looking videos I could find the day before a show. I quickly grew weary of several things about these kinds of performances though. The archival footage I tended to gravitate towards was often unwieldy, and sometimes did a better job being funny than integrating well with the music. This footage wasn't so much of a problem when performing along with whatever a DJ was playing, but it felt much more distracting and disconnected when I was playing with a live band. The issue I had was that the images were often too loaded, and too full of their own meaning. The consequence was that the balance between integrating with the music and visuals was thrown off. Working with this kind of imagery is by no means a bad thing, but at that moment I was still developing my own performance language, and this additional level of meaning was not something I could grapple with at first. Gradually, I began shooting

my own footage. This gave me much greater control over the types of motion, content and color I preferred to use in performance. The footage I could get was personal, and my own. An essentially blank slate I could use to build new relationships with the musical material. At the time of this writing I have over a hundred different clips (three or four hours total) that range from a ride on the Vancouver Subway system to an up-close tour of my backyard foliage.

Around 2007 I also tried my hand at developing an automatic video improviser for my undergraduate thesis. The program, also built in Max/MSP, used Tristan Jehan's "Analyzer~" object. Analyzer~ was capable of using FFT analysis for sonic components like monophonic pitch, loudness, noise, brightness, and sharp attacks (Jehan). Through a complex set of algorithms, I would have the program make decisions about when to turn different video effects on and off, or change other elements about the video. For example, if a song became quiet, a streaking, temporal blur would be applied to the video, and if the song were quiet for a long time, even more blur would be applied. These decisions were mapped into my existing video software, so I could have conceivably performed visuals alongside the automated visuals. Unfortunately, the intense FFT processing required a great deal of the computer's attention, and this left very little time for the video processing. This resulted in extremely slow frame rates, which looked awkward (10 to 13fps was pretty standard). I had also hit a wall with my programming ability, and could only get the software so far. As much as I'd hoped for a more organic interaction with the music, many changes were simple on-off triggers, and I had trouble making it more natural. This would definitely be a project to revisit in the future in order to augment my own visual performances, but for now I'd have to wait to

Figure 11 - My sound analysis Max/MSP patch

develop my programming skills and possibly split the program across two computers (one for audio, one for video).

3.3 Development of the work within the graduate program

3.3.1 Early Developments – Coming Together and Improvisation

Figure 12 - Image of the performance of Coming Together at EMPAC, Nov. 19th, 2008

Upon starting in the graduate program, I was initially inspired by some of the early color organists, and was intrigued by the idea of creating a one to one relation between sound and image. In my first semester, this led to me mostly exploring the role of music as interpreter, and not so much of an equal contributor to the musical action. I was asked by Michael Century to develop a video piece to accompany an upcoming live performance of Frederic Rzewski's piece *Coming Together*, which was based on the Attica Prison riots of 1971. The piece is essentially in eight sections, and it follows an extremely slow build over the course of about twenty to thirty minutes. For video content, I obtained several discs of archival footage of the actual prison riots. As the piece progressed, I mirrored the music's form and moved in eight steps from more neutral shots of the prison's exterior, to more violent shots of the filthy prison camps and brutal fights. The footage was also mostly in low contrast black and white, but had more colorful segments towards the end. Additionally, I had several kinds of video effects that I was using to augment my own performance. I moved from extremely blurry, dim effects, to rapid cuts and gritty bright image overlays. Although this piece received many positive reactions, I was dissatisfied with my role as a background decoration. Also, all of the musicians even had their backs to the screen, so there was no way for them to be effected by what I was doing. The experience was compelling in that I was consciously

working with the deeper musical structure, but I wanted to explore other possibilities of using visuals alongside musicians.

In the following semester, I was taking several courses that focused on musical improvisation. Each week I was able to play visuals a couple times with some different ensembles, including Tinntinabulate in Pauline Oliveros' Experimental Telepresence class. This experience was tremendously helpful, and allowed me to develop more of a language for communicating with the musicians and with myself. One class was much more inexperienced with improvisation, so we often resorted to simple exercises to help make people more comfortable with less structured musical practices. These exercises were often intriguing for me because many of them were simple actions like passing a sound around the circle, but the musicians would often pause and remark to me: "Well, I don't know how this is going to work for you." I was sometimes treated as if I had a disability in the improvisational exercise, but I would just have to present my own idea of how I would integrate with everyone. This semester was definitely important for me in terms of learning more about how I was interacting with the music. Initially I was still resorting to mirroring the musical action, but gradually I felt more like an equal contributor to the whole improvisation, and was able to be myself in the overall texture. I even had to add a new feature to my program as the result of all of these practices, and that was adding a feature that allowed me to fade to black. I had never really had a reason to turn myself off in my past performances, but in any good improvisation with a large group, everyone is not playing the whole time, so I needed a way to drop out. This semester also saw my first experiments with working with multichannel projection. These early experiments were crude and often used small mirrors or pieces of posterboard, but it definitely was a learning process to figure out how to use multiple projection surfaces effectively.

Figure 13 – Some of my early multichannel projection tests on posterboard and on the back of a laptop

Most recently I have been exploring the role of visuals as more of a conductor of musical action. There were two reasons why I wanted to work with this idea. The first was just a simple question of what would happen if the music were reacting or interpreting the content of the screen. Secondly, I wanted to get a better view on how musicians were reacting to certain visual cues, which wasn't always so obvious when working in totally free improvisations. My initial instructions or scores asked for simple arcs over the course of the piece, such as a move from consonance to dissonance in my piece "The Rescue" (see score in Appendix B). These early tests were to get a sense of the density of visual cues I could deliver, but still have me performing and reacting at the same time. There was no sense in expecting the musicians to turn on a dime for every sudden flash or video filter change, especially if I was changing things rapidly several times a minute. If perfectly in sync musical reactions to visual cues were desired, a lot of practice would be needed, but then there would be no guarantee an audience member would understand how the two were working together. Additionally, if musicians were reacting perfectly to each visual cue, they would merely be interpreting my actions in the same way I had been reacting to the musical material only a few semesters prior. I was not looking for a soundtrack, but rather exploring what happened if visuals were forced into a more essential role in an ensemble.

3.3.2 Pieces for the thesis show

For my thesis show, I decided to use the Troy Gasholder House as a performance venue. The Gasholder is a very unusual local building that was built in the 1870's. The unique quality of the building is that it is an extremely large, empty, round building (100ft diameter, 50 ft dome ceiling). The building's shape contributes to it's very strange acoustics, with reverb times ranging from three to seven seconds, depending on

Figure 14 - Interior and Exterior of the Troy Gasholder House

the instrument and it's location in the building. There is also a delay effect that occurs at certain points near the center of the building. The acoustics also serve the purpose of challenging many of my initial performance practices in which I often cut video to a prevailing rhythm. In the Gasholder, one's sense of musical time is completely distorted and it becomes very difficult to do anything to a solid beat, so instead I am forced to communicate with intensity and texture indicators. The round shape of the walls aids some of my ideas about multichannel immersive projection[3] in that there is not a central focus, or an assumed point of attention when people walk in. I use this to my advantage by placing projectors in a fan shape around the center, and several transparent scrims in intermediate points around the audience. The space also has a rather unique history and energy that I was interested in engaging with in my series of pieces.

The show itself follows my own progression through the program. The first piece called *Building a Still* is my own arrangement of the song *Woods* by the band Bon Iver. The original song is very simple and repeats the same text over and over in an auto-tuned a cappella chorus. I was drawn to use it for the show because it would be a good introduction to the sonic character of the space without being overwhelming, and because I personally find it to be incredibly emotionally powerful, despite its simplicity. The Gasholder communicates an intense loneliness and isolation as a large, empty void, and this piece engages with that aspect of the space My visual intention for this piece was to demonstrate the role of visuals moving along with a piece of music that was composed prior to the performance. The music is prerecorded and is not affected by the visual changes, much like my performance for *Coming Together*. For footage, I used fairly abstract shots of my backyard during a nighttime snowfall. I chose this footage because it matches the simplicity of the song, and because my backyard at night is often the site of much thinking and soul searching. *Building a Still* is also projected on a small opaque screen at the front of the space, so that I can save the full size of my projection design for later on in the performance.

The second piece is just a straightforward free improvisation with five musicians and myself. For this piece, I mean to demonstrate some of my skills in working with

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[3] Images of the performance are featured in Appendix D.

musicians in a very unstructured environment, and to show what it is like when I am working as an equal contributor to the performance. This piece is also to help ease the audience into the acoustic space of the gasholder. While it is largely a free improvisation, the musicians are instructed to move around the space while playing, and also to discontinue the use of their instruments at some point and engage in an all vocal improvisation instead. In terms of visuals, the small projection screen from *Building a Still* is removed, and now the projector hits a few pieces of hung cloth and the bare brick wall of the space.

3.3.2.1 Trip[tych]

Trip[tych] is my first successful visualist-led improvisation piece that came out of some of the early experiments mentioned above. The piece is inspired by Tony Martin's composition *Floorlamps* which used several lights to cue musicians throughout a piece (Martin 137). *Trip[tych]* for me is an answer to several problems I was having, including the visualist's role in performance and the placement of the screen. The piece involves three musicians who sit behind separate see through screens, or scrims made of some cheap bridal veil-like material. Using my software, I map an individual video screen onto each musician's scrim using just one projector (multiple projectors were used in the case of my thesis show). I then have the ability to fade on or off each musician's screen, and each musician is allowed to play only if their screen is lit up. Essentially my role in this piece was to function as an audio mixer for the ensemble, as well as a performer. Additionally, performers are instructed to react to the visuals, but not with extremely specific mappings, only with loose suggestions (See score in Appendix B).

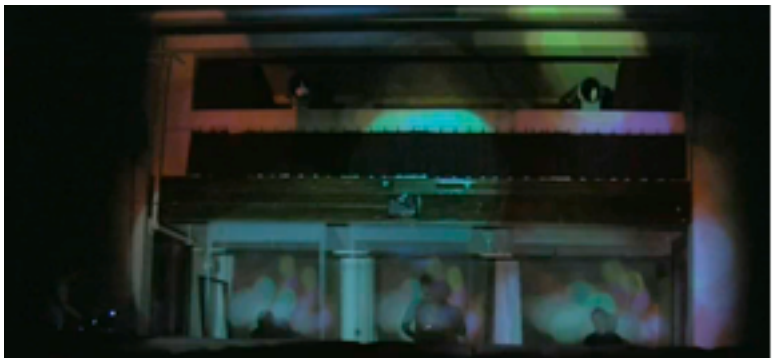

Figure 15 - Image of Trip[tych] performance in the rear of the West Hall Auditorium, Dec. 13th, 2009

Trip[tych] helps solve a problem I was having with the placement of the screen to the musicians. In most performance situations prior to this, it was difficult to have

musicians see each other, and watch the screen at the same time. By providing these transparent screens, it allows the visuals to be much more present and integrated, and not exist on a disembodied screen far away. The musicians are still visible to the audience, but only through the haze of the animated sheet. The projection setup also adds a lot of extra dimensionality and depth to the visuals. My performance station is also near to the performers and clearly visible to the audience, to emphasize that I was also part of the performance. Additionally, even though I am in a sense conducting the musician's actions, there is no way for me not to be affected by what they are playing. I had initially tried writing a graphical score for myself to follow, and to make some of the "mixing" more structured, but realized that I wasn't able to watch the score, and perform the visuals at the same time. I also prefer to leave the interaction between us be a little more of an open back and forth. It would have been almost impossible for me not to be affected by the musician's actions since I was performing at the same time, so there is a strange kind of feedback loop that occurs between us. If someone happens to play something exciting, it enters into the system and grows until a climax occurs. It suited the performers and I to only fit a loose overall structure onto the piece and leave everything else up to the moment.

Another issue I was also having with some of my other performances was the disconnection of some of the visual material to the mood of the music. I wasn't always adding any extra meaning to the pieces I was performing with, I would just pick a video at random and run with it. In *Trip[tych]* I decided to use some footage I had taken on a late night cab ride after a particularly exciting night in Brooklyn. I wanted the piece to communicate the range of emotions felt in a situation like that, from elation, to questioning, to overwhelming exhaustion. The footage is mostly out of focus streetlights and simple shapes and surfaces, which I find is a very easy canvas to work with. I am used to using footage that is much more concrete and referential, but it was very helpful for me to try this piece with some more abstract imagery. The footage was much easier to handle in terms of the types of motion and textures, and it worked very well with certain video filters.

3.3.2.2 Scouter

Trip[tych] is more of a piece I was developing prior to having the Gasholder show in mind, but *Scouter* interfaces with the building in much more specific ways. On my first visit to the Gasholder, I was struck by how differently instruments sounded depending on where you were standing in the space. If one traverses the space from one side to the other, clicking two drumsticks together, the reverberant quality changes from a smooth decay to a rapidly dancing series of delays in eighth and dotted eighth notes. Additionally, as a listener, I found that sounds have the ability to seem like they are coming from the mirror opposite of their actual origin. I wanted to highlight some of these unusual qualities for the audience by guiding a solo banjo player around the space by projection. The banjo player plays the same repetitive phrase when he is moving between stations so that the audience can hear it being transformed spatially and temporally by the space. The performer starts in one quadrant of the space and moves counter-clockwise to the three projection stations. He stops in front of each projection and I interact with him visually, and we have a brief conversation, until I fade that screen off and turn the next one on.

For the visuals I decided to again engage with the idea of the building, and it's place in the present. For each of the three projectors, I use the footage of three entirely different spaces. Without getting to specifics of where I actually shot the footage, I will describe them generally: distant shots of a large beautiful city, an exploration of an abandoned building, and vague shots of nature. I see this progression as a literal journey that the building itself is passing through. The Gasholder once saw itself as an essential part of the city, but has gradually fallen into disrepair. As the years continue, there may be no one around to care for the building. It already has significant structural damage, so it is only a matter of time before nature takes its course and reclaims the brick walls and metal. So, like the sound of the banjo, the visuals are also interacting with a change both in time and space (both in the space they are displaying, and in their literal position within the Gasholder). Originally I had wanted to experiment with things like a live camera and video feedback within the space to play with a visual analogy of audio delay and spatial transformation, but technical issues were a hindrance and pushed me towards my current choice.

3.3.2.3 Overflow

The finale for the thesis show breaks away a bit from the more melancholy pieces of the beginning. The first four pieces interface with the building as it appears, as a broken down forgotten space. *Overflow* is more of a celebration of the essence and energy of the space. In its first incarnation, the Gasholder held a tremendous amount of fuel, a condensed form of heat and light. Now vacant, the space still exudes a strange exciting kind of energy, especially in the form of sound. The tiniest sounds explode and zip around the space. The finale is meant to be a celebration of all of that energy, both light and sound, just waiting to be released.

The performance will also in a sense be conducted by my video projection. I will be using images of flames that I shot very close up. Sonically, the piece starts off with some high-pitched violin tones and quiet white noise. As the energy in the video builds, drums start to join in with cymbal washes. Eventually, three drummers will be pounding on their lowest toned drum and thrashing their cymbals at the same time. The other musicians will also be playing a drone of their highest intensity as well. Once the point of extreme visual and sonic energy is reached, the audience joins in with flashlights, uncovering the extent of the space. I was unsatisfied with the amount of visual energy I could create even with four projectors, so I needed a way to make that come across more powerfully. The best (or at least cheapest) way is to have about fifty to seventy audience members all wildly waving flashlights all over the space, matching the energy of the sound. Once this extreme point of energy is reached, it is held for an appropriate amount of time, and then allowed to slowly die back down. This piece hinges on the fact that both light and sound are both similar forms of energy, but that they work in different ways. During the actual performance, the wind outside the building began to get very intense right before the last piece. It was an amazingly powerful coincidence, as the whole building began creaking and cracking as if it were going to get blown apart.

3.4 Interface specifics

Even though I am still experimenting with adding new features to my performance program all of the time, I will give a few details about some of the more constant aspects. I have coded the entire program in Cycling 74's Max/MSP and Jitter

environment, which allows me to focus my creative energy on how to drive the system, and not spend too much time on coding my own effects and graphical interface. My program is structured in a very similar way to how a guitarist might use his effects pedals. A raw video plays, is then sent through a bank of effects that can be switched on and off by controllers, and then is sent to an output where it can be mapped onto different screens and surfaces. One unusual concept about my system is how I work with the video files. Many other video performance programs such as Vidvox's VDMX base their modular structure around using video loops, which are usually clips that are a few seconds in length, and often can be triggered in time with the music. My method is different in that I take a longer video clip of about eight minutes in length, and have my program assign arbitrary time points that I can jump to inside the video. This allows me to use passages of an infinitely variable length, and also gives me the challenge of working spontaneously with whatever points the system chooses (points typically come from a random number generator). Additionally, I save myself editing time by allowing myself the freedom to try a practice with some long clip I shot a few hours prior, and I can then decide if it is good material or not. I also have the option of not always working with random time points, but rather I can give myself ten buttons that will trigger a range of ten degrees from the darkest to the brightest points in the video. For this option, I run a separate video analysis patch beforehand to obtain the brightness values for every three seconds of video. The analysis patch takes down brightness values and at what time they

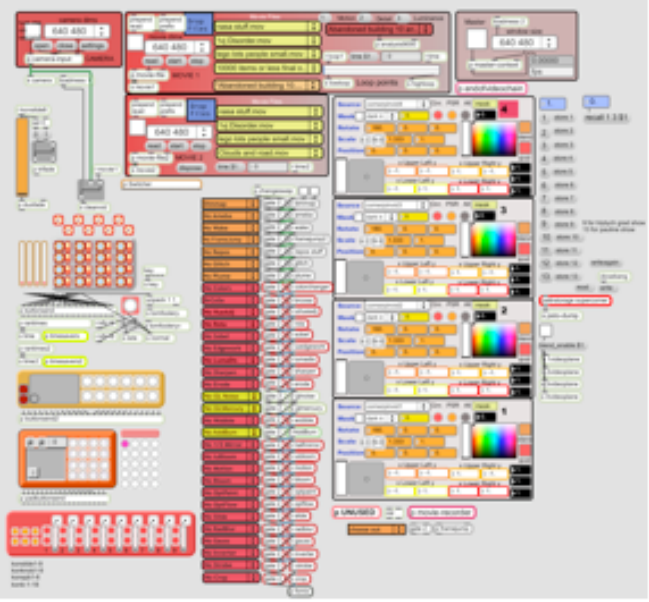

Figure 16 - Image of my performance software. A large labeled diagram is available in Appendix A.

occur, and then stores them in a file to be referenced later[4]. Videos can also be analyzed and segmented for amount of motion (still or fast paced) or for amount of detail (smooth or highly textured).

The raw video and time point manipulation is the first structure of my patch, and the image then flows into my video effects bank. I have a wide range of effects that I am continually refining, adding more expressive elements, and removing effects that I find too cheesy or cliché. I tend towards effects that have gestural changes and are not a simple on-off switch. My current arsenal consists of a range of blurs (spatial and temporal), color/brightness shifting effects, spatial warps, and other more layered and complex blends of the above. With these effects, I am able to immediately communicate elements like texture, color, shape and intensity changes to the musicians and the audience. As an example, I typically communicate slower, quiet passages with spatial or temporal blurs, making the video play slowly, or adding a kind of glowing luminance to the overall video. All of those effects I attribute to the idea of a visual reverb, or a way of applying a low pass filter to the image. The effects will continue to get more sophisticated as graphic processing ability increases. Additionally, in order to perform real-time, my video has to be limited to standard definition[5]. I'm looking forward to the ability to work with HD[6] footage in real-time.

After applying effects, the video flows to the final section. In this section, the same video is distributed into multiple individual planes[7], and then I can warp those planes

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[4] I am not getting only ten values of the range of brightness to darkness, but rather dividing something like one hundred and fifty values total into ten separate sections. I can then hit a separate button to randomize which value I get out of those ten sections to give me a bit of variety.

[5] Standard definition: About 640x480 pixels

[6] High definition: Ranges from 1280x720 to 1920x1080 pixels

[7] I can control up to four individual planes of video at the time of this writing. More are possible, but four has been sufficient in most applications. These planes are only rectangular for now, but the ability to map onto more varied surfaces is something to be examined in the future.

into various shapes. This ability allows me to use projection mapping with physical elements in the real world, and fade the images on those surfaces on and off. When I can project onto more unusual physical architecture, I am freed from the single channel white rectangle that is home to typical projection work. Images should have the ability to be spatialized and integrated with an ensemble. Sound has the ability to envelop a listener and move around in wide spaces, but rarely do visualists explore this possibility. Additionally, when projecting on a screen, one is stuck at a constant size, a constant "volume." By using different surfaces and materials, a visualist can more easily control their sense of scale as well as space. Technology has reached the point where a screen positioned above an ensemble doesn't have to be the only option available. Working with different kinds of projection materials, like scrims, and mirrors also helps expand a sense of depth and space with what would have been a flat video projection.

In terms of interacting with my system in a physical sense, I have a wide range of interfaces that I use. As I mentioned above, my initial interface was a Korg PadKontrol. As the system expanded, I began to reach the limits of what I could control or express with the PadKontrol because it had only on/off abilities and velocity sensitivity. My next upgrade was to a similar interface called the M-Audio Trigger Finger. The Trigger Finger was a significant upgrade for me because it had extra knobs, sliders and more versatile pads. The pads on this interface allowed not only momentary hits, but also continuous pressure changes. I can apply varying amounts of pressure to change the amount of warping or blurring on images, and it is a much different feeling from turning a dial or moving a slider. (A full diagram of the system is available in Appendix A).

Figure 17 - Image of my control surfaces in the wild. Full diagram in Appendix A.

I carefully consider which effects are managed by what kind of physical controller when implementing something new. Pressure pads are best for momentary kinds of changes that can be very rapid or very slow. When pressing against the pads I often feel like I am doing something akin to shoving a small boat off to sea. Sliders are my next

preference in terms of setting things on visuals. They are quite expressive, but also good for zeroing in on more granular settings. Dials or knobs are my least favorite expressive element, but are good for "set it and forget it" kind of effect, like adjusting contrast or a subtle effect mix. If you pretend to turn a small dial for a moment, it is a very unnatural action, one that you would be hard pressed to find a comparison for on most musical instruments.

I try and interact with the laptop as little as possible when performing for a couple of reasons. One reason is for the audience, and one is for myself. It is still easy for me to think someone like a laptop DJ is just checking their email, no matter how vigorously they are bobbing their dimly illuminated head to the beat. I like to remove the laptop from the equation as much as possible, so that the audience is fully aware of the fact that I am making changes to the visuals in real time. I don't think my live manipulations are something people immediately realize because of the nature of visual performance, but it definitely comes across in certain situations. In one of my early performances with the band Phantogram, after finishing the set an audience member came up and remarked something about how he liked my beats for the songs. To him it had looked like I was running the drum machine for the band, instead of running the visuals. I am more intrigued than insulted by a comment like that. There is not really an image of what a visual performer should look like, on top of the fact that the audience should be watching the visuals and not necessarily the visualist. Of course, Jay Smith and his Viditar attempt to create a view of what a performing visualist should look like, but I have not yet tried my hand at creating such a piece of hardware. It is still a difficult dynamic to figure out, and it will take a few years for there to be a cultural awareness of what a visualist in action looks like. I don't think I even have the means to articulate it in the right way, especially since the interfaces I use were originally intended for the control of music software. My gestures and physical actions aren't quantifiably different from someone working with music software, but I still think it is important for that awareness to be there, the awareness that the connection between the music and visuals is being made in real time and can change at any point.

Another reason I like to have the laptop away from me is so that I am aware of the scene as much as possible, so that I am seeing what the musicians and audience are

seeing on the same scale. If I had to click around a screen the whole time, I would be very removed from the overall experience. Additionally, there is no way I would be able to control the visuals on the same level with a keyboard and a mouse. Many gestures I use in performance have multiple elements to them. I'll often find myself stretching my hands and fingers across many different knobs and buttons, all to achieve one combined look.

I am still developing my physical interface, but to a point it has become what any good musical instrument is, and that is an extension of the body. I feel most connected to the performance when I am barely thinking about what my hands are doing and just let them fly around to the different controls. There are still points where I need to lean in close and fine tune something, or make absolutely sure I'm about to move the right slider, but for the most part my interface feels very transparent. This transparency is important because I don't have to think about what things I'm turning on or adjusting, I just do it as naturally as possible.

3.5 Personal philosophies of live visual performance

3.5.1 The use of video versus image synthesis

There are a couple reasons why I have chosen to work with video while performing, as opposed to images generated purely within the computer. The first is more of a subjective reason than the other, and it involves my views on what music evokes in me. When I listen to music, I don't feel like I envision splashes of color, or pulsing geometric shapes in my minds eye. Aside from the emotions music can bring out in me, it definitely pulls out scenes from my imagination and memory. Music can often be a particularly good time machine in the same way that a smell can often remind you of home. Revisiting certain songs that I had on repeat a couple years ago can bring back particularly strong images of places and people. These same sorts of moods and images can be evoked in live improvised music as well, music that hasn't been as entrained in us. Memory is certainly not the only place that we can draw images from for music, as our imagination is also a very wild and strong contributor. Again, my imagination does not often create simple shapes dancing to the rhythm, but rather has complex movements, wide attention shifts, and a fantastic range of depth and textures. As it

stands, the best way to create these sorts of visceral images outside of the mind is through the use of video.

Also, using video is not just about representing what I visualize when I listen to music. Oftentimes the complex feelings and thought patterns that follow music are difficult to describe in some kind of concrete visual form. There is a crackle of activity as the mind jumps around to a new attention-grabbing part of the music, or a background part that may sound boring, but is nonetheless essential and intensely engaging. I don't think I can say for sure that what I do with my visual instrument is an accurate representation of what people "see" when they listen to music with their eyes closed, but it somehow touches on bases of what people expect to see. Through my practice, I've found that there are definitely some innate expectations for visual and musical interactions in terms of what types of movement goes with what kinds of sounds. However, my work again is not all about representing exactly what is happening with the music, but rather to explore a common language that the two share.

There is also a more practical reason for why I have chosen to work with video as my visual medium. Working with video affords me an almost infinite range of different styles of imagery that I can work with. Most of the early audio-visual animators discussed in previous sections, such as McLaren and Whitney, had to go through a planning stage before they began making their piece. In this stage they had to decide how specific sounds would relate to specific image movements. Additionally they had to decide how the overall piece would look and run with it (a series of dancing colored rectangles, flashing colored stars over a cloud background). These works required weeks or months of laborious effort to develop a single piece, and may have involved considerable optical or mechanical research. Many times the works are astounding feats of precision. However, there must have been occasional cases of the animators, upon watching the finished product, wondering: "What if I had used this shape instead of that one? It might have worked better then." There was not enough time for experimentation with these methods, and little room to grow the pieces to become even more evocative.

The computer does not necessarily enhance the experimentation of working with music and visuals simultaneously. There is still a large amount of planning and research required to make audiovisual tools, and if too much time is spent on considering

different mappings, then there is a risk of making something with very little value. Golan Levin's work on developing different painterly audiovisual software pieces is a good example of problems that can come up when working with these ideas in the digital domain. In his thesis, he discusses several different programs he developed and the different issues that he has in terms of how they react to the user's input, how they look and how they sound. For his piece Yellowtail, he adapted a looping, animated drawing program called Curly to sonify the shapes that were drawn. In Yellowtail, the squiggles drawn by the user were made into sound by using them as an "inverse spectrogram." Unfortunately he laments that:

> Yellowtail's basic metaphor for creating sound was no more novel than that of a traditional score or sequencer. Moreover, its spectrogram's arbitrary mapping between dimensions of sound and image, namely, {X=pitch, Y=time} had the effects of introducing arbitrary non-isomorphisms into the pictorial plane. (Levin 79)

This quote presents the idea that working with simple or meaningless relationships between sound and image can be unfulfilling. These relationships can seem quite obvious when first working them out on a two-dimensional computer screen, but it takes a lot more effort to get at something more interesting. Levin expands on his initial ideas with his programs Loom, Warbo and Aurora and overcomes some of his misgivings by making the interaction between the user's visualized input and the sounds much richer. He even used these tools in a part improvised, part structured audiovisual performance called *Scribble* in 2000. Interacting with his audiovisual instruments becomes much more about representing and creating different kinds of performative gestures rather than simply mapping a sound to an image component. By focusing efforts on the final output rather than obsessing over the mapping connections, it becomes much more possible to create a visual instrument with a lot more depth and character[8].

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[8] I did recently see a performance with a drawing program that actually made me a little more of a believer in using drawing interfaces in conjunction with musical performance. In the performance, the artist Joshue Ott accompanied the band Son Lux with his custom software called *Superdraw*. With *Superdraw* he was able to draw and animate with different styles and motions on the fly. Using a drawing tablet and a keyboard, Ott

Of course, there is a heavy tradeoff that comes with using video versus generative images. Generative images are very much a blank slate in terms of what they are representing. A flowing line does not often hold a rich cultural or political association. Video on the other hand cannot help but be incredibly loaded and representational in most cases, and this makes it incredibly hard to wield. Images of a city can suggest so much, like industrialization, population growth, and pollution. A visualist must carefully consider the connotations of whatever footage they are using, even if it appears very emotionally neutral. Earlier, I mentioned how I had stopped using archival footage of 1950's educational films because they became funny or distracting during a band's performance. Those kinds of films are extreme examples of loaded imagery because they have so many layers of issues going on within them. Music does not often have the challenge of dealing with loaded material in the same way as video. Of course samples of environmental sounds, or speeches could be used, but single trumpet notes or snare hits don't necessarily have the same cultural elements attached to them as images do. The challenge is focusing this additional referential layer into something that works well for the performance. Granted, like the Light Surgeons, a lot of visualists are using more political footage to add a social commentary layer to their performances, but that is not necessarily where my personal interests lie. I don't feel like I have a true handle on this concept of using referential images yet, which is why I have retreated my own work to

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focused completely on the projection screen, and kept his laptop closed for the duration of the performance. Different custom visual effects would echo his drawing patterns, shatter them, and color them. Additionally he received input from Son Lux's sound sequencer that allowed for some tighter rhythm and form signals to alter the drawings. The different kinds of behaviors he added to his own drawings gave the animations a great deal of depth and complex motion that really suited the music well. I have been in contact with him recently and he said he had been working with a dance company lately and his interface made him feel as if he was dancing his own performance He also said that his mind goes somewhere else completely during a performance, and that time passes in a different way, which is a strange experience I often have when performing with live video.

using more abstract imagery for now. *Trip[tych]* is probably the first piece I really worked on that tried to engage with more abstract imagery. *Scouter* has me working with slightly more loaded images, but with much more of a purpose behind them than in my past performances. Again, I consider the image's power of symbolism to be one of the more challenging and powerful reasons why I work with visual performance, but it is by no means an easy axe to swing.

3.5.2 Direct mapping versus subjective association

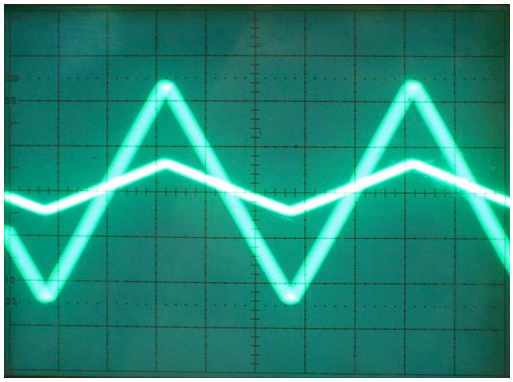

Figure 18 - Image of an Oscilloscope

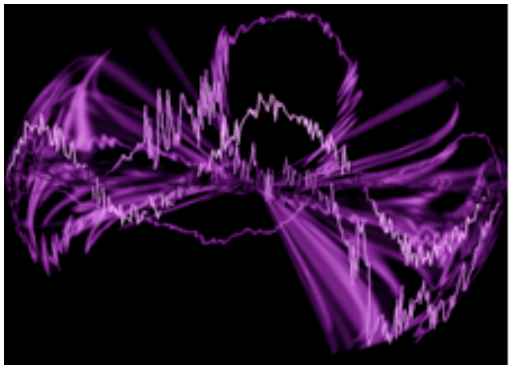

Figure 19 - Screenshot of the iTunes visualizer

Another important issue that must be discussed in relation to audio-visual performance is the idea of mapping. I have already covered a few of my ideas relating to mapping in other sections of the thesis, but I would like to clarify my stance a bit more. There is a scale that different kinds of visual accompaniment can be placed on. On one end, there is direct mapping of image components to sound elements. These can be simple associations like tone to color, or more complex relationships like Golan Levin's drawn shapes to sound waveforms. Other examples of this type of system would be pieces of hardware like oscilloscopes or color organs, or software elements like the Apple iTunes visualizer with it's dancing, psychedelic waveforms. When direct mapping is concerned, I see the visuals more as data representation rather than really augmenting the music. The purpose of an oscilloscope is to display waveforms for different signal testing, and not necessarily to strengthen emotional response to the music. Many artists are exploring this kind of mapping relationship with different software tools like Jitter, VDMX, Resolume, Processing and Modul8. A simple search on sites such as vimeo.com for the term "audio visual" reveals

hundreds of people's experiments with mapping different audio parameters to generative visuals. Of the experiments I have seen, many rely on measuring the amount of motion of specific EQ bands of the music and mapping that to some kind of drawing element. For example, this would allow the bass drum to drive one part, the snare to another, and the hi-hat and melodies to a third. Additionally, electronic music is often used for these videos because the sonic landscape is easily sectioned into different areas. These can be interesting to look at for a little while, but once your mind grips the simple relationships that are occurring, they can get fatiguing very quickly.

Direct mapping also has a threshold of connection recognition. It is easy for the mind to grasp the connections between a pulsing bass and snare, but what happens if every small sonic shift is represented visually? Imagine if a small video window featured flying, pulsing colors for every individual instrument in Stockhausen's composition *Gruppen*, a piece where 3 separate orchestras spread out around an audience play simultaneously. Not only would this be overwhelming, it would reach a point of being so connected, that it would eventually seem to be completely disconnected. The flurry of light and pixels would be too much for the eyes and ears to process simultaneously. Personally, my brain will give up on trying to make connections if the stimuli are too numerous. When listening to music or watching videos, I often find my attention jumping around to different visual and sonic elements. A good composer or filmmaker knows how direct attention different elements, but it would be difficult to account for where an individual's thoughts are focused at a given moment. Additionally, this threshold means nothing if the data is not mapped in some captivating, visually significant way. Would the sound of a violin appear the same as a trumpet in the full orchestra visualization scenario? This also leaves us with the question of what would be considered the important musical elements to map. I don't think I would say the pitch of a singer's voice is the sole element that moves a listener emotionally. Individual sounds have incredible depth and character and can be described on many levels, but these can be difficult to reliably express in a visual sense to a large audience.

An alternate approach is to not favor this direct mapping idea as much, and to consider the visuals as their own separate instrument, capable of independent shape and movement. In my experience it becomes a challenge of the visualist figuring out a sort of

common language or way to communicate with the musicians in a meaningful way. The easiest elements to communicate between the two media are energy or intensity, rhythm and texture. When I'm performing, brightness, fast cuts, or jittery movements can represent high energy. Conversely, spatial or temporal blurs, and slower playback rates, are good for easily communicating slow energy. I can typically communicate rhythm with looping jump cuts, motion within the frame, or turning an effect on or off. Texture can be communicated either through additional effects (like blurs) or through the actually video content. All of these can be combined to communicate a more complex feeling as well. A paper entitled "Toward a Model of Information Aesthetics in Information Visualization" from Andrea Lau and Andrew Moere has a useful scale, shown in figure 20, for placing various kinds of visuals in relation to their data. In this chart, I would place my own work somewhere near the top right side of the triangle, more towards the interactive side. I would place pieces that favor direct mapping more on the middle to top left of the chart, as they favor the actual data much more, but still tend to favor aesthetics (except in the case of a simple oscilloscope).

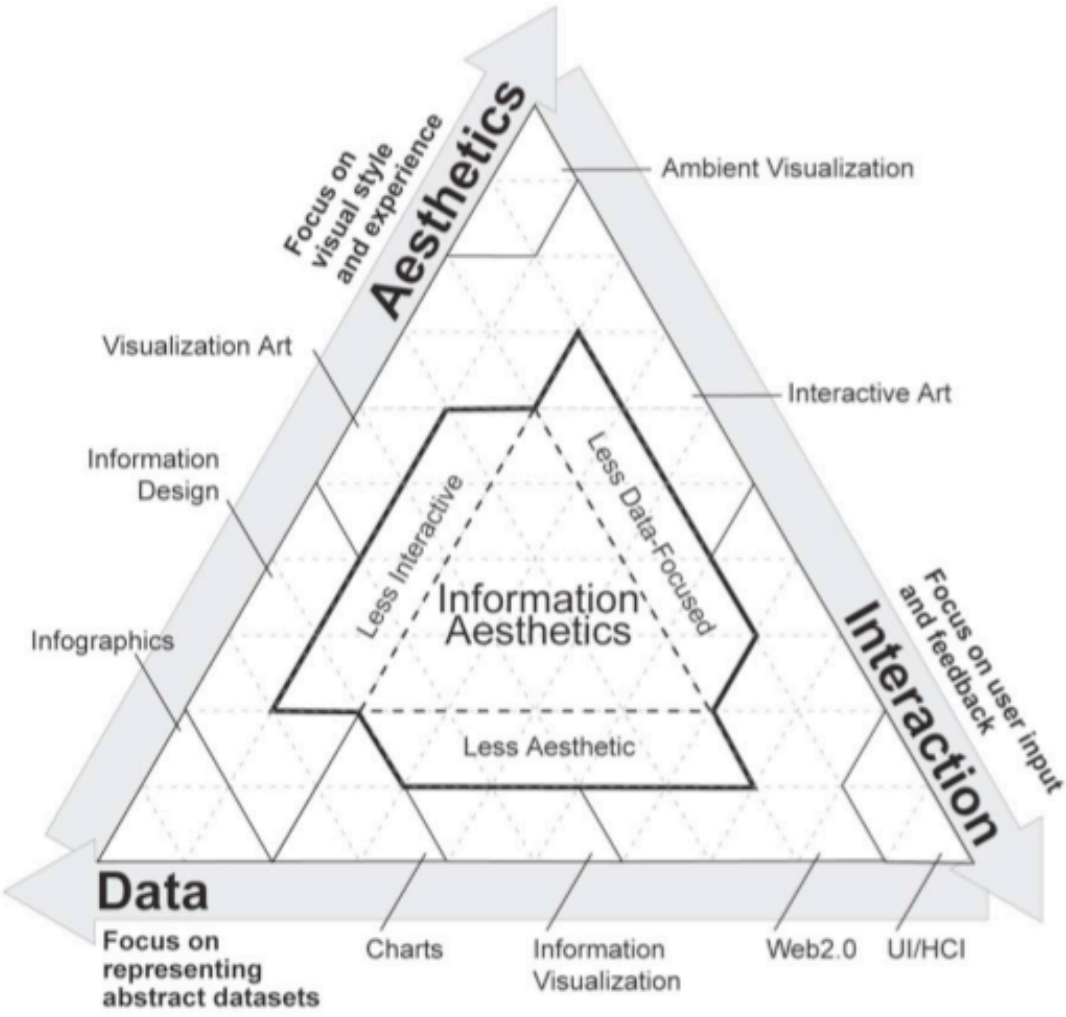

Figure 20 - Image of the "Domain Model for information aesthetics"

The issue with my performance method is that a lot more decisions are left up to the musicians and audience about how to react to the visuals. There can occasionally be a sense of ambiguity about what they are doing in relation to the music. For most performances they lack the precision of something that would be directly mapped to a sound source, but I still believe there is something compelling going on between the two. When just listening to some free improvisations myself, there is always a small burst of excitement when it feels like the sounds come together for a nice short moment. The moment feels like it was planned all along, but there is excitement in knowing that it happened spontaneously. This same feeling can be present when working with visuals and music. Of course, it is still up to the audience whether they see the two working in

sync with each other, or if they see them as totally disconnected. The same could be said for more eye candy visuals, where the visuals are barely reacting to the music at all. The difference is that my intentions lie in really performing alongside the music, and I think that results in the connections coming across much stronger to the audience. Additionally, visual aesthetics will change through the years, and some of the effects I rely on now will inevitably look cliché or outdated, but I am much more adamant about my process than what the final outcome looks like.

3.5.3 The importance of live performance versus pre-made visuals

Much of my process of working with visuals relies on a live performance situation for several reasons. In a live setting, the connections between visuals and music work very differently than if I were to make pre-edited visuals to a pre-recorded music track. As an example, I have often played video live with the band Phantogram. Their live shows tend to be very energetic, and playing along with them is very fluid for me. A couple months before my thesis show, the band asked me to make background videos for them for their entire set because they were not able to bring me along with them on tour. As I set to work on the videos, I noticed a huge difference between their album tracks and their live show, and they were lacking a large amount of energy in comparison. To make the pre-edited videos I recorded the output of my visual performance software as I played along with the album tracks, and then I tightened things up later in Final Cut Pro. When editing, I noticed that my way of working with the sound was very different from when I was playing along with them live. Mistakes are a fact of life in my kind of visual performance, but at the same time this spontaneity can open up whole new ideas for connecting with the music. When editing on a timeline, I have to consciously make the connection based on what I think makes the most sense logically, but not based on what I'm feeling emotionally at that moment. Ultimately, the difference may be subtle, but it is a very important difference to me.

I have also discussed an element of this in the previous section, where I talked about how canned visuals could be seen as connected to the music, but many of these perceived connections would most likely be coincidental. The effect would be similar to watching a muted cartoon on television while playing music or a speech. The characters

motions or mouths may line up with the sonic action at a few spots, but the connection would be largely a fluke. Of course pre-made visuals can be very engaging if conceived in the right way. Pre-made visuals have the advantage of not necessarily being limited by computing power. There are many video filters and methods that I would like to use in a live situation, but they are not achievable in real time, and require a large amount of rendering. As mentioned before, my resolution is also very limited, so things still have a vaguely pixilated look to them. These are mostly aesthetic concerns, but there are also some tradeoffs in the conceptual realm. Just like composing a piece of music, pre-composing a visual accompaniment can help with building more complex structures alongside music. However, I feel that this opportunity has been available for a long time, and I am more interested in exploring creating real-time structures. Conceiving of a strict visual accompaniment beforehand can be limiting in that there is no room to shift things when the performance comes, and this can put an invisible barrier around the performers' creativity for fear of getting out of time with everything. A performance that stifles spontaneity too much can quickly lose its spirit.

Finally, the audience can interpret the performance differently when viewing it in a live context. I don't believe most of my performance work would be as interesting if viewed outside of a live context. I think having a captive audience helps with this kind of work, especially with more abstract film. I occasionally have trouble making it through a professional music video for a song I enjoy, especially sitting at my computer when I have a million other windows and options calling to me. Sometimes it is easier to listen rather than watch and listen at the same time. Also, as with many new multichannel media, due to the way I have been working with projection surfaces, it becomes very difficult to convey the same sense of space and depth when a performance is documented on camera. The live situation is also important for the audience because it is the only situation that allows them to realize that both sound and image are being manipulated spontaneously in real time. Unfortunately, as discussed previously, it will take some time before an audience member will really understand what a visualist is doing or even looks like when out on stage. Admittedly, there is also a challenge of figuring out whether the audience should be paying attention to the screen, the musicians, or the visualist. My thought on this is that in a musical performance, visual

and aural attention freely wanders, and I do not want to define the visuals as being the sole focus. I have the same response about everyone's awareness when improvising with musicians. They do not always have their eyes on my screen, but on the same point, I am not consciously listening to all of them at once. Projection luckily can still influence the playing environment indirectly by altering the light levels and movements in the performance space.

4. Discussion and Conclusions

4.1 Future work

Although I have made progress concerning my own philosophies of working with live interactive visuals, there is still a great deal of development needed to continue moving forward. These developments range from some personal ideas I would like to work on, to wider reaching goals that would involve the entire population of visualists working within this realm.

4.1.1 Interface developments

I have been continuously updating my own software interface for visual performance since I started working with Jitter in 2005. There are several additions I would like to make in the future. First, I would like to expand my method of multi-screen and multi-surface projection. My current method is robust enough for some simple applications, but is limited in that I can only control four planes of video simultaneously. I lack the ability to create dynamic video masks on the fly, so many of my projection surfaces are still square, despite my misgivings about projecting on a rectangular screen. I would like to have a better knowledge of mapping video onto more complex 3D surfaces so that I can develop more ideas about spatialized video. There are many artists, such as the collective AntiVJ, who already work with projection mapping ideas on an extremely large scale, such as manipulating the architecture on the facades of an entire building ("AntiVJ").

I am also tempted to return to some of my ideas surrounding audio analysis in the usage of visual performance. I am still hesitant of the idea of directly mapping parameters between sound and visual components, but there is a definite possibility of using the audio analysis elements towards creating visual behaviors that are not simply: LOUD SOUND = BRIGHT COLORS. Even in my early experiment with audio analysis, I was working more towards creating distinct behaviors in relation to the audio rather than a more general one to one connection. Several different sonic events would have to occur in unison for a particular visual effect to happen. Pushing this work further would require a little more knowledge of logic systems and artificial intelligence. My computing power would also have to be increased because processing both at high

quality is a strain on even modern processors. I would be able to use this computer-augmented system in conjunction with my current performance interface, and have it aid me in making more decisions about the musical events. It is a thorny project to return to however, because it would return to the idea of musical events being merely interpreted, which could possibly throw off the balance between the visuals and music.

There are of course more fanciful dreams for visual software that would require considerable research and development in several areas. There are simple requests like having the ability to project 3D Ultra-HD images with a flawless frame rate at any size I want, to having more fine control of the images themselves. Things like the burgeoning world of computer vision could help augment my usage of video. Although I am already able to analyze video for simple features like luminosity, simple movement, and detail, it would be amazing to have the ability to categorize and have instant access to more complex visual features. I could organize videos based on when they zoomed, when they panned right, how many human faces are in the frame, or even if they had a particular geometric feature such as a prevalence of square shapes or round shapes. If this could all be done in real time, without any offline analysis, all the better. Additionally, many of my video filters are often full-frame effects. By full-frame effects, I mean that when I apply a blur for example, it occupies the entire frame. It would be much more interesting to be able to apply the blur to some simple shape on the frame, like a single building in the distance, or even a more complex shape, like a tree. To reach inside the image and change it's content and depth would be amazing. The facility to have complete speed control is another ability I would love to have. With most videos, I can only go so slow before things start to stutter due to frame rates. It would be helpful to be able to have completely smooth, slow movements and jarring, fast paced motion all in the same clip. This could be achieved with processing, but is probably not available in real time just yet.

In terms of my hardware interface, there are many improvements to be made. Right now I am mostly at the mercy of my budget and electronics skills. I am satisfied with many of the interfaces I am using, but I am beginning to reach a threshold of what I am able to control with just two hands. The fact that I use four separate interfaces means that my hands are often stretched over awkward distances, so there are many combinations of

effects that I haven't even been able to try yet. I would like to consolidate the best parts of all of my hardware into one easy to use control surface. I may not even be limited to the concept of a control "surface," by which I mean a small flat table full of control devices, if I develop more electronics experience. With more electronics expertise, I could expand the number of options I have for gestural control, instead of relying on relatively two dimensional controls like slides, taps and presses. There is still the option of augmenting an existing musical instrument to use for video control as well. In developing my interface I would hope to be able to be more of a presence on a stage or whatever performance area. Interfaces like the Viditar are definitely a tempting direction, just so I have something that comes across to an audience member more as a video controller rather than a drum pad. During my thesis show I definitely began to feel some of the gestures that I was lacking. When working on the scale of using three large projections, the gesture I had to use for fading the three on and off just felt small and insubstantial in comparison with what was actually happening out in space. Many of my motions now are mostly finger-based, but larger gestures involving my whole arm or more of my frame would definitely be worth exploring in the future.

4.1.2 Performance developments

It has taken a great deal of practice and experimentation to reach my current ideas of live interactive visual performance, but I am still relatively new at all of this, so I suspect I still have a lot to figure out. I have gotten to perform with established pop bands, experienced orchestras, skillful improvisational ensembles, and beginner level improvisers, but there are still a multitude of performance situations I have not explored to the fullest yet. Besides my piece *Scouter*, I have done very little work with a solo musician. When beginning work on *Scouter*, I was struck by how challenging it was to work with just a single instrument, as opposed to an ensemble. There was much more of an emphasis on the visuals since there was such a stripped down aural environment. Additionally, at first our communication seemed very vague and ambiguous, and it took some practice to learn some common gestures we could play with. I would like to try more challenging situations with a solo musician or playing in more unusual settings.

Recently, another person interested in video performance joined Tintinnabulate, and there are many new obstacles with this kind of situation. I remember one of Pauline's remarks in particular, something like "You're like two solo pianists who don't know how to play together yet." I definitely haven't had much experience with working alongside another visualist, but it is definitely an intriguing avenue to explore. There are many questions to answer about whether each person gets their own projector, what sorts of surfaces do they get to project on. Additionally, each visualist has a very distinct style that they have honed, so one would have to be careful not to unintentionally combine two visualists with very different styles. By the same token, an industrial noise musician would have quite a learning curve if they were tossed in with an acoustic folk artist. There is the option of working more as a visual "band" with several members who have different roles. The Light Surgeons have a setup similar to a band with lots of people running things at once. I have seen another collective where one person drew things on a tablet, passed their feed to someone running VDMX, and had one more person playing an electronic drum set controlling visual aspects along with a separate musical group (which coincidentally was made of only one person). I would like to try more of a band approach at some point, but it would take considerable practice and experimentation to figure out who gets to control what aspect of the visual content.

I also have some work to do in terms of making compositions. Ideas for pieces do not come easily to me yet because I am still working out a lot of questions surrounding the role of music and visuals in a performance. Since I come from more of a musical background, it is still very difficult to consider both factors equally when developing an idea. Especially when working in the Gasholder, sonic ideas often came first because of the acoustics. Coming up with the visual idea first is also common, but it is still very much a challenge to make them seem balanced. It always feels like one must adjust a little bit to the direction of the other in the stage of creation. Also, much of my current work centers on spontaneously making a connection between the visual and aural during performance. Due to this direction, I am not sure how I feel about making more structured compositions quite yet. I discussed earlier how I began to make a graphic score for my piece *Trip[tych]* but left it aside for practical reasons, and because I didn't want to lock my own visual performance down too much. I think more structured pieces

could definitely come up in the future, but after practicing them with a group for an extended period, and working them out like a band would put together a song.

4.1.3 Documenting projection and the telepresence of live visuals

My experience with Tintinnabulate and my own ensemble has taught me how difficult it is to document performances that involve projection, just as it is difficult to really capture the sense of space in a multichannel music performance. One issue stems from the quality of projectors that I typically have access to and the fact that they are very dim. I occasionally compound this difficulty by projecting on alternative surfaces that may not have optimal reflective qualities. A space must be very dark for the projection to communicate well for the audience, but in this situation the camera can sometimes barely see the projection and then not see the space at all. Of course some cameras can be manually brightened but this results in a very noisy, ugly image. Also, musicians and the visualist should not have to sit in darkness, as they are just as important as the images. Striking a balance in lighting the performers for camera, and projecting images so they have appropriate emphasis is very challenging and takes a great deal of stage and set design that I have not gotten to explore fully yet. In addition, now that I'm working with multichannel projection that is much more immersive, it becomes almost impossible to preserve the sense of space and depth in a performance. This is a problem that artists working with immersive environments have faced for years though, and problem that hasn't been fully worked out at this stage of technology. All of these issues become important not just for documentation and preservation of a performance, but also for the emerging field of telematic performance. I have participated in a few pieces that make use of telepresence and figuring out how to use cameras properly, much less live visuals is a whole area that requires considerable development from artists in the next few years.

4.1.4 And beyond

In my introduction section on synesthesia, I mentioned the vOICe device that aids blind people by allowing them to "hear" their environment by translating a black and white, pixellated image into beeps that modulate based on the individual pixel's

brightness. This is an interesting project, but to me it seems like it is only the beginning of this kind of work. There is much less work done on turning an image back into sound, and this issue can be explored in more technical areas, and in more artistic avenues. As computer vision techniques improve, rich meaningful soundscapes could be derived from the features of a single image.

Other senses could stand to be explored in terms of relating them to music. There is haptic sensation that has been explored a little bit in performances, although sound is in a way a haptic sensation. Of course there is the often-neglected olfactory sense, which would be incredibly difficult to relate to sound. I would not consider my sense of smell to be a very temporal sense, but its ability to conjur up memories and emotions is amazing and in some ways is on par with music. I recently came across a project called the Scentisizer by Rodolphe el-Khoury and Nashid Nabian. The following is the description of their project from their website:

> Scentisizer allows for the orchestration and spatial deployment of complex fragrances by giving precise control over the constitution and diffusion of scent accords in dynamic compositions. A tangible interface combines haptic and graphic features for managing an array of sixty-four scent dispensers that maps a wide-ranging olfactory field. Users can manipulate individual scent containers, much like organ stops to compose and time an accord in a direct and intuitive fashion. They can also control tem with greater complexity and precision by means of a digital graphic user interface that allows for multichanneled sequencing and modulation of scent tones and dynamics. (Nabian)

Perhaps decades from now the Scentisizer will be seen as the “color organ” of its day, and artists and scientists will be chasing the dream of creating scent music.

4.2 Conclusion

In conclusion, this thesis has investigated various methods of exploring live interactive visual performance within a musical context. Contemporary methods of live video performance have been analyzed in relation to a long history of development in interfaces and practices involving the combination of the aural and visual senses. My study of the history of visual music has led me to believe that this stage of development is just another step towards a long, rich future in live interactive video, as there is still quite a lot of work to do in terms of interfaces and practices. Moving forward, it is my

belief that live video performance does not need to follow music in an exact relationship, or vice versa. The quest for direct mapping between is an unnecessary and unproductive avenue for creating audio-visual pieces. Finding these mappings may be a fruitful avenue for data representation, but not necessarily for creating emotionally engaging artworks. One must face the fact that the two operate in completely different ways, and by understanding these different functions one may bring out either one to its greatest strength rather than attempting to stuff it into a box it does not fit in. Even if the revolution of live interactive video goes the way of the color organ, the important thing to take away from all of its experiments is the idea of a message. Both sound and video are incredibly strong communicators on their own. When they have to work together, they must communicate amongst themselves. They must hone their collective signals to be more pure and significant, so as not to confuse and muddy the original message. A message can have its most wide-reaching impact only when it has reached a pinnacle of accessibility and resonance in the population. In a time of such persistent media bombardment, the stronger and more meaningful the signal, the more hope it has for reaching people.

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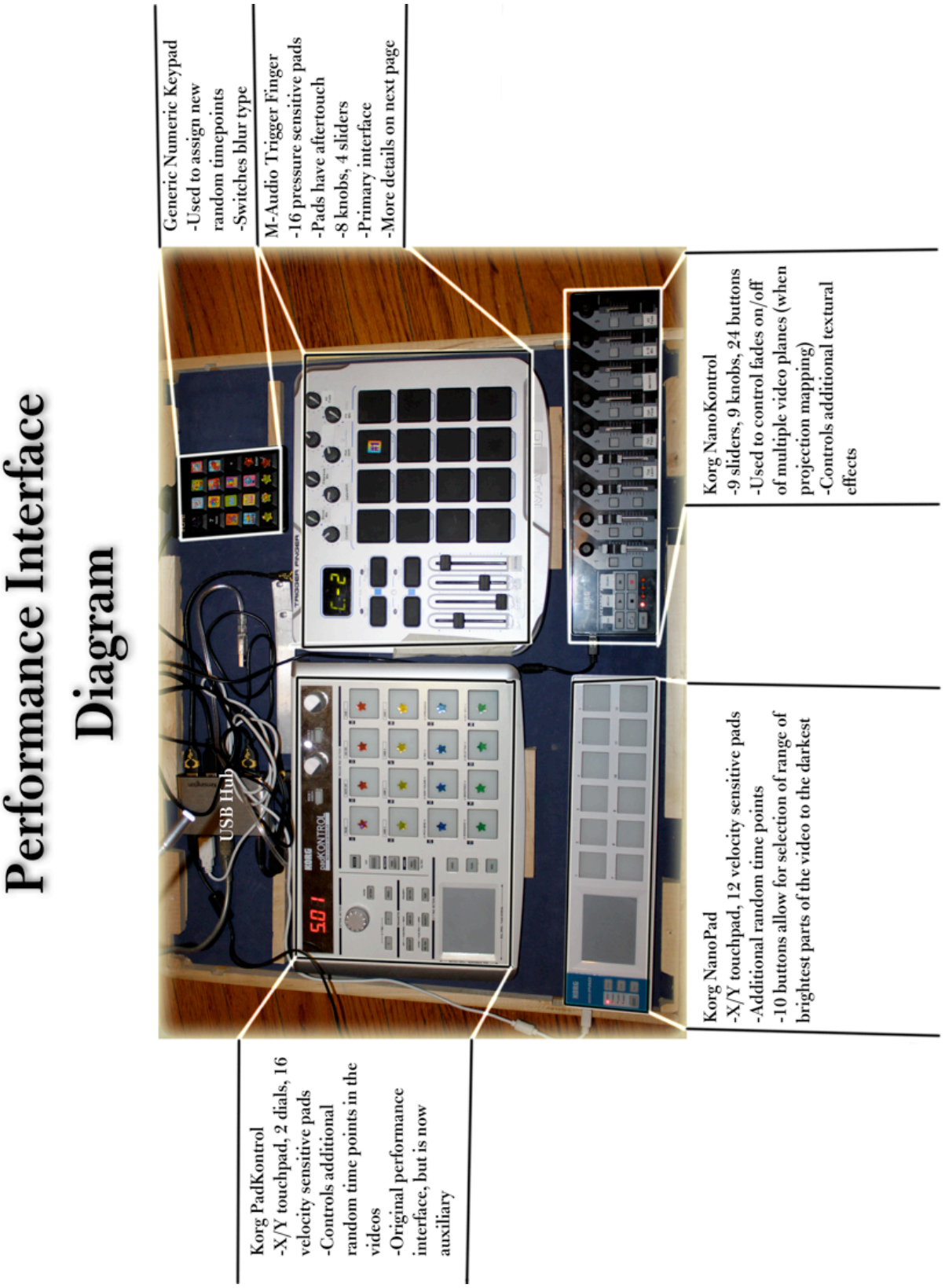
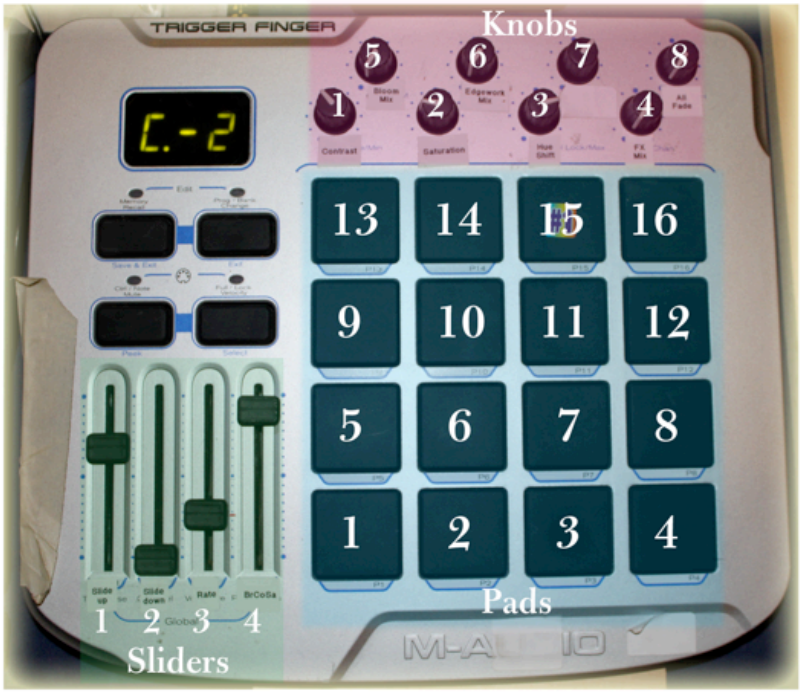
APPENDIX A. Performance Interface Diagrams



Layout of Trigger Finger Interface



Knobs
1 - Contrast change
2 - Saturation change
3 - Hue range shift
4 - Overall FX Mix
5 - Bloom mix
6 - Edgework mix
7 - Unassigned
8 - Fade on/off entire video

Sliders
1 - Temporal blur (horizontal)
2 - Temporal blur (vertical)
3 - Video rate (ranges 2x as fast to backwards)
4 - General adjustment of contrast/saturation (from black and white to oversaturated)

Pads

-Pad 1,2,3,4,7,8 - Random time point in video
Pad 8 alternate: Sobel effect
Pad 7 alternate: Make video go backwards

-Pad 4 - Pressure does a time scrub on video

-Pad 5 - Spatial Blur (Gaussian or Radial)
Pressure determines blur amount

-Pad 6 - Feedback based brightness blow-out
Pressure determines brightness amount

-Pad 9 - Flops video horizontally
Hard tap applies "erode" texture effect
Pad 9 alternate: Glowing blur based on movement

-Pad 10 - Video Glitch I (Square)
Pad 10 alternate: "Bloom" glowing temporal blur

-Pad 11 - Continuously random timepoint (changes on each tap)

-Pad 12 - Video Glitch II

-Pad 13 - Wobbly/water distortion effect
Pressure determines amount of wobble

-Pad 14 - Earthquake displacement
Pressure determines amount of earthquake

-Pad 15 - Stops video

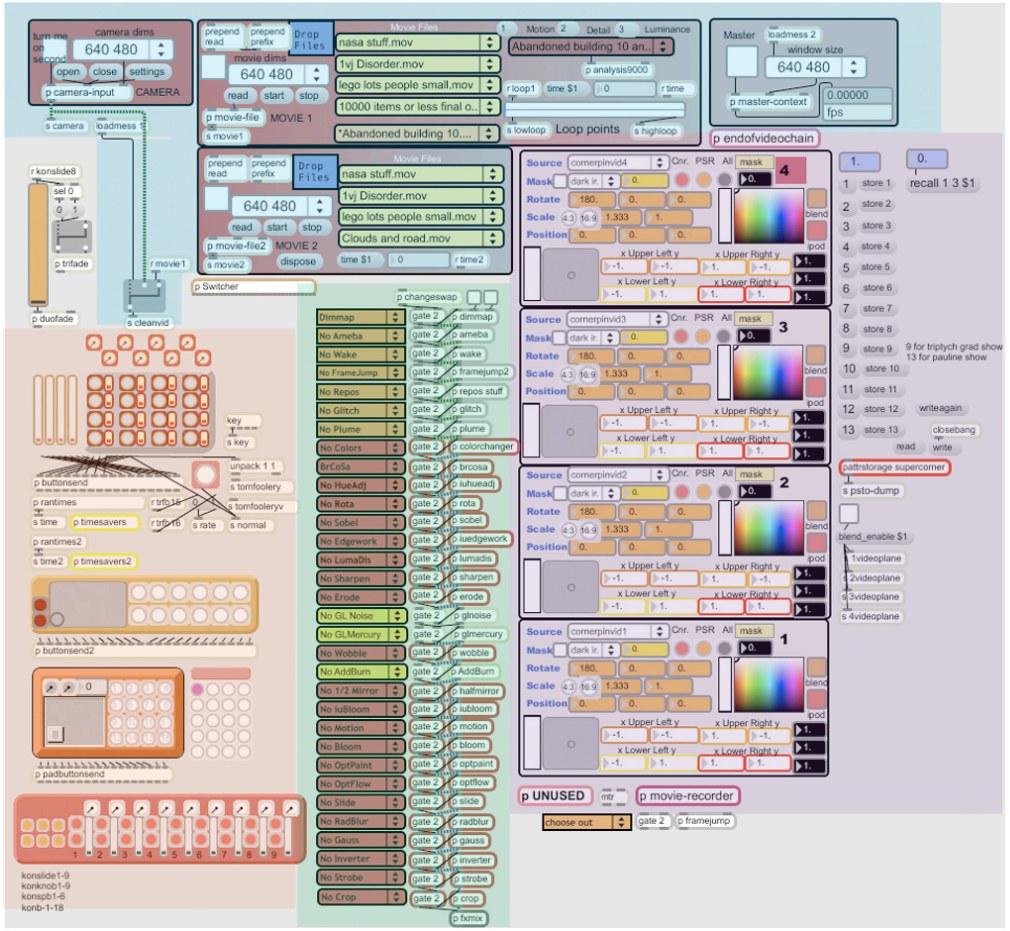
-Pad 16 - Turns off all effects, sets everything back to default. The "Fix it!" button

Note: Using one of the system buttons, I can switch the functioning of certain buttons and allow them to control "alternate" effects on the fly

Performance Software Interface

Video/Camera selection and controls
For selecting from a range of movies, or using a live camera

Representation of physical interfaces
-Allows me to see if the computer is getting input from my devices, and is essential for fast troubleshooting during a performance
-Also allows me to easily map controls to new things on the fly



Video effects bank - currently has 32 different effects that range from simple color changers, to complex composite effects that combine several filters together

Quad-warping patches

- for distorting the four screen corners and projection mapping.
-Different screen setting can be recalled so that mapping doesn't have to be re-done for every practice

APPENDIX B. Samples of scores for visual improvisation

1. *The Rescue* (2009)

A leader chooses a small number of musicians in the ensemble. These chosen musicians start playing just one constant gesture like a drone or small melody/rhythm, preferably something dissonant. The visualist may start at the same time as well, but is not necessarily restricted to a repetitive gesture.

Each performer sets an internal rule for themselves that they will change something about that gesture when a certain visual cue occurs on the screen (or projection surface).

Others may join in one at a time when they see a visual cue that interests them, but must try and pull the piece towards consonance. You may not join quietly, you must come in loudly, announcing your presence, and then you may adjust your volume to become part of the texture. The meaning of “consonance” can be decided on beforehand. It could be tonal or rhythmic consonance, or something completely different.

When everyone is playing, and you perceive everyone to be playing, everyone should then drop out gradually. The video is allowed to go to black at any point, but that does not indicate that the piece is finished. Aim for a 10 minute arc.

Images may follow a similar progression from "dissonant" to "consonant"

2. *Trip[tych]* (2009)

(originally “Visualist as conductor. Variation/tribute to Tony Martin piece "Floorlamps")

3 musicians sit behind see through scrims (see through screens) mounted in front of them (could be expanded to different instrument sections behind screens). The projection will come from in front of the musician, hitting the scrim, the musician and the space behind them.

Each visual on each of the 3 scrims may be individually controlled by the visualist. The visuals will typically be faded on or off or have slight effects applied to them.
The musicians should be very mindful of the content on the screen and work to mimic elements of it in how they are playing.

Examples/suggestions for relationships:
An unlit screen means stop playing immediately
A dim screen means play softer or lower volume
A bright screen means play louder
A colorful screen means play colorfully
A blurry screen means play softly, or slur your details/articulation/rhythm
A noisy/busy screen means play noisily, soft or loud
If motion is going slowly, go slowly
If motion is repetitive, play repetitively
If motion is going backwards, play backwards
Don't be afraid to do the complete opposite of any of these suggestions, either.

The visualist should create a sort of feedback loop between music and visuals, that is, they should conduct the musicians, but not be totally deaf to the music that is being created.

It is up to the visualist to pick the content of the images, and the shape of the piece

The visualist decides when the piece has reached a suitable stopping point.

APPENDIX C. Interviews with contemporary artists about the state of the live interactive visuals

In preparation for my thesis, it was helpful for me to get a sense of where my own work lies in relation to some much more established audio-visual artists. I was lucky enough to get interviews with four artists who have very different angles on the realm of visual performance. Some connect their visuals very directly with music, and others are more interested in using visuals in a live performance environment with less of a focus on describing their work as "visual music." As I am coming at this issue more from a musical background, it was interesting to get angles from people who were more film or performance art focused. The four artists that I was able to have a talk with were Tony Martin, a new media artist active since the 1960's, Jay Smith, the creator of the Viditar, Chris Allen, founder of the Light Surgeons, and Mike Faulkner, founder of the A/V collective D-Fuse and co-author of a book chronicling the current state of VJ culture.

Tony Martin

After working with Pauline Oliveros for a few semesters, she had suggested that I get in touch with Tony Martin, as she had done a lot of work with his visual performance pieces in the 1960's. Many of Martin's ideas surrounding visual's relation to music, and the use of visuals in performance resonate with many of my own thoughts. Martin is still very active as a new media artist, working with installations, performance and painting. Many of his pieces I was interested in came about in the 1960's and involved multiple film projection and lights. He described his initial fascination with this work as stemming from his musical family and his passion for making music when he was younger. For him, the mixing of the two is "automatic" and the two are very connected already. He believes that the first real multimedia work is tribal, with music and dancing around a fire, so there is a natural connection there for him. However, like myself, he does find things like synesthesia and "decorating" the music with music to be a dead end in terms of the art form, even though he thinks some of that work is perfectly fine in it's own realm. He also says that there is also an issue of form with this kind of work, and that it is not whether it is abstraction or realism, but rather how it's done that really counts. He is interested in what he calls "equal information" where the carrier isn't as

important as the information itself. In many of his pieces he is interested in making loops of this equal information, like the ones between light and sound, or visualist and musician. He also has similar thoughts on how live performance feels different than editing on a time line. He feels that working as an editor with visuals and music can quickly become very rigid, but it should feel more organic and intuitive if possible. As a painter, he also shares my concern about the rectangular screen and considers it a very rigid format. He occasionally favors dark edges that allow for different shapes to surround his works. I found it very interesting that I was able to connect so well with an older artist like Tony Martin, but it was also encouraging to speak with some people who have been doing more recent work in the field.

Jay Smith

Although I have already discussed Jay Smith and his Viditar in detail in the overview section, my interview with him helped shed more light on his approach for visual performance. He had initially started working with video in installation settings and was interested in people's reactions to video from a performance standpoint. His idea was to create a sort of "multimedia rockstar" and bring video art out of an art gallery and bring it more into the mainstream. Additionally, he loved visuals and video but hated editing, so creating a tool he could use to intuitively manipulate images live was a natural fit for him. Much of our discussion centered on his use of his interface. He pointed out that in an electronic music scene, people don't really expect to see someone performing the visuals, it is sort of meant to be wallpaper. For him though, he was more interested bringing this kind of work to more of a rock music scene, and creating his Viditar helped him bring a more emotional performance of visuals to that kind of audience. He had an aversion to being stuffed offstage in some distant control booth. He wanted to be on stage, but not with some weak interface like a laptop or MIDI keyboard. His tool helped force him on stage with the rest of the musicians, and helped him connect better with his audience. He told me he felt that the history of hip-hop performance was a sort of analogy for the future of live interactive visuals. Initially, hip-hop shows were just two guys on stage rapping on a backing track, but in recent years, groups like The Roots have whole bands on stage performing that backing track live.

Having that kind of setup, he says, brings everything to a whole new level. He does worry that the visualist as performer has gone a little downhill in the past few years due to people being complacent about using "lame" devices for performance. Even about my own interfaces, he remarked "If you're going to use a keyboard, or a Trigger Finger to play visuals, the audience is going to think you're playing a keyboard, and you can't blame them for it, but that's kind of the way it is."

Chris Allen

Speaking with Chris Allen of the Light Surgeons was a very different experience from speaking with Tony Martin or Jay Smith. While Martin and Smith came at the issue from a more musical or performance based side, I got the sense that Allen's graphic design training had him approaching everything from more of a media/film based angle. There were certain musical or interface based questions that I tried to dig out but they weren't really coming across to him in the same way. However, he did say that he became interested in the DJ scene and how they were able to take elements from other pieces and mix them together as a collage, and he wanted to explore that kind of aesthetic visually. For him, visuals in nightclubs in the early 90's were "either kind of lurid, horrible fluorescent backdrops or the visuals were total techno-crazy fractals[9] and things like that," and he felt more influenced by the DJ subculture. He wanted to reflect some of the similar ideas of grainy, collage materials visually in performance. Gradually, as digital tools increased, he became more interested in honing the Light Surgeon's experiments towards greater meaning and dialogue with material. He is interested in how film could be more collaborative and expressionistic and "perhaps even a bit more truthful to how the world is." By having a performance group, they are able to explore this idea of collaborative filmmaking more organically. There is the challenge of presenting this performance to the audience, but that is where the use of different projection materials comes in. We discussed his use of scrims in performances as a way

[9] He did defend the more meaningless visual work a bit in that some performances don't call for deeper meaning but rather allow for people to project their own meaning onto something, and that there is room for both.

of breaking out of a rectangle and conversing with the space. He was interested in how light could be caught, and how it travels in a space. He did a lot of experiments with this material of stuff early on, and working with strange materials helped him to adapt to new architectural spaces in a more low tech way. He seems to favor the more immersive environment, but for *True Fictions* he had to sort of flatten those ideas into more of a stage shape for touring things around.

As for the future of the art form, he seemed encouraged, but a little worried about it at the same time. When we discussed the various terms surrounding live visual performance he said "It's ok to have that frame, but sometimes people get too hung up on figuring out what to call it when they should be asking 'What's it going to do?', 'How are we going to change things?', 'How are we going to survive and keep doing this?'" For him, that is the kind of debate he wants to get artists in this field (or any field) interested in. Unfortunately, the structure of how survival and funding functions is a huge concern for any artist working right now, and it can deeply affect the creative process. He is encouraged by the surge of work on the internet and the rise of people and festivals working with this idea, but is concerned about how any artistic work will be sustained in the digital age if everyone's giving stuff away for free. However, he remarked, "that is perhaps a whole other paper."

Mike Faulkner

Mike Faulkner, founder of the A/V collective D-Fuse, gave me yet another angle on how he was approaching this kind of work. D-Fuse's work is often self-initiated art projects that span a wide range from installations to huge multi-screen works. Occasionally, they also do work with well-known musical acts such as Beck. He also put together a book on the current state of VJing a few years ago. Like Allen, I got the sense that Faulkner was coming at audio-visual performance much more from a visual side. He says that he "does not seek to represent musical elements visually, and wouldn't describe our work as 'visual music.'" Both audio and visual elements are considered as equally as possible when creating new performances, although he acknowledges that without audio, "video has a flatter feel." However, his sense about live performance is a little different from my own because of the large professional scale that he works on. He works with a

lot of complex generative imagery and he says that very often the “free form improvisational jam, even with musicians, very often it doesn’t come out very well.” He went on to describe a completely improvised set with a musician that had it’s fair share of issues The best approach for him is to “have a rough idea of where you’re going, and then leave some up to chance, otherwise it can be a bit boring.” The live performance setup is incredibly important to him as well and he agrees that his work wouldn’t communicate the same way as if he released a DVD or something like that, but this is primarily for technological reasons. He seemed to be cautious of releasing things that were produced in high quality HD for a stage, but then watched on Youtube or on a cell phone, which would possibly alter the original intent. He is encouraged about the future of the art form, but one problem he worries about is that craftsmanship can drop as the technology for visual performance reaches more of the mainstream. He isn’t complaining about these tools reaching a wider audience, but is aware that stuff like that can happen as more people pick up this work as a curiosity.

APPENDIX D. Program notes and images of Overflow, the Gasholder Performance on 3/3/2010

Overflow

Blair Neal's MFA Thesis show
Wednesday, March 3rd, 2010 at 7pm
Troy Gasholder House (1115 5th Ave)

This show features several of my own pieces that are meant to show the range of using live improvised visuals alongside music. Oftentimes visuals are used purely as musical accompaniment, or vice versa, but tonight I aim to show them working together in different roles in a truly unique space.

Each piece is approximately 10 minutes long, and the audience is invited to move around the space between pieces. Simply moving a few feet can make the entire space sound different. The pieces are meant to interact with the overall feeling of the space, as both a lonely, empty void, as well as a place of tremendous energy, meant to be celebrated.

-Program Notes-

Blair will be performing live video on each piece.

I. Building a Still
An arrangement of Bon Iver's song "Woods"
Featuring: Lisa Rogers and Blair Neal on vocals (prerecorded/preprocessed), and Kyle McDonald on glockenspiel

II. Free Improvisation
A free improvisation with music and visuals
Featuring: Will Rogers on saxophone, Caitlin Morris on violin, Kyle McDonald on glockenspiel, Jason Rankins on drums, and David Rhoderick on effects pedal

III. Trip[tych]
A visualist led improvisation. Each performer is only allowed to play when their screen is lit up, and they are to react to the visual changes on the screen.
Featuring: David Rhoderick on effects pedal, Kyle McDonald on drums, and Will Rogers on saxophone

IV. Scouter
A visualist led improvisation. In Scouter, the musician will be led around the audience by projections featuring three different locales. As he walks around, the space will subtlely transform the sound of his instrument.
Featuring: Jesse French on banjo

V. Overflow (with audience participation)
This piece aims to interact with the history of the Gasholder, and is a celebration of the energy it used to house in the form of fuel. The piece is also meant to ellicit a feeling of danger about being in such close proximity to that much energy. Using multiple projectors and musicians spread all over the space, the piece will emulate the building of a fire, from high pitched tone, to a cacophonous rumble, ending with a sustained wall of noise.
Featuring: Ryan Jenkins, Jason Rankins and Kyle McDonald on drums, Caitlin Morris on violin, Will Rogers on saxophone, David Rhoderick on effects pedal

Participation in finale: Those of you with flashlights will participate in the finale by shining and waving your lights all over the walls and surfaces of the space. You will be led by the "head flashlighter." When they turn on their light, you can join in and help illuminate the space with rapid or slow motions, depending on how the energy of the piece is driving you. When you sense the energy of the piece dropping, try to follow it as best you can. Turn your lights off gradually when the head flashlighter has turned theirs off.

Thanks
I am extremely grateful to Bill Sage, his son Kevin, and everyone in Sage Brothers Painting Company for allowing me to use the Gasholder, and for helping me set up the space. Their generosity is truly inspiring, and I cannot ever thank them enough.

Thanks to Lisa for all her encouragement with getting my work to this point; it would not have been possible without her.

Thanks so much to all of the musicians for enduring the cold, long practices and unorganized instruction.

Thanks also to my parents, Sally Rogers, everyone in the RPI Arts Department, iEar, my fellow graduate students, my thesis committee (Curtis Bahn, Pauline Oliveros, Kathy High and Kathleen Forde) and anyone else I may have forgotten.

Program notes issued to the audience.

Sample video of performance here: http://vimeo.com/10533772

Full list of show performers and their instruments:

Blair Neal – Live Visuals

Lisa Rogers – Pre-recorded vocals

Kyle McDonald – Glockenspiel, Drums

Will Rogers - Saxophone

David Rhoderick – Effects pedal

Jesse French – Banjo

Caitlin Morris – Violin and Microkorg

Ryan Jenkins – Drums

Jason Rankins –Drums

Taken during the finale of the last piece, *Overflow*. Photo by Jeff Stark

Shot of interface and small screen for *Building a Still*. Photo by Rob Ray.

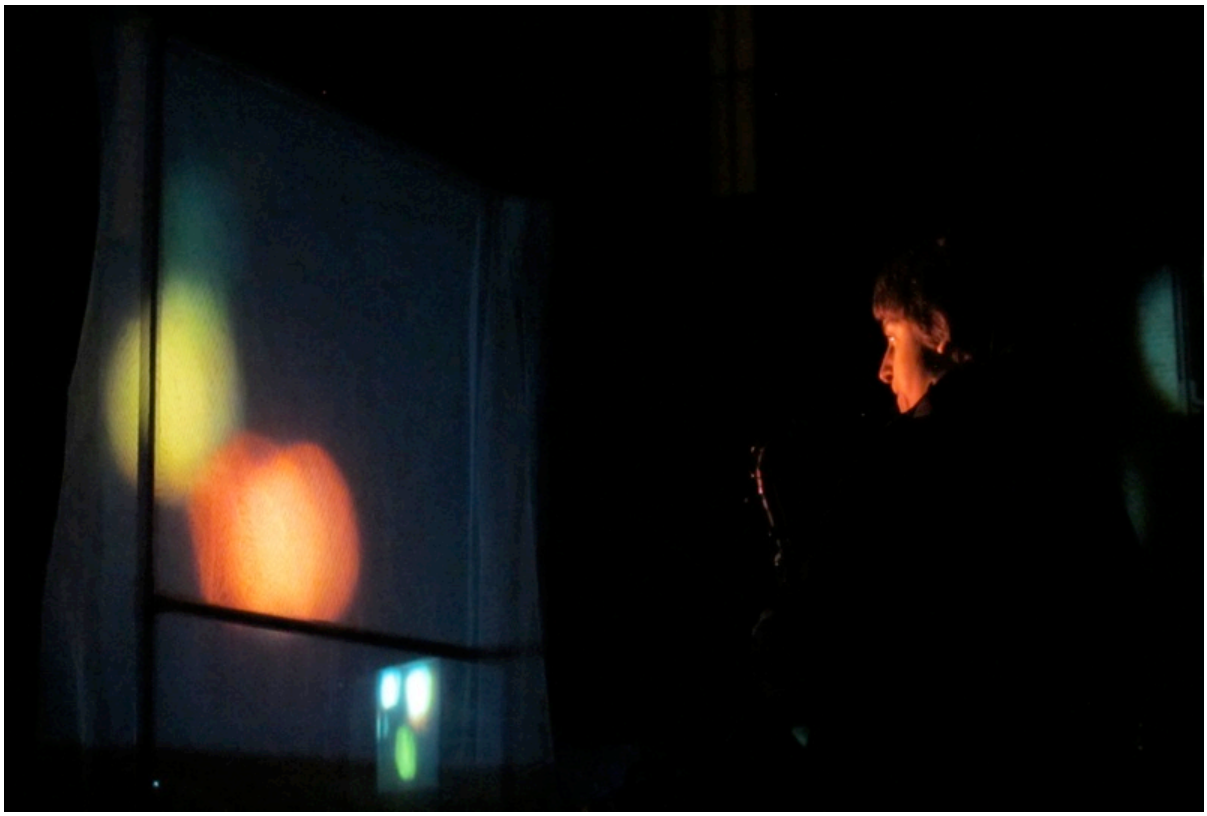


Photo of Will Rogers (saxophone) during *Trip[tych]*. Photo by Rob Ray.

The Finale. Photo by Jeff Stark.