VIDEO INSTALLATION DESIGN:

APPROPRIATION AND ASSEMBLAGE

AS PROJECTION SURFACE GEOMETRY

A Thesis

by

TIMOTHY ANDREW WEAVER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2010

Major Subject: Visualization Sciences

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Approved by:

Chair of Committee,	Karen Hillier
Committee Members,	Jeff Morris
	Vinod Srinivasan
Head of Department,	Tim McLaughlin

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ABSTRACT

Video Installation Design: Appropriation and Assemblage as Projection Surface Geometry. (May 2010)

Timothy Andrew Weaver, B.S., Mechanical Engineering., The University of Texas at Austin; B.F.A., Studio Art - Painting, University of Houston

Chair of Advisory Committee: Prof. Karen Hillier

This area of research focuses on the use of video projections in the context of fine art. Emphasis is placed on creating a unique video installation work that incorporates assemblage and appropriation as a means to develop multiple complex geometrical surfaces for video projection. The purpose of this research is to document a working process within a pre-defined set of guidelines that is influenced from my past work and the study of other artist's prior work. Research includes the demonstration of the entire working process to create this original work and recommendations for future artists who wish to work in this medium.

For Ethan

ACKNOWLEDGEMENTS

Words cannot express enough gratitude to my thesis committee chair, Prof. Karen Hillier, for not only sticking with me on this journey, but for also being a mentor, a guide, and a friend to both me and my family. I would also like to thank my other committee members, Prof. Jeff Morris and Dr. Vinod Srinivasan, who have helped me achieve personal artistic goals in the visualization program by sharing their knowledge and experiences. Thanks to Glen Vigus for being a great instructor and guide in the Department of Visualization. To my wife and son: much love and gratitude.

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1. INTRODUCTION

When we think of collage or assemblage, we think of combining images or objects to create a work of art. Two-dimensional (2-D) collage is an art form that is characterized by the appropriation of various materials on a flat surface. The three dimensional (3-D) equivalent, assemblage, emphasizes the appropriation of manufactured materials and pre-formed structures. This thesis emphasizes using assemblage to create a unique projection surface for a digital video installation. The installation design is inspired by prior artistic works that use collage, assemblage and projected video and expands upon this past work in three specific ways.

First, where examples of prior work in this medium keep projection surfaces simple with few symmetric or smooth surfaces, this thesis will incorporate multiple 3-D objects or appropriated found objects as a projection surface. Second, the projected video, which in past artistic work tended to remain as simple as the projection surface, is more complex in placement and playback given that the projections surface is more complex. Third, the video and projection surface components engage the viewer to shift perspective by possibly revealing textures, illusions or movement in the projections.

1.1 Artistic Intent

This area of research focuses on the use of video projections in the context of

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This thesis follows the style of *ACM Transactions on Graphics.*

fine art. Emphasis is placed on creating a unique video installation work that incorporates assemblage and appropriation as a means to develop multiple complex geometrical surfaces for video projection. The purpose of this research is to document a working process within a pre-defined set of guidelines that is influenced from my past work and the study of other artist's prior work. Research includes the demonstration of the entire working process to create this original work and recommendations for future artists who wish to work in this medium.

The following artistic guidelines will define the working process for this thesis research. Their function is to help this work expand on prior work by defining an artistic intention that incorporates an assemblage as a projection surface, a collage of projected video and image textures, and a satisfactory approach to help engage the viewer within the installation space. They also provide a means to evaluate the final work in an artistically and technically objective way.

First, the video installation will follow established characteristics of collage and assemblage art by being designed with readymade objects combined together and oriented for projected imagery. The video will also be a collage of imagery that will be projected onto the assemblage. Further, the work attempts to extend the work of prior artists that use video projections and collage to realize a final work of art. Artistic evaluation will attempt to contextualize the work relative to the artistic works referenced in the prior work section.

Second, the installation will be autonomous in that it will run automatically around the clock as long as there is an available power source. The installation will be

designed with a node-based design toolkit that allows for automation and control of the final state for presentation. The working process will help solve issues related to developing this framework and attempt to discover and make useful suggestions for a framework to define a multi-surfaced video installation.

Third, the orientation of the geometry and suspected issues with the video are addressed. These areas include distortion, orientation, optimization, and registration. The relationship between the surface and projected texture will be discussed and evaluated from artistic and technical perspectives. Tools and procedures to solve projection problems will be documented.

Fourth, the installation will have a component that will allow a viewer that enters within the installation space to have interaction with the installation. This will either be a direct or indirect interaction, but the underlying criterion is that the audio and video within the installation will be affected some way by a viewer having the ability to interact with the object or within the space. This might be achieved through an input device such as the Nintendo Wiimote game controller or a webcam within the viewable artwork area.

Finally, the installation will have an audio component that will accompany the video. The main criterion is that the audio provide an immersive quality to the work and that it also satisfactorily accompanies the projected video.

Evaluation of this thesis will discuss how effectively these points are dealt with in the final artistic piece. The working process to design the installation as well as any problems and epiphanies I find will be discussed and elaborated in the written thesis. I

intend this thesis to document a working process for other artists as inspiration in the development of projected art on to 3-D surfaces.

2. PRIOR VISUAL ART

2.1 Contemporary and Related Visual Art

This work attempts to draw from prior work in video projection and collage demonstrated by Tony Oursler and James Rosenquist. Tracing the relevant history of collage and video art and where these two mediums intersect, will help provide a context to critique this work.

In 1912, Pablo Picasso introduced appropriation to fine art by including imitation wood-grained wallpaper and newspaper to the surface of his cubist paintings. Picasso maintained that the purpose of collage or *papier collés* was "to give the idea that different textures can enter into a composition to become the reality in the painting that competes with the reality in nature" [Perloff 1983]. In *Guitar, Sheet Music and Glass* (1912) (Figure 1) Picasso has shown a guitar form in such a way that reveals the 2-D shape by applying simple found textures. In this case Picasso is pasting sheet music, painted papers and newsprint onto the canvas [Taylor 2004].

Fig. 1. Picasso's *Guitar, Sheet Music and Glass* [Taylor 2004]

The inclusion of prefabricated elements into art raised questions about the nature of reality and the possibilities of new realities created by the artist. Katherine Hoffman, author of *Collage: Critical Views* reiterates, "Collage may be seen as a quintessential twentieth-century art form with multiple layers and signposts pointing to a variety of forms and realities, and to the possibility or suggestion of countless new realities." Twentieth century artists were turning to new media such as photography, film, and newsprint to reflect the changing realities in a modern society. They began to look for ways to express multiple realities through collage, which provided a means to break from traditional painting [Hoffman 1989].

Evolving technology had direct repercussions on how artists used collage in their work. The photographic equivalent of collage, or photomontage, resulted from the

manipulation and combination of photographic negatives. The origin of photomontage is credited to the early 1920s German Dadaists who were among the first to use photographs as a means to compose and structure artwork. Photomontage combines the realism of photography and the pictorial techniques of collage to experimentally reintroduce reality with abstraction [Ades 1976]. Artist David Hockney uses photomontage in *My Mother, Bolton Abbey* (1982) (Figure 2) as a means to achieve a style similar to Picasso's early collage work [Hockney and Weschler 1984].

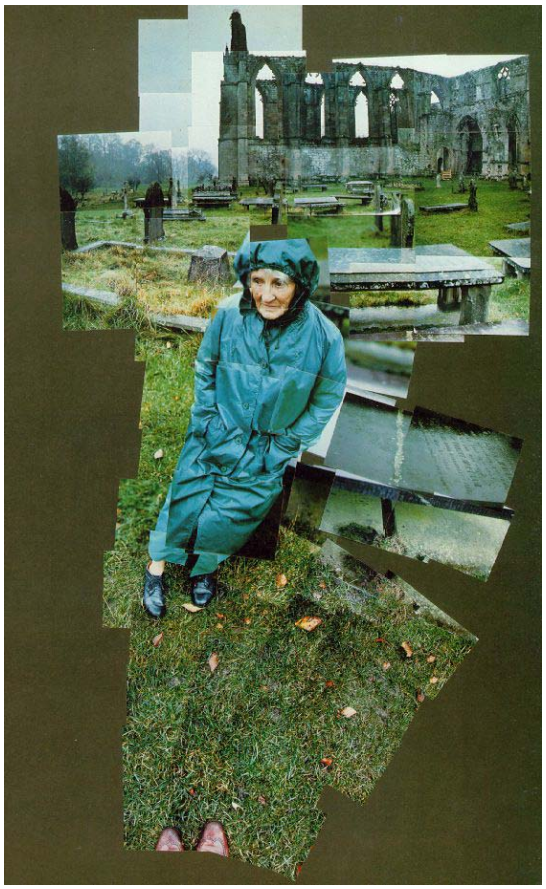

Fig. 2. David Hockney's My *Mother, Bolton Abbey* [Hockney and Weschler 1984]

Collage is often an appropriation whether it's found imagery, material, or media. Avenues for collage began to appear in sculpture usually referred to as an assemblage of appropriated material. The simplest example of appropriation of found objects is very closely associated with Marcel Duchamp's ready-made sculptures. Duchamp took objects such as sinks and toilets and appropriated them as sculpture. Duchamp played off of the juxtaposition of manufactured materials and naturally preformed structures [Seitz 1961]. In 1917, Duchamp famously appropriated a urinal as art in his work *Fountain* (Figure 3). *Fountain* was a pinnacle artwork symbolizing not only one of the first readymade appropriations but also the absurdity and "anti-art" characteristic of the Dada art movement [Kleiner et al. 2001]. Duchamp's re-contextualization of the urinal as a fountain is important to note when viewing this work.

Fig. 3. Marcel Duchamp's *Fountain* [Kleiner et al. 2001]

Collage continued to find more application in fine art as mass communication, commercialism and broadcast media themes appeared in formal exhibitions. The Pop Art movement of the 1950s and 60s was a response to the onslaught of visual imagery from print, TV, and film. The line between fine art and a magazine ad became indistinguishable. Appropriation of commercial design and the California aesthetic was made famous by such artists as Andy Warhol and David Hockney. Painters embraced a graphic aesthetic usually found in print. In 1956, British artist Richard Hamilton created a collage used as a catalog illustration and poster for the *This Is Tomorrow Exhibition* held at White Chapel Art Gallery, London (Figure 4). The collage, titled *Just What is it That Makes Today's Homes so Different, So Appealing?*, was comprised of magazine imagery found in American magazines of the period and successfully covers the basis of all modern communication systems in that information is transmitted through print, logos, television, films, photography, reproductions, telephones, and tape recorders [Brauer et al. 2001].

Fig. 4. Hamilton's poster for the 1956 *This Is Tomorrow Exhibition* [Brauer et al. 2001]

At the time Hamilton was aware of the expansion of communication media, especially in western culture. His 2-D image has a strong 3-D illusion which is clearly not concerned with representing true perspective. It is comprised of appropriated imagery constructed to appear as a seamless interior scene.

In 1964, George Fullard made extensive use of Duchamp's found object vernacular. Fullard took Duchamp's re-contextualization further by breaking apart a wooden door and intentionally placing the parts to create figural form. *Woman With*

Flowers (Figure 5) represents an assemblage built from the appropriation and manipulation of found objects [Wolfram 1975].

Fig. 5. George Fullard's *Woman With Flowers* [Wolfram 1975]

Robert Rauschenberg used appropriation to create thousands of paintings, sculptures, and mixed-media installations. In 1967, Rauschenberg combined his collage technique in *Revolver*, a motorized work that presents the viewer with rotating wheels of collage in a kaleidoscope style presentation. Rauschenberg's work (Figure 6) was unique in that it was a rare artistic presentation in which a collage of appropriated imagery was presented in motion [Hopps and Bancroft 2003].

Fig. 6. Rauschenberg's *Revolver* [Hopps and Davidson 1997]

James Rosenquist often would create a handmade collage as reference for a large scale painted work. When working on *Nomad*, Rosenquist created a sketch combined with found imagery of spaghetti as his reference image (Figure 7). The large scale painted version clearly deviated from the source collage with the addition of a sculptural element. Here Rosenquist is appropriating found objects as somewhat of an afterthought (Figure 8). Walter Hopps, former Director of The Menil Collection, characterizes Rosenquist's work in the following way: "Rosenquist has developed a broad range of methods for putting a painting together, for incorporating a collection of things into a composition in such a way that they make a kind of sense, even if it is sometimes counterpoint to what the objects imply [Hopps and Davidson 1997]."

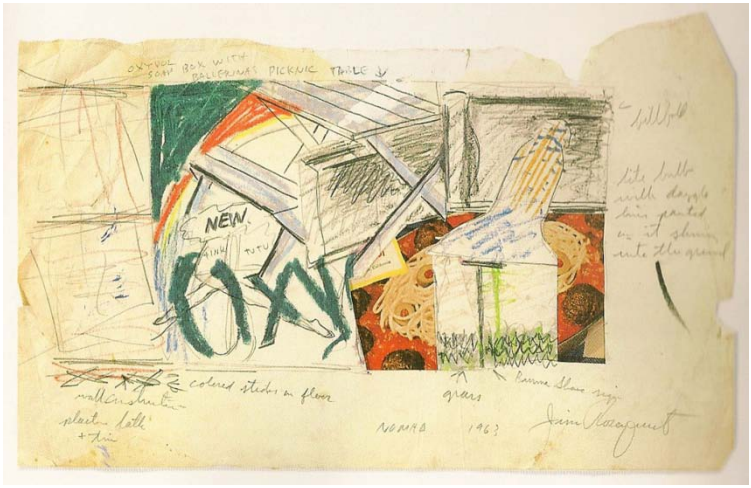

Fig. 7. Rosenquist's *Collage for Nomad* (11 in. x 17 in.) [Hopps and Bancroft 2003]

Fig. 8. Rosenquist's *Nomad* (7 1/2 ft. x 11 ft. x 2 ft.) [Hopps and Bancroft 2003]

Patrick Hughes isn't noted as a collage artist, but rather a painter of illusions. Hughes creates extruded canvases in which he paints inverted perspectives (Figure 9).

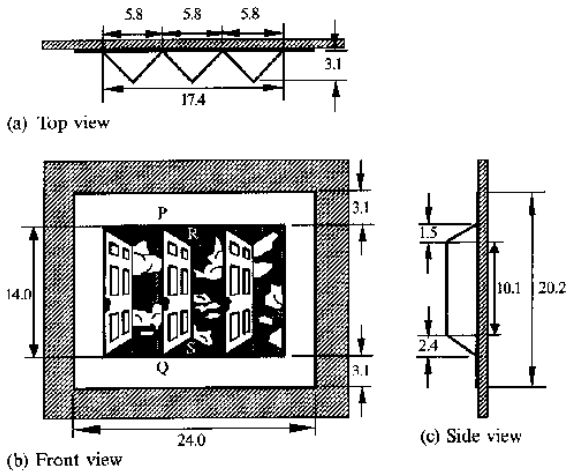

Fig. 9. Patrick Hughes' Reversepective Design Blueprints [Papathomas 2002]

Those elements that would normally be closer to the viewer are painted in the recessions of his canvas. Those elements appearing farther away are painted on the extrusions [Papathomas 2002]. The end result is a moving perspective that shifts based on the viewer's point of view (Figure 10).

Fig. 10. A reversepective showing front and side views [Whaley 2007]

Credited as the first modern artist to use video as art, Nam June Paik (1932-2006) frequently used multiple stacked television screens or CRT monitors feeding video through them to create a shape or likeness of some object,. In his work *Video Flag* (1985-1996), Paik synchronized video playback on 70 CRT monitors with four laserdisc players. The CRT monitors were arranged in a wooden housing and presented the appearance of the American flag (Figure 11) [Smithsonian 2007].

Fig. 11. Paik's *Video Flag* [Smithsonian 2007]

Where Nam June Paik clearly appropriates CRT monitors using video, Bill Viola creates total environments based on video and sound. With *The Crossing* (1996), Viola created a large intimate dual projection installation that features a man appearing on screen who is subsequently engulfed by water or fire (Figure 12). One side of the screen shows water falling from above disintegrating the man. The other side presents the same man being engulfed by flames from below. These two events occur simultaneously. Viola engages the viewer to "pick a side" or shift perspective given that it is impossible to witness both events in their entirety at the same time [Rawlings 2006].

Fig. 12. Bill Viola's *Crossing* [Rawlings 2006]

New York artist Tony Oursler uses projection on sculptural objects. Oursler stages his installations with simplified projection surface forms that come to life in a

very realistic way by adding definition, texture and detail through video projection. The forms themselves, particularly when staged in an exhibition area, are usually few in number, smooth and lacking extrusions or tactile textures (Figure 13). In *Thought Forms* (2006), Ousler is using a single video projection on a suspended foreground irregular surface and the corner of the installation space [Licht 2006].

Fig. 13. Oursler's *Thought Forms* installation [Licht 2006]

The Italian design firm dotdotdot presented a work entitled *Moving Landscape* which was conceived for CDESIGN Combine Connect Create International Design

Competition promoted by Citroën in April 2008. The designers describe *Moving Landscape* "as an installation conceptualized as a course, a journey through a landscape that transforms itself: from nature to city (Figure 14). It's a spatial and temporal path made of suggestions that accompany the visitor through material-geometrical perceptions and digital sensory experiences." The projection surfaces are mostly polygonal. Multiple projectors work together to create the illusion of a single projection. Dotdotdot ran its installation with the *vvvv Design Toolkit*, the open source node-based toolkit originally developed in Frankfurt, Germany by the media collective MESO.

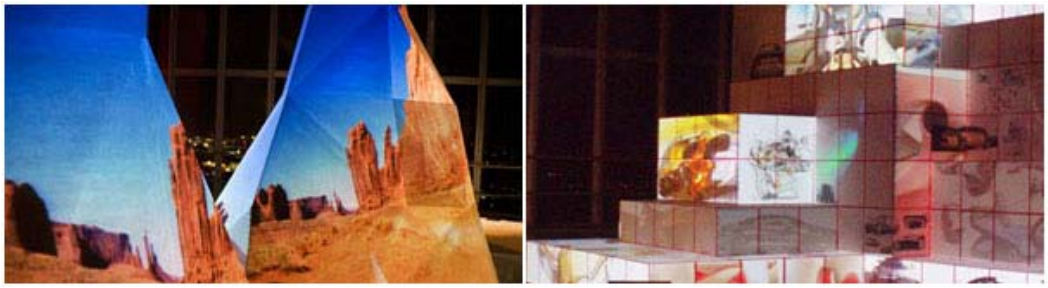

Fig. 14. *Moving Landscape* [dotdotdot 2008]

2.2 Personal Work

It is important and relevant to reflect on my prior personal work to not only familiarize the reader with where this current research is coming from, but to also establish that there is a clear and present connection between my past work and this thesis. As an artist, I've worked in collage and assemblage since 2003 as a studio art major and throughout my current graduate studies in visualization.

Using collage for sketching or laying out an image to paint was a personal emphasis. This working process was directly inspired by James Rosenquist's paintings shown in 2003 jointly at the Museum of Fine Arts Houston and at The Menil Collection. Rather than create a physical collage with images from magazines or photographs as Rosenquist did, I fashioned them in Adobe Photoshop from images I drew or discovered online or in print. Often these collages would be sized for large printouts. I would apply the printouts directly to the canvas with an acrylic medium . These printouts would either be a painted layer or a component of the final image.

One of my final paintings as an undergraduate served as a study of Rosenquist's working process. This work entitled *Collage* (2004) was an exercise in establishing a workflow for a painting. I began with designing a small collage at 16 inches by 11 inches out of found imagery and original photography (Figure 15).

Fig. 15. Collage version of *Collage* (11 in. x 16 in.)

I then built two large wooden panels measuring 8’x4’ in an effort to create a much larger version of the small collage. From past experience, I knew I could effectively add large scale printed images combined with painted areas on the wood surface. Figure 16 shows the large scale painting in progress. The blue folded paper area was hand painted. In contrast the spiral edge in the right image was a printed element applied to the surface.

Fig.16. *Collage* in progress

Through the working process I determined that the painting needed a cohesive visual element that tied the two panels together. This visual element took the form of photographs that visually documented a separate sculpture I assembled from found objects. Figure 17 shows the sculpture in the top image with the bottom row of images showing photographs originating from the sculpture.

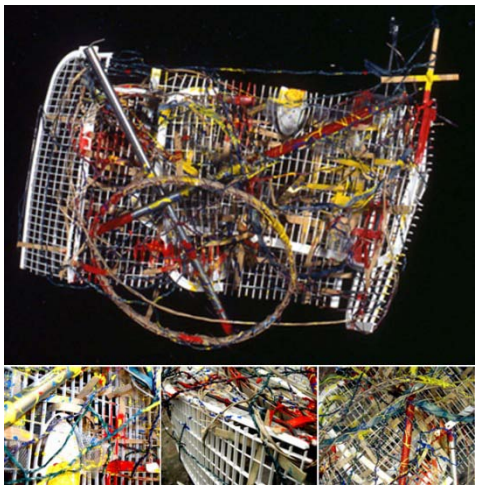

Fig. 17. Sculpture for *Collage*

The sculpture, like the small scale collage, became another source that would influence the final large scale version (Figure 18). Similar to Rosenquist's *Nomad*, the end result had evolved away from precisely representing the original source collage.

Fig. 18. *Collage* (8 ft. x 12 ft.)

In 2006, I continued my work in collage by moving into video-based collage. In the three minute work entitled *In Retrospect*, video, rotoscoped images , photography, drawing and 3-D renders were collaged together to create a provocative video work set to an original audio track (Figure 19). This was a seminal work in that it was a video painting and my transition into video-based work.

Fig. 19. Video frames from *In Retrospect*

Simultaneously in 2006, I also began a photomontage approach similar to David Hockney combined with a surface designed for Patrick Hughes's Reversepectives. *Toy Store* (2006) is an abstracted reverse perspective that, due to the construction of the surface, created the illusion that the perspective of the image would change depending on the perspective of the viewer (Figure 20). This was a direct precursor to the notion of projected image on a 3-D surface in that the photos were applied to an irregular surface or a surface that wasn't flat, but shaped to create the illusion.

Fig. 20. *Toy Store*

In the Fall of 2007, I was a technical artist collaborating with artist Paolo Piscitelli. Piscitelli's work, a live sculptural performance entitled *New World Order,* reworked a flat global map layout of colored clay into a single abstracted multicolored organic shape (Figure 21). Working collaboratively with Piscitelli's team of artists, I designed a patch in Max/MSP and Jitter, taking a live camera feed of the performance and analyzing individual pixel data on every scan line of the image. Due to Piscetelli's physical working of the clay and changing color within the image, the patch provided changing data that an audio artist used to create an aural performance mimicking the repetitive gestures and introspective trance of Piscitelli. This experience was a gateway for me to explore future patch-driven video art.

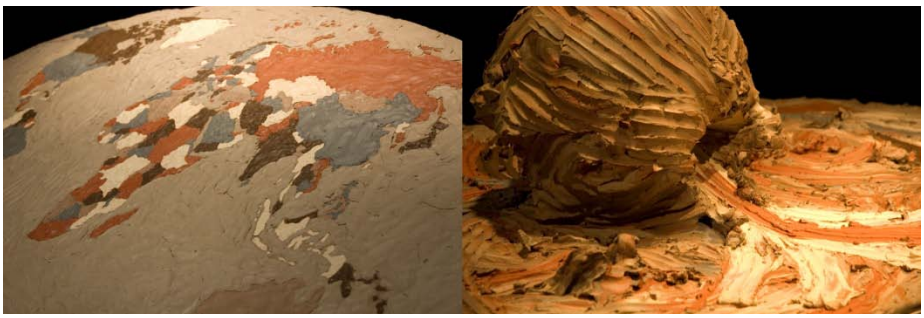

Fig. 21. *New World Order* by Paolo Piscitelli

3. ARTISTIC PROCESS

3.1 Introduction

This installation is the culmination of prior work which existed on a much smaller scale. Research began with a series of projected works focused onto 3-D surfaces using the vvvv design toolkit (Figure 22). These mini works were an initial study into the exploration of a working process to achieve video projection onto 3-D shapes. (For the sake of clarification I will make a distinction between the terms 3-D shapes and 3-D models. The word shapes will refer to the actual real world object. The word model will refer to the virtual representation or model of the shape). The actual 3-D shapes in these studies evolved from symmetric to asymmetric. These studies ran on the vvvv design toolkit developed by the MESO group. vvvv provided the framework to play and place the projected textures and audio within an installation space.

Fig. 22. Studies on video projections

These initial studies provided me enough information to set additional parameters complementing my artistic intent discussed in Section 1.2.

First, I decided that scale needed to be increased in this new artwork. All studies into this process established a very small scale with objects no larger than 8 inches in height. This new iteration needed to be human scale or larger and function within a large space. In my personal prior work, creating large scale work is my preferred method. I also felt that large work tended to include the viewer in the experience more than small scale work. Also, a larger surface meant that when viewing the work, it would be less likely that viewers could completely obstruct the projection. The smaller scale projection studies used projectors that were usually within 6 feet of the projection surface. When viewing, it is practically impossible to avoid obstructing the projection.

Second, the projection surfaces, given their imagined complexity, would need to be realized with flat 2-D planes. In my studies, I would model 3-D shapes to correct proportions and then use that model in vvvv as the object in space. I discovered that achieving a matched projected image that is virtually represented with a 3-D model proved labor intensive and ultimately unnecessary. It took tremendous time to model the object, especially if it were complex. The difference between a 3-D model versus a flat plane is represented in Figure 23. The left image represents the volume with a semi-transparent 3-D model. The same space can accurately by represented with the plane shown in the right image.

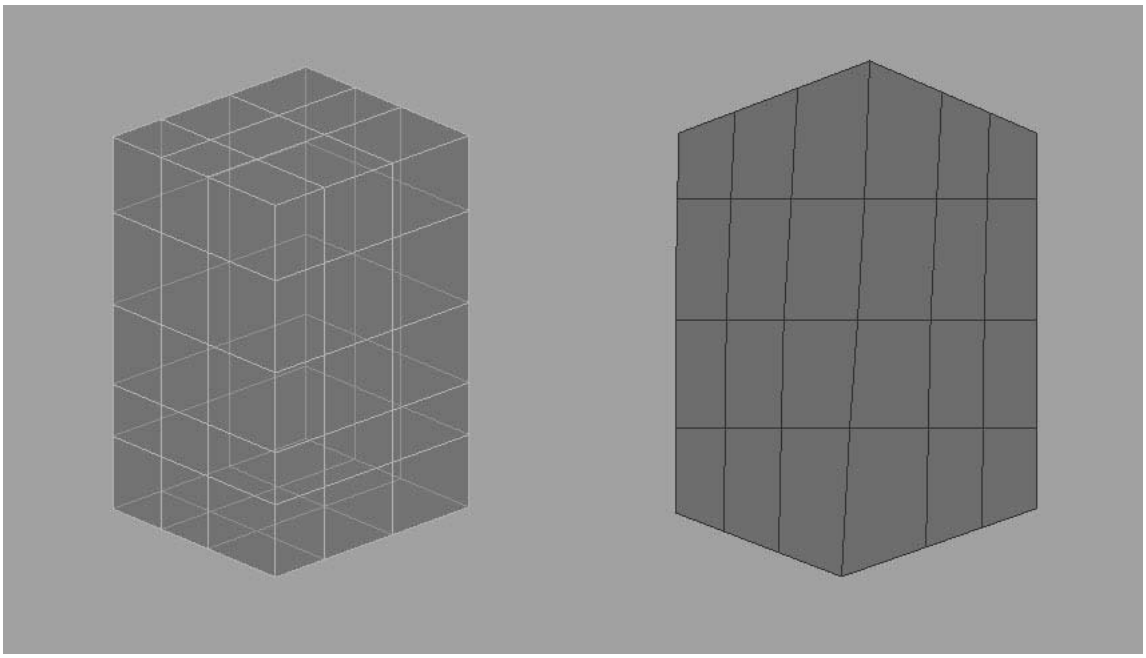

Fig. 23. Comparison of 3-D model versus a 2-D plane

Likewise, the placement of that model in 3-D virtual space was too inexact and time consuming as well. I realized that the projected image only needed to be the size of the area it covered. I did notice that using actual 3-D models corrected for image distortion much better than a 2-D plane, but overall, the final result using 2-D planes distorted images and video enough to not only question what the object was, but also question the image or video that was used for the projection. I liked this unintended effect of how the viewer feels compelled to question the reality of the object. I felt this worked quite well to help engage the viewer, a requirement established in Section 1. I believed that this should be pushed in the final version of this work allowing for instances where the projection combined with the object help to question the reality.

Any approach using 3-D objects proved ideal for fewer shapes and would be considered in future projects.

Third, the installation would be projecting a combination of video and photographic textures. In these studies I discovered that I had limitations on processing power and couldn't have an excessive number of videos playing at one time. I also knew that photographic textures could be just as impactful as a small video loop. For the sake of efficiency, projected images and video needed to complement each other. Being limited to only video projections proved creatively restricting, especially given that prior work with these projection studies established that the *vvvv Design Toolkit* allowed me to selectively animate lights over specific objects and their textures. I could still provide some sense of movement on a still texture by animating the lights in the virtual scene. This virtual scene is then projected back onto the real world assemblage.

Fourth, I decided that viewer interactivity was completely unnecessary to the work. From past studies that were publically viewed, the viewer wanted to move around the space and see what was projected from within or from behind. Since I was not limited to having one projector, but rather two, the idea of projecting at multiple angles onto a shape to engage the viewer seemed "interactive" enough. This demonstrated to me that using any kind of external user input as a means to interact directly with the art was unnecessary and ultimately would seem contrived. The point I realized from these studies, was to create a visually meaningful work within a context of my past work that insists that the viewer shift perspective for unique viewing experiences at different

perspectives. Interactivity could therefore be considered “indirect” in that the work itself must use its imagery and structure to engage the viewer.

Therefore, I elected to provide only me, the artist, with interactivity since I decide where to place video and images. In the initial studies, I added the ability to use a handheld device, in this case a Nintendo Wiimote gaming control, to have quick access to each individual shape of the installation. This component for manipulation would be carried over to the final work as either a means for testing textures and video quickly, without having to mouse around inside the patch in a search for a specific object. It also provides a means to activate the installation video and audio quickly without having to interact with the patch window. I hoped that the initial studies would inspire some means of viewer interactivity that was cohesive with wanting to present a personal visual work, but couldn’t see how it could contribute to the viewer’s experience without being intrusive.

Consequently, as demonstrated by these addendums to the goals laid out in this thesis, the overall process is iterative with it often necessary to revisit some part of the process to solve visual issues of content, functionality, appearance, or projection placement. Overall the development of this installation began with an idea for a projection structure, the building of the projection surface, the development of the public installation space and projector placement, the configuration and programming of the vvvv design toolkit for projected textures and audio, and the development of the projected textures and audio. Again, to achieve an artistic result, I felt it necessary to

often go back and reconsider certain portions of the work and make adjustments during the working process.

3.2 Developing the Projection Surface

The projection surface, is comprised of 3-D shapes and is the surface area that is projected onto. The projection surface structure is a supporting frame holding the projection surface. Without projected video or image textures, the projection surface reads as a relief sculpture that is designed using an assemblage of found objects. What would be the final appearance of the projection surface was initially unplanned, but the overall structural support for the projection surface began with an initial idea based on a visual concept demonstrated in Patrick Hughes' Reversepectives. Equally important was the notion that at some point this projection surface would have to occupy a public space with stationary projectors. This was evident from past work shown publically where projection registration, or the act of lining up a projected image to a specific projection surface, was something that changes when the work and equipment is moved. For any large scale projection surface to be adequately explored, I knew that it needed to be installed in a location where both the projectors and projection surface would be totally stationary. I also knew that the work needed to be in a space that could be exhibited publically. These factors helped inspire a projection surface that grew from the artistic working process.

From prior work I knew that I wanted to develop a human-scale or life size projection surface that would again utilize two projectors while still having some

freedom with modularity as the work progressed. I also knew that orientation of the projection surface can make a significant impact on how the projected light will conform. These ideas led me to develop a structural design that was modular and conducive to maximum light coverage, while still giving me some choices to work with appropriated objects in such a way to engage the viewer within the installation space.

To explain the idea of maximum light coverage, consider a simple box. Figure 24 shows the box oriented such that 2 sides, the top and side are exposed directly to the projector. Now if the box is rotated 45 degrees light coverage will now span 2 sides and the top of the box. This led me to the idea that if I create a structure that emphasizes this 2 sides and top exposure, then I would have an easier time of achieving maximum light coverage.

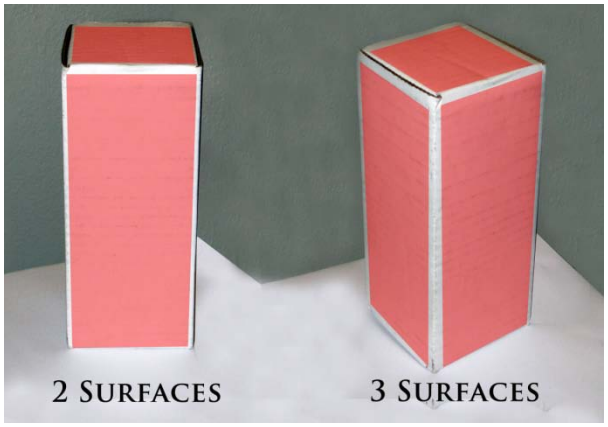

Fig. 24. Maximum light coverage based on box orientation

This design idea is also similar to what Patrick Hughes uses in his paintings that demonstrates a shifting visual experience from one perspective to the next. Where

Hughes somewhat uses this design to create the illusion of a moving perspective, my intention was to use this design to create a different experience from one angle of view to another with little intention on my part to re-explore the illusionistic capabilities. From Hughes design, I could see that if I took the box idea, cut the box vertically downward starting from the top side diagonal, I would have a very similar shape. Hughes design moves the top and bottom triangle at specific angles inward to establish the moving perspective visual illusion (Figure 25 left).

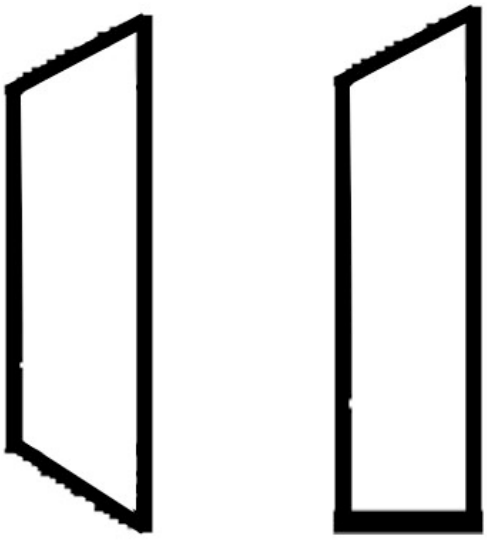

Fig. 25. Side view comparing Hughes's extrusion (left) to mine (right)

This same thinking was applied to my design idea where I would take the top portion of my triangle and slant it downward (Figure 25 right). I believed this surface would be seen much easier by the viewer while at the same time achieve maximum light coverage. I sketched a design that would use 6 separate triangular extrusions. Each of

these would have appropriated objects located on one side of the extrusion, while the other side remained flat, much like Hughes' design (Figure 26).

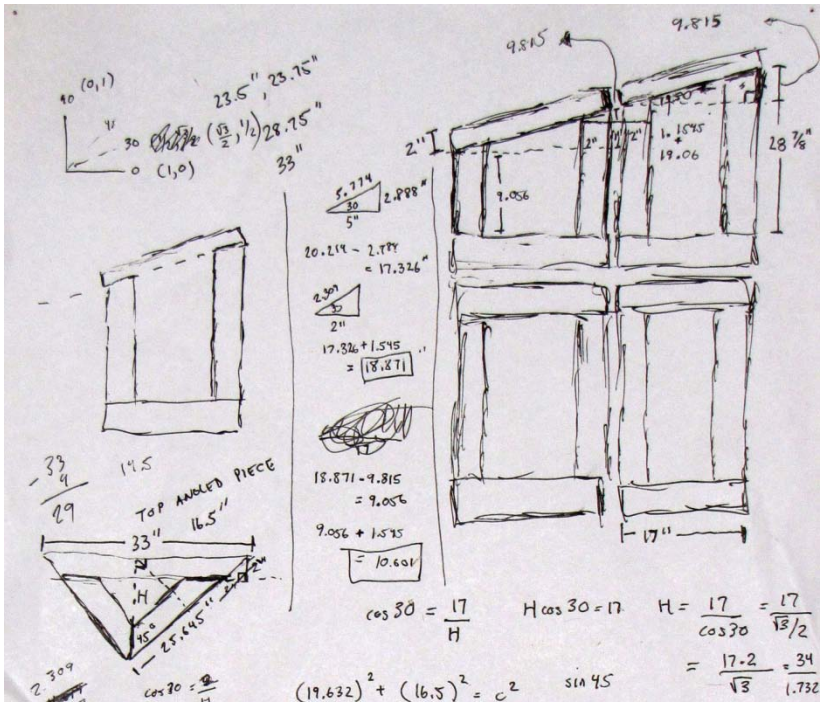

Fig. 26. Sketch for the construction of supporting frame

Two of these extrusions could be stacked one on top of the other, with the top extrusion being the structure that has a tilted top triangle angled thirty degrees downward. Three of the triangular extrusions would have flat tops and three would have the slanted downward tops. Moving and orienting these structures could yield different results and it was apparent to me that how I place and stack these structures would have a significant impact on the projection surface design. Also evident was making the work

portable. I knew that providing modularity might also allow me to break the work apart for future travelling to other exhibition venues.

Fig. 27. Constructed supporting frame showing modularity

With Hughes and portability in mind, and some unanswered questions as to where this installation would find a large public presentation space, I started with this triptych structure approach shown on the right of Figure 27. I embraced the idea that from a viewpoint on the left side, the viewer would have to confront the appropriated object side across the 3 structures. A viewpoint from the right side presents a flat video that was meant to be a cohesive visual spread across the three structures. I was also thinking ahead about how I would apply imagery to this surface. I believed that I could explore an artistic idea that embraced some narrative between the object and the video that was projected on the opposing side. Because this idea wasn't completely realized at this stage, I decided that I would let the final projection surface define a direction for

projected imagery. Figure 28 shows the assemblage side represented with red and the video side in white.

Fig. 28. Supporting frame showing modularity

With very little studio working space at this stage, I focused on the top-left portion of the projection surface as an initial test. All assemblage or found-objects were fastened to the supporting structure with screws, glue and in some cases white tape. My approach was to take flat assemblage and apply it to the structure first and then apply the more irregular shapes. I kept the scale relatively consistent, but was very interested in breaking away from flat rectilinear shapes. The end result was a layering of assemblage that provided both structure and projection surface. I then painted the final structure with a combination of white spray paint and latex wall paint (Figure 29).

Fig. 29. Initial testing surface

Overall, I did not apply the found objects with an eye towards making any kind of statement or narrative, however that doesn't mean that there wasn't clear intent on my part with regards to the object placement. Design considerations such as balance, implied line and focal point were very much on my mind. I attempted to create a sense of balance with the circular metal plates by placing them at opposing ends.. Continuity, which is the creation of an implied line within the work, was established with the upper left plate, circular dome, the mannequin breasts, and the CD rack. An implied line is also prevalent in the racetrack emanating from the dome. I also felt the need to have a focal point provided by the biomorphic quality of the mannequin breasts.

I tested this surface further by setting up the projectors perpendicular to either side of the extrusion triangle. Using the vvvv patch I designed in early tests, I began the

overall process of registering a 3-D or 2-D mesh to each of the objects on the projection surface. Figure 30 shows the work with registration textures.

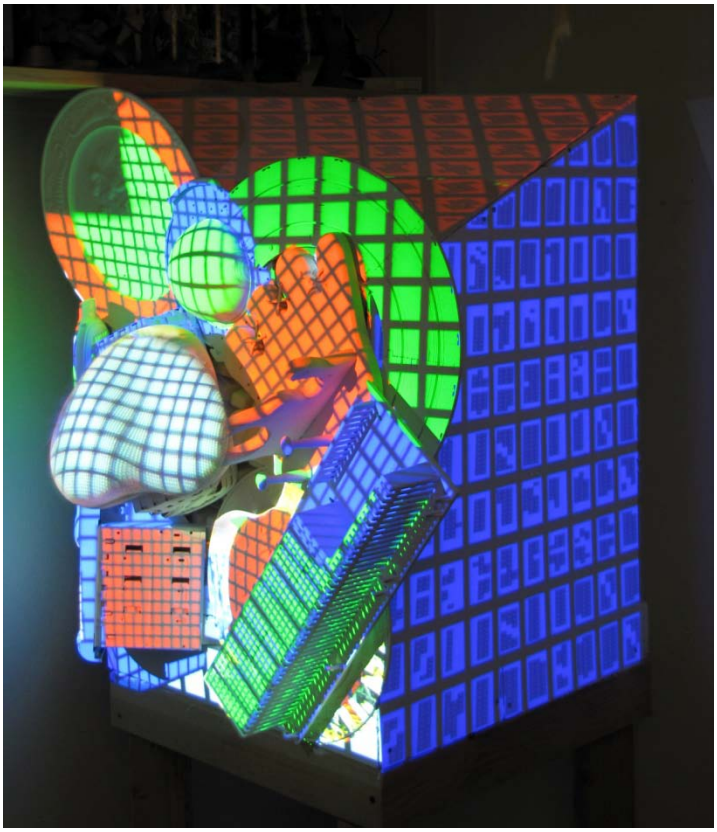

Fig. 30. Initial testing surface with projected textures

Using available video clips and image textures I could see some clear issues with the projection surface. First, there were going to be shadows resulting from overlapping assemblage. Second, the projection surface from my point of view needed to be what I ultimately termed as “light tight.” Not only am I providing a projection surface, but I am also in a way creating a surface that bends and moves the light for the sake of

presenting a visual work. I made the artistic decision to fill gaps and provide some interior illumination to fill in the dark areas of the projection surface.

It has already been declared that the installation space is a necessary component to completing this work in some final form. First it was understood that the space needed to provide a sizable area where I could develop the surface to my desired human scale proportion. The space also needed to be accessed by the public. From past experience, it has always been difficult to move even a small scale multiple projection-surface work to a new venue. Though the shapes and the content would be set, projector positions and projection surface orientation inevitably changes. At best, I could duplicate the conditions from one venue to the next, but there is always a need to re-register projections to the projection surface requiring significant time. Knowing that the scale would be larger meant that it was even more important to find a location that provides some means to lockdown projector positions and surfaces.

I found a space in downtown Bryan, Texas which provided me an area to set the final work into motion towards completion. The layout of the space available suggested that the initial plan to create a work that utilizes the triptych approach was in fact a safe assumption. Had the space been such that there were no available walls, the projection surface structure might have taken another direction. Figure 31 shows the layout of the available space and the planned projector positions.

Also very crucial was the need to install stationary projectors that could not be moved or altered during the course of completing this work. Prior work has always relied on projectors that could be portable which also meant that the projectors

themselves were never fully tamper proof. Two foot galvanized poles were installed to hold the ceiling-mounted projectors. Two 100 ft. VGA cables ran from the projectors to the computer running the installation.

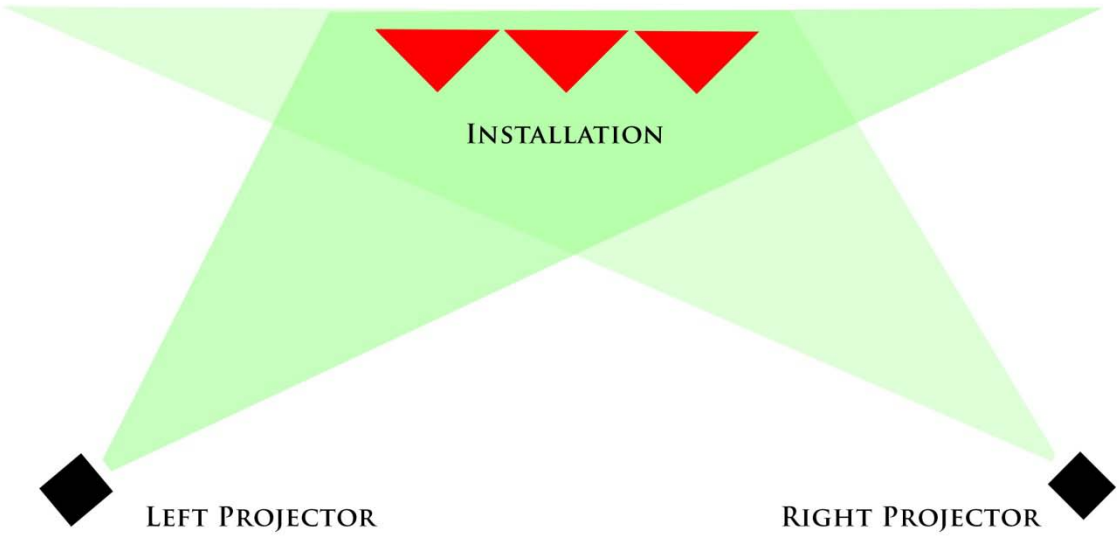

Fig. 31. Installation space layout top view

Once I was moved into the space, I began the artistic process of combining the assemblage into a form very similar to how I did the initial first test.

As an artist, I'm constantly evaluating my work during the working process. This evaluation dictates the personal decisions I make in realizing any final artistic work. Again, as previously stated there was no actual sketch of the intentionality of this particular work other than it was a work which grew out of the process itself by the assemblage of found objects. The projection surface was evaluated before the process of applying video and image textures as projections. While design characteristics were

considered in building the surface, there were certain elements that I purposely assembled together to suggest a meaning

The upper left side of the projection surface was part of the first projection test. This component had the breast pad component that visually was a curved surface among more symmetric and rectilinear shapes.

Fig. 32. Left view of the installation surface representing the self-portrait

From this breast area I added the mannequin torso, the water jug inside the torso and the personal portrait which I sculpted out of silicone from a mold made of my face. I rearranged the racetrack piece to create a halo around my head area, a common of holy figures characteristic in Renaissance and Byzantine painting. The rest of the section was

filled in with available materials in an effort to complete the entire left structured section. Figure 32 represents a self-portrait alluding to personal gender issues, a broken self-image, and a suggested inner core represented by the jug. As with art in general, most meaning is usually reserved for the viewer, but as the artist, this was how I was attempting to develop this section of the work.

The middle section shown in Figure 33 has a dominant focal point with the car front-end. Additional assemblage was added to fill in the middle section, but mainly the toy racetrack components, the PVC pipe, and plastic lawn chairs were added to provide a direct visual connection to the left side. The car front end bumper had holes where the lights and radiator would normally be that were filled in with white foam board. This allowed me to create the illusion that there could be something behind the front-end that would also be viewable by shifting your personal viewing angle. Primarily, the middle section was a means to increase the scale, which was characteristic of the left side. Finding the car front-end was a huge moment for me. Knowing that James Rosenquist often referenced cars in his paintings, using the car front-end was necessary for me. It was the perfect object to use as a focal point for the central piece and helped achieve the change in scale I was looking for.

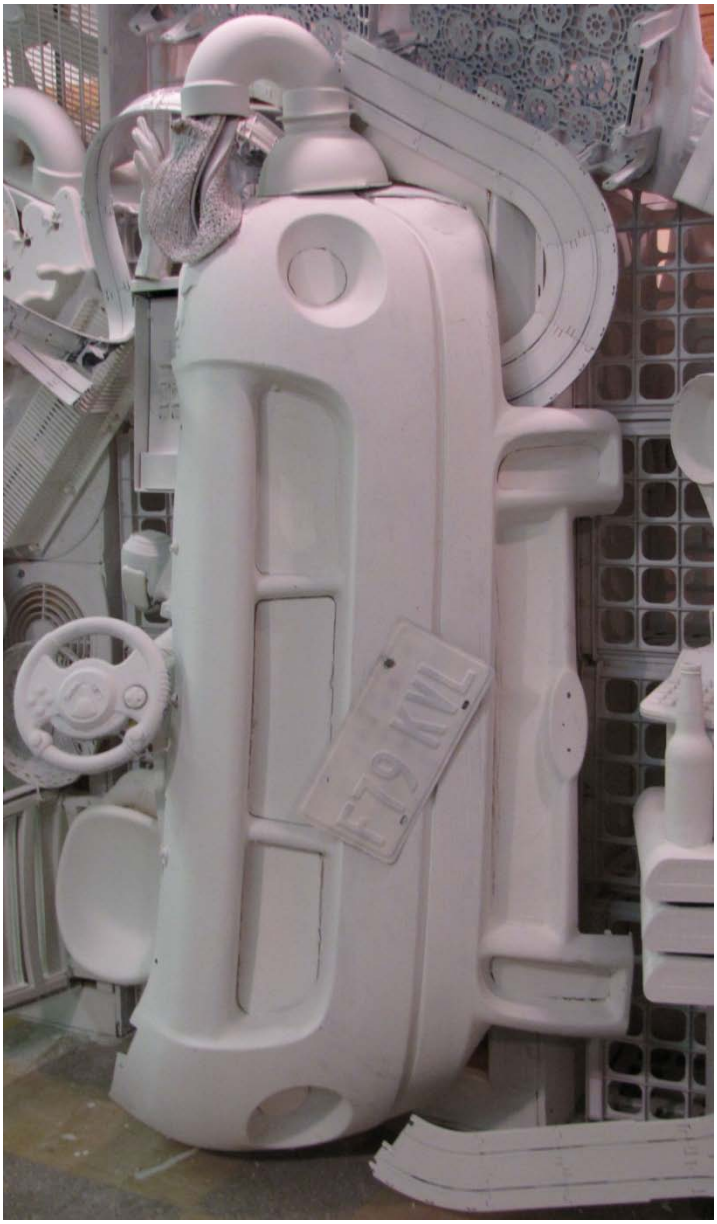

Fig. 33. Middle section of the installation surface representing the car bumper

The right side was meant to be a balancing component to the left side. Given the difference in scale between the middle sections with the car bumper, it was an instinctive approach that I balance this with a right side that was similar in scale to the left side. I

also instinctively wanted to make a more textured right side that had more assemblage than the other two sections. At this point, the most notable area on this section is what I refer to as the “coffee table section” described with a beer bottle, a picture frame, a radio and a hard drive case. This area shown in Figure 34 was meant to suggest a habitable area that exists with the human self-portrait form found on the far left. Toys, computer parts and repeating bottles suggest consumption. Again, racetracks, pipes and chairs were unifying elements tying everything together.

Fig. 34. Right section representing more projection surface objects

Once I had three separate sections or a triptych as planned, I evaluated how these three components would work together as a projection surface. This configuration presented new challenges (Figure 35).

Fig. 35. Triptych configuration

A viewing from the left clearly yielded a much more interesting design than the flat surfaces found on the right. The right side also had significant overlapping from shapes attached to the left side that would need to be addressed in the right side projection. At this point I decided to bring the three assemblages together and orient them forward facing. It was soon evident that projector coverage would still be required from both sides since certain extrusions had areas exposed to solely one projector or the other. This ultimately presents a new challenge in dealing with overlapping projectors and newfound empty areas in the design of the sculpture. More assemblage in the form of plastic crates, toy racetrack parts, PVC pipes and white bed sheets were added to fill

in the voids. Like before in the initial test, the sculpture was painted completely white with a combination of latex and spray paint.

Combining these separate sections was an aesthetic decision inasmuch as a technical one. Overall, this design still allowed me to consider the shifting perspective of the viewer as a component in that certain areas of the sculpture are revealed from differing vantage points. Unifying assemblage was added along the way, but it was the additional assemblage that was attached across the top of the projection surface sections that revealed a shape. Making it a point to step back and look at what was happening with the assembly, I was acutely aware that the structure now read as house with the front end of the car as an abstracted entry way. The left side was clearly biographical with my likeness applied to the female form. The right side was designed to balance out the left side while taking the house suggestion further by adding Styrofoam roofing shingles. I had created a work that had a very domestic theme to it. Though my intention was never clearly defined to be this way, it was something that grew out of the overall working process and proved to be a "eureka" moment. This helped suggest a direction of the applied textures. This process would continue to morph while working on the virtual version of the installation and the addition of projected surface textures. The completed projection surface I shown in Figure 36.

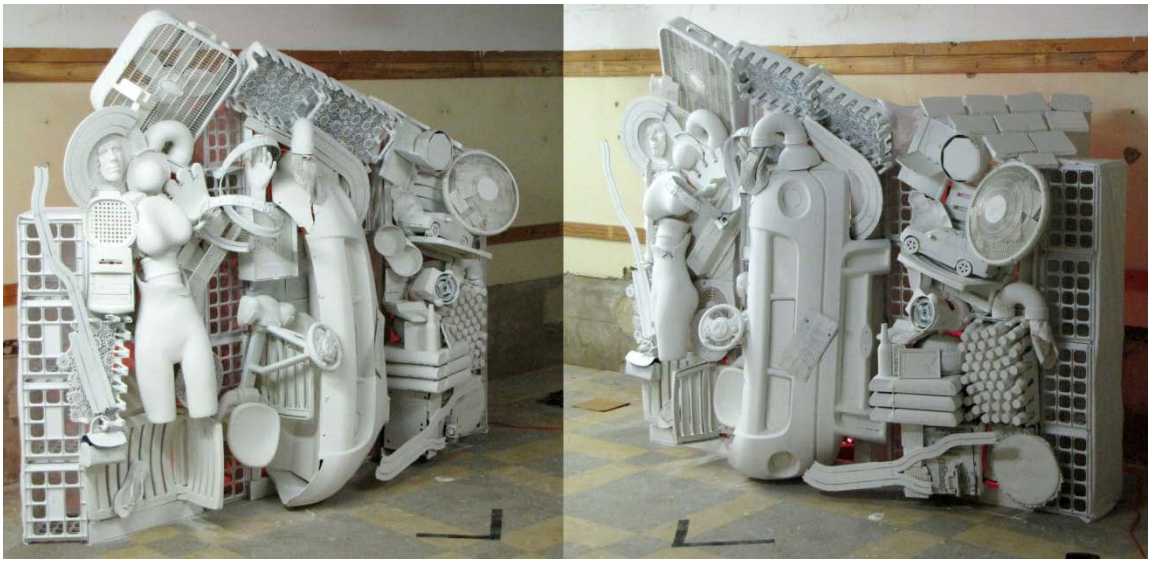

Fig. 36. Final projection surface before projected textures

The space behind the installation and the structural frame also allows for space to conceal the computer and attached speakers. As a light coverage test, I used standard "calibration grids" that are provided by the projector to see just how much light coverage the sculpture was receiving. This test revealed that in certain areas harsh shadows could be a problem from extruding objects. In most instances, the other projector compensates with coverage and shadows were minimally obtrusive. For added light fill, I added colored light strands behind the installation structure. The colored mixture created a reddish brown hue which I suspected would blend very well with whatever was projected onto the surface (Figure 37). I also understood that certain emphasis areas of the sculpture surface could inevitably be focal points that draw attention away from the fact that these back surfaces weren't as prominent.

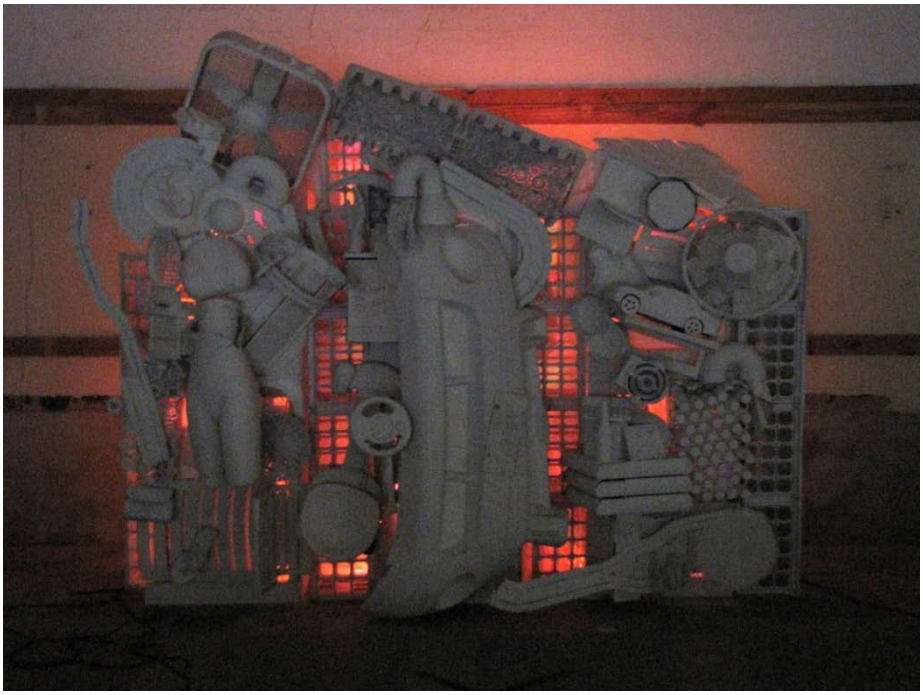

Fig. 37. Interior illumination of projection surface

Now that the surface was determined, I needed to represent this projection surface in the *vvvv Design Toolkit* so that textures and video can be projected. Like the surface, the virtual installation was derived from experiences with the small scale studies completed during research.

3.3 Building the Installation in the *vvvv Design Toolkit*

The *vvvv Design Toolkit* has some very useful tools for video and installation artists. It is a node-based toolkit that functions by connecting "nodes" together into a "patch." Each node represents a function or object that performs a certain way. Certain function nodes are already built into the toolkit. Common examples of these could be a

"random" node that on execution gives a random number based on specific parameters or a "+" node that returns the addition of two inputs.

In simple terms, the real world setup, meaning the sculpture with each object, the projectors, and the space they occupy are recreated virtually in the vvvv design toolkit. Each projector is represented as a projector node. The projector node can be placed in a specific location in space. Given that I'm trying to project what the projector node sees in virtual space, I needed to create a render node for each projector. That is, where I decide to place my projector in virtual space, I will see what that virtual projector sees since it is essentially acting like a camera. This is the image that the real world projector will cast onto the sculpture. Additionally, each surface or object must be recreated virtually in space. This required me to create my own "geometry" node for each object by taking many of *vvvv's* built in nodes and connecting them together. I then define the inputs and outputs to that node and save it as a "subpatch." The subpatch is imported into my main patch and can then be accessed and reworked within the confines of the main patch itself. The use of subpatches is an important consideration in this toolkit in that it allows for easier and faster access for adjustments. The tendency is to build everything in one window. With subpatches multiple windows are nested into each other. The best way to illustrate this is to think in terms of moving into the patch itself as opposed to across it.

The following is a simple patch showing two geometrical components to the car front-end (Figure 38). These are 2 out of the approximately 70 shapes that make up the projections in the installation.

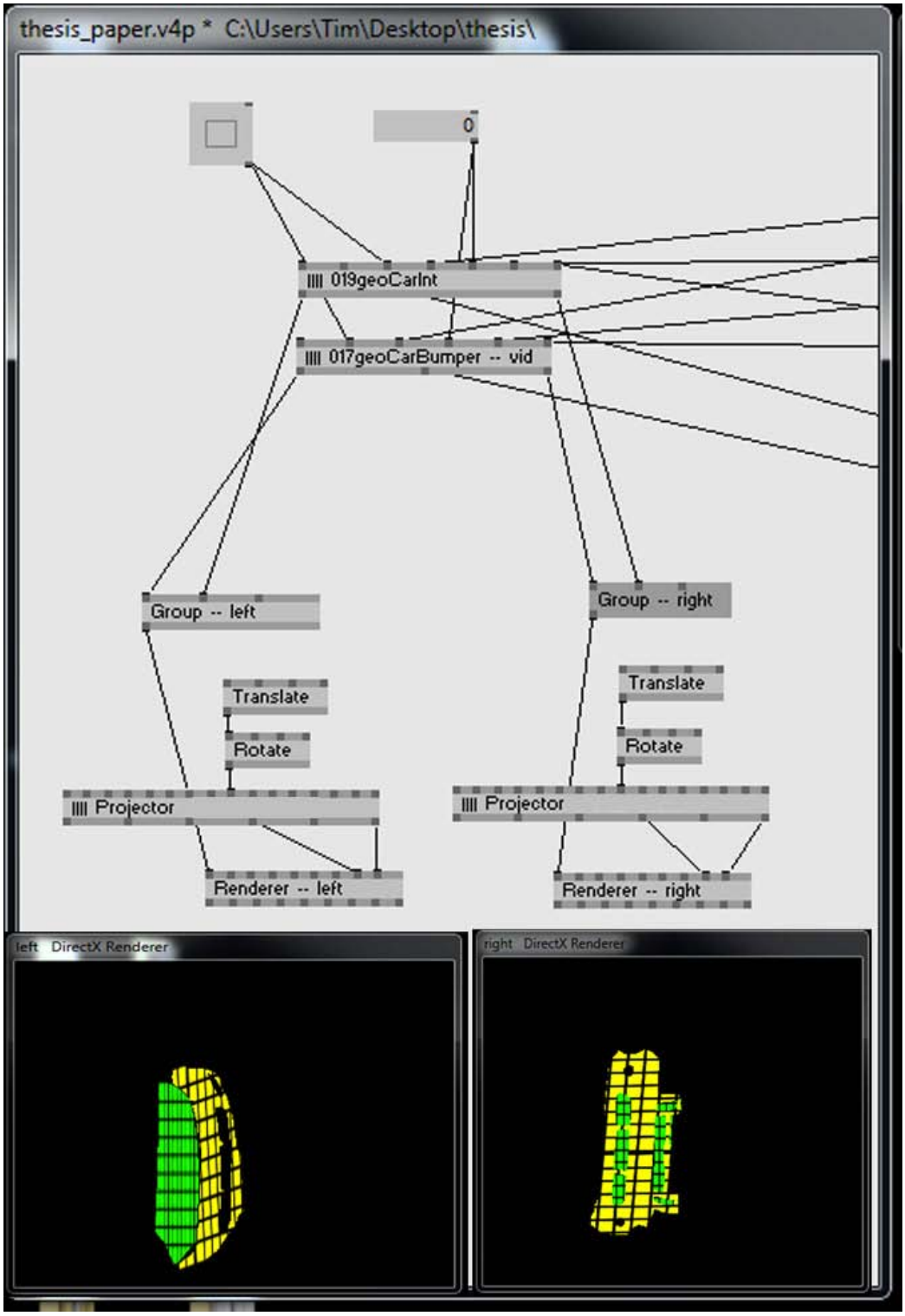

Fig. 38. Root patch representing the front-end of the car

Each projector node has adjustable characteristics that can aid in matching the projectors to the real world space including lens characteristics, projector geometry and projector placement using translation, rotation, and scale if necessary. The projector node is a subpatch created with the built in vvvv nodes. Matching the projectors to the real world projectors proved to be a challenging experience and will be discussed in greater detail in the next section. The main consideration here is that this projector node represents the camera that sees the virtual installation. The geometry is grouped according to left view and right view and is then attached to a renderer for the right projector and a renderer for the left projector. The projector node is also attached to the Renderer node in that it tells the Renderer node that this is a projector that exists in 3-D space. The Renderer node is visually represented as a window that goes full screen in the computer's display window. This is the projected image on the installation. In this instance, the projected resolution is set at 1280x1024 pixels for full screen mode. It's important to note that vvvv is equipped with multiple Renderer nodes for different applications. In this case, I'm using the EX9 Render node which is a DirectX based renderer. This means that the geometrical models are DirectX models/meshes.

The node in Figure 38 called "017geoCarBumper" is a subpatch that represents the geometry and the textures attached to the Renderer node. Further exploration of the subpatch reveals the structure comprised of a PhongPoint shader node, an xMesh node, and video and image texture attachments (Figure 39).

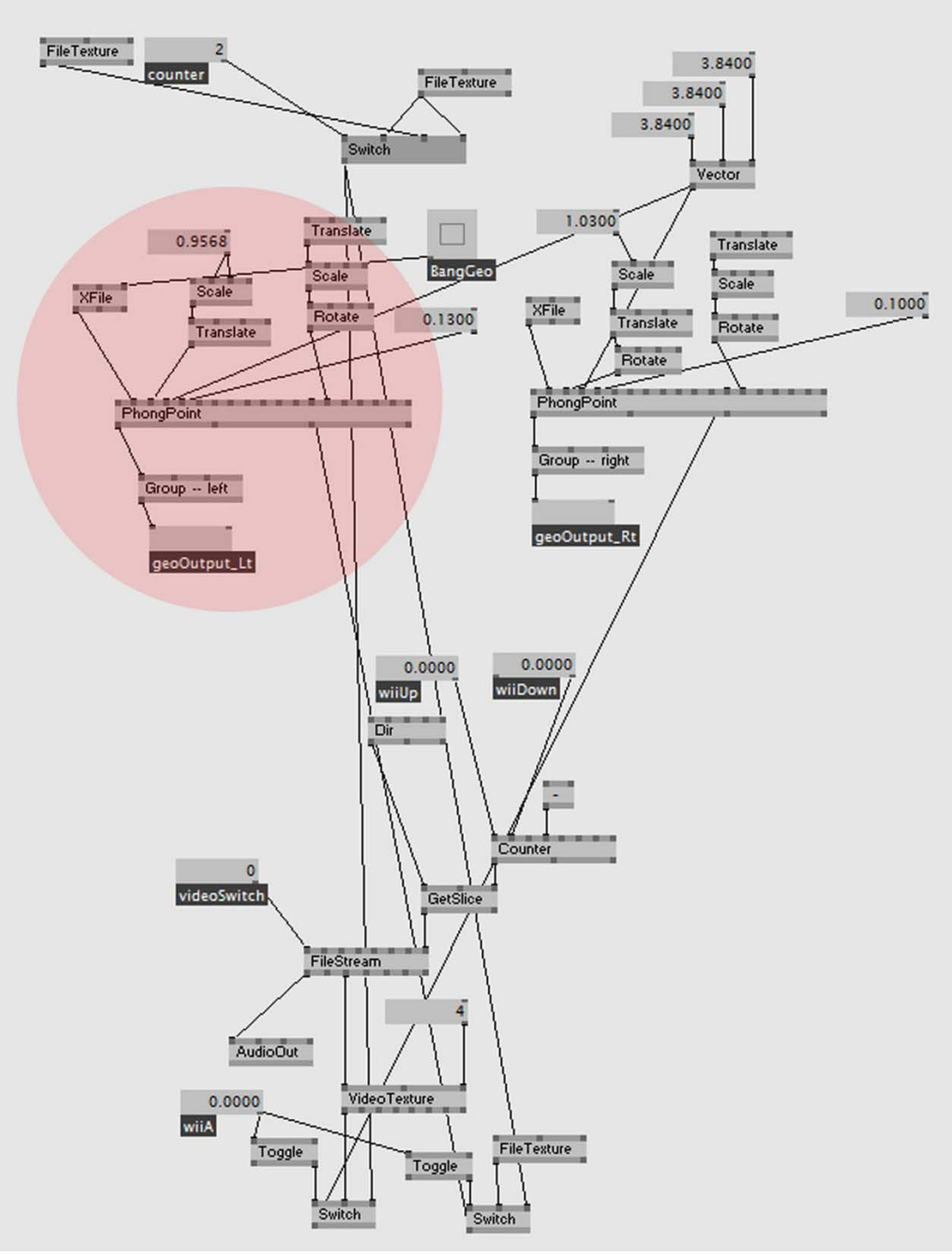

Fig. 39. Subpatch *017geoCarBumper* highlighting the network that defines geometry seen in the left render window

The PhongPoint node is the shader itself. Attached to this node is an xFile node which is the DirectX model representing the object. The DirectX model is originally created in Autodesk Maya as an OBJ file. It is then necessary to convert this file to a DirectX file for use in vvvv. This particular version of Maya did not have Direct X export, otherwise that would certainly be the preferred way. For conversion I used Accutrans3D. This software also allowed me to automatically texture map the surface and define UV coordinates. The xFile node allows the user to import the mesh and define the texture mapping stored in a BMP image file.

Transforms can also be applied to PhongPoint node to adjust position and texture placement. Additionally, the video or image texture is applied to this node using either the VideoTexture or FileTexture node. Additional aesthetic properties are also available. For example a point light is a component to this node providing some lighting adjustment. Ambient, diffuse, and specular color can be adjusted here as well.

The FileTexture node simply attaches an image to the shader itself. The VideoTexture node provides standard video controls allowing for the ability to start and stop video at specific locations, looping and video monitoring (Figure 40). One of the constraints to the VideoTexture node is that for a two renderer setup, two video texture nodes must be used, one for each window. Initially it was assumed that one VideoTexture node was sufficient to attach to the geometry and share between two renderers or windows. This resulted in video glitching and artifacts. Closer study of the documentation on this node revealed that one VideoTexture node cannot be shared over two Renderer nodes. Therefore each video needed two VideoTexture nodes one for

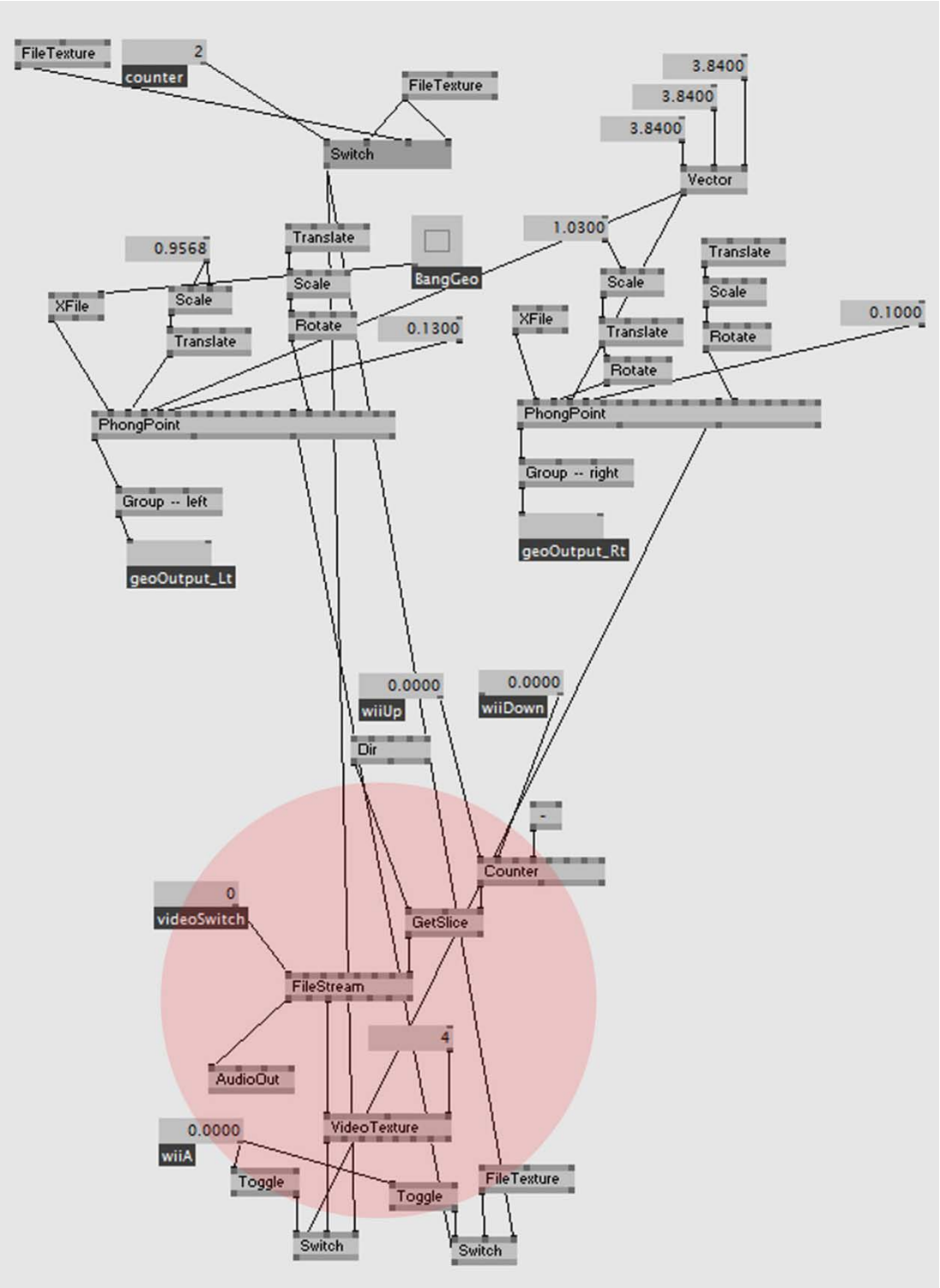

Fig. 40. Subpatch *017geoCarBumper* highlighting the network that handles video and image textures

each projector renderer. The VideoTexture node also requires that the frames per second of the video be a multiple of the refresh rate of the projectors or monitors. In this case, the projector's refresh rate was 60Hz which is four times the 15 frames per second setting. This node has a setting requiring the artist to set the frame rate multiple. This information can be found within the help system built into the vvvv frame work. Selecting the VideoTexture node and then pressing F1 reveals a help patch that explains this frame rate issue. The AudioOut node will playback the audio attached to the video file. This node has the ability to pan the audio and adjust the volume to a desirable setting.

Additional controls were added to the patch for artist interactivity. This allowed me to move from shape to shape with relative ease thereby allowing faster access to geometry for texture switching. Switches and buttons were added to the patch to provide in-patch control. A Nintendo Wiimote gaming controller connected to the in-patch buttons was used as well to allow remote control movement and selection through the patch. This movement was limited to the button controls of the Wiimote and not the infrared or accelerometer capabilities. A Wiimote node is available in the vvvv toolkit.

Overall, this is the basic structure of the patch. A subpatch was created for each shape or groups of shapes considering both the left and right view render windows. Each subpatch also varies based on specific requirements related to whether a video or a still image is applied. This patching structure ultimately changed in very specific ways to accommodate image registration, or the lining up of the projected image on the

projection surface. The patch, once run, requires activation of the textures on each shape. This requires the need to cycle through each shape using the selection capability though the Wiimote or the built in buttons in the patch.

3.4 Registration of the Projected Image to the Projection Surface

At this stage the sculpture and the projectors are physically fixed and installed. From past work I assumed that I could measure the projector location in the physical space and then apply the measurements to the patch. I identified an origin(0,0) in the installation space and placed a large box at his location (Figure 41). As stated before, the geometry must be in the form of a DirectX mesh. The toolkit however, provides a box node that only requires the parameters of length width and height be applied.

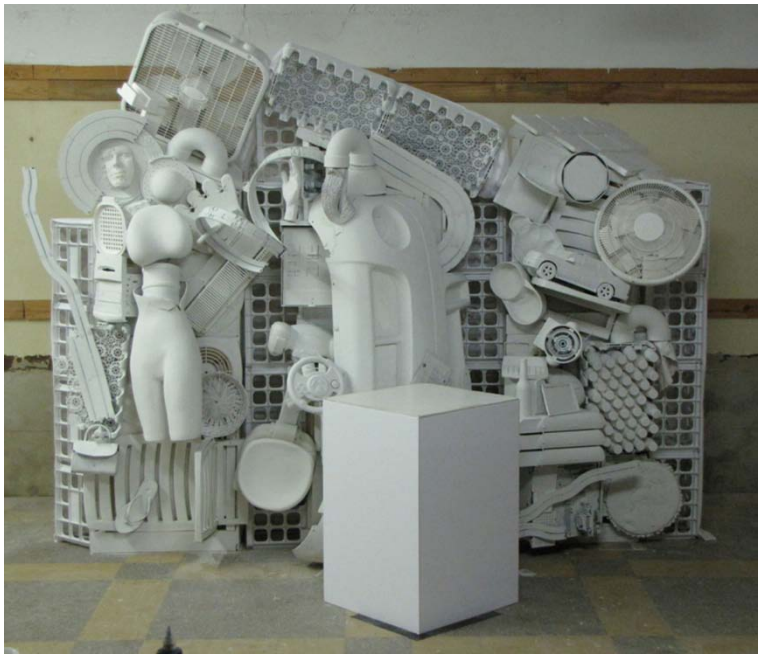

Fig. 41. Calibration of projectors to surface using Box

A box subpatch was built with the box node. From the installation space origin, measurements are made to determine approximately where the projectors are in x-y-z coordinates in inches. These parameters are applied to the two projector nodes. While projecting the box image onto the box itself, the spatial coordinates of the each projector node are adjusted until the box image lines up and is registered correctly on the box (Figure 42). Once the box was registered correctly, an asymmetric breast shape object was modeled from the front view. Once imported and moved around the environment to the approximate location in the installation, the result was less than satisfactory. This process revealed that the larger scale of the installation space and projection surface made registration a very inaccurate experience when compared to prior studies with smaller scale geometry. A second attempt relied heavily on photographing the approximate vantage point of each projector. This proved more successful but still revealed model distortions that could not be adjusted with vvvv node transformation tools. It was finally determined that the best course of action was to project an Adobe Photoshop canvas onto the installation and then paint the installation using the Photoshop paint tools. The painted image was a representation of what the projector sees and can best be described as a camera where the Photoshop painted or traced image is the picture the projector made Figure 42 shows both projector views.

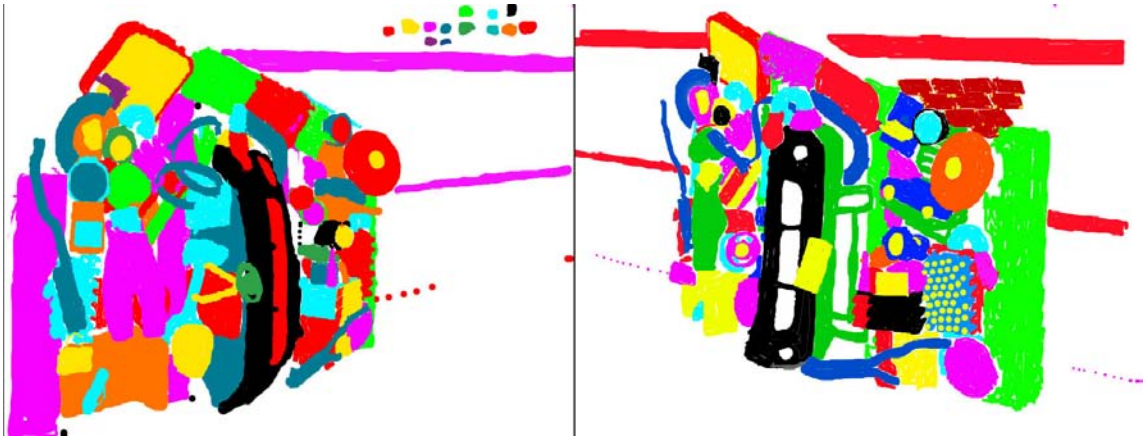

Fig. 42. Painted views representing projector perspectives

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Both images were imported to Maya and then each surface from the left and right projectors was modeled as a 2-D planar mesh (Figure 43).

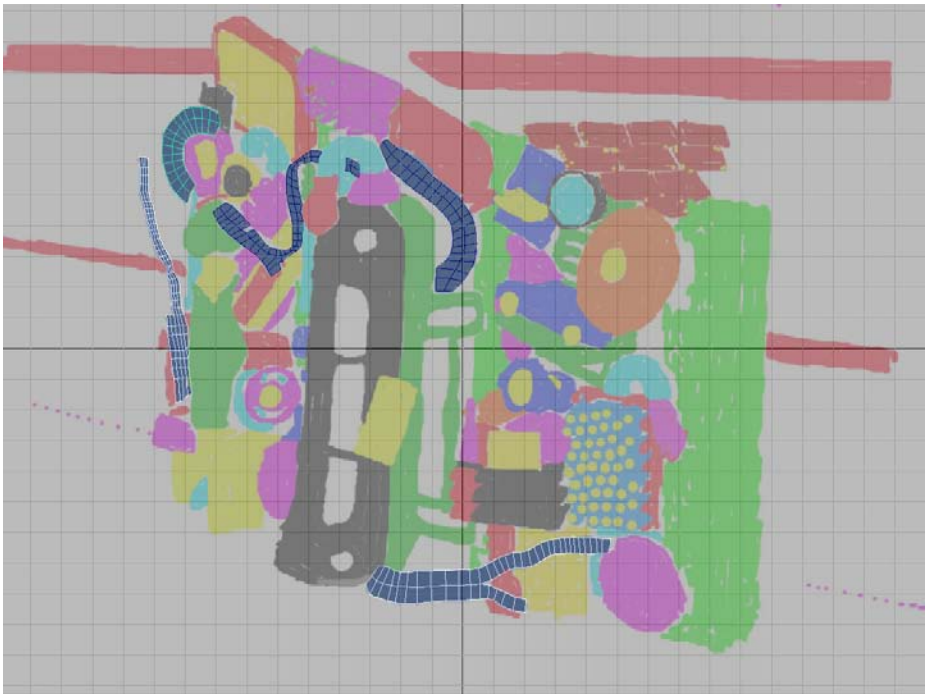

Fig. 43. Planar models of the racetracks using the captured Photoshop images

Each mesh had its pivot point moved to the origin in Maya and was then exported as an OBJ for conversion to the DirectX file format for import into vvvv. In vvvv, the model appeared in the correct location with only minimal projector movement over the z-axis from the origin to achieve a successful image registration. A 256 pixel x 256 pixel grid calibration texture was added to each shape in the shape's respective subpatch file texture node. Once all of the geometry was represented as a subpatch, the geometry was adjusted slightly to match up to the projection surface using the grid textures as reference (Figure 44).

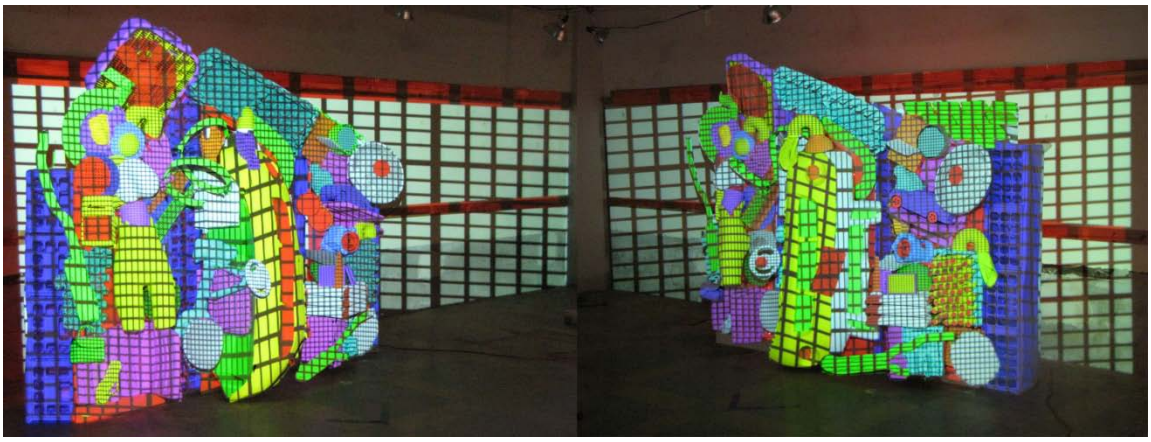

Fig. 44. Registered views from left and right projectors

At this stage I also began considering the groupings of certain geometry at the vvvv level and the Maya level. For example, the area behind the objects or negative space was represented as 3 vertical planes that were combined in Maya as one mesh. The toy racetracks were each modeled in Maya but were not combined as one mesh. Instead they were grouped as a subpatch in vvvv with the intention that the same video

clip would be played on all toy racetracks. The vertical planes representing the negative space could have just as easily been represented separately and then grouped in the subpatch. However, since the vertical planes were more symmetric and less prominent than the racetracks, they were grouped as one mesh. Similar groupings were made to achieve optimal video playback or a desired artistic result. These include the plastic chairs, the PVC pipes and the bottle holders.

3.5 Photographing Textures and Shooting Video Clips

Video and image textures were developed from multiple approaches. One approach took into account the shape which was being projected. The second approach was more arbitrary in that the textures and video were captured according to my personal tastes. Image textures were shot from the perspective of capturing imagery that reads as an interesting surface texture. Some video textures were based on the domestic house concept, references to prior work and with the intent to create motion.

Most of the video was shot in High Definition resolution. Some video shot for the early test studies was shot at standard resolution. Video textures were rendered at 256x256 square pixels at 15 frames per second. This kept video size relatively small but also met a specific requirement for smooth playback in vvvv. Each video clip is set on a loop to maintain constant video playback. All clips were never longer than thirty seconds in an effort to keep file sizes small.

Seventy-five image textures were shot and rendered as 512 pixels x 512 pixels and saved as medium compressed JPEGs (Figure 45). These textures were applied to

areas that were not going to be represented with video. An animated light was also added to the work to help create a sense of movement over the still image textures. When the light is revolving around the virtual structure, textures are alternating from being brightly lit to darker. This provides a means to break up the texture playback while the installation is running by revealing the plain white structure or surface that exists underneath.

Fig. 45. A sampling of the projected image textures

At this stage of the process, the projection surface suggested difficult visual decisions in the video and image projections. As mentioned, it was established that certain shapes would suggest specific textures. In this case the face and the female form seemed a perfect place to try to achieve the illusion of realism by adding the texture that is appropriate on those shapes (Figure 46). These correctly textured objects juxtaposed with objects that have textures that don't actually make literal sense enhance the focal area of the self-portrait. The core of the self-portrait form was represented with a projected video of moving fish. It was meant to be a whimsical addition that made sense

given the fact the physical object was a water jug. I also believed that it was a subversive element that could be interpreted many different ways.

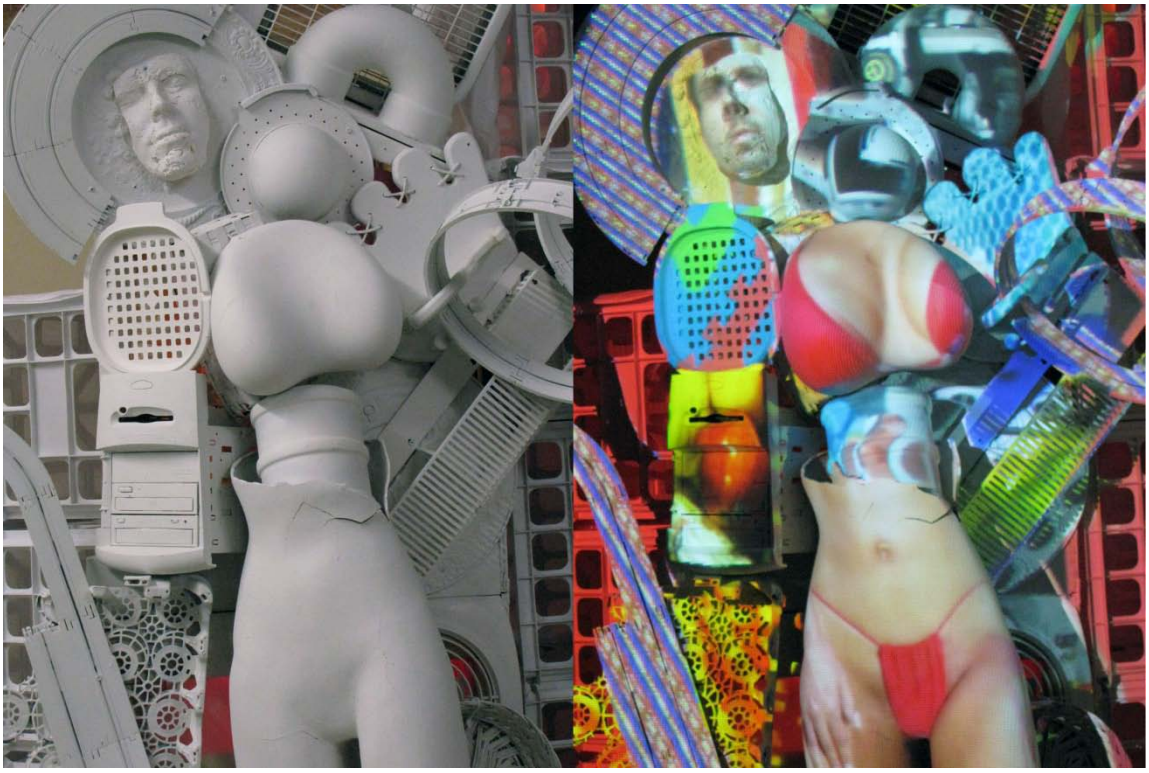

Fig. 46. Final view of the installation projection surface

For the face I decided to shoot a video of me with eye movement to project on that surface (Figure 47). The female breasts and torso was a painted texture developed from a collage of female models in swimsuits (Figure 46).

Fig. 47. Projected face with video texture

The middle section representing the car bumper directly references my past video work *In Retrospect* (2006) with the projected faucet. A dripping faucet was the bookend to the original 2006 video work. This time the faucet is a rhythmic free flowing faucet that turns on and off during the installation run. The original faucet in the 2006 work represented that moment in time where crisis and personal tragedy enhance one's introspective tendencies. This time the faucet's state is loud and obtrusive: a completely different experience than the quiet drips that drove the 2006 narrative. It's the suggested entrance to the abstracted house inasmuch as it's the catalyst that fills the interior of the car bumper with liquid (Figure 48). While the interior of the car was liquid, the PVC pipes in the piece have a video texture of a working car motor. This was an intentional contrast that, when viewed, would probably go unnoticed by most viewers.

Fig. 48. Projected water faucet on car front end

The faucet video was a simple clip that showed the turning on and turning off of a kitchen faucet. In Figure 49, the top image represents the raw image. The bottom is the post-processed result.

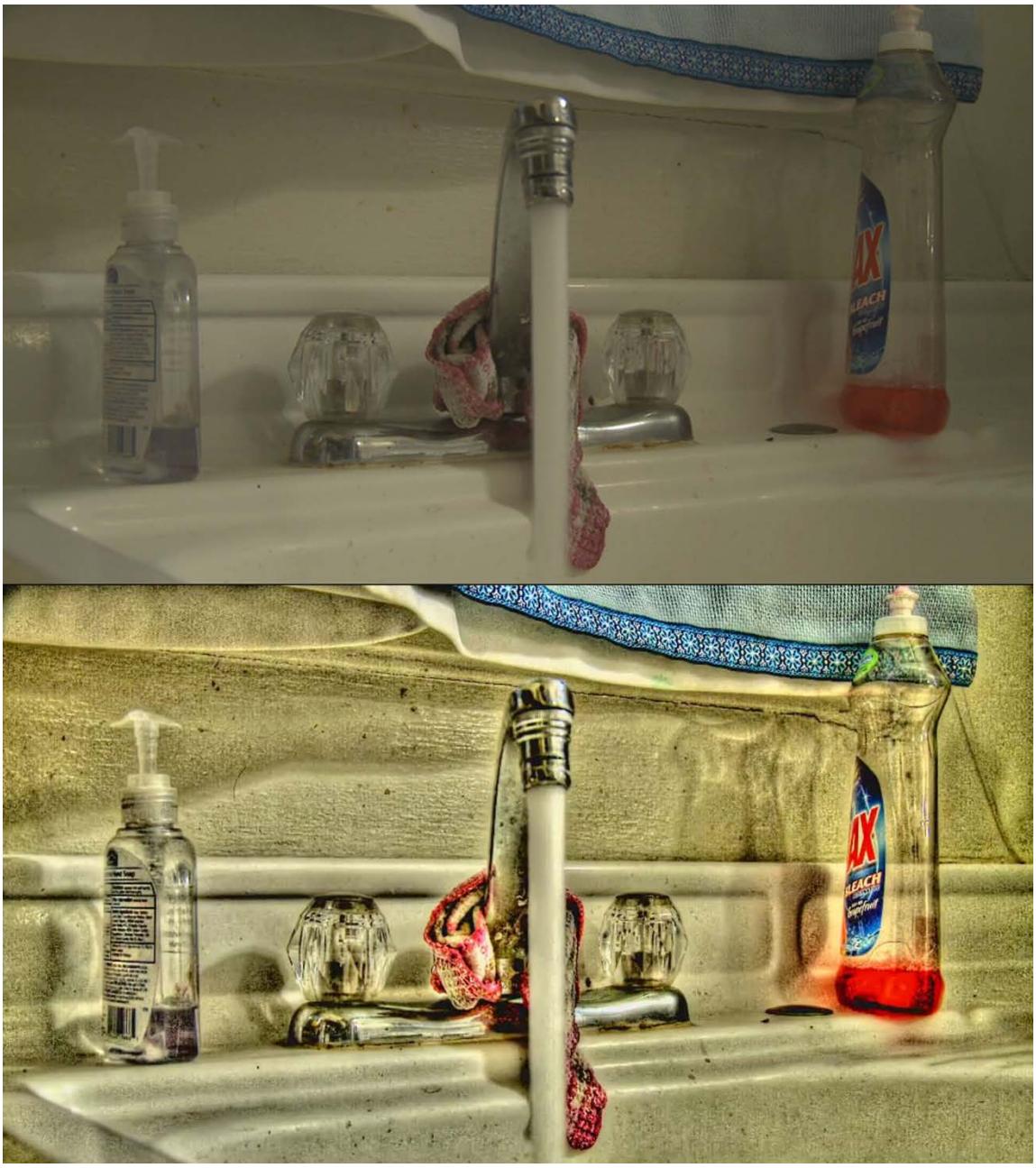

Fig. 49. Before and after video frames of the faucet footage

This look was achieved by batching each of the video frames in Photoshop using the exposure adjustment tool. Two groups of frames were rendered: one group at a -2 exposure setting and the other group at a +2 exposure setting. This resulted in three

groups of frames with one at a high exposure setting, one at the original setting and one at a low setting. These three groups of video frames were then batched into a High Dynamic Range(HDR) photo tool called Photomatix that specializes in generating HDR images with a very robust tone mapping capability. Using a decided final tone mapped look, the frames were batched using Photomatix's batch processing tools. The new image sequence was then converted and sized to a video texture for import into *vvvv*. This process was based on a "fake HDR" approach that can be achieved with a single still photograph. This same process was applied to a video featuring my son that appears on a shingled part of the installation structure.

In keeping with the domestic home motif, the inclusion of my son as a video image on the roof section seemed a logical extension. Here he's seen trapped under the roof made from the Styrofoam shingles (Figure 50). I argue this as my selfish reasons in not wanting him to grow up and lose the innocence of being a child. I also wanted to suggest a protected or sheltered existence which is something I feel that I could be personally doomed to repeat through his eyes.

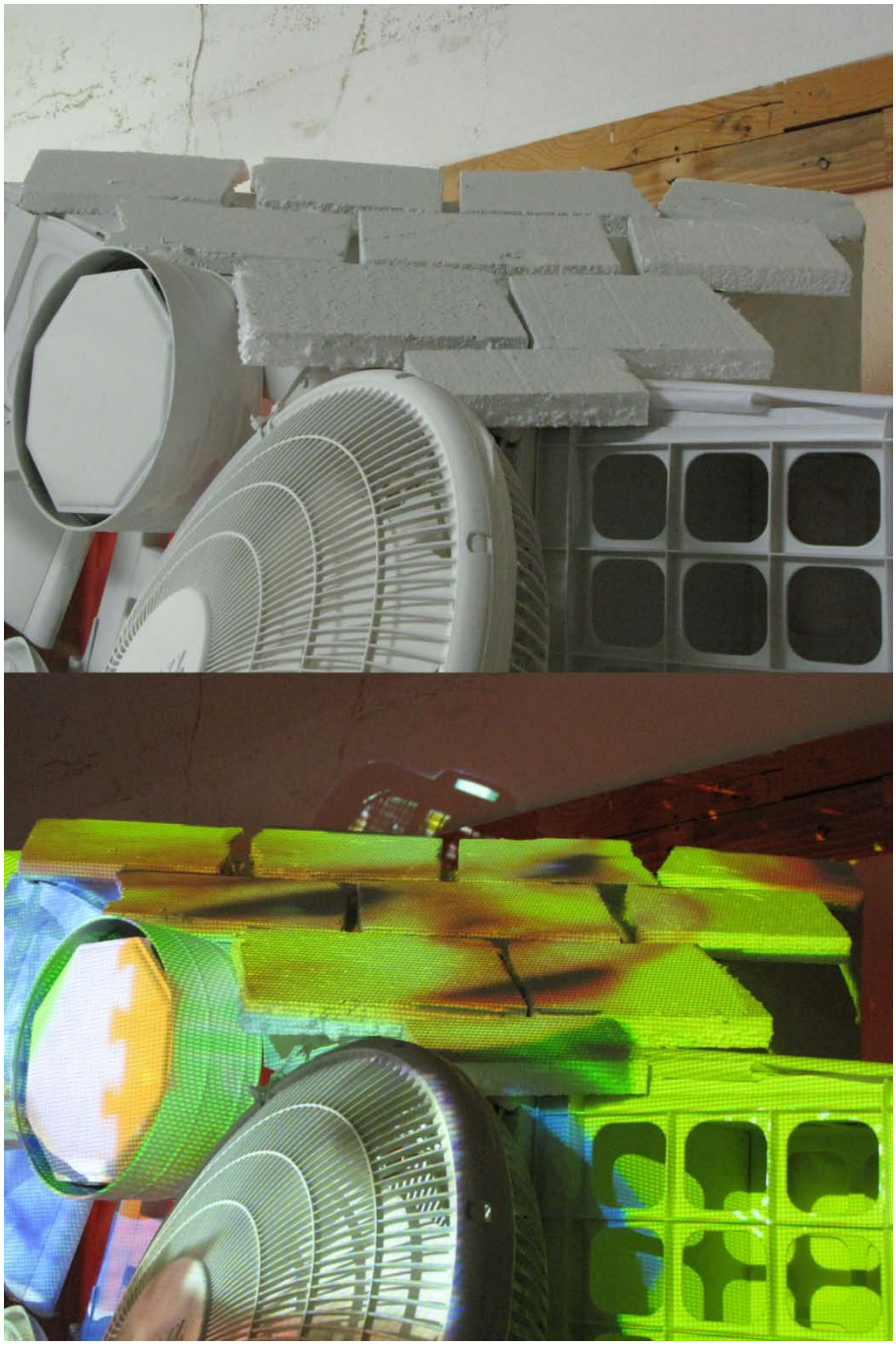

Fig. 50. Projected video of my son on roofing shingles

The upper right fan surface is covered with a time lapse video (Figure 51) texture of my wife cleaning house, doing laundry, making dinner, and washing dishes. Approximately 30 minutes of video at normal speed was processed to play over thirty seconds resulting in a time-lapsed video. This seemed a logical addition in that it represents the very fast paced life she leads in being the backbone of the household. I also wanted to directly contrast the broken female-form of my self-portrait found on the left side of the projection surface. While the left side of the installation was an artistic representation of me, my wife was represented in this fan structure on the right side (Figure 52). It's no surprise to me that she's focused on keeping things moving in the video where my form is more subtle in movement.

Fig. 51. Sequence from the time-lapsed video

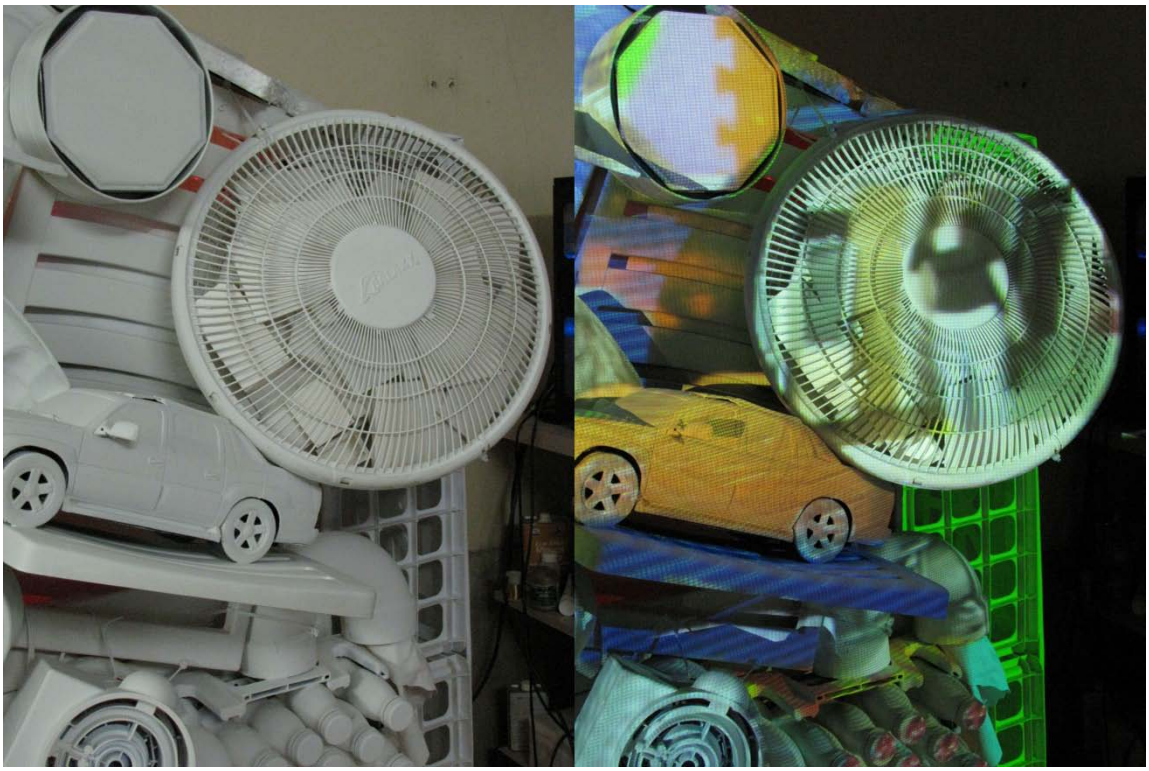

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Fig. 52. Time-lapse video as it appears on the fan surface

In contrast to processed and timelapsed video manipulated outside of *vvvv*, certain video textures were adjusted in the patch using the PhongPoint node. Recall that the PhongPoint node allows color adjustments, lighting adjustments and texture transformations. Where necessary, these were adjusted to a desired level. For example, the chair surface geometry played the same video clip. To make the clips seem different, ambient color was adjusted to create a sense of variety. Likewise, adjusting playback in the FileStream node at different times also helped create the illusion of different video clips. Texture transformations were also used to achieve a desired artistic result. The

PhongPoint node also allows for the scale, translation and rotation of textures on each projection surface. The majority of projected textures had some form of transformation.

The final version of the installation was an evolving process (Figure 53). Early iterations used the back wall of the studio as part of the surface geometry. When playback lagged and was jerky, this video was dropped out. It was also my belief that this back wall video took away from the emphasis on the installation sculpture projection surface. Likewise, video and photo textures that seemed unreadable and unnecessary were dropped to increase performance. Reducing the number of Video Texture nodes increases both the audio and video performance. Negative space or the space that exists in areas that are not the appropriated assemblage was textured with a black and white image and darkened in the PhongPoint node. This allowed the foreground lit surfaces to stand out.

. Fig. 53. Final installation structure with and without projections, three views

4. EVALUATION

4.1 Contextualizing the Work as Collage or Assemblage

The final work will be referred to as *Untitled* (2009). *Untitled* was defined by my prior artistic work in collage and has many characteristics that suggest the work as an extension of this style of art. The obvious example was the use of found objects to develop the projection surface. These objects were combined together to create a final form. I interpreted this final form as a house. Consider this definition presented in Section 2.1: "Collage may be seen as a quintessential twentieth-century art form with multiple layers and signposts pointing to a variety of forms and realities, and to the possibility or suggestion of countless new realities." In this case the layers are the objects, and the projected textures. The new reality is my perception that the assemblage read as a house. With the projected textures as another layer, the house achieved another reality or perception with some sense of life to it. Again, these are my personal perceptions. New realities exist in the perceptions of viewers who watch and observe the work over a period of time. The meaning isn't as clear to someone else as it may seem to me, but the exploration of why the artist combines these objects is a driving force to the work itself.

4.2 The Work as Installation and the Working Installation

This installation has the capability to run autonomously for hours given a constant power source. However, one issue that eluded me was the idea that this work could somehow be portable. It can be moved and reinstalled based on the procedure

defined in this thesis. However, there would be some difficulty in having anyone else except me to run and setup the installation. This creates problems when wanting to send this work someplace to be exhibited to the public. I would have to be available to see this work started and then direct another on how to start it. This is an issue that I didn't foresee and plan to address in future video installations.

I think one of the most disappointing aspects of this work was the hardware limitations in using multiple videos for output. When playing a video clip such as the planned back wall projection, the large size of the playback video tended to slow or delay the video playback. Is the hardware really relevant? It is, but I've refrained from defining the hardware that was used here for *Untitled*. The fact remains that art of any kind is limited to a predefined set of boundaries. The hardware was certainly one of them for me. I embraced it by being selective on what video I felt needed to be played and by exploring ways with using lights to create movement. I prefer to have the freedom to have video on every surface. It's an accomplishment that more than 70 surfaces were defined with a projected texture. The organization of these surfaces as subpatches made quick access and editing easy and straightforward.

There is definitely room for improvement of ways to optimize the patching networks to boost performance. The VideoTexture node is frustrating in that it makes so much more sense to think of one node for one video instead of one node for each video per render window. I think it's possible to span one render window over both displays allowing for the one VideoTexture node per video convention. This would require more setup time and shape positioning to achieve a satisfactory result.

Another disappointment stemmed from overloading the VideoTexture node with multiple video clips for a single surface. While using the Wiimote or the built in buttons on the patch to select through videos, the patch took a sizable performance hit which ultimately led to the decision to use one video clip per object. I believe that it would have been more interesting to have selectable or random playback of video clips across all surfaces. This was tested, but proved to be something that was abandoned to boost performance.

4.3 The Relationship Between the Textures and the Projection Surface

In terms of the aesthetic quality, this work reveals that the final projected image is only as good as the projectors. In this case the video looks degraded when projected onto the assemblage surfaces. Given that the projectors are set at 1280 x1024 and that the image is enlarged to cover the installation space, the pixels are apparent when viewing up close. Farther back, the installation video is easier to see, but still not as clear as I would like the image to be.

In some instances the video clip or texture doesn't entirely conform to the surface in a satisfactory manner. Video playback on the surface doesn't take full advantage of the surface shape. Clips were not tailored to take full advantage of the shapes that they conform to and I kept the texture limited to simple transforms that the PhongPoint node allowed in the toolkit. The best case would be having textures move based on the definition of the shape. Some areas used movement to suggest the shape as in the case

of the toy racetrack parts, however these weren't developed enough to look as if video conformed to the tracks volume.

There were some areas of apparent success. The still textures that were applied to the female shape stand out from other areas of the installation. This was interesting when thinking about how it seemed that applying the textures that fit the object appear to make that object more interesting or stand out than say an object that had some random texture. The combination of adding the faucet texture to the car front-end with the water filling texture to the car front-end interior proved an interesting combination for video.

Also successful was the viewer's ability to move around the installation space and not obstruct the projections. Given that there were two projectors, this enabled a sense that the viewer couldn't completely deconstruct the projected image. This appeared to be interesting to the viewers who found interest in how I was creating two wholly separate projectable views. Viewers were moving up close and farther back to get differing points of view of the work. I immediately believed the work was engaging to them.

4.4 The Issue of Interactivity

Is there interactivity where a viewer is directly causing a change to the installation space? This is not the case. Interactivity was something that proved difficult in justifying from my point of view as the artist, especially in a work that was multi-surfaced and multi-image. I always went back to the question of why. If I put a Wiimote in the installation space would a user know what to do with it? Where there

was success in using a light to provide movement to still textures, there was a failure in not recognizing that perhaps a camera could have been used to detect movement data for lights in *vvvv*. This was an idea that surfaced after the fact, relative to the writing of this document.

There was interactivity developed for me as the artist in an effort to make texture selection possible. While this was built during the early studies that helped define my direction for this research, I never fully let go of the idea that the Wiimote was nothing more than a convenient way for me to make quick changes to the projections while applying them to the surfaces. This idea continued to remain the convention for the duration of this work. Therefore, as a whole, this work was not developed to be interactive or use interactivity to help convey a message or an idea.

4.5 Audio in the Final Work

The audio for this work is tremendously underdeveloped. It was my intention to let the audio mix naturally based on the available clips, but it has actually turned out to be a very obtrusive component to the final work. The audio in some ways represents the machinery of the installation. Its rhythmic nature, implied by the looping nature of the video clips, becomes monotonous. I decided to bring the volume levels down low in the final presentation and just have a hint of audio to accompany the final presentation.

4.6 Artistic Results

It was established early on that examples of prior work in this medium keep projection surfaces simple with few symmetric or smooth surfaces. Artist Tony Oursler uses few projections either over much simpler surfaces or fewer surfaces. Given this final result, it is clear that this work expanded on Oursler's work by projecting several more textures over more complex geometry as an assemblage for a projection surface. A good example contrasting complexity is seen when comparing the amount of geometry seen in Oursler's work versus this work . Where Oursler's work uses a few surfaces, this thesis work clearly had more (Figure 54).

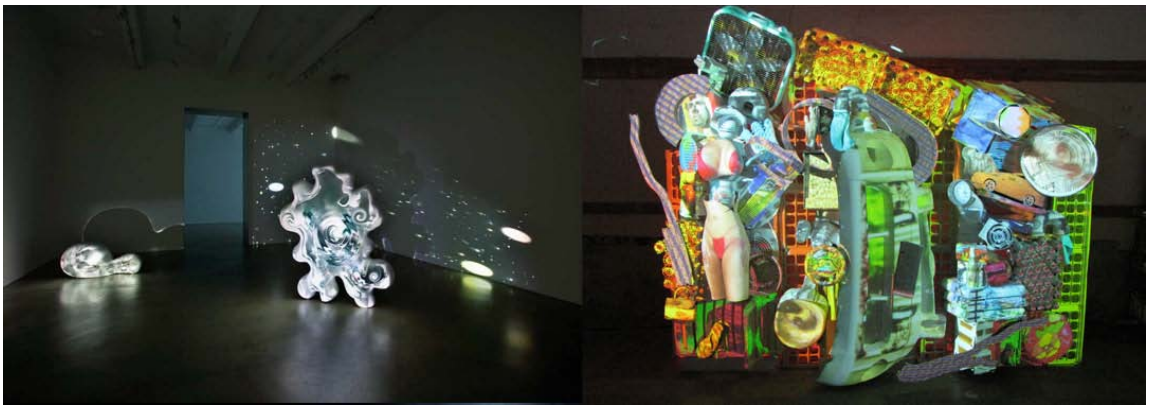

Fig. 54. Comparison to Tony Oursler's projection with *Untitled* [Licht 2006]

Not only is this more complex, but the overall work as a whole demonstrates a more complex placement of video and playback in that the projection surface has become more complex. Figure 55 shows the surface complexity with the applied complex arrangement of textures.

Fig. 55. Sculpture with and without projections

Overall, the work as a whole is engaging to the viewer in that the projected images in some locations have the illusion of being life-like. The broken self-portrait form on the left side and the chiseled out rectangular area in the lower right are very successful in that they make me question the actual surface properties from the projected texture as well as the reality of the object itself. Viewers will have to move around to experience everything the installation has to offer visually. This is evident in the fact that it's not possible to see everything from one single vantage point.

Marcel Duchamp re-contextualized objects to create a different reality. For example, Duchamp created his work *Fountain* from a urinal. This idea is a reoccurring theme in this final work. The racetrack in the upper-left above my face mold was re-contextualized as a halo. The cat food bowl is re-contextualized as a clock. Given that everything has a video or image texture applied to it, it is reasonable to say that every object in some way is being re-contextualized.

I purposely established this work as being directly connected to my prior work through the use of a now re-occurring visual element of the water faucet. Likewise it was my intent to incorporate the influence of Rosenquist into this work since past work used it too. Rosenquist's work was defined by his ability to create an image out of found imagery. His large scale paintings represented a mashing together of disassociated objects or people. In the same manner, this installation work is made up of a mashing of found objects that when combined together create a final image with some derivable meaning. Rosenquist's color palettes in his paintings usually consisted of bright vivid colors. In this installation work, the projected textures are very saturated and bright similar to Rosenquist's paintings. I directly referenced Rosenquist's work in the inclusion of the car bumper in the assemblage projection surfaces. The car front end has appeared more than once in various Rosenquist works. In the projected image textures, I included a texture of macaroni and cheese, another reference to Rosenquist's reoccurring use of spaghetti.

5. IMPLICATIONS FOR FUTURE RESEARCH AND CREATIVE WORK

It was established during the working process that the VideoTexture node must exist for each renderer and cannot be shared over a multiple display configuration. In the vvvv documentation the renderer can be setup to stretch over a single window that is shared across two displays. This should reduce the number of VideoTexture nodes thereby improving video playback performance. This could allow for more video to be added and played. This solution is intended to be an immediate one, but doesn't address the larger issue which is developing a way to create projected set of multiple video textures with little limitations on hardware or software playback capability.

An alternative method is to use this framework a means to create a single projected texture. In other words, much like interactivity became an artistic tool, the toolkit itself becomes a way to create a video which is captured re-projected back onto the surface. Multiple iterations of this work can exist with different video and images. Using a video capture tool in conjunction with vvvv gives another degree of artistic manipulation allowing for hours of video to be captured and edited to a single projection video for playback. Playback can then only be limited to the use of a video player. This makes installation playback for longer periods simpler, less hardware intensive and will provide a way to reduce the monotony of the projected video work. This can also address the issue of making setup easier for a second party that would be responsible for running this work in a gallery space.

I also believe this work would benefit greatly from a more defined experience with audio. The vvvv patch could be connected with another design toolkit such as

PureData or Max/MSP to manipulate and conform the audio to the space. Likewise, multiple speakers would help to place sounds for specific objects.

In its current state, the installation if moved to another location would need to be re-registered. New projector views would need to be derived and then imported into Maya to readjust the geometry. This is a time consuming process that could be streamlined to reduce setup time. This leads to the idea of using environmental markers, perhaps a unique setup methodology, that aid in the quick registration of real and virtual environments. Surfaces would have to be modeled in 3-D this time to account for differences in angle of the projector to the surface or object. Achieving complete confidence in setup from one location to the next could be a technical endeavor worth exploring.

Interactivity could also be explored in future iterations of this work. I found it unnecessary despite my initial intent, that doesn't suggest that someone else might find a way to effectively use it. Interactivity in this framework can create an experience that needs the user to control the outcome of the final projected work. The idea of using camera data to move lights in the vvvv toolkit is an exciting idea that could become a reality in the immediate future.

Exploring how hardware impacts this video work is certainly an interesting area of research. From experience, it would have been nice to be able to know how certain hardware restrictions would limit playback within the vvvv framework. It is safe to assume that better hardware would result in less constraint to quality and quantity of video. Utilizing projectors directly within the framework as opposed to just being

simulated with Photoshop is also a very interesting idea. Better resolution and quantity of projectors would no doubt have a significant impact on the final outcome. Again as I have mentioned, I was limited in certain aspects to this work.

Hardware, space and time all prove to be elements that helped me come to some realization of this work. This research demonstrates that working within a set of boundaries and a working process are enough to complete a realized work of art.

6. CONCLUSION

It's clear from this that even with the best of intentions, art has the ability to morph and become something entirely different. This work successfully manages to be a collage-based work and can run autonomously as an installation. Video is successfully controlled for this work, but it raises an interesting question of just how far an artist can take and manipulate a form within the limitations defined here. Interactivity proved troublesome with this process in that it didn't make sense to have it in what was to be a visually intense work. Forcing interactivity would seem obvious and from experience I've learned that if you have to force something into your work just abandon it completely and move forward.

Making art is a passion of mine. As an undergraduate, I was always interested in how the other guy did it. I asked my instructors. I asked my peers. This thesis is my answer to that question. Every artist has a working process. It's that fundamental structure that provides a way to just start and create. The artist may not have all the answers to begin with, but taking the journey and questioning directions at every turn is an effective way to create.

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