

# LOST IN TRANSLATION

by

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**LOST IN TRANSLATION**  
written by Joanna Bugajska  
has been approved for the Department of Art & Art History

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# ABSTRACT

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LOST IN TRANSLATION

Thesis directed by George Rivera, Ph.D.

## ABSTRACT

This thesis contains a detailed visual record of my VR work entitled “Lost in Translation.” I use 180-degree panoramas to capture the essence of the work. “Lost in Translation” is an attempt to understand better and ultimately accept events from my early teenage years, that after much introspection and therapy, I believe to have negatively impacted much of my adult life. This is a seated VR experience that reflects on themes of identity and place through interaction with objects and various media from the artist’s childhood memories of immigrating from Poland to the United States.

# TABLE OF CONTENTS

<b>INTRODUCTION .....</b>	<b>1</b>
<b>PART I.....</b>	<b>4</b>
WHAT IS VR?.....	4
REAL PRESENCE, VIRTUAL EXPERIENCE .....	5
METAMODERNIST EXPERIENCE.....	9
EXPERIENCING VIRTUAL REALITY .....	13
<i>Rachel Rossin: “Artist’s First Look” Exhibition and Masked Men.....</i>	<i>13</i>
<i>Rossin’s “Lossy” and Memory .....</i>	<i>17</i>
<i>The Night Cafe.....</i>	<i>20</i>
<i>Raising A RUCKUS and alternate viewpoint storytelling.....</i>	<i>21</i>
<i>REAL TOPICS AND “TESTIMONY” .....</i>	<i>25</i>
NOT JUST ANOTHER KIND OF FILMMAKING.....	29
<i>MiYUBi AND POV .....</i>	<i>31</i>
<b>PART II.....</b>	<b>37</b>
"LOST IN TRANSLATION".....	37
OBJECTS AS MEMORIES .....	42
LOST IN TRANSLATION IN IMAGES.....	47
<i>CHRONOLOGICAL Cinematic .....</i>	<i>47</i>
<b>PART III.....</b>	<b>58</b>
MUSEUM PRESENTATION.....	58
<i>InStalLING VR PIECE IN CU ART MUSEUM .....</i>	<i>58</i>
<i>WAYS ARTISTS EXHIBIT VR WORK.....</i>	<i>58</i>
FINAL INSTALLATION .....	60
<b>CONCLUSION .....</b>	<b>61</b>
POTENTIAL OF VR .....	61
<b>APPENDIX A.....</b>	<b>67</b>
HOW TO ACCESS AND VIEW “LOST IN TRANSLATION” VR EXPERIENCE ONLINE .....	68
52 VR DEFINITIONS BY JARON LANIER’S.....	69
MAKING OF “LOST IN TRANSLATION” .....	75
<i>Warsaw AND PUEBLO IMAGES USING GOOGLE EARTH .....</i>	<i>75</i>
<i>MODELS AND TEXTURES.....</i>	<i>80</i>



POSTERS AND OTHER DIGITAL PAINTINGS .....	85
<b>APPENDIX B .....</b>	<b>90</b>
WHO AM I? .....	91
VISUAL ARTIST STATEMENT .....	92
PLANNING A VR PROJECT.....	93
HOW I MADE “WITNESS: A VR EXPERIENCE OF WARSAW UPRISING” BY SAYAM GHOSH.....	94
“DRAWING ROOM” BY JAN ROTHUIZEN.....	96
ANIMATED AUTOETHNOGRAPHIES BY JEREMY BLAIR.....	97
CAO FEI.....	98
KENT BYE AND “CROSSING GRIEF RITUAL” .....	98
“TRANSITION” .....	99
“FLATLINE” .....	99
IMMERSIVE JOURNALISM: REAL STORIES IN VR .....	100
NONNY DE LA PEÑA AND THE EMPHATIC MACHINE .....	101
JORDAN WOLFSON.....	103
<b>APPENDIX C .....</b>	<b>104</b>
OTHER VR ARTISTS AND WORKS WHO INFLUENCED ME .....	105
<i>CARNE y ARENA by Alejandro G. Iñárritu.....</i>	<i>105</i>
<i>“Zen Parade” by Kevin Mack.....</i>	<i>107</i>
<i>Daniel Steegmann.....</i>	<i>109</i>
<i>RACHEL ROSSIN (MORE) .....</i>	<i>110</i>
VR4VR CONTENT CREATION TOOLS AND ARTISTS USING THEM .....	111
<i>PAINT WITH Tilt Brush by google .....</i>	<i>111</i>
<i>PAINT AND ANIMATE WITH QUILL.....</i>	<i>112</i>
<i>GORO FUJITA.....</i>	<i>113</i>
<i>Saschka Unseld's “Dear Angelica” .....</i>	<i>113</i>
<b>WORKS CITED .....</b>	<b>114</b>
<b>COMPLETE BIBLIOGRAPHY .....</b>	<b>116</b>

# TABLE OF FIGURES

<i>Figure 1. Branching out, Joanna Bugajska, 2017, digital paint, 11 in. x 6 in.</i>	4
<i>Figure 2. Slide and descriptions of the four elements of presence from 2017 SVVR Keynote address titled “Historical Context of Virtual Reality” and presented by Kent Bye.</i>	8
<i>Figure 3. Four slides from Kent Bye's 2017 Keynote lecture from 2017 SVVR Keynote address titled “Historical Context of Virtual Reality.” In these slides, Bye details 42 considerations in the four elemental groups.</i>	9
<i>Figure 4. 360 panoramic image from Rachel Rossin, “Man Mask,” 2016. Stereoscopic 360° video. Courtesy the artist.</i>	15
<i>Figure 5. VR installation, Rachel Rossin, “Lossy” at Zieher Smith &amp; Horton.</i>	18
<i>Figure 6. Images for The Night Cafe, and interactive painting experience and tribute to artist Vincent Van Gogh. Source: Oculus Rift store.</i>	21
<i>Figure 7. Images for the animated film Raising A Ruckus. Source: Oculus GearVR store.</i>	22
<i>Figure 8. Images from Zohar Kefir’s interactive VR documentary “Testimony.” Source: Oculus Rift store.</i>	26
<i>Figure 9. Images from article How Creatives Work: The Emotional Performance Art of Marina Abramović showing the remarkable performance “The Artist Is Present.” This performance was about human connection and the power of presence when all four elemental needs are addressed.</i>	28
<i>Figure 10. Poster promotional image and five 180 panoramic shots from VR film Miyubi. Source: Oculus Rift Store.</i>	30
<i>Figure 11. POV screenshots of the stereoscopic 360 VR film Miyubi showing the overlaying robotic interface to enhance “seeing through the robot’s eyes” point-of-view in which the movie is shot.</i>	32
<i>Figure 12. Example of a POV shots from Miyubi which enhanced viewer’s embodied experience where Miyubi/Viewer can see whom they are “playing,” what they look like (right) and even interact with their reflection (left). Source: Miyubi official trailer.</i>	33
<i>Figure 14. Example of a POV shots from Miyubi which enhanced viewer’s embodied experience where acting includes eyeline, dialogue and action which are performed at Miyubi/viewer as part of the story. Source: Miyubi official trailer.</i>	34
<i>Figure 15. Six shots from Miyubi VR film showing various traditional framings done by blocking actor’s proximity rather than cameras to actor or lens types as is done in film or video.</i>	36

Figure 16. 360-degree view in 180-degree panoramas of the main virtual set from "Lost in Translation."	46
Figure 17. "Transitional Flight," 2017, 34'x 34', digital painting printed on canvas paper. This painting is an abstract visual storyboard for the work.	47
Figure 18. Installing Lost in Translation work in MFA Show, CU Art Museum, Nov. 9, 2017	58
Figure 19. Few ways artists installed VR pieces in museum and galleries.	58
Figure 20. Daniel Steegmann's Phantom (left) and Rachel Rossin Lossy (right).	59
Figure 21. Other installations of VR work from various artists.	59
Figure 22. "Lost in Translation" installation view, CU Art Museum, Nov. 10, 2017	60
Figure 23. GearVR headsets placed on chairs, CU Art Museum, Nov. 10, 2017	60
Figure 24. Laurie Anderson's 'Chalkroom' (2017) has been created in collaboration with the Taiwanese artist Hsin-Chien Huang.	63
Figure 25. Performance artist Marina Abramović show working on her first work in VR.	65
Figure 26. Google Earth VR promotional image, two screenshots and a cube map texture.	75
Figure 27. Four high resolution, equirectangular (2:1) 360 degree panoramic images of locations I lived in in Pueblo, CO.	76
Figure 28. Image of a virtual reconstruction using Unity 3D of my favorite spot in Pueblo, CO, the lookout point over the reservoir.	76
Figure 29. Screenshot of Unity 3D software showing tools and graphic elements used to sculpt, texture and paint the Pueblo landscape in Figure 15.	77
Figure 30. Screenshot of the istreetview.com website used to pull high resolution 360 panoramic images of real locations from Google Street View (top).	78
Figure 31. Image from Lost in Translation VR experience showing an image captured in Google Earth VR closely simulating the exact view from my childhood room in Warsaw, Poland.	79
Figure 32. Vintage postcard with the name of a location is used as a navigation device to change between locations in Poland and US.	80
Figure 33. 3D model of the paper plane throughout the "Lost in Translation" experience as a device to move between scenes.	80
Figure 34. Examples of some resources to find 3D models for building a project like "Lost in Translation."	81
Figure 35. Examples of 3D models used in the "Lost in Translation" VR experience.	82
Figure 36. xBot female model used in the Gulliver's Travel park scene is a free pre-rigged 3D model with a library of motion capture clips from Microsoft Mixamo project (mixamo.com).	83

<i>Figure 37. Planet earth model used in the final scene at the Space Atoll is a free model from the Unity Assets Store.</i>	84
<i>Figure 38. Word-image response for Who Am I? art project. In collaboration with students from Art &amp; Race/Ethnicity and Dr. George Rivera. 2017</i>	91
<i>Figure 39. My visual artist statement.</i>	92
<i>Figure 40. Four picks for the thesis project: autobiographical, sincere or authentic, ultimately positive, and puzzling or playful.</i>	92
<i>Figure 41. Top down concept map for a second version of my VR experience.</i>	93
<i>Figure 42. “Witness: Warsaw Uprising” by Sayam Ghosh. Historical VR experience about Warsaw Uprising during WWII using archival materials and interviews. Muzeum Postania Warszawskiego, Warsaw, Poland.</i>	94
<i>Figure 43. Traditional storyboard and Porotype #1of the “Witness: a VR Experience of Warsaw Uprising.”</i>	95
<i>Figure 44. High resolution renders from Porotype #2 of the Witness VR experience. Testing various aesthetic integrations of archival content.</i>	95
<i>Figure 45. Traditional storyboard used in Prototype #3 of the Witness VR experience to develop story and camera work.</i>	95
<i>Figure 46. Jan Rothuizen’s Drawing Room VR experience is entirely rendered using black &amp; white line drawings.</i>	96
<i>Figure 47. 2015 IDFA participants from workshop by Jan Rothuizen are surrounded by the original artwork used to create the Drawing Room VR experience.</i>	96
<i>Figure 48. Snapshot of a Jeremy Blair’s website (top) and four frames from autoethnographic animated films made by Blair’s students as part of his doctoral dissertation titled “Animated Autoethnographies.” Source: Video of Jeremy Blair’s lecture at the CU Anschutz Medical Campus in Nov. 2015.</i>	97
<i>Figure 49. RMB City (2007-2011), is a virtual metropolis developed by Cao Fei’s avatar, China Tracy, within the game Second Life. RMB City became a site for experimentation and collaboration where the historical, simulated and real mingled. Images from solo show Cao Fei: Shadow Plays organized by gallery The Mistake Room.</i>	98
<i>Figure 50. Still image from Crossover Grief Ritual by Kent Bye, VR Evangelist and host of the most popular in the community Voices of VR podcast.</i>	98
<i>Figure 51. Transition VR experience by Mike von Rotz and Joost Jordens was shown during The Art of Dying VR Experience Art Show.</i>	99
<i>Figure 52. Still images from Flatline: Experience the Other Side VR experience directed by Jon Schnitzer about death, dying and Evangelist and host of the most popular in the community Voices of VR podcast.</i>	99
<i>Figure 53. “Flatline” at the NYC VR event The Art of Dying presented inside an ambulance for extra strong feeling of presence, as if you were really there.</i>	

<i>This is one of the most elaborate and interesting approaches to displaying VR work. Source: Images from Oculus Rift store and YouTube.</i>	100
<i>Figure 54. Immersive Journalism is still a novelty but VR's ability to allow people to embody presence or feel like they are present at the event has been recognized by all major news outlets like CNN as a great tool for telling important stories in a way that can elicit emotions and affect people.</i>	100
<i>Figure 55. La Pena and many others hope that virtual reality can be used to reconnect people to each other and as a positive force for social progress. Above two reenactments of police shootings of black man. 2016.</i>	101
<i>Figure 56. Project Syria: An Immersive Journalism Experience by Nonny De La Peña show at UN to generate empathy for the plight of Syria refugees. Example of how toxic some gamer communities like 4CHAN and other anonymous social media posting sites have become. Source: Image from Steam.com illustrates how gamers community and other social media has made us less civil.</i>	101
<i>Figure 57. Still image from Hunger was Nonny De La Peña first virtual reality experience and attempt to build awareness about food shortages for the homeless in LA. La Peña is often referred within VR community as the “godmother of virtual reality and immersive journalism.</i>	102
<i>Figure 58. La Pena and many others hope that virtual reality can be used to reconnect people to each other and as a positive force for social progress. Above two reenactments of police shootings of black man.</i>	102
<i>Figure 59. People at Whitney Museum watching and reacting to Jordan Wolfson's controversial VR piece “Real Violence.”</i>	103
<i>Figure 60. Image of the CARNE Y ARENA (Virtually present, Physically invisible) VR experience by Alejandro G. Iñárritu. Source: Los Angeles County Museum of Contemporary Art.</i>	105
<i>Figure 61. Image of the CARNE Y ARENA (Virtually present, Physically invisible) VR experience by Alejandro G. Iñárritu. Source: Los Angeles County Museum of Contemporary Art.</i>	106
<i>Figure 62. Filmmaker Alejandro G. Iñárritu accepts a Special Academy Award Oscar for his virtual reality installation Carne y Arena (Virtually Present, Physically Invisible).</i>	106
<i>Figure 63. Images from Zen Parade, a meditative VR art experience by Kevin Mack.</i>	107
<i>Figure 64. Artist Jeff Koons first work in VR. Artist show directing dancer in the process of motion capture and working with CG artist creating in VR a photo realistic virtual environment for the 3D puppet of a ballerina.</i>	108
<i>Figure 65. Phantom (Kingdom of All the Animals and All the Beasts is My Name) virtual reality environment, oculus, optitrack tracking system. New Museum Triennial, Surround Audience, New York, 2015. Source: Images from artist's home page.</i>	109

<i>Figure 66. The Sky Is A Gap was made possible with support from: The Zabłudowicz Collection, London; Patty Quillin; Nvidia; Alienware; Technicolor; and Borscht Corp.</i>	110
<i>Figure 67. I Came And Went As A Ghost Hand, 2015, Virtual reality, Ed. 1 of 5+AP, 2 min 30 sec.</i>	110
<i>Figure 68. Promo image and art work for Tilt Brush for Google. Source: Images from Oculus Rift store.</i>	111
<i>Figure 69. Painter Bradley Theodore standing between two of his abstract portraits (on the left) which are displayed alongside his first all-digital 3D portraits painted entirely in VR with Tilt Brush by Google. Source: Images from the Maddox Gallery, London, U.K.</i>	111
<i>Figure 70. Images illustrating steps by artist Jonathan Yeo to create self-portrait sculpture starting in VR and ending in casting in bronze. Source: How to Make a Sculpture in Virtual Reality, <a href="https://goo.gl/RnbuJx">https://goo.gl/RnbuJx</a></i>	112
<i>Figure 71. Quill is the Adobe Photoshop of the VR4VR content creation tool that has animation tools.</i>	112
<i>Figure 72. New generation CGI artist Goro Fujita (top right) shown modeling in VR using Quill. Fujita is an Art Director, illustrator and visual development artist based in the Bay Area California. Source: Images from Oculus Rift store. Image of Fujita working from iamag.co online article Art in VR: Oculus Quill Paintings by Goro Fujita.</i>	113
<i>Figure 73. Images from Emmy Award winning Dear Angelica by artist Saschka Useld. This animated VR experience is a journey through the magical and dreamlike ways we remember our loved ones. Dear Angelica, plays out in a series of memories that unfold around you. An immersive, illustrative short story starring Geena Davis and Mae Whitman. Useld painted the whole film entirely by hand inside of VR with Quill. Source: Images from Oculus Rift store.</i>	113

# INTRODUCTION

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**The biggest mistake with VR is to interpret it as an extension of cinema, but it's not cinema. VR is everything cinema is not... that playfulness is a fantastic way to not be afraid to fail.**

*- Alejandro González Iñárritu*

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This thesis paper is a result of several months of research into virtual reality covering a span of time from early 2016 to mid-2017. This time frame overlaps with rapid changes in virtual reality technology including content creation tools and their application by various artists to create progressively more complex Virtual Reality (VR) art pieces.

The first section of this paper is a comprehensive review of art and other research materials on the topic of virtual reality, with detours into storytelling, journalism, audio design, Game Theory, Theory of Presence, as well as a brief look at neuropsychology of memory as it relates to trauma and VR applications in psychology in treatment of phobias and PTSD. Though some of these influences appear to be far apart, I will connect the topics and reveal their relevance by discussing them in context of works of other artists, including those working in VR.

The second section of the thesis contains a detailed visual record of my VR work “Lost in Translation.” I will be using 180-degree panoramas to capture the essence

of the work. Where appropriate, I will use sequential images to show the most relevant animation and/or transformations. A full media version of the “Lost in Translation” VR experience can be viewed online with Google Cardboard, Oculus GearVR, Oculus Rift, or another open VR/SteamVR compatible HMD and will be available on my Vimeo Channel (*See Appendix A for details on how to access best view the VR experience*).

In the third and final section I will summarize the most important insights I gained through making my first VR experience “Lost in Translation.” I will use pre-production materials, as well as relevant process-oriented influences, to show how the work came to be, changed, and evolved over several months. In the last part of this section I will show various ways VR work is shown in museums and galleries, and how I installed my final piece at the University of Colorado Art Museum (CUAM) during the opening of the 2017 MFA Show.

Throughout my thesis, I will be applying Metamodern Theory and Rhizome Theory. Metamodern Theory as related to the content, context and outcome, and Rhizome Theory as it pertains to the process of making the work. In addition, I will research artists in contemporary society who are working with VR and explain how their insight into the new medium has informed and expanded my vision for this work.

This thesis has three Appendix sections: A, B, and C.

Appendix A contains instructions on how to access and view online the “Lost in Translation” VR experience, a list of 52 VR definitions by Jaron Lanier, and an illustrated list of references that I found very useful to get started creating a virtual reality art piece. Most of the information in the last part of Appendix A focuses on software tools, specifically Unity and VR4VR context creation tools.



Appendix B and C includes visual samples of VR experiences by artists whose work, choices and insights have been essential to my process while working on “Lost in Translation” and/or an understanding of VR as an art medium but whom I have not directly referenced in previous sections of the thesis. The VR experiences illustrated here all have some unique aspects to them, for example aesthetics or approach to storytelling.

# PART I

## WHAT IS VR?

Jaron Lanier, an early VR pioneer and author of the *Dawn of the New Everything*, a book on the history and future of VR, popularized the idea that was later expanded by other pioneers like Nonny de la Peña and Chris Milk, and loved by the VR community that defines VR as “**an empathy machine.**” Lanier also proposed 51 other definitions of what is virtual reality and boldly asks those following in his footsteps to pick their favorite. VR definition by Jaron Lanier that I like the most is: “Virtual reality is the 21<sup>st</sup> century art form that will weave together the three greatest 20<sup>th</sup> century arts: cinema, jazz, programing.”<sup>1</sup> A list of the 52 definitions proposed by Lanier in his book and compiled by blogger Monika Jo is included in the Appendix A.

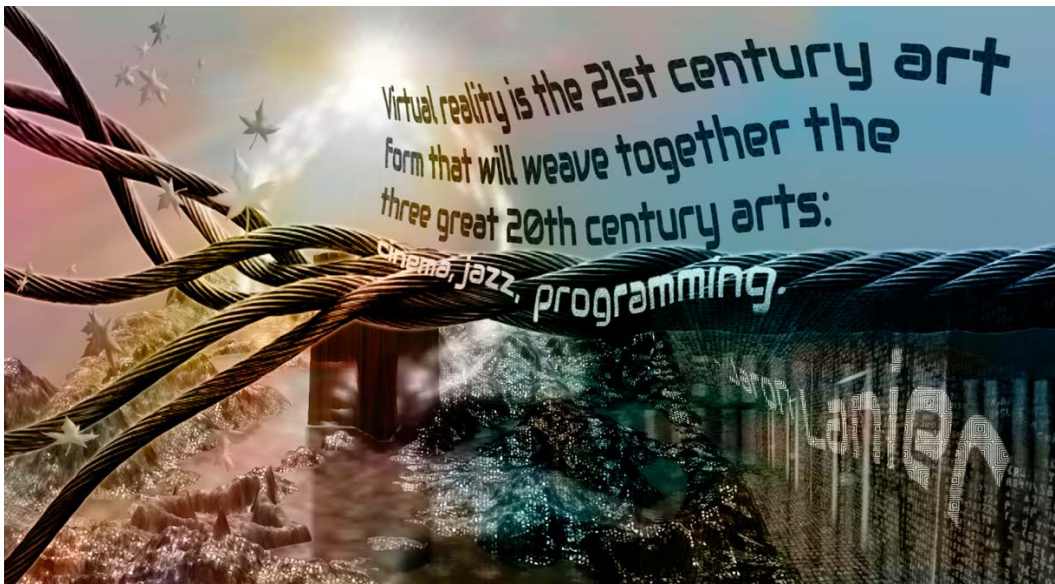


Figure 1. *Branching out*, Joanna Bugajska, 2017, digital paint, 11 in. x 6 in.

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<sup>1</sup> Lanier, *Dawn of the New Everything*.

# REAL PRESENCE, VIRTUAL EXPERIENCE

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**“We don’t just think with our minds, we actually think with our entire bodies. We don’t actually know how we construct our reality; we have some sense that it has something to do with the holistic system of our body and emotion, everything and not only that but the environment.”<sup>2</sup>**

*- Kent Bye, Voices of VR podcast*

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The ease with which Unity can create synthetic, photorealistic landscapes is seductive. Unity, with little effort, allows its users to create beautiful terrain with lush and varied vegetation, pristine or cloudy skies, and finally the long time impossible challenge, beautiful bodies of water. The artist has but to imagine a landscape and between the various packages or plugins for Unity they will be able to sculpt, paint, assemble and transform elements to make their vision real, if only virtual.

It has become much easier, cheaper and faster to create for VR, which has led to explosion of available content and many young and older artists. VR Art is already making an impact on the development of new VR tools, including features and activities already available or being developed for social VR platforms and other socially relevant virtual worlds that exist to affect the real world and culture. Google Arts & Culture allows the visitor to step into a painting, and the first VR contemporary art gallery AcuteArt is now open to public.

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<sup>2</sup> Kent Bye, #556.

Virtual reality equipment gives the viewer a more immersive stereoscopic 360-degree view of the worlds that are created. In the near future, everyone will be able to create their own safe space or happy place. This is already possible with Social Media platforms like Facebook and Sansar.

Modeling and 3D model libraries are the most common source of elements populating hundreds of recently available VR experiences. An interesting development is the addition of 3D content created with the emerging group of VR content creation tools, like a sculpting tool Medium or 3D paint tools like Tilt Brush by Google and Quill. Another new source of VR content that has come a long way is 360 video, now available in mono and stereoscopic versions at various resolutions.

One of the most important aspects of shooting content for VR has to do with whether the element will be used in proximity to the position of a virtual camera or as backdrop. For example, monoscopic 360 video makes for a good background but does not work well in Kent Bye's Elemental Theory of Presence in the middle or foreground.<sup>3</sup> While stereoscopic, or 3D 360 video, has a large depth created by two cameras recording video simultaneously and which are located eye distance (approximately 62mm) apart. 3D 360 video has more or less the same quality of spatial depth as virtual spaces. That is why the look is very different though these two elements integrate fairly well.

David O'Reilly, a Canadian animator, in his essay "Basic Animated Aesthetic" shares his conclusion that when creating an animated work, we should note that "...with all the possibilities there is no reason to try to recreate worlds that already exist."<sup>4</sup> I fully agree with him in principal but in practice I founded that, especially,

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<sup>3</sup> Bye, *Historical Context of Virtual Reality - Kent Bye's SVVR 2017 Keynote*.

<sup>4</sup> O'Reilly, "Basic Animation Aesthetics."

when getting started with the incredible tools that come standard with Unity or the many available expansion packs, reconstructing familiar spaces but making them just how you want them and bending the familiar to your will is both exhilarating and seductive.

Overall, however much research points out that for us to engage and immerse with the story's realism it is the least of necessary four elements (discussed below). According to Richard Skarbez, a VR researcher interviewed by Kent Bye for the #130 episode of Voices of VR podcast, these two crucial conditions for an experience to be fully immersive requires just **place illusion** (PI) and **plausibility illusion** (Psi). Skarbez explains how each work by referring to Mel Slater and his seminal essay on the topic of presence titled: "*Place Illusion and Plausibility Can Lead to Realistic Behavior in Immersive Virtual Environments.*" Citing Slater directly Skarbez goes on to explain both PI and Psi as follow:<sup>5</sup>

The first is 'being there', often called 'presence', the qualia of having a sensation of being in a real place. We call this Place Illusion (PI). Second, Plausibility Illusion (Psi) refers to the illusion that the scenario being depicted is actually occurring. In the case of both PI and Psi the participant knows for sure that that they are not 'there' and that the events are not occurring.<sup>6</sup>

Bye agrees that an experiential design needs the logic of the experience, so that both the place and plausibility illusions are consistent and create a GREAT experience. A holistic way of thinking is required. For centuries, the Platonic thought or the holistic approach needed feedback from both **the objective experience (mind and logic)** and **the subjective experience (body and spirit)** when considering the health of their community and society.<sup>7</sup>

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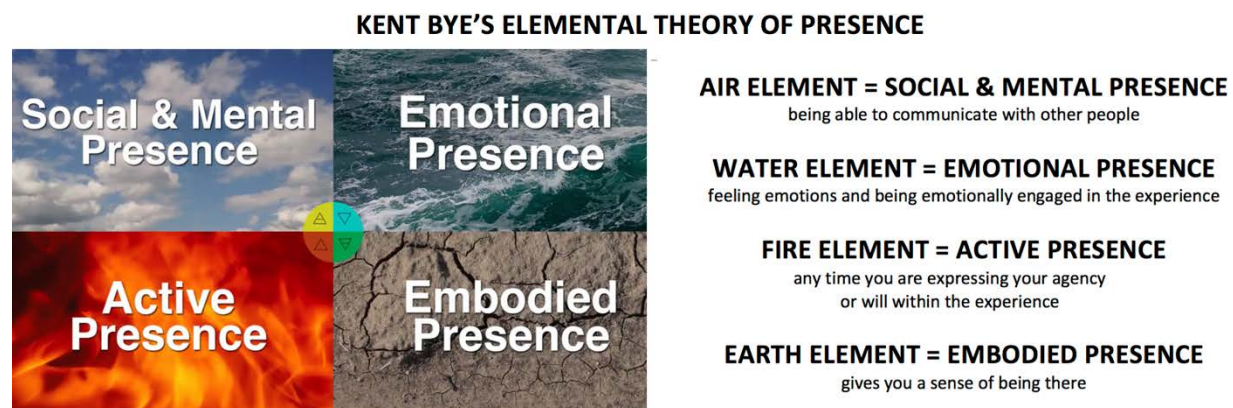
<sup>5</sup> Bye, #470.

<sup>6</sup> Bye, *Historical Context of Virtual Reality* - Kent Bye's SVVR 2017 Keynote.

<sup>7</sup> Bye.

Since the Age of Enlightenment our thinking has become progressively split away from considering the subjective experience in matters other than personal. Instead the society proclaimed the quantifiable objective experience (mind and logic) as only valid and consequential source of feedback on its condition. One of many reasons to welcome VR with open arms is that “...with virtual reality we are starting to have this convergence with objective and subjectivity, mind and body, and science and spirit [and] return to holistic thinking.”<sup>8</sup>

Mainstream tools of generating novel experiences -- namely film and games -- have their strength but each engages only some of the core four elements of presence and falls short of holistic embodied experience. Bye asserts that film, being a passive medium, engages emotions and video games build on that adding active presence and social & mental presence when engaging in multiplayer on and offline games. He then points out that virtual reality is the first holistic medium with an intact “center of gravity.”<sup>9</sup>



**Figure 2.** Slide and descriptions of the four elements of presence from 2017 SVVR Keynote address titled “Historical Context of Virtual Reality” and presented by Kent Bye.

<sup>8</sup> Bye, *Maps for Understanding VR & Reality*.

<sup>9</sup> Bye, *Historical Context of Virtual Reality - Kent Bye's SVVR 2017 Keynote*.



**Figure 3.** Four slides from Kent Bye's 2017 Keynote lecture from 2017 SVVR Keynote address titled "Historical Context of Virtual Reality." In these slides, Bye details 42 considerations in the four elemental groups.

## METAMODERNIST EXPERIENCE

It isn't every day that a NEW MEDIUM comes along. Painting, drawing, sculpture, ceramics, photography and even video and digital arts have been around for some time. Virtual reality has only recently come into being (mid-2016) as a viable tool for an artist to use.

In recent years, as we emerged from the post-modern era, a significant shift has been taking place in the type of expressions, approaches to the work, themes artist choose to explore and share, and the general tone of the work. Timotheus Vermeulen and Robin van den Akker have more closely investigated this budding change in the art world, which they termed "Metamodernism." They co-wrote extensively about it in a seminal essay on the topic that they co-wrote in 2010 and titled *Notes on*

*Metamodernism* (also see their recent book *Metamodernism: Historic, Affect and Depth After Postmodernism*). Other theoreticians have previously referred to this trend as post post-modern and defined more closely some of the shared characteristics of this art made in the last decade in the first part of the 21st century.

In *Notes on Metamodernism* Vermeulen and van den Akker asserted that there are few characteristics in works that they consider Metamodernist, which can be identified as a reoccurring or being repeated in those works<sup>10</sup>:

1. Oscillation between modern and postmodern ideas
2. Component or form of narrative or storytelling
3. Interdisciplinary nature of the work
4. Ephemeral often collaborative aspect
5. Ultimately positive and sincere

Oscillation between past and present, specifically ideas that artists has been explored in works during modern and postmodern periods. As Vermeulen and van den Akker state in *Notes on Metamodernism*: a “...the 2000s were characterized by the return of typically modern positions that did not forfeit the postmodern mindsets of the 1980s and 1990s.”

Storytelling component in the work, which often takes form of time based work or serial work that both enable formation of more complex narratives than for example a painting.

Interdisciplinary directions characterize most of these works. Many contemporary artists think and therefore work across many disciplines. For example, painters and sculptors include video and sound. Digital artists integrate performance

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<sup>10</sup> Vermeulen and van Den Akker, “Notes on Metamodernism.”



art and installation work that requires them to have skills of a sculptor and often those of a painter and more.

Ultimately a positive tone which is the greatest and notable departure from post-modern work, which was full of cynicism and often highlighted problems including social issues like racism, sexism and injustice, but offered little to no hope for better future or solutions. On the other hand, metamodernist work recognizes all the same problems as the previous generations of artists, but they prefer a more optimistic view of the future and less ambivalent and more hopeful view of human nature. These artists also often wish to communicate to the world optimism and hope that things can be better. In addition to the message of hope, metamodernists often attempt to inspire active engagement/action or AGENCY -- a term I will in later a section "Seduction of Interactivity" explore in more depth.

At CU Boulder, in the Department of Art & Art History, in his class on *Art And Contemporary Society*, Dr. George Rivera researches and lectures about the art made by artists working in the last five to ten years, same period that artists focused their theoretical work on Metamodernism. Dr. Rivera frequently points out to his students that the number of times that some of the most successful artists working today, especially those starting today, are creating work that's not driven by the medium as in modernism but that the work drives the medium. Also, appearance of a "group of artists" and collaborations including those integrating people from outside the art community -- notably various types of scientists -- is also a more common today.

Bayles and Orland said in *Art & Fear* that "...the only artist who will be successful has to learn to sustain themselves with the process of making art and not live for that finished piece." While the sentiment is probably as old as artmaking, this also reflects on the Metamodernist works departure from permanence and

commercial characteristics of work made by previous generations of artists in favor of temporary art installations, post studio sculptural practices, activism and associated happenings and other event based art experiences, performance art, and more. All these types of work cannot be easily or at all monetized because they lack reliance on the institutions of art like galleries and museums.

At the same time in a lecture at the 2016 New Dawn conference at ArtEZ Conservatory at Enscheda, Netherlands, Vermeulen and van den Akker bring up that the current generation of artists are MAKERS and unlike previous generations that thought about art from inside out by applying theory and conceptual art, there is a trend today of thinking through making<sup>11</sup>.

VIRTUAL REALITY or VR is exactly the tool we need to give even more power to the spirit of hope and vision of a better future. I believe that VR has the potential to be the economic, geographic, social equalizer and interpersonal filter against bias and hate passed from one generation to the next. However, these intriguing aspects of potential of VR are outside of scope of this paper. In the following sections I will focus on potential of VR for personal healing and positive effects on the mind that I have attempted to integrate into both the process of making work, as well the finished VR experience.

“Lost in Translation” is an attempt to understand better and ultimately accept events from my early teenage years (after much introspection and therapy) I believe to have negatively impacted much of my adult life. This is a seated VR experience that reflects on themes of identity and place through interaction with objects and

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<sup>11</sup> ArtEZ studium generale, *Timotheus Vermeulen and Robin van Den Akker*.

various media from the artist's childhood memories of immigrating from Poland to the United States.

## EXPERIENCING VIRTUAL REALITY

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**“So basically, we have this technology that can HACK our senses and put us in this crazy world where we have these experiences and our mind doesn’t necessary make a differentiation between what’s real and what’s happening in these synthetic realities, which then gives us a direct experience of what is reality .... making us realize just how much our reality is created in our minds.”<sup>12</sup>**

*- Kent Bye, VR researcher and host of Voices of VR podcast*

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### **RACHEL ROSSIN: “ARTIST'S FIRST LOOK” EXHIBITION AND *MASKED MEN***

“Artist’s First Look” exhibition by Rhizome and New Museum was the first of its kind. It is available via the internet for download or stream. Anyone can download the exhibition or use their smartphone with or without a cheap Cardboard viewer to experience the VR artworks that are part of that exhibition. “First Look” was not only the first exhibition that focused on VR as a valid artistic medium, but it also offered similar experiences on and off site.

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<sup>12</sup> Bye, *Historical Context of Virtual Reality* - Kent Bye's SVVR 2017 Keynote.

I am interested in the concept of a virtual exhibitions as a geographic and economic equalizer to reach much larger audiences. So, it was a great experience to interact with the “Artist’s First Look” virtual exhibition and see first hand the potential and experience the work. This exhibition, at least for the time being, is available online. That’s the one aspect of a virtual exhibition that I question because I see several down sides for the artists, rather than audiences, of having the work always on display. It reduces the precious novelty of presentation and experience if it can be viewed anywhere and anytime. Also keeping virtual exhibitions permanently available will saturate the art scene, both real and virtual, with show and works. Lastly, as an artist I hope to make better works each time, and good art work evolves over period of time. Moreover, an artist should not have to compete with their old work or have it as a constant reminder of either success or failure.

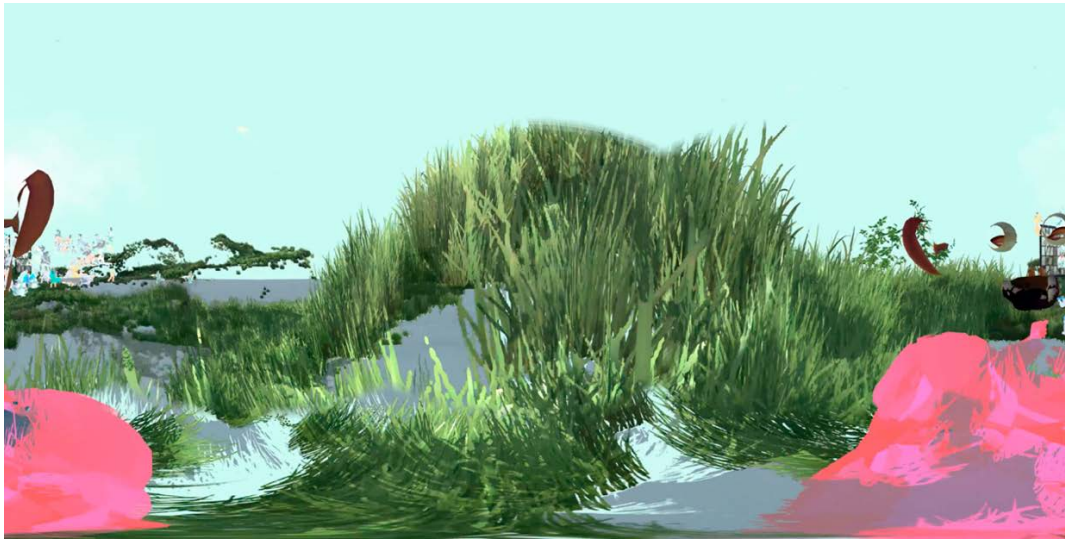
“Artists’ First Look” features work of a number of contemporary new media artists including Rachel Rossin. Rossin’s work in this show titled *Masked Man* (2016) has been the favorite from the show. Various critics, including the NYT, noted that Rossin makes use of the new medium in a way that only the VR medium can be used.<sup>13</sup>

In *Masked Men*, Rossin uses all the techniques and tricks of working with computer graphics (CG) and animation. In addition to 3D modeling and animation, she also uses machinema - a technique where CG is acquired or captured from a video game. In this case the title element, *Masked Men* presents in majority of the scenes a squad and individual characters from the game Call of Duty. After processing the captured gameplay to isolate and alter the soldiers in various configurations, she then

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<sup>13</sup> Schwendener, “In Rachel Rossin’s ‘Lossy,’ the Virtual Reality of Living in a Painting.”

altered them with various effects and patterns, and finally placed them in the 3D environment of the VR work<sup>14</sup>.



**Figure 4.** 360 panoramic image from Rachel Rossin, “Man Mask,” 2016. Stereoscopic 360° video. Courtesy the artist.

Rossin draws on some of the best practices to create stories for VR. However, she tells no story and rather than follow those practices, she breaks with conventions. The work is a meditative experience with lots of room for interpretation and letting your mind and eye roam around. There is a central theme of man-made intrusion and existential threat, and the healing power of nature. The guiding or linear element of the experience is sound and includes the soft-spoken hypnotic voiceover you often find on self-guiding meditation audio programs. The content of the words also fits the genre of meditative and self-improvement audio materials.

VR is a great medium for meditation, contemplation, and self-reflection. In *Masked Men*, Rossin captures this potential. As Chris Milk said, “Virtual reality is the first medium that captures our full attention.”<sup>15</sup> Milk’s supposition is echoed by number of other artists who also believe that it captures our full attention because

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<sup>14</sup> “Rachel Rossin - 13 Artworks, Bio & Shows on Artsy.”

<sup>15</sup> Miller, *A Different Canvas*.

the technical aspect requires the viewer to use a head mounted display (HMD) and headphones that physically isolated them from the outside world and its constant stimulus and distractions.

Rossin aids the viewer by addressing the viewer directly through an avatar with fetus-like body with a compelling adult female head. The words are loosely lip-synced with the avatar though there is no doubt that the voice, which sounds like it comes from inside our head, is that of the female avatar. This is accomplished through direct eye contact with the avatar looking straight into the viewer's eyes and following them as they "move" through the scene. The value of direct eye contact in viewer's experience cannot be overstated. This powerful tool has been used by filmmakers for decades but very sparingly. In the 2D medium of cinema, it is called "breaking the 4th wall." That wall is the screen itself and "breaking" it refers to taking the viewer out of carefully constructed illusion that the filmic world of the story extends beyond the screen by having them focus on the screen. A fantasy "brutally" halted to reflect on itself brings the passive viewer into making them aware of being "seen" and often being "seen" watching which can make one feel like a voyeur who shifts reflection from outward to inward. Often, it's not a pleasant experience, but it's always a powerful one.

Jaron Lanir, in an interview for BBC, adds to the discussion on VR's unique attributes maintaining that it "breaks down the 4th wall and speaks directly to the person in the experiencing." He goes so far as redefine "viewer" as a "participant." In VR there is no screen and the 4th wall does not exist, and the illusion of the world outside of the frame does not apply because in VR the illusion of the world beyond the frame is tangible; it exists not just in our minds as woven by elaborate use of sound and framing as is done in traditional cinema, but it is tangible. The world of the story can actually be seen, and in more sophisticated VR works, it can also be experienced

and interacted with. In that sense virtual world is REAL, and to be “seen” or make eye contact in VR is a validation of person's existence in that world.

## **ROSSIN’S “LOSSY” AND MEMORY**

Mediation between the physical reality and ephemeral nature of digital work is one of the repeating themes in Rachel Rossin’s work. She utilizes advanced digital process like photogrammetry to inform her paintings and recently she used her paintings to create a virtual environment in a project titled “Lossy.”

Rossin created the oil paintings from digital renderings of the 3D models of familiar spaces and even her own face. She photographed these environments with a digital camera in successive overlapping sequence of images through a process called photogrammetry wherein she used software to compile a 3D model likeness in the photo. In the next step, Rossin placed the 3D models in a game creation engine called Unity and applied it to parts of the model physical forces, like gravity and decay.

She then captured, or rendered stills from the simulations, and used them to create the oil paintings coming full circle from physical world to once again physical reality.

In “Lossy,” Rossin specifically focuses on our relationship with technology by going back and forth in a complete cycle between the physical and digital. The title “Lossy” refers to a process of compression of digital information which seeks to create the smallest file by dropping out similar data. Rossin captures the fragmentary nature of the process, which when preformed successively (or what is referred to as “generations”) each time dropping out more data, resulting in more glitches and degradation of the image. In an interview she compares the “Lossy” process of

compression as the natural force of entropy and how this force exists in both the physical and the virtual world.

Rossin's "Lossy" informed my own process by referring to entropy in recording digital information as a very accurate description for how our memories are formed.

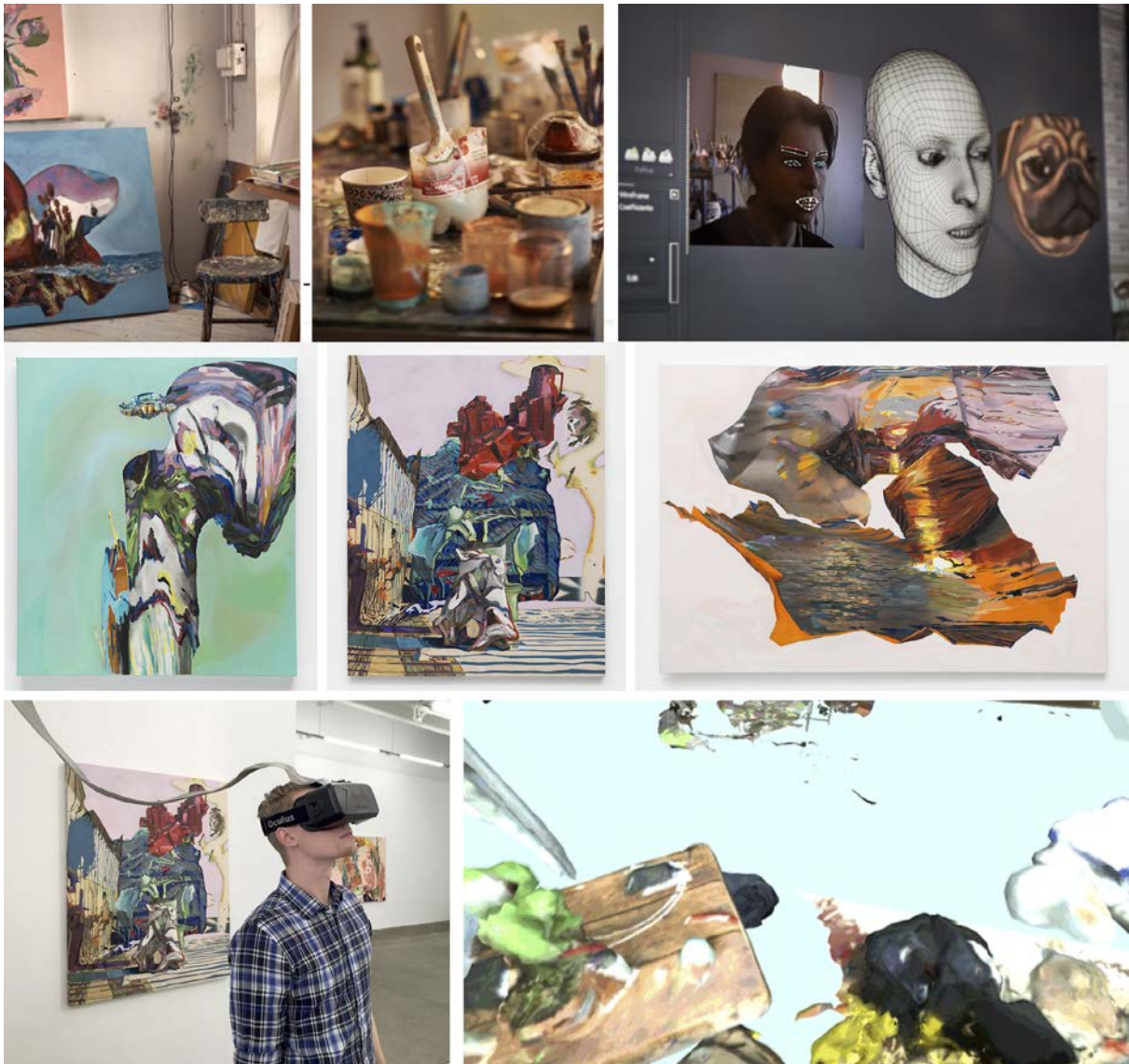


Figure 5. VR installation, Rachel Rossin, "Lossy" at Zieher Smith & Horton.



Dr. Julia Shaw in her book *The Memory Illusion: Remembering, Forgetting, and the Science of False Memory* writes about memory from a holistic but scientific perspective. She describes in different terms (appropriate to her field) very similar to the “Lossy” compression process -- like chunking, false memories and overwriting that takes place when we recall any memory.

Chunking in context of memory research refers to the process of consolidation that takes place as we acquire new information. The short-term memory has a very limited number of slots available to hold new information, from 3-7 slots depending on a person<sup>16</sup>. In order to maximize the access and usefulness of information, our mind combines related pieces of information into chunks. If you compare that with the way file compression works, they are very similar in how they work. In a computer, a chunk is called a packet and information is clustered into pockets rather than compiled into chunks. Both processes use data elimination in the process.

The human mind’s process in writing memories is a lot more complicated, often resulting in a higher degradation of information.<sup>17</sup> The many mechanisms behind this are outside of the scope of this paper. However, I point this out because the human brain has to deal with a lot more information than a computer. The data is less targeted because of the constant information flow from our multiple senses and even the least quantifiable factor of all, our EMOTION, at the time of acquiring the information.<sup>18</sup>

One of the more interesting aspects of human memory that is very physical in nature and at least at the moment without a digital counterpart, is formation of false

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<sup>16</sup> Shaw, *The Memory Illusion*.

<sup>17</sup> Shaw.

<sup>18</sup> Shaw.

memories. Digital information once recorded, if copied or viewed, will always remain the same. When you take a picture no matter how many times you copy it or open it, no matter which platform or device you open it on to view, it will show the same subject. I choose to grade it this way since depending on the screen it is viewed on. The color and detail or clarity might differ -- not because of the data which remains the same in all instances-- but because the translation of that data being subjected to limitations and peculiarities of the hardware it is shown on. This can be exemplified by seeing the same picture of multiple devices, then again on the first device and seeing that the image is unchanged and identical to the first viewing.

In our minds each time we recall a memory, that memory is overwritten by our experience of recalling the memory and as such tinted by the moments feelings, altered and/or reshaped since obtained information and possibly entirely changed by the new context within which those memories are recalled. One thing is certain is that by remembering our memories are altered. Rossin's idea of evoking concept of "Lossy" compression is a very unique and specific method of saving files that is a subject to generational entropy eventually resulting in glitchy unrecognizable images after successive generations. It is probably the most organic memory related process in the computer. However, "Lossy" compression cannot create new information adding details to the data that previously did not exist or were part of other data, but the human mind does this with ease shaping the memories, which in turn shape who we are and how we behave with the fluidity.

## **THE NIGHT CAFE**

Paintings including Edward Hooper, Vermeer, and Van Gogh, have long inspired filmmakers. It is no different for those working with VR. The Night Cafe experience

is a tribute to the last of these masters -- Van Gogh. It is based on his famous painting “The Night Café” and takes the viewer/player through a VR experience into a painting and allows, with the help of game controller, to look behind the set. The VR experience meticulously replicates the painting’s environment, Van Gogh’s brush stroke, and the feeling created by his use of colors.



**Figure 6.** Images for The Night Café, and interactive painting experience and tribute to artist Vincent Van Gogh. Source: Oculus Rift store.

## ***RAISING A RUCKUS AND ALTERNATE VIEWPOINT STORYTELLING***

*Raising A Ruckus* is the first successful attempt at Pixar-style animation and storytelling in VR. The film was produced by Robert Stromberg (an Academy Award-winning director of *Avatar*-- 2009) and Josh Wassung. These two experienced filmmakers in making *Raising A Ruckus* choose to embrace the medium and mid-story into telling it in TWO different points of view. As the warring twins gets separated during the rollercoaster-like adventure in the mysterious underground “center of the Earth” space full of dinosaurs, the viewer can choose to follow either twin and/or later replay that part while following in footsteps of the other twin. While not as powerful as most first person experiences, they allow the viewer to see each character and how they react and deal with the situation. While parallel storylines in filmmaking is an old technique which utilizes editing and often linear sound

cutting from the scene showing one character to the scene while showing the other character(s), allowing the viewer to see the same information.



Figure 7. Images for the animated film Raising A Ruckus. Source: Oculus GearVR store.

Parallel storylines in filmmaking is an old technique which utilizes editing and often linear sound cutting from a scene showing one character to another scene showing the other character(s), allowing the viewer to see the same information.

Many techniques used in film production today do not work for VR production. Parallel editing is one of those techniques that do not work at all in VR. The use of rewind in “Raising A Ruckus” taps into something crucial about storytelling in VR. I believe that something is CONTINUITY OF EXPERIENCE. I believe that the same reason that VR is able to tap into empathy and emotion like no other medium before and create lasting impact and powerful memories relies on the uninterrupted nature of many VR experiences, which means no cuts. Parallel editing doesn’t work in VR because abrupt change of location break the immersion and brings attention to itself.

Once we have gotten to the stories' conclusion, rewind doesn't pose a problem. Just the opposite, many viewers wanted to know what happened to the other character. Following each storyline separately has an added benefit that audiences are given one-on-one time with each character, allowing the viewer to empathize with each character for a time rather than having to choose which twin they like better. The two narratives join again in the final part of the dramatic story arc. The resolution with the catharsis and morals revealed is when the twins having confirmed their love for each other was stronger than any petty disagreements. They demonstrate how confirming those deep bonds has changed them by surprising their parents and getting along and willing to share the one dog Ruckus.

With the exception of repeating the conflict and climax section twice, the three-act dramatic storytelling arc is one of the oldest, most standard and proven ways of telling a story as long as stories have been told. However, it is that repetition that makes a difference in two ways. First, experiencing the story from both sides the audience is emotionally engaged on a deeper level. Repetition also plays a role in allowing the emotions to grow and foster empathy and familiarity by allowing more exposure and alternative views of the story being told.

As a result of telling the story this way, the viewer doesn't have to choose which character they will be rooting for. My experience engaging with stories is that it's hard, maybe even impossible, to empathize with multiple characters at the same time. This is especially if they are in conflict with each other or setup as being on opposite sides, as Stromberg and Wassung did in "Ruckus," literally drawing a line on the floor of the room the twins shared in the opening scene of the VR experience. The viewer follows each character and engages with them and experience in critical moments to find that each care more about their siblings and dog's safety than their own. Despite everything both kids love each other and have equally fallen in love with

Ruckus. Having experienced the story from both sides, the resolution is cathartic both times; the second time offering additional insight.

In *Raising A Ruckus* Stromberg and Wassung have succeeded in engaging the viewer's empathy by using a combination of traditional storytelling and editing techniques with only a small but significant twist from mainstream filmmaking conventions. However, Ruckus is an 8-minute animated experience, 12 minutes with the rewind. One of the challenges faced by storytellers in VR is duration. Unlike passive medium of film, VR presents a number of unique challenges, like framing.

Stromberg and Wassung's successful VR animation tells us something about editing VR stories by using the dynamic flying camera to follow the twins at a fixed distance. This is reminiscent of all third person games and is not suitable for live-action 360 filmmaking for VR. While in computer generated content, it is a snap to attach a camera to characters. In real life, at least at the moment and especially with 360 video, it's not technically viable option. Also part of the appeal and engagement in *Raising A Ruckus* has much in common with a rollercoaster-like ride. In fact a number of VR experiences populating VR content platforms, like SteamVR, Oculus Store and YouTube, are exactly that -- a thrilling virtual rollercoaster ride.

However, there is a reason why most rides don't last too long. Part of it is that such experiences have a limited novelty and rely on increased tension with each successive beat. This rising tension can only be raised so far before it has to break and resolve; otherwise the viewer will reach his/her limit brake immersion.

Flexible ejection from an experience, caused by emotional and sensory overload, especially when that experience is a narrative, ruins it. VR does put more strain on the viewer, either because we are still not accustomed to it and/or the level of

stimulation and our viewing habits, like “wide eye wonder” where we keep our eyes opened wider than normal when gazing on the new and often alien locations.

While many aspects of feature length VR storytelling are still an unknown, from games we know that interactivity and self-driven or guided experiences can be a lot longer than passive material like 360 video.

## **REAL TOPICS AND “TESTIMONY”**

“Testimony” by Zohar Kfir is one of the first interactive documentary VR experiences. It premiered at Telluride film festival in 2016. Because of its revolutionary approach to storytelling and the controversial theme, “Testimony” recieved alot of attention from critics, filmmakers and general public.

“Testimony” is a non-linear documentary about sexual assault and the lasting, often for many years, deep trauma and resulting personal difficulties and devastation. The documentary features a diverse group of victims of sexual assault who on camera recall their experience from the time of the assault through the process of reporting it to years later wherein adverse effects appear in their personal and professional lives. The victims conclude their stories by sharing what they want others to take away from their experience.

Kfir’s “Testimony” offers a step-by-step recount of the devastating burden that not only the perpetrator, but also ill equipped law enforcement and justice system, put on the victim. The often heart wrenching recollections and often equally emotional catharsis, achieved often years later (and in one case a decade later), are presented by Kfir as a self-paced interactive one-on-one "conversations."

The viewer is in full control of which story they listen to and for how long. An intriguing aspect of Testimony is that the playback of the interview is controlled by eye gaze or input. The interview plays only as long as the viewer continues to look directly at the person speaking. If the viewer looks away, the interview window fades into its original dormant state.

The reward for the viewer's time and willingness to engage a tough subject with their attention makes a genuine human connection. By sharing their stories the victims are empowered but so is the viewer. Interviews are recorded with the subject looking directly into the camera, and the viewer's gaze activates the video, like in real life "when their eyes meet."



Figure 8. Images from Zohar Kefir's interactive VR documentary "Testimony." Source: Oculus Rift store.

Few people demonstrated the power of the gaze and its significance more than Marina Abramovich in one of her most acclaimed performances entitled "The Artist Is Present." Originally held at MoMA in 2010, this performance was a unique in many



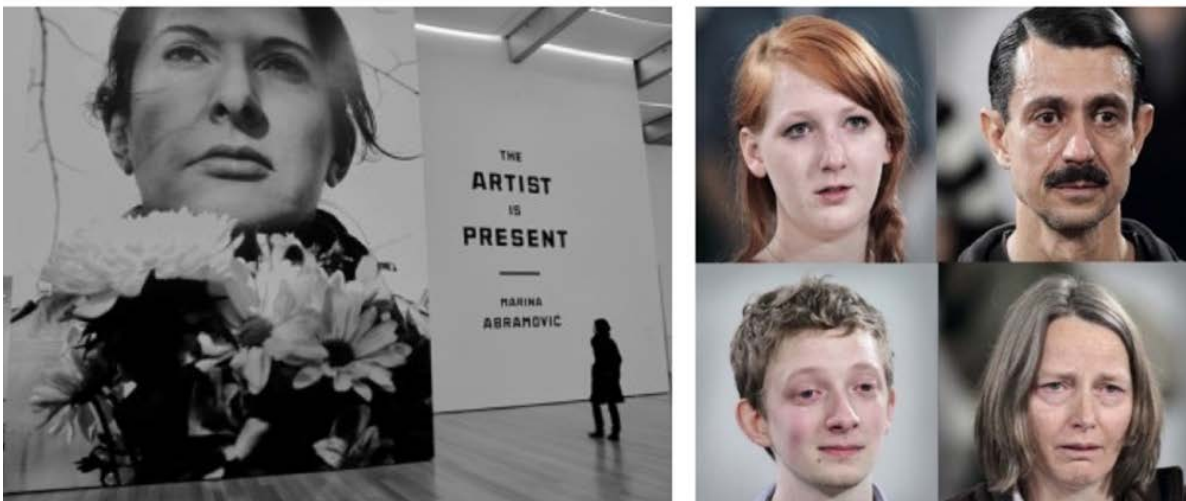
ways. For 8 to 10 hours a day for 3 months, without moving or speaking a word, Abramovich did exactly what the title of the work suggested; she was present in mind, body and soul. She was present in every way for anyone from the audience who wanted to sit and interact with her. Even though the only interaction between the artist and the audience member was through gaze, Abramovich showed that eye contact backed by full physical and mental presence is an immensely powerful means to establish unique human and emotional connection as a way of sharing that which cannot be expressed in words, like pain and existential angst that many experience. Many people were deeply affected having spent sometimes only few minutes as the center of attention of this other person, yet having been privy to 100% of their attention<sup>19</sup>.

Abramovich performance lends credit to Kent Bye's Elemental Theory of Presence and its four pillars: social & mental presence (feeling emotions and being really emotionally engaged in the experience), emotional presence (feeling emotions and being really emotionally engaged in the experience), embodied presence (gives you a sense of being there) and active presence (any time you are expressing your agency or will within an experience). Through power of her own focused presence, Abramovich in one-on-one encounter VALIDATED the presence of the person who sat with her. Abramovich in a TED Talk entitled *An Art Made of Trust, Vulnerability and Connection* goes into depth about the experience. However, it seems that the experience which she refers to as IMMATERIAL is equally elusive in being described in words. Abramovich tried imparting her experience about the authentic moment of human connection she shared with each person, that "there was so much pain and loneliness, there's so much incredible things when you look in somebody else's eyes,

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<sup>19</sup> Akers and Dupre, *Marina Abramovic: The Artist Is Present*.

because in the gaze with that total stranger, that you never even say one word - everything happened.<sup>20</sup>



**Figure 9.** Images from article *How Creatives Work: The Emotional Performance Art of Marina Abramović* showing the remarkable performance “The Artist Is Present.” This performance was about human connection and the power of presence when all four elemental needs are addressed.

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<sup>20</sup> Abramović, *An Art Made of Trust, Vulnerability and Connection*.

## NOT JUST ANOTHER KIND OF FILMMAKING

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**“The biggest mistake with VR is to interpret it as an extension of cinema, but it’s not cinema. VR is everything cinema is not... that playfulness is a fantastic way to not be afraid to fail.”**

*- Alejandro González Iñárritu*

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Kefir’s experimental VR documentary “Testimony,” (discussed in the previous section) is more than a documentary film or just a **STORY EXPERIENCE**. Kfir uses normal 2D video and other traditional filmmaking techniques like “talking head” interviews edited into clips, but then she goes beyond traditional filmmaking in ways she uses those elements and sound to create not just immersive but also interactive story experience.

How VR experiences and traditional film and animation differ in many ways including storytelling, production and potential as a communication medium is unfortunately outside of the scope of this paper. VR is unique, and in my opinion better suited for storytelling as a means of imparting human experiences. However, the diversity of related topics and a whole new group of essential VR films, documentaries, and filmmakers which should be included in any discussion on this topic deserve further attention.

*Miyubi* (2017), world's first long-form scripted VR comedy<sup>21</sup> is one VR film that has been essential in guiding my process, which early on included 360 video and at a later stage a 360 stereoscopic (3D) video. *Miyubi* has a duration of 40 minutes and

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<sup>21</sup> Matney, “Embody an 80s Family Robot in Funny or Die’s Feature-Length VR Flick ‘Miyubi.’”

unlike previous attempts at VR films longer than 20 minutes, it succeeds in giving audiences an immersive experience without physical discomfort, e.g., eye fatigue, headaches usually brought on by eyestrain, and in extreme cases nausea and motion sickness.

With VR technology itself being a novelty, today just looking around the space can be enough engagement to an audience for 10-15 minutes, but for the same reasons it's actually harder to tell a story. In VR the filmmakers have to guide the viewer not around the frame but in full 360 environments and have additional task of caring for their audiences' physical comfort and have try to prevent the viewer from wearing themselves out<sup>22</sup>. Because physical comfort and its effects of duration on it to audiences' satisfaction with VR film or experience, the industry has taken to rating both in levels of comfort. VR experiences on all main platforms like Oculus Rift Store, Vive Store, and SteamVR are rated as comfortable, moderate or extreme.



Figure 10. Poster promotional image and five 180 panoramic shots from VR film *Miyubi*. Source: Oculus Rift Store.

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<sup>22</sup> Matney.

## MIYUBI AND POV

*Miyubi* tells a good story but despite being written specifically for VR, its story could be just as well told in traditional film form. Here is the very normal synopsis of the film:

*Miyubi* is a 40-minute virtual reality comedy about a Japanese toy robot - inhabited by you, the viewer - gifted to a young boy on his birthday in 1982 suburban America. Over the course of a year, as the boy's family fractures apart, you experience love and your inevitable obsolescence in an intimate, hilarious and endearing interactive story<sup>23</sup>.

What makes *Miyubi* so successful and a significant insight into VR storytelling is precisely that it is an otherwise normal story told well in this new medium. What makes Miyubi's work so well done are the filmmaker's choice to return to one of the earliest film techniques of uninterrupted long takes and their choice to **CAST THE CAMERA** in the film in what arguably is the film's main character, the Japanese toy robot name Miyubi.

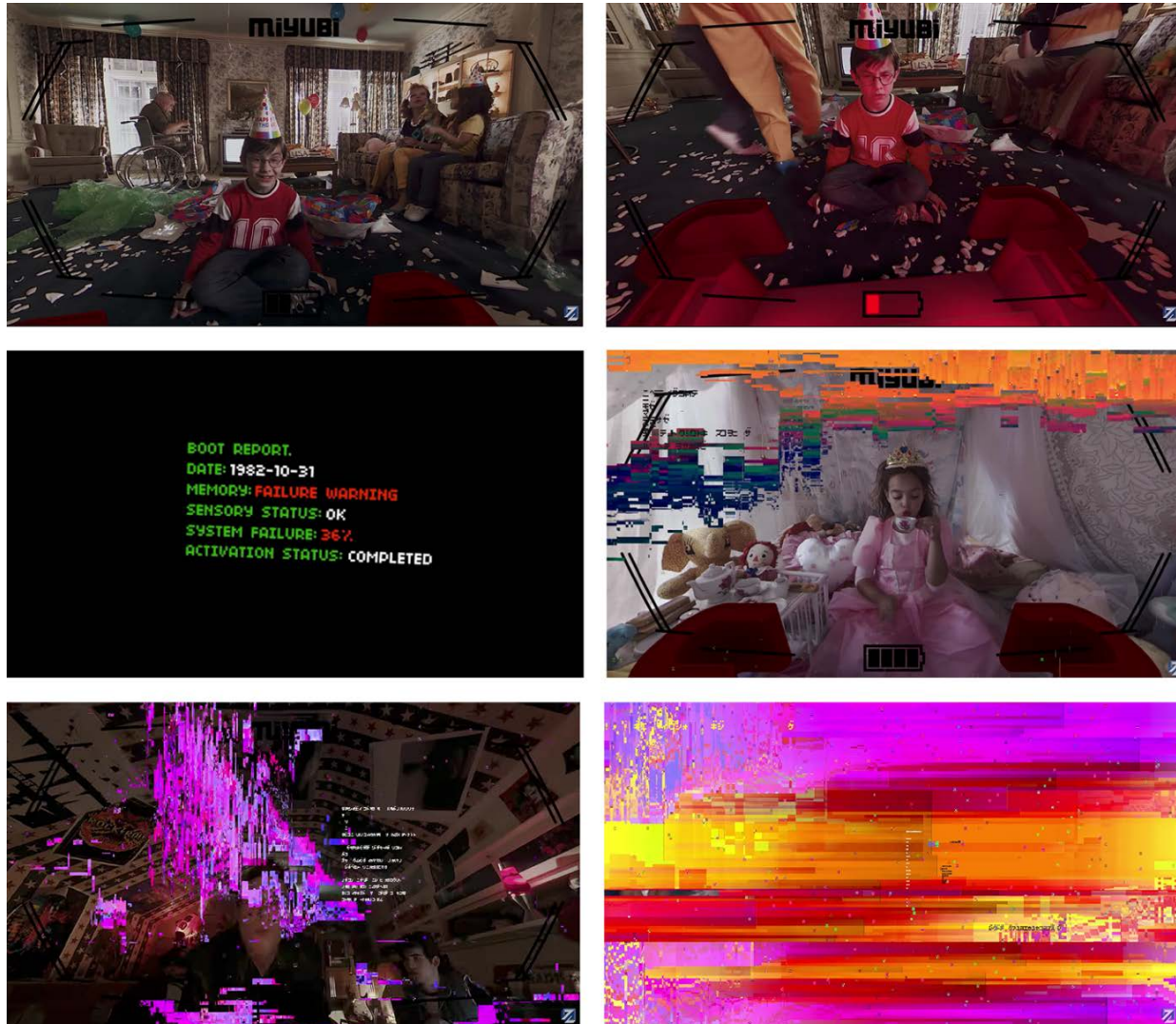
The entire film is shot from the perspective of the robot toy Miyubi and this is emphasized in number of ways including a digital overlay onto of the video that includes elements that you would expect a robot toy to have on their display, e.g., a battery life indicator. The concept of using other characteristics commonly associated with a robot toy such as a digital data display, software glitches and even a full breakdown or a shutdown are all cleverly integrated into the film's editing providing natural transitions. Smooth transitions between shoots and scenes is one of the big problems for a VR film and VR storytelling in general. In film cuts are the foundation of film grammar, but cuts are too abrupt for VR and result in viewer strain and lost engagement. Right now in VR filmmaking the creators agree that the fade in and out

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<sup>23</sup> Lajeunesse, *Miyubi*.



is the best and most universal transition. Fade in and out is essentially what *Miyubi*'s creators did but they added story driven context and aesthetics to those transitions making them an organic part of the film.



**Figure 11.** POV screenshots of the stereoscopic 360 VR film *Miyubi* showing the overlaying robotic interface to enhance “seeing through the robot’s eyes” point-of-view in which the movie is shot. Also shown are image glitches. Note: These images have been reduced from 360-degree panoramic footage to a 16:9 video frame for a web trailer. Source: *Miyubi* official trailer, <https://www.youtube.com/watch?v=90qS3ZyPMI>



**Figure 12.** Example of a POV shots from *Miyubi* which enhanced viewer's embodied experience where *Miyubi*/Viewer can see whom they are "playing," what they look like (right) and even interact with their reflection (left). Source: *Miyubi* official trailer.

During the set-up stage of *Miyubi*'s dramatic arc, the viewer can see what the robot toy or their avatar in this VR film looks like. In first few minutes, one of the kids unpacking Christmas gifts speaks directly to *Miyubi* asking if he knows what he looks like and pointing in the direction of the big box that's off to the right (just outside of corner of the viewer's eye and normal field of vision). Using all three methods of guiding viewer's look to a specific point in the scene increases the likelihood of its happening. Those three ways of setting up cues include: proximity, direct eyeline, audio cue or in this case dialogue cue, and good old fashion pointing.

Midway through the story, the viewer again gets to see themselves as *Miyubi* robot but this time it's a live feed which reflects real-time tracking of viewer's HMD mirrored on the image of *Miyubi* on TV. The addition of this minimal interactive component and allowing the viewer the time to play with their virtual body is very significant. This long scene can be seen as extraneous to the actual storytelling as it does little to forward the narrative, but it's crucial in deepening viewer's engagement as well as allow for the viewer's body and eyes to rest on a single point in the scene for an extended period of time.

This scene can be compared to an intermission or half time commercial break as it comes midway through the film and shows the viewer their avatar, a digital body

representing the viewer in the virtual world, reengaging the viewer on an even deeper level than before. Seeing one's virtual reflection, or in this case live video, regardless of the shape and size of the physical form if that representation matches our movements in real-time, our body and mind are able to suspend disbelief and develop body presence -- one of the four pillars of full presence.<sup>24</sup>

The final element of *Miyubi*, which is largely responsible for achieving the full presence in VR and the embodied experience it ensures, comes from the way filmmakers used eyeline and a 360-video version of a close up.

The character of Japanese robot toy Miyubi is literally central to the way the film was captured. The viewer is given a role of the toy robot which for the most of the VR film is a passive observer of the developing story and sometimes as a passenger brought along for the story. In few shots Miyubi/viewer is directly addressed by actors as if its part of the action. At a second look, all dialogue directed at the robot/viewer is rhetoric (not requiring response) and does not change or advance the story. This act of “being seen” or “acknowledged” makes difference in engagement when aided by deliberate eye contact yields unporportinal benefits deepening and/or renewing the viewer's engagement.



**Figure 13.** Example of a POV shots from *Miyubi* which enhanced viewer's embodied experience where acting includes eyeline, dialogue and action which are performed at Miyubi/viewer as part of the story. Source: Miyubi official trailer.

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<sup>24</sup> Bye, *Historical Context of Virtual Reality* - Kent Bye's SVVR 2017 Keynote.



Unlike in a normal film where it's the filmmaker who chooses which part of the scene is seen, in a VR film the viewer has the agency over which part of the 360 scene or environment they are looking at in any given moment. A new challenge for filmmakers is how and how much to guide the viewer through the story while accepting that ultimately that the director cannot direct where the VR audience is looking without heavy-handed techniques, like expressly blacking out other areas but where the action is happening.

*Miyubi* is going to be a case study in how to use proximity, a 360-video version of shot sizes such as wide shot or a close-up, to give the viewer both freedom to explore the scenes and be able to effortlessly follow the story. Other amazing techniques used in *Miyubi* to achieve this successful embodied VR film experience are unfortunately outside of the scope of this paper and are better suited for discussions about 360 filmmaking than VR experiences which constitute the majority of art made in VR.



**Figure 14.** Six shots from Miyubi VR film showing various traditional framings done by blocking actor's proximity rather than cameras to actor or lens types as is done in film or video.

All shots show above have been cropped from a 360-panoramic image in the area most likely to be the viewer's focus during that moment and framed in familiar 16:9 frame ratio. Wide shot allows the viewer's look to explore the scene while still following the story mainly by listening to it after initial orientation (top). Medium shot as used in Miyubi was characterized fewer direct eyelines and fewer interactions. Unlike wide shot, medium shot puts the viewer close to the action, and proximity of the action and characters naturally focus the viewer's attention where the action is (middle). Close up simulates arm's length distance daily used in western society as comfortable one-on-one interaction distance. In Miyubi most close ups are characterized by personal interaction with the camera as the Miyubi character, often including direct eyeline and dialogue (bottom). Miyubi also uses extreme close up where one of the characters reaches in or even steps in what in Western society is considered a personal space or bubble. This results in a very immediate and physical response from the viewer. Both close up and extreme close up naturally lock the viewer's full attention.

## PART II

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**There is so much possibility in 3D software to create original worlds there is simply no excuse to try and recreate other ones. To get there I feel we should forget everything about the idea of right or wrong, of beauty and ugliness, and focus on the idea of coherence.<sup>25</sup>**

*- by David O'Reilly*

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### "LOST IN TRANSLATION"

"Lost in Translation" is the perfect title of the work as both literal and metaphorical because many things were lost in translation in the artist's original personal experiences, the experience of making the work, the final result, and the work itself. Whether translating human experience through time by excavating childhood memories or trying to create a complex experience using technology, many things including those that are important have been lost in translation.

One of the bases for the project and an important personal revelation while making this project has been that the period immediately after moving to United States from Poland when I lost the ability to communicate until much later when I have learned to speak and read English. This period has greatly affected me and set

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<sup>25</sup> O'Reilly, "Basic Animation Aesthetics."

a stage for a lot of later events in my life. While unable to read, a source of great comfort to me, I turned to Hollywood and television.

One of the films in the recent years that has stuck with me was Sophia Coppola's 2003 film with Bill Murray and Scarlett Johansson under the same title, "Lost in Translation." The film is a story about two characters that have a moment of connection --something I feel I have tried to achieve with this work-- a moment of connection with my younger self. In this paper, I will touch upon each of the aspects that inspired the work's final title: memory, illusions, language, relationships, and literature, media, and film.

Translation is an important term for many reasons including English being my second language. It includes the misses in communication during my first few years and even now, expressing myself. I can also add a different meaning to the word "translation," which is both literal and metaphorical. In computer graphics (CG) the word "translate" refers to MOVING an object in space, which is very appropriate here since I am focusing on my experience of moving to the US from Poland. Likewise with this project, I have moved into a new medium - virtual reality and have moved forward in my life with confidence that I have found my medium of choice.

When I came to the US, I experienced an extended moment when I found it impossible to understand and be understood. I wasn't able to communicate. I also found it impossible to enjoy books and follow the stories because reading a page would take hours. Having to use dictionary and make sense of the word puzzle seeping all the joy from reading. In retrospective, language barrier is a very normal problem for most immigrants who come from non-English speaking country, but it was one that I did not expect and which did not fit my expectation of what moving to USA, which I have longed to do for years, would be like. Rather than being able to join in and

continue life, it felt like a reset and starting over again while being far from everyone else.

Even once I have learned sufficient amount of English to communicate with relative freedom, fitting in and using the language in a way that didn't cause miscommunications and social tension presented a problem. To this day, I learn new cultural idioms, their meaning and proper context to use them in. For example, "walk in the park" depending on context means "easy," but "walk in the woods" again depending on context means "waste of time." It can be overwhelming and isolating to find that you understand nothing and can't even make yourself be understood when you do make the effort and learn the words.

One of the first things I noticed upon my arrival in my new home in Pueblo West, Colorado was that there were NO TREES anywhere, and the poor caricatures of the trees you find on the open plains just made it worse. The open spaces were desolate, not devoided of charm, but actively feeding my melancholia and feeling of isolation and detachment. Growing up in Poland, woods have always been about having a quiet place to enjoy and look for those little awesome encounters, like the deer or even mundane yet exhilarating nonetheless squirrels. I would ride my bike and drop it by the side of the road and just hang out in the woods. Sometimes with friends but mostly alone. My quiet place, to think, read and fantasize. When I first moved to US all these familiar activities, especially reading, were no longer ways I could spend time or things I could do. I was less able and it felt less as a person than before.

Distances were also staggering. My dad got me a bike so I would have freedom to go where I wanted... not that there was really anywhere to go, not like it was in my native Warsaw (the capital city of Poland) -- a city of two million people and a cultural capital with galleries, museums, theaters, and one of my favorite hangout places the

PALACE OF CULTURE. There was no culture in Pueblo West or in Pueblo, which was too far for me to ride my bike. In the first weeks when I tried to ride to Pueblo, I had a sun stroke and fell by the roadside. This caused a whole incident, where people stopped in their cars to help me, emergency responders came and they all wanted to help, but I could not understand them and they could not understand me. However, they knew my Dad. My dad, who worked for KRDO News station, was listening to his police scanner and when someone mentioned a girl on a bike, about 13, who didn't speak English, and was probably Eastern European, he grabbed the scanner and was already on his way before police even started looking for my parents.

After that I didn't bike to Pueblo and back too often. In the heat it was exhausting and the sun in Colorado was unforgiving, and in Pueblo West there were no trees to give you a shade. No trees except right next to the river. Down in the valley the river runs past the dam and the man-made Pueblo reservoir. It was a blessed strip of what, with some imagination, felt familiar -- like a forest with majestic tall and bushy trees freely sheltered from the sun in cool or at least cooler shade.

However, it was far. Often, I would not go as far as the look-out point, which became my favorite place to go and just sit on the edge of the cliff and look down at the reservoir with its gleaming surface and the treetops of the riverwalk below.

Back then, I was still the person I see my childhood self was, the person that I thought was growing up in Poland before we moved to the US. My biggest heroes were Peter Pan and Pipi Longstocking.

Back then, I was still fearless or at least faced my fears like fear of heights, so I would climb the biggest tree and brave going on terrace of the Pałac Kultury in Młodeży, a spear unlike the Chrysler Building in the heart of Warsaw and the tallest building over 60 stories tall, back then.

Back then, I was fit and would ride my bike and explore the surrounding my neighborhood areas or on the weekend ride as far as I could to the Old Town, to banks of Wisła river, and once in a while even crossed to the other side and go to the Warsaw Zoo, all the while letting my imagination cast me as the hero of a great adventure, or a great explorer or a secret agent.

However, the stark vastness and emptiness of the land, the unforgiving sun were not what I expected. Still I could relate to the landscape, and find my way in it. Even that was lost when on one of my nightly adventures - when I sneaked out of the first story window of our apartment - and walked for hours in the hills, usually going to my favorite spot overlooking the reservoirs.

One time I climbed over the fence of the local swimming pool and swam and just floated in the cool pool, but at 6 AM the cleaning attendant put an end to what was otherwise an awesome adventure.

### **When did I stop looking for adventure? When? Where? Why?**

When did safe become more important than stimulating? When did my curiosity and joy in life die? These hard questions are some that I want to explore while reconstructing a specific period in my childhood, which I believe was a crucial turning point in my life. In this work, I will focus on the year I moved from Warsaw, Poland to Pueblo West, Colorado in United States. At the same time I will reconstruct memories of that time looking for insight. I will use iconic elements of those memories to construct related environments both external and internal in virtual reality.

This is where my story “Lost in Translation” begins. Below is an excerpt from the voice over from the introduction:

Here is the first story I want to tell in this new medium, to share with you what I thought of as too ordinary and unrepresentative to make for a good story; my own personal story of moving to the US at the age of 13.

I am not a refugee; I don't come from a war zone; I didn't travel to US via dangerous routes; I didn't come here illegally. I have family here. I am white and my Dad had a good job, and a stable life was waiting for me and my sister when we arrived via the longest flight of my life into a new homeland of the USA.

That is not to say that everything about my story is plain. My mother passed away from cancer only a few weeks before we moved. Long before that, I have dreamed of coming to the USA and living here. I was inspired by the books, the movies, colorful photos of parades, Western Stockshow and the American flag.

I have flown here on a fantasy flight many times. I have day dreamed about it so often I thought I already knew the place, that I was finally HOME.

## **OBJECTS AS MEMORIES**

The main set for “Lost in Translation” is a virtual reconstruction of my childhood room in Warsaw, Poland. Various objects that I have chosen to place on the set and highlight with color have a special meaning to me.

To communicate the associated memories or those objects individually or as a group are developed into scenes that play when the object is triggered. In the show version of “Lost in Translation” all objects are triggered automatically at a specific time. The order and various scenes can be seen in a storyboard format in the next section titled “Chronological Cinematic.”

The process of reconstruction of the spaces was especially important and synonymous with reconstruction of the memories, which I have buried and not touched in a long time. In a process like a forensic reconstruction over a period of



months, I have recreated the spaces occupied during my transition from leaving in Poland to living in US.

I selected the most important objects as visual anchors for my thoughts and feelings concerning meaning of being “Lost in Translation.” Below is a list of some of those important objects with brief explanations.

Important objects from “Lost In Translation” virtual sets:

- bed
- windows and postcards
- posters
- books
- radio
- the globe
- aquarium
- bicycle

## **BED**

The bed occupies much of the room, but it is also symbolic of the time I spent in bed, especially during the peak of my depression in the time-period of my life that “Lost in Translation” VR experience focus on. For me, bed is also symbolic of a “safe space” where I can let my mind drift and daydream. Once books no longer served as never-ending sources of stories, I replaced them with television and movies as the content for the inner screen of my imagination.

## **WINDOWS AND POSTCARDS**

Windows in the experience have mostly a literal function for knowing locations; Warsaw, Poland, or Pueblo, Colorado in United States, where the scenes takes place.

Postcards are both literal and symbolic of the back and forth connection between the two places, i.e., as when being in Warsaw I would desire to go to Pueblo where my father was living and working and later being in Pueblo I would desire to go back to Warsaw.

## **POSTERS**

Poster originally were intended as symbolic representations or buttons for the respective scenes. For example, “Welcome to Space Atoll” shows a view of the space lagoon and when selected it would activate that space. Due to technical difficulties, I have largely eliminated interactivity from the project.

The posters remain as a connection to the follow-up scenes as well as a mental anchor. It was in that space that I have conceptualized and made the decision to create those scenes.

## **BOOKS**

Books are a reoccurring theme in “Lost In Translation.” The book, *The Little Prince* appears several times in the VR experience. It has a number of meanings for me. It is a book, and one of only objects from Poland that I still have. It is also symbolic of my struggle to learn a new language, and finding that joy in reading that I have always depended on is literally lost in translation. Having to check every other word for meaning in a dictionary interrupts the story or rather to never let it unveil. *The Little Prince* is one of the important aspects of the experience that is the transition from books to TV and movies to doing nothing.

In the first room in Warsaw there are tons of books. I went so far as to find covers of some of my favorite books and placed them on the objects. In the room in Pueblo the only books visible are *The Little Prince*, Dr. Seuss ABCs and a Polish-English dictionary. Eventually even those are gone, as I have stopped reading. For a decade I would not read a single book. It is worth mentioning that at the same time I have quit high school.

For me, books represent a bridge to imagination, especially *The Little Prince* book that in many ways is about the inner world of imagination. It starts with the popular drawing problems of the elephant that ate a snake and the best sheep in the box. The two pages of the actual book *The Little Prince* that I used to texture the object in the experience are the sheep in the box and my personal favorite, “flight of fancy” or in other words engaging your imagination.

## **RADIO**

While I was growing up in Poland, kids did not watch much TV. I included the radio, and a related scene with the bubble bath during which I listened to fairy tales and other radio programs for children to highlight the difference between my earlier habits of consuming stories while living in Poland and after moving to the United States.

We had a black & white TV in Poland but unlike in the U.S. there were little interesting programs, especially for kids. The VCR was a rare possession, as the first video rental place opened in our neighborhood at about the time that I left Poland in 1993. I found my habit of consuming stories through books and later other media fundamental to my insight of how that time changed me.

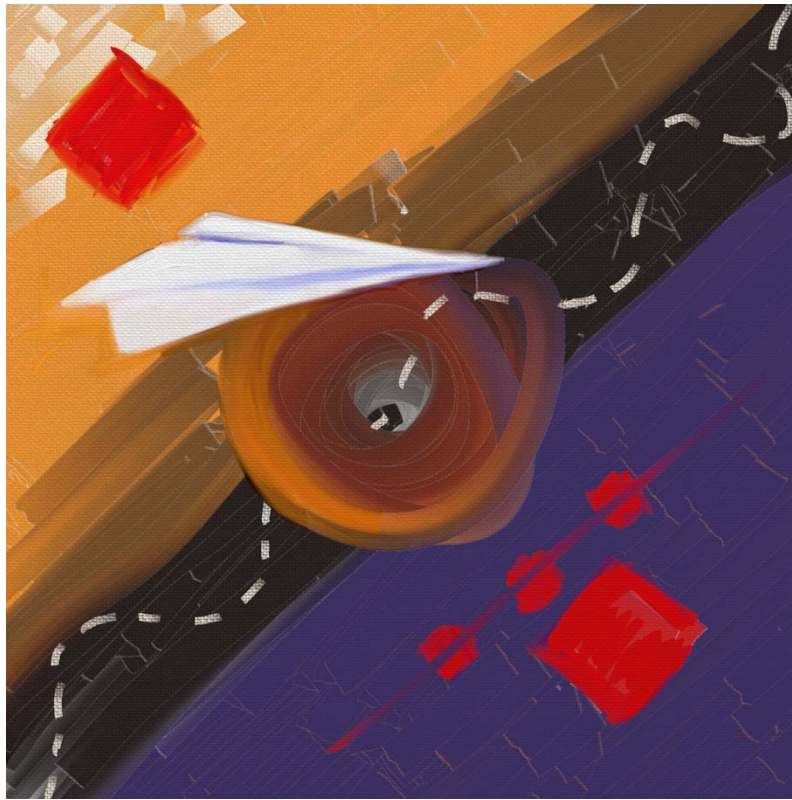
## BICYCLE, GLOBE AND AN AQUARIUM

Earth globe, bicycle and the aquarium are all symbolic objects. In Poland I had an aquarium on my desk but in “Lost in Translation” I used it primarily because of its connection to water which I associate with transition including changing states. The glob represents my book-inspired childhood desire for globetrotting adventure and travel. The bicycle represents the freedom, mobility and the spirit of exploration.



**Figure 15.** 360-degree view in 180-degree panoramas of the main virtual set from "Lost in Translation."

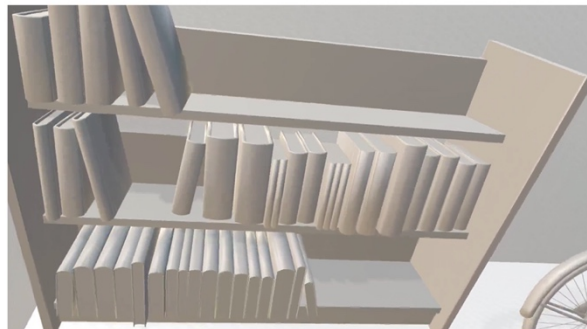
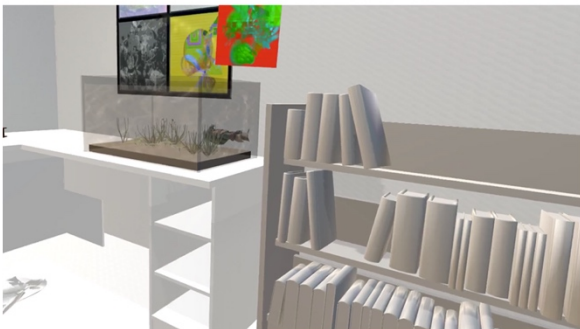
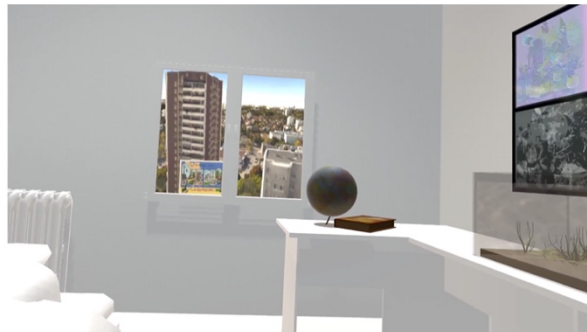
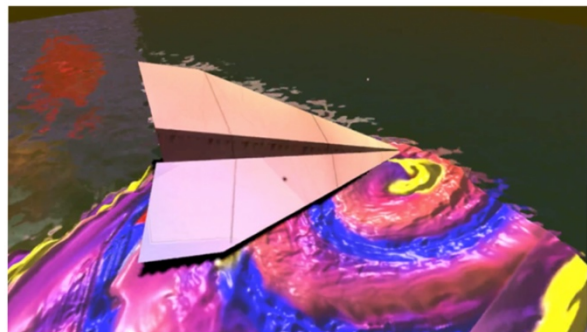
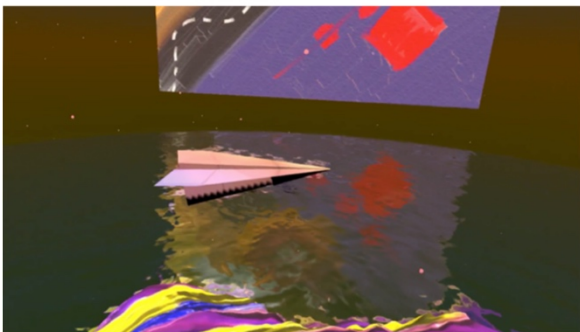
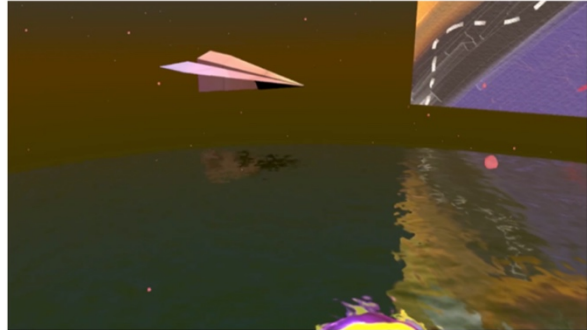
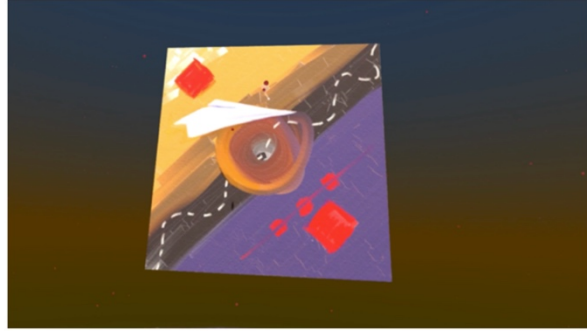
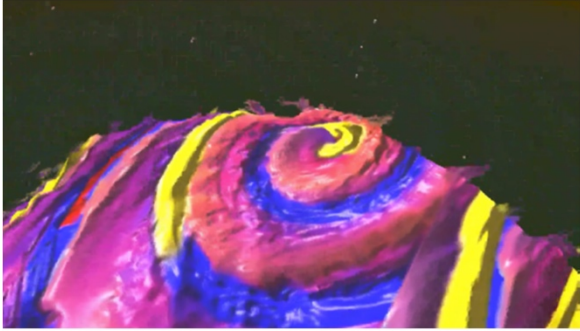
## LOST IN TRANSLATION IN IMAGES



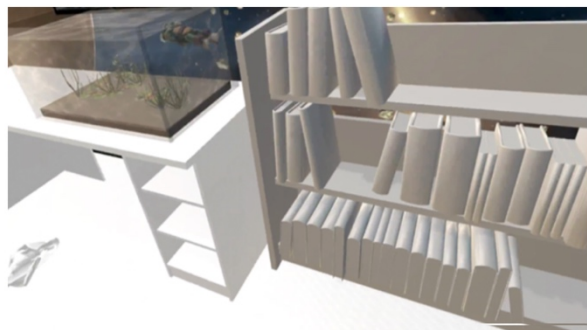
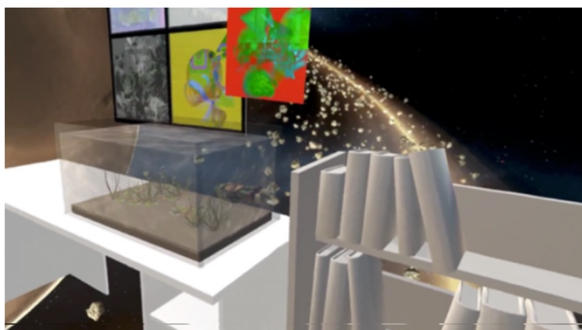
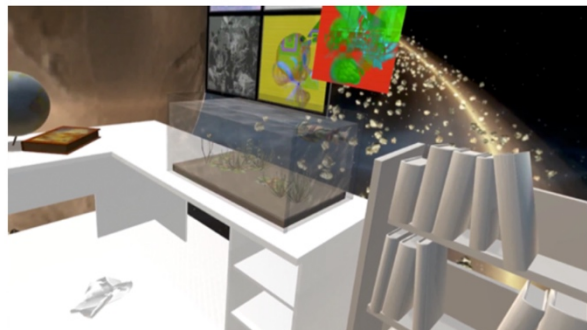
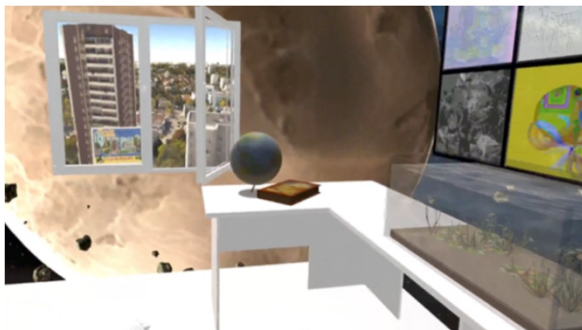
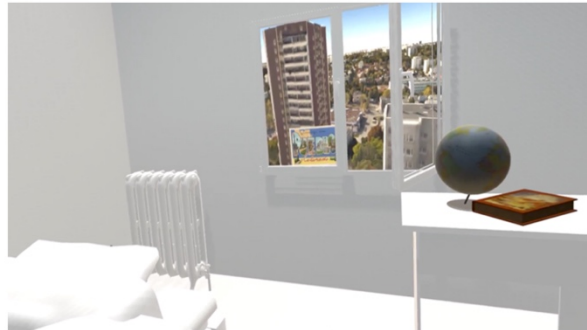
**Figure 16.** “Transitional Flight,” 2017, 34’x 34’, digital painting printed on canvas paper. This painting is an abstract visual storyboard for the work.

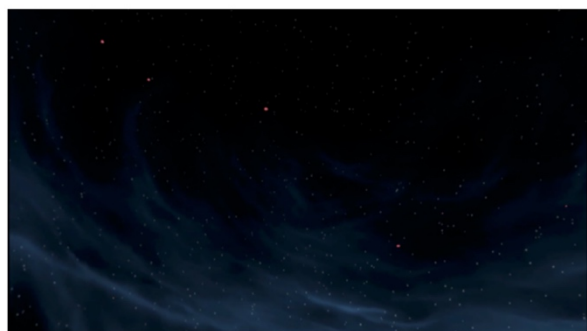
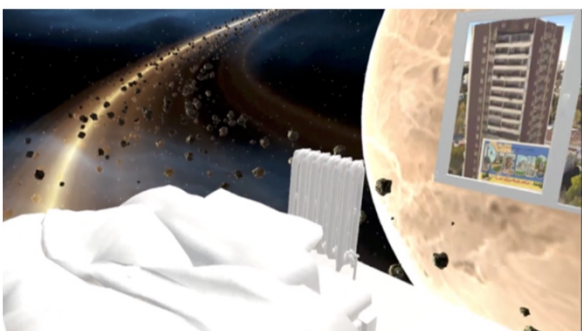
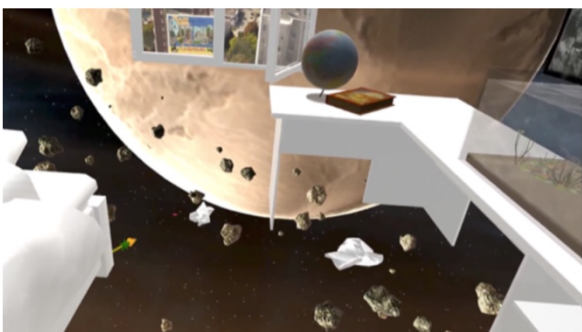
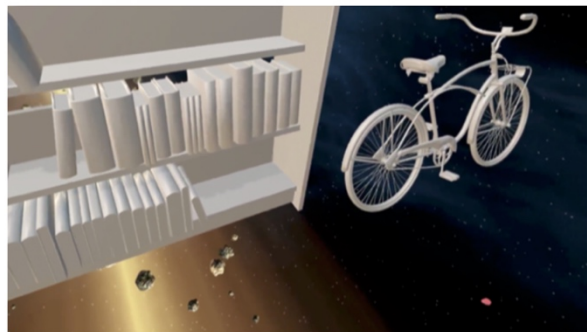
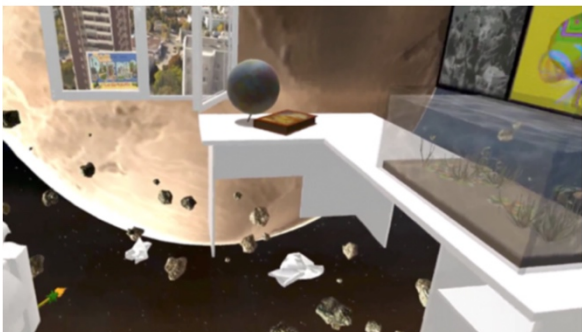
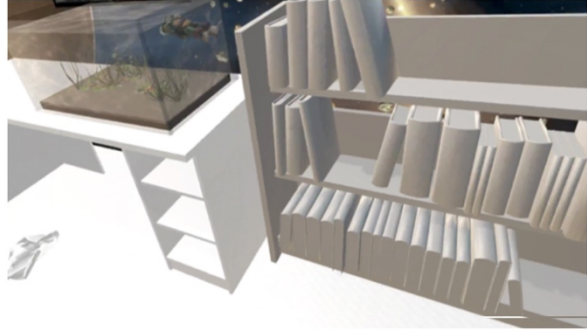
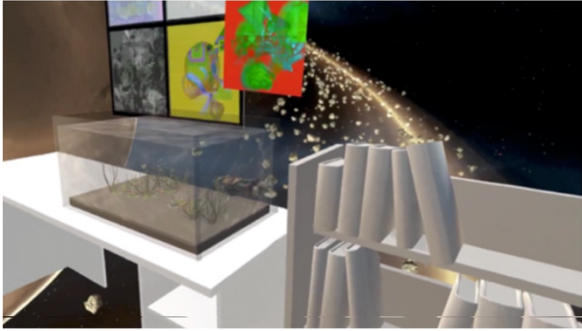
## CHRONOLOGICAL CINEMATIC

Below images are a chronological capture of my “Lost in Translation” VR experience. These images were captured in 16:9 screen format and attempt to follow the focus of the narrative. The focus is intentionally loose and mostly driven by sound and special effects like light and emissive particles. The viewer has full freedom to look around the 360-degree environments. In Appendix B are posted the 180 degree panoramas that better capture the immersive environment. However, still images lose coherence at any attempt of the underlying narrative.

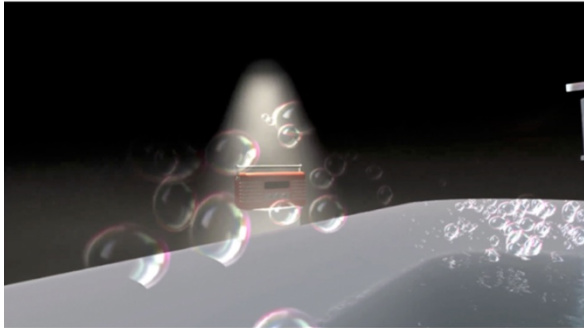
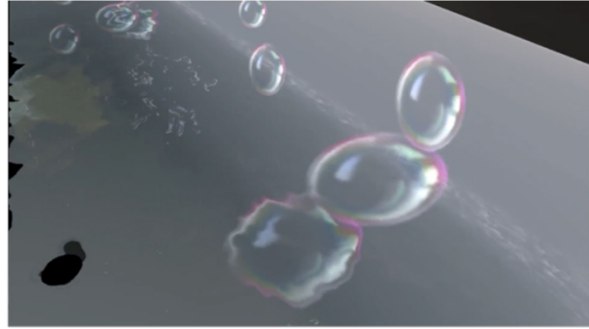


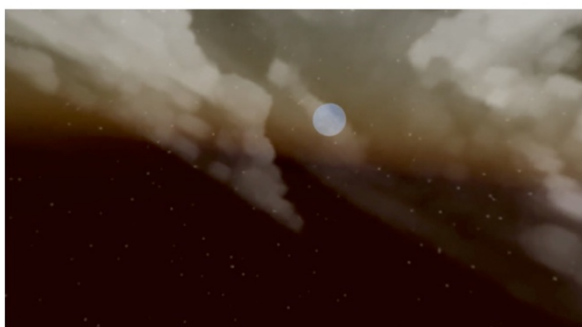
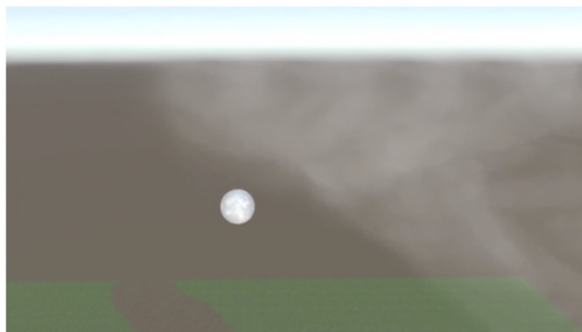
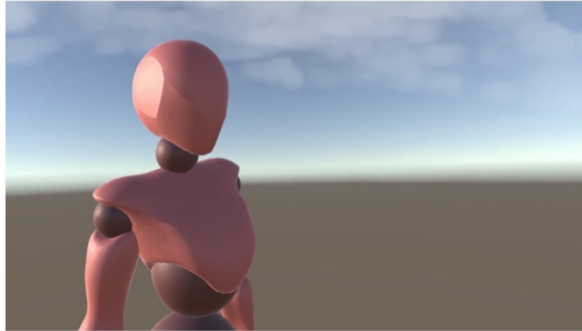




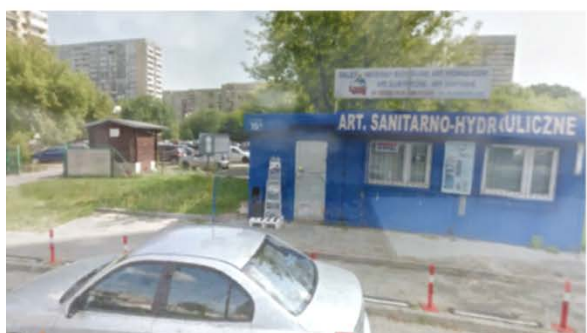
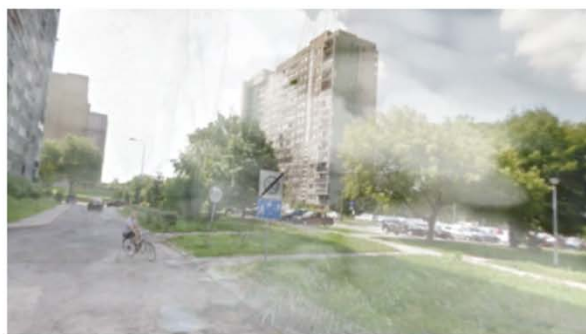
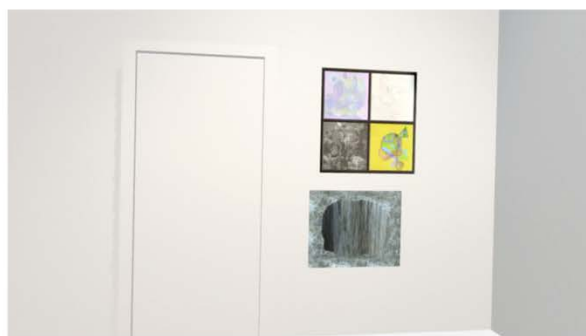
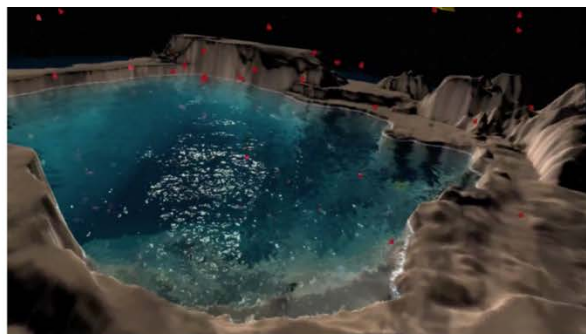
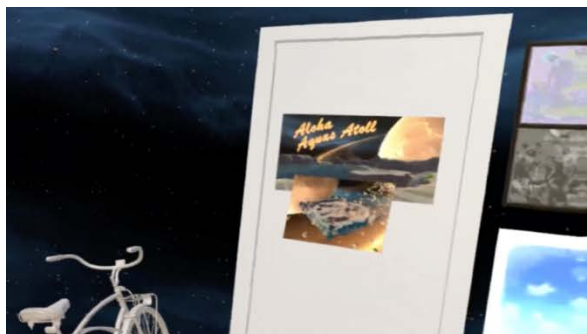






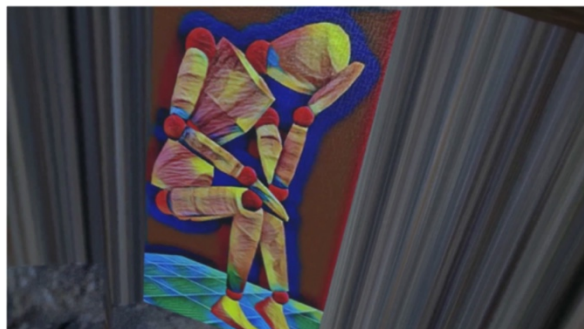
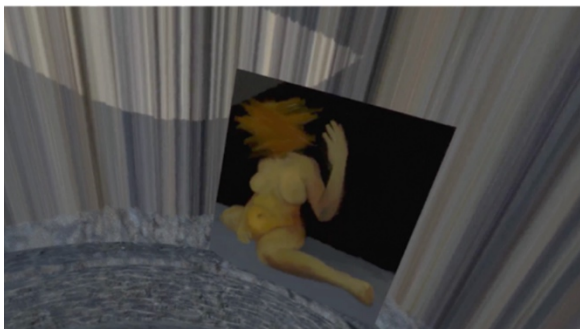
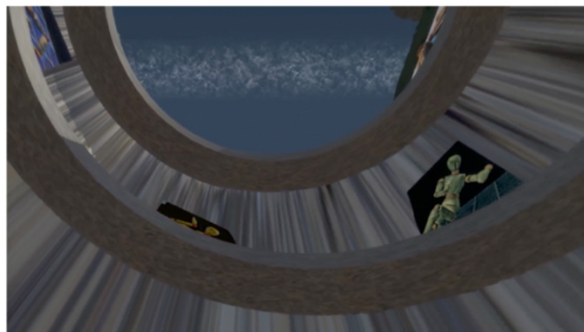
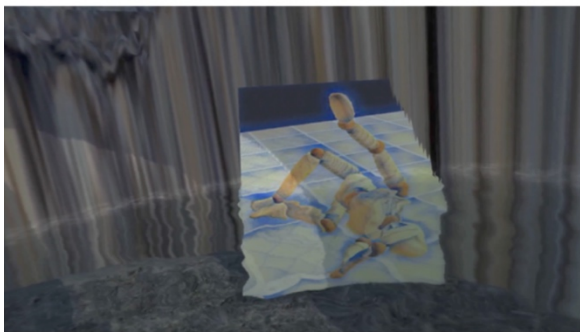
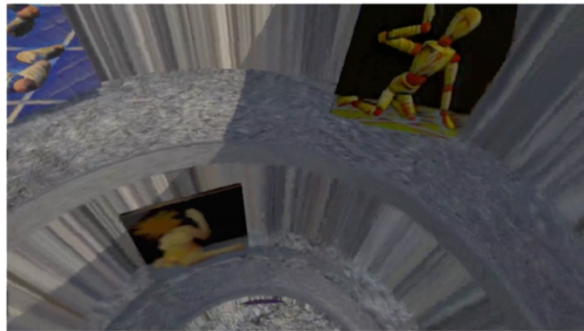
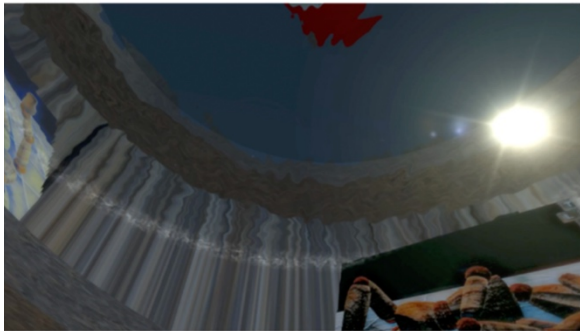
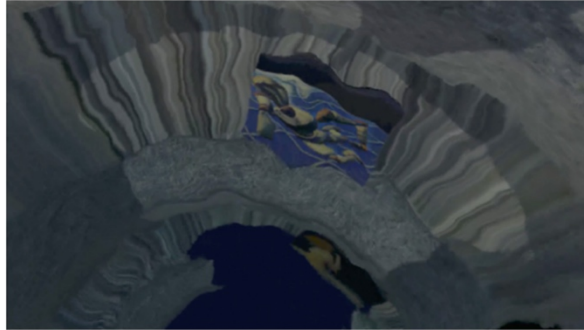
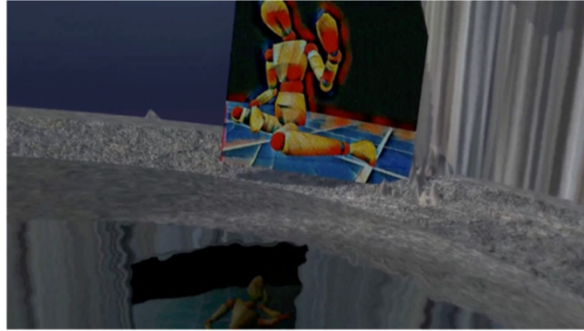


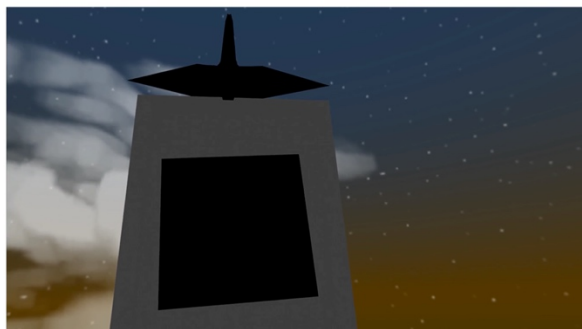
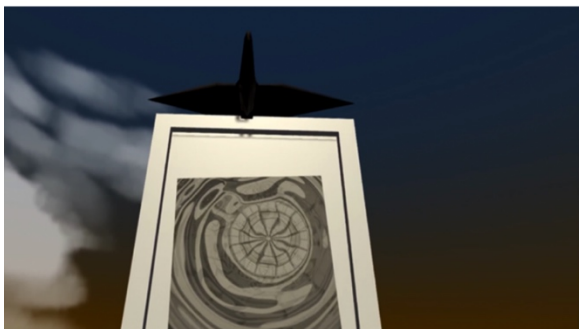
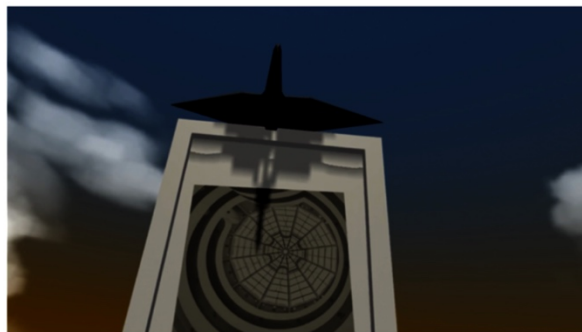
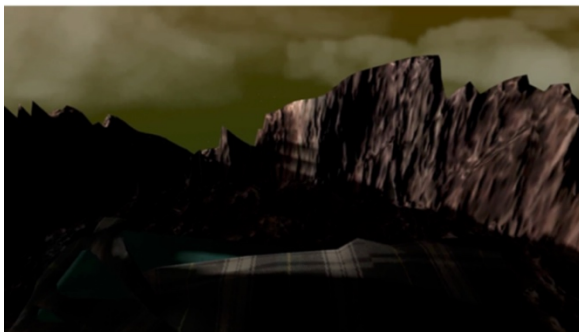
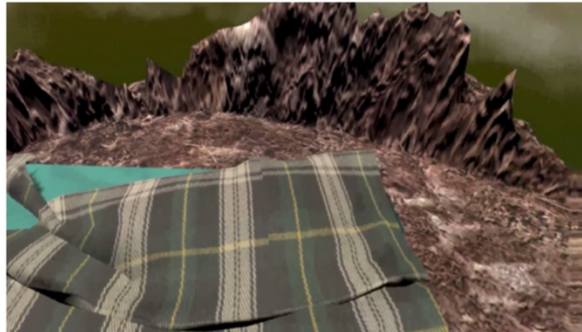
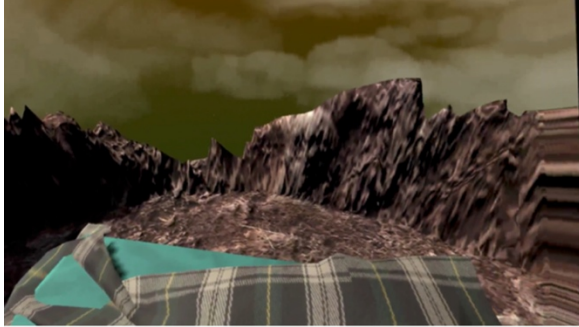




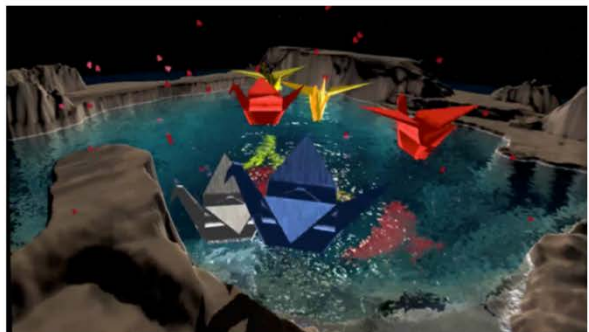
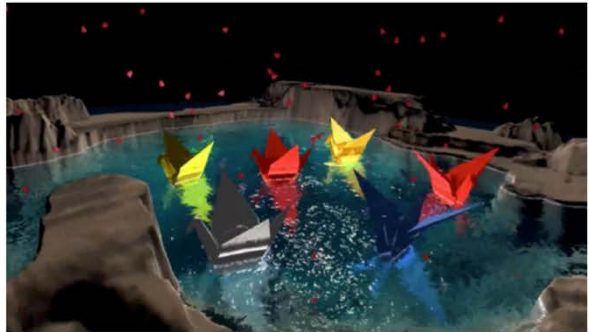
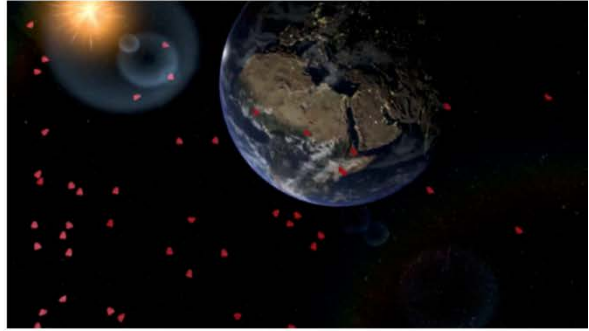
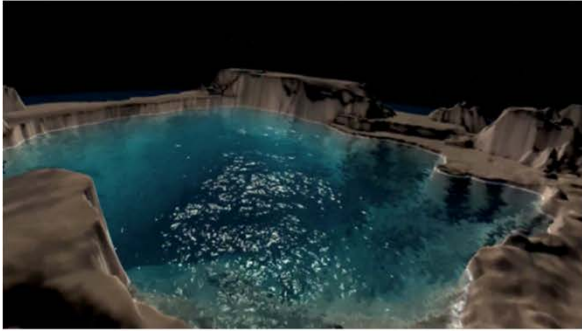












# PART III

## MUSEUM PRESENTATION

### INSTALLING VR PIECE IN CU ART MUSEUM

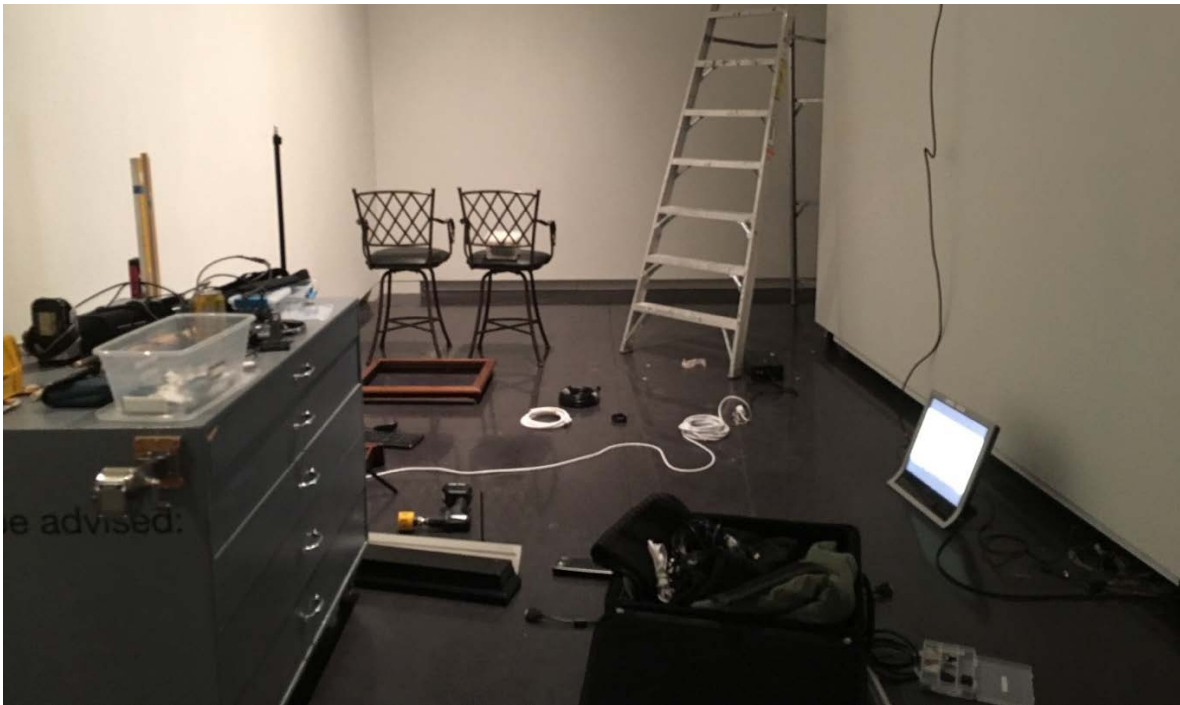


Figure 17. Installing *Lost in Translation* work in MFA Show, CU Art Museum, Nov. 9, 2017

### WAYS ARTISTS EXHIBIT VR WORK



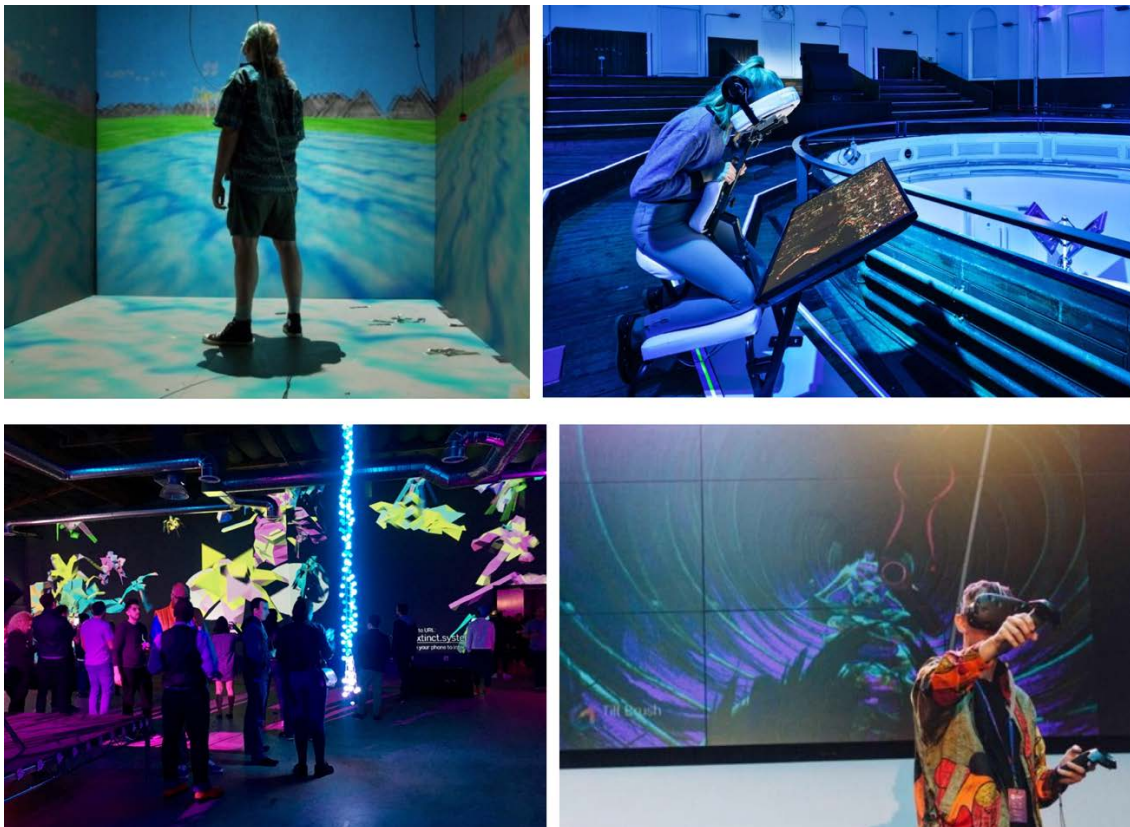
Figure 18. Few ways artists installed VR pieces in museum and galleries.





**Figure 19.** Daniel Steegmann's *Phantom* (left) and Rachel Rossin *Lossy* (right).

Both are very common, plain setups, while Steegmann depends entirely on the enclosed virtual experience to show his work, Rossin uses the inner play of paintings and virtual experience to create additional layers of depth to the work. Another use of the inner play between physical and virtual experience is the engagement of those waiting to put on the head mounted VR display or HMD. It's unusual for the gallery to have more than two headsets available for visitors and many experiences are several minutes.



**Figure 20.** Other installations of VR work from various artists.

Mirroring the video from the HMD while worn by one viewer and showing it on a screen or projecting on nearby wall is a common option used to provide something to look at for those waiting. However, as shown here artists, are experimenting with new concepts to create an all-around engaging experience. Images from *New York Times* articles "Art & Virtual Reality."

## FINAL INSTALLATION



Figure 21. "Lost in Translation" installation view, CU Art Museum, Nov. 10, 2017



Figure 22. GearVR headsets placed on chairs, CU Art Museum, Nov. 10, 2017

# CONCLUSION

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**Virtual reality is a coarser, simulated reality fosters appreciation of the depth of physical reality in comparison. As VR progresses in the future, human perception will be nurtured by it and will learn to find ever more depth in physical reality.**

*- Jaron Lanir*

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## POTENTIAL OF VR

Year 2016 was called by many “the year of VR” because of the pace of adoption, development in hardware and software, as well as finding new ways to use VR. In the final quarter of 2016, Facebook announced that in 2017 they were going to push for getting 1 BILLION, with a B, people to adopt VR. So big or even bigger things are yet to come.<sup>26</sup>

Going forward I am greatly inspired, challenged and overwhelmed by the new ways of working with VR and new works artists around the world are creating. Even established artists like Marina Abramovich, Jeff Koons and Laurie Anderson whose long legacies bring in an image of their visual language including medium and

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<sup>26</sup> *Opening Keynote: Mark Zuckerberg.*

aesthetic, have braved the technology and alone or in collaboration are now testing the limits of this amazing emerging new medium of virtual reality<sup>27;28</sup>.

From the three-famous artists during my research finding out that Laurie Anderson who now is 72 years old has both literally and metaphorically leaped off the ledge and in collaboration with the Taiwanese artist Hsin-Chien Huang created a VR experience titled “In the Chalkroom” (2017).<sup>29</sup>

Like a lot of people who know Anderson, I first encountered her name and work with performance, sound art and video art through a popular UK 1981 single “O Superman,” and a more recent heartfelt experimental “Heart of a Dog” (2015). Even a surface research into Andersons’s life reveals that her range of personal expression is not confined to the visual arts. According to Wikipedia, Anderson encompasses variety of other works as “a composer, musician and film director whose work spans performance art, pop music, and multimedia projects.”<sup>30</sup> So it should not be surprising that VR is “a twenty-first-century art form that [...] weave[s] together the three great twentieth-century arts: cinema, jazz, programming”<sup>31</sup> which would be Anderson’s next frontier.

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<sup>27</sup> *Acute Art Virtual Reality* - Jeff Koons, Marina Abramovic & Olafur Eliasson.

<sup>28</sup> Channel, *Laurie Anderson Interview*.

<sup>29</sup> Channel.

<sup>30</sup> “Laurie Anderson.”

<sup>31</sup> Jo, “52 VR Definitions.”





**Figure 23.** Laurie Anderson's 'Chalkroom' (2017) has been created in collaboration with the Taiwanese artist Hsin-Chien Huang.

In 'Chalkroom' it is possible to float around virtually and to explore a hand-drawn universe of sentences and words written in chalk on the walls, guided all the while by Laurie Anderson's voice – stories and storytelling are at the heart of the work. Anderson's 'Chalkroom' VR experience has received much recognition and awards. Source: Video interview *Laurie Anderson Interview: A Virtual Reality of Stories* for Louisiana Channel.

Abramovich, who is now 71, is often referred to as a "grandmother of performance art."<sup>32</sup> Even her recent 2010 performance of *Artist Is Present*, which was discussed in detail earlier, is ground breaking in the field of performance art. Many established artists continue to work in the same medium and often continue to explore in their work the familiar themes from new angles and perspectives, but few artists like Abramovich are oblivious to the medium and form to make art. Some call her new work that has "take on a form of a sprawling art institute devoted to experimentation and simple acts done with mindful attention [...] her boldest work yet."<sup>33</sup>

In June 2017, much to the world art community surprise and equally split between delight and disdain, Abramovich in partnership with Sculptor Jeff Koons announced they were establishing the very first virtual reality contemporary art museum the Acute Art ([www.acuteart.com](http://www.acuteart.com)).<sup>34</sup>

Acute Art VR Gallery mission statement posted on the [acuteart.com](http://acuteart.com) states that:

Acute Art is the world's first virtual reality arts platform, a museum without walls that lets you experience the cutting edge of interactive art anywhere in the world.

Acute Art was founded around the idea of sharing original virtual reality artworks by contemporary artists.

Our mission is to explore and enable the transition from art in the physical world into the boundless realm of Virtual Reality. We want to provide a space where users can explore immersive art from any location in the world.<sup>35</sup>

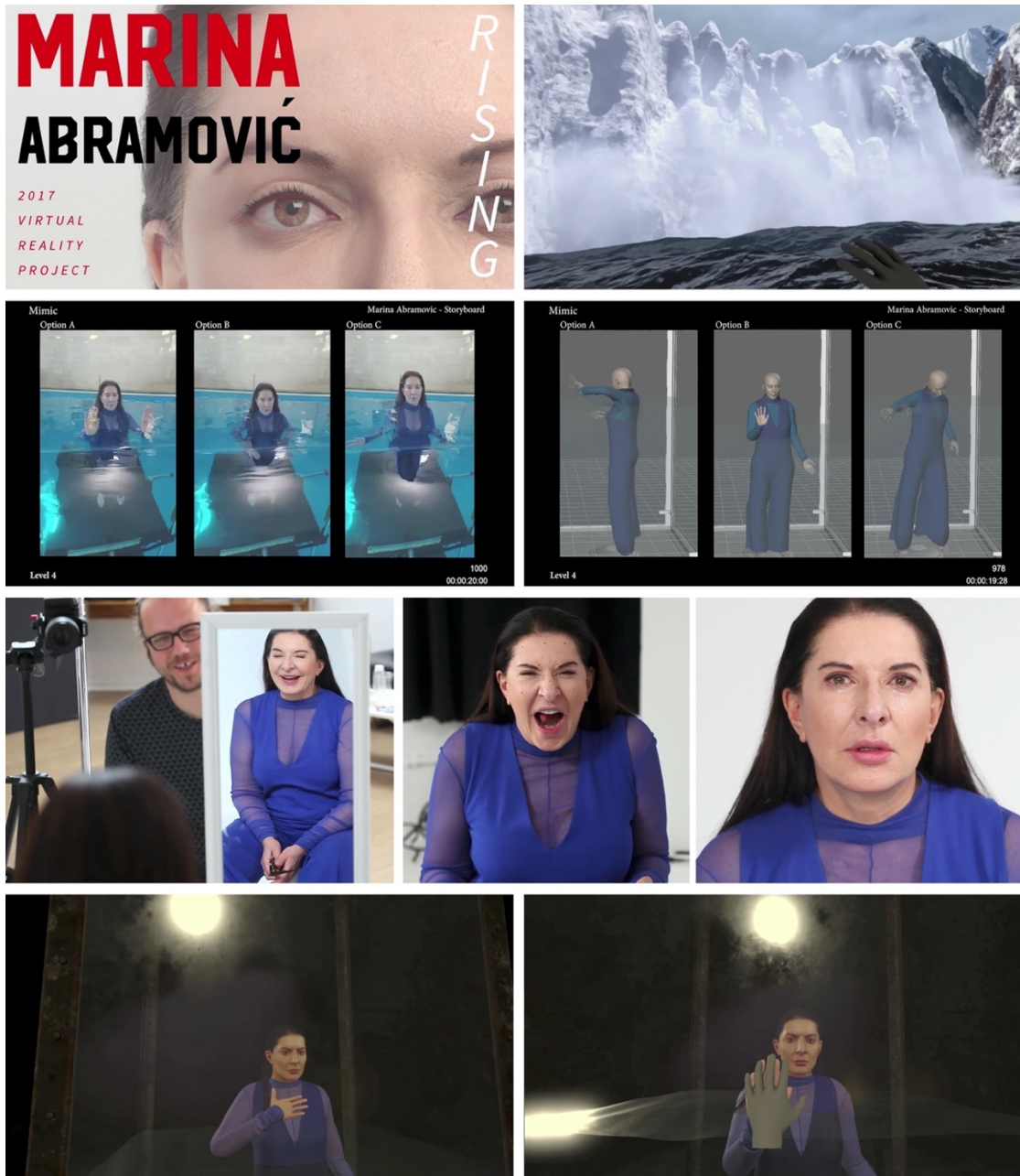
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<sup>32</sup> "Marina Abramović."

<sup>33</sup> Abramović, *An Art Made of Trust, Vulnerability and Connection*.

<sup>34</sup> *Acute Art Virtual Reality - Jeff Koons, Marina Abramovic & Olafur Eliasson*.

<sup>35</sup> "Acute Art."



**Figure 24.** Performance artist Marina Abramović show working on her first work in VR.

Using photogrammetry she created a detailed 3D model or avatar of her body and face. Then using video captures most essential facial expressions which were then applied to the avatar that viewer can interact with. In this project Abramović pushes the limits of technology, walks the dreaded Uncanny Valley, where line between human and inhuman is most easily treaded by avoiding photorealism. Images from article Marina Abramović & Jeff Koons Front New Online VR Gallery published on Dazed.com. Anna Cafolla, June 11, 2017.

Abramovich and Koons, for the opening exhibition at the Acute Art VR gallery, together with another artist Olafur Elisson, become one of the first artists to make VR art and showcase it in virtual reality. They also attempt with this work to bridge the digital-analog divide, or a physical and virtual reality by apply their respective strengths to create works which started in physical reality, the physical elements were digitized, processed in the virtual or digital envirimnt and then again given physical form as sculpture, objects or space.

Acute Art VR Gallery is powered by an OpenVR platform SteamVR, allowing the largest number of VR technologies and even WebVR enabled websites to access their content. My dream of VR becoming the ultimate economic, geographic and social equalizer by giving untold millions access to experiences and knowledge previously accessible only to some. The future is already here.

"Nothing happens if you always do things the same way," she says. "My method is to do things I'm afraid of, the things I don't know, to go to territory that nobody's ever been."<sup>36</sup>

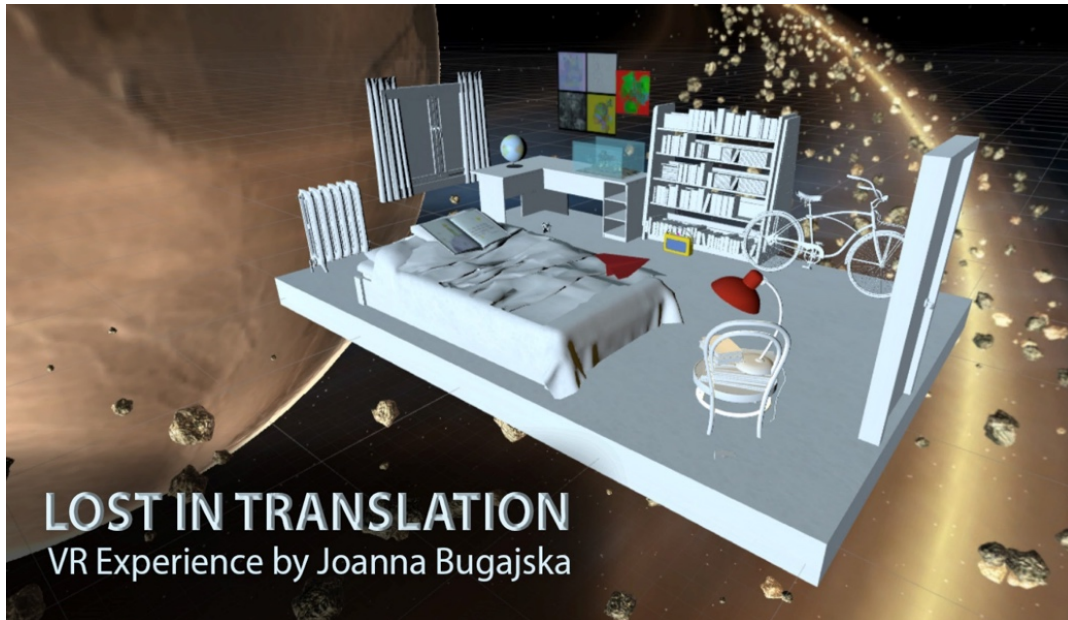
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<sup>36</sup> Abramović, *An Art Made of Trust, Vulnerability and Connection*.



# APPENDIX A

## HOW TO ACCESS AND VIEW “LOST IN TRANSLATION” VR EXPERIENCE ONLINE



Full version of the “Lost in Translation” is only available online February 2018 thru September 2018. Afterwards to view the whole experience or request the work for a show, please contact me for special permission at [checklostandfound@gmail.com](mailto:checklostandfound@gmail.com).

Vimeo Channel: <https://vimeo.com/user4027665>

The 360 video can be viewed on any device including a smart phone with or without a VR viewer. When viewed with Google Cardboard or Oculus GearVR “lost in Translation” is intended to be a seated experience and does not support spatial positioning. No controller is necessary.

The fullest VR interactive experience with spatial sound and positioning allowing for moving in the space requires Oculus Rift or an OpenVR/SteamVR compatible HMD. No controller is necessary.

## 52 VR DEFINITIONS BY JARON LANIER'S

The following list contains the 52 definitions for virtual reality as proposed by Jaron Lanier in his new book *Dawn of the New Everything: Encounters with Reality and Virtual Reality*. This list was published on Medium blogger platform by Monika Jo in a post “52 VR Definitions: Jaron’s Scientific, Cultural, and Personal Adventures.” Dec 9, 2017.

52 VR definitions by Jaron Lanier:

1. A twenty-first-century art form that will weave together the three great twentieth-century arts: cinema, jazz, programming.
2. A simulated new frontier that can evoke a grandiosity recalling the Age of Exploration or the Wild West.
3. Hope for a medium that could convey dreaming.
4. The substitution of the interface between a person and the physical environment with an interface to a simulated environment.
5. A mirror image of a person’s sensory and motor organs, or if you like, an inversion of a person.
6. An ever growing set of gadgets that work together and match up with human sensory or motor organs. Goggles, gloves, floors that scroll, so you can feel like you’re walking far in the virtual world even though you remain in the same physical spot; the list will never end.

7. A coarser, simulated reality fosters appreciation of the depth of physical reality in comparison. As VR progresses in the future, human perception will be nurtured by it and will learn to find ever more depth in physical reality.
8. Technology that rallies the brain to fill in the blanks and cover over the mistakes of a simulator, in order to make a simulated reality seem better than it ought to.
9. The investigation of the sensorimotor loop that connects people with their world and the ways it can be tweaked through engineering. The investigation has no end, since people change under investigation.
10. Reality, from a cognitive point of view, is the brain's expectation of the next moment. In virtual reality, the brain has been persuaded to expect virtual stuff instead of real stuff for a while.
11. VR is the most centrally situated discipline.
12. VR is the technology of noticing experience itself.
13. The perfect tool for the perfect, perfectly evil Skinner box.
14. Magic tricks, as applied to digital devices.
15. Instrumentation to make your world change into a place where it is easier to learn.
16. Entertainment products that create illusions of another place, another body, or another logic for how the world works.
17. A general-purpose simulator, as compared to special-purpose ones like flight or surgical simulators.

18. Instrumentation to explore the deep time of nervous system adaptations and pre-adaptations.
19. Instrumentation to explore motor cortex intelligence.
20. Like lucid dreaming, except that (a) more than one person can take on roles in the same experience, (b) the quality is not as good, (c) and you have to work to program VR if you want to be in control, which you should want. Dreams, meanwhile, are often best if you don't seek to control them. Even Stephen LaBerge seeks to be nonlucid in most of his dreams, since it is untethered dreams that the brain surprises and renews itself.
21. In comparison to older, grandiose definitions of "nanotechnology," VR lets you experience wild things without messing up the one physical world that others are compelled to share with you. VR is vastly more ethical. It's also not so nutty. We can see how VR will work without weird speculations or apparent violations of fundamental physical laws.
22. A preview of what reality might be like when technology gets better someday.
23. VR is sometimes compared to LSD, but VR users can share a world objectively, even if it's fantastical, while LSD users cannot. VR worlds will require design and engineering effort, and will be best when you are willing to make the effort to create and share your own experiences. It will be like riding a bike, not a roller-coaster ride. Although there will be thrilling VR experiences, you'll always [be] able to take off the goggles. You won't lose control. VR will typically be "lower quality" than reality or dreams or psychedelic trips, although it will be up to you to hone your senses so you can notice the difference. LSD is ready now and VR won't be good for a while. It might be more for your kids or their kids.

24. A cybernetic construction that measures the probing aspect of human perception so that it is canceled out.
25. A media technology for which measurement is more important than display.
26. A media technology that prioritizes stimulating the cognitive dynamics by which the world is perceived over accurately simulating an alternate environment.
27. A medium in which interactive biological motion is emphasized.
28. The digital medium that fights the hardest against time.
29. A cultural movement in which hackers manipulate gadgets to change the rules of causality and perception in demos.
30. A technology in which internal data and algorithms are intelligible as transformations of real-time, point-of-view human experiences and thus inspire curiosity to look under the hood.
31. You are having interesting experiences but look preposterously nerdy and dorky to onlookers.
32. The technology that is often misrepresented as being able to make so-called holograms float impossibly in the air.
33. The ultimate media technology, meaning that it is perpetually premature.
34. Instrumentation that might just enable telecommunications with honest signals someday.
35. Training simulators for anything, not just flight.
36. A way to try out proposed changes to the real world before you commit.

37. Instrumentation to present data as lucidly as possible.
38. The ultimate way to capture someone inside an advertisement. Let's hope it is done as little as possible.
39. Digital implementation of memory palaces.
40. A generalized tool for cognitive enhancement.
41. A training simulator for Information Age warfare.
42. Digital puppetry.
43. A new art form that must escape the clutches of gaming, cinema, traditional software, New Economy power structures, and maybe even the ideas of its pioneers.
44. The term you might have used in the 1980s if you were partial to those weirdos at VPL Research.
45. A person-centered, experiential formulation of digital technology that hopefully inspires digital economies in which the real people who are the sources of value aren't ignored.
46. VR = -AI (VR is the inverse of AI).
47. The science of comprehensive illusion.
48. A shared, waking state, intentional, communicative, collaborative dream.
49. The technology that extends the intimate magic of earliest childhood into adulthood.



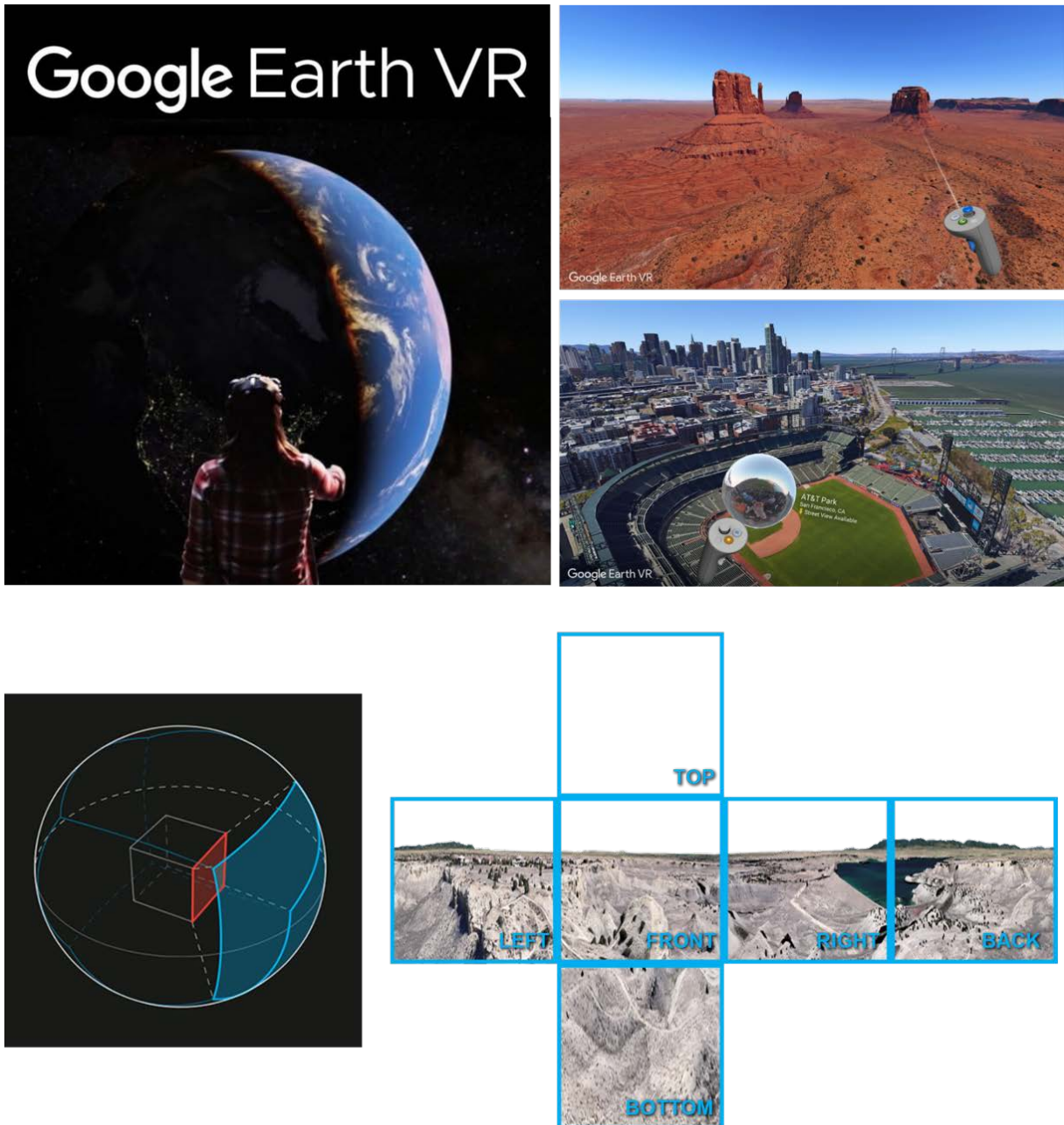
50. A hint of the experience of life without all the limitations that have always defined personhood.

51. The medium that can put you in someone else's shoes; hopefully a path to increased empathy.

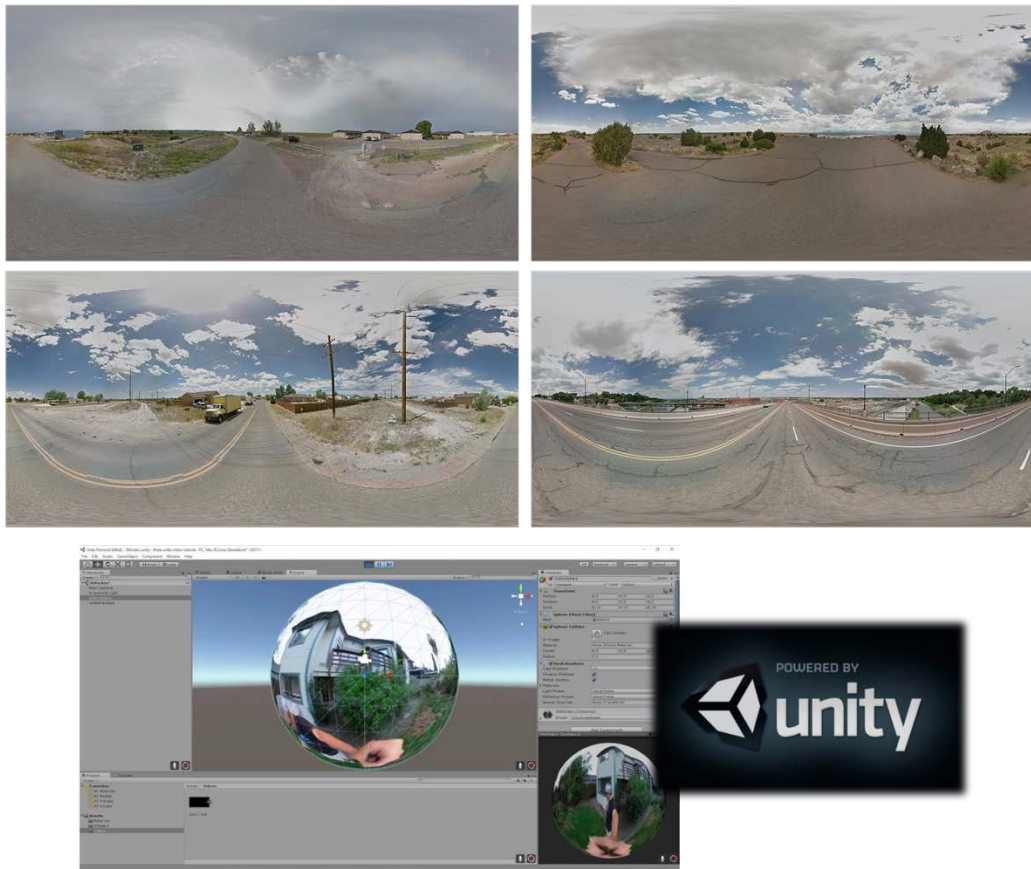
52. A way of using computers that suggests a rejection of the idea of code.

# MAKING OF “LOST IN TRANSLATION”

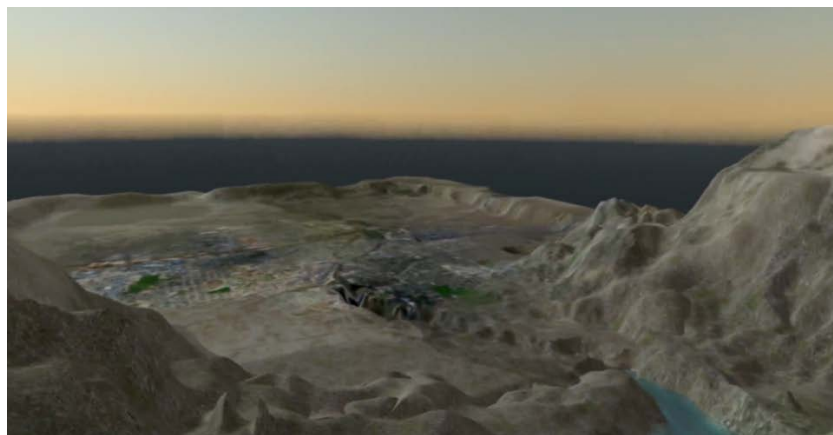
## WARSAW AND PUEBLO IMAGES USING GOOGLE EARTH



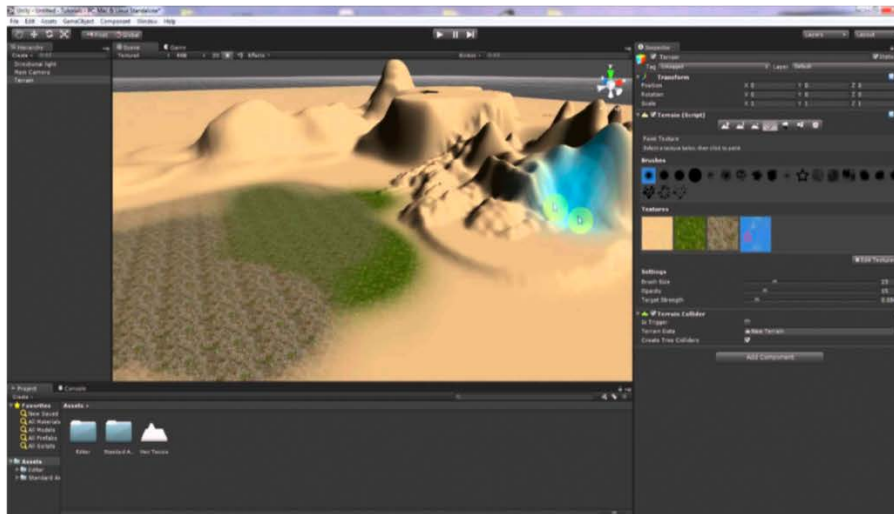
**Figure 25.** Google Earth VR promotional image, two screenshots and a cube map texture.  
The unfolded cube map of a lookout point in Pueblo, CO which then was sorted and stitched to create a cube texture which is then projected on the inside of the sphere with the camera placed in the center to create the illusion of 360 space.



**Figure 26.** Four high resolution, equirectangular (2:1) 360 degree panoramic images of locations I lived in in Pueblo, CO. These images were pulled from Google Street View website and then used in Unity 3D to create a VR slideshow of these locations by mapping each image in sequence on the inside of the sphere with the virtual camera at the center.



**Figure 27.** Image of a virtual reconstruction using Unity 3D of my favorite spot in Pueblo, CO, the lookout point over the reservoir.

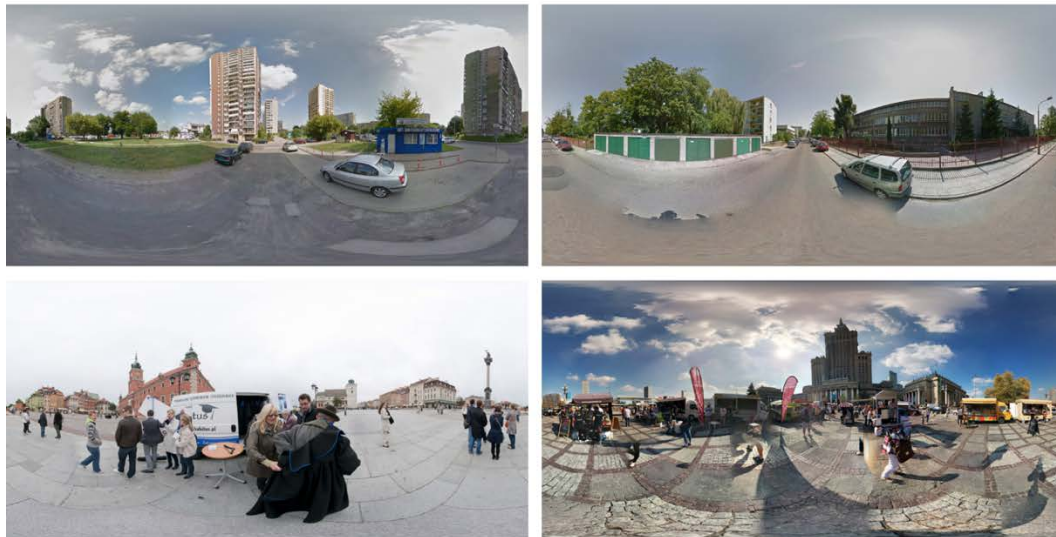
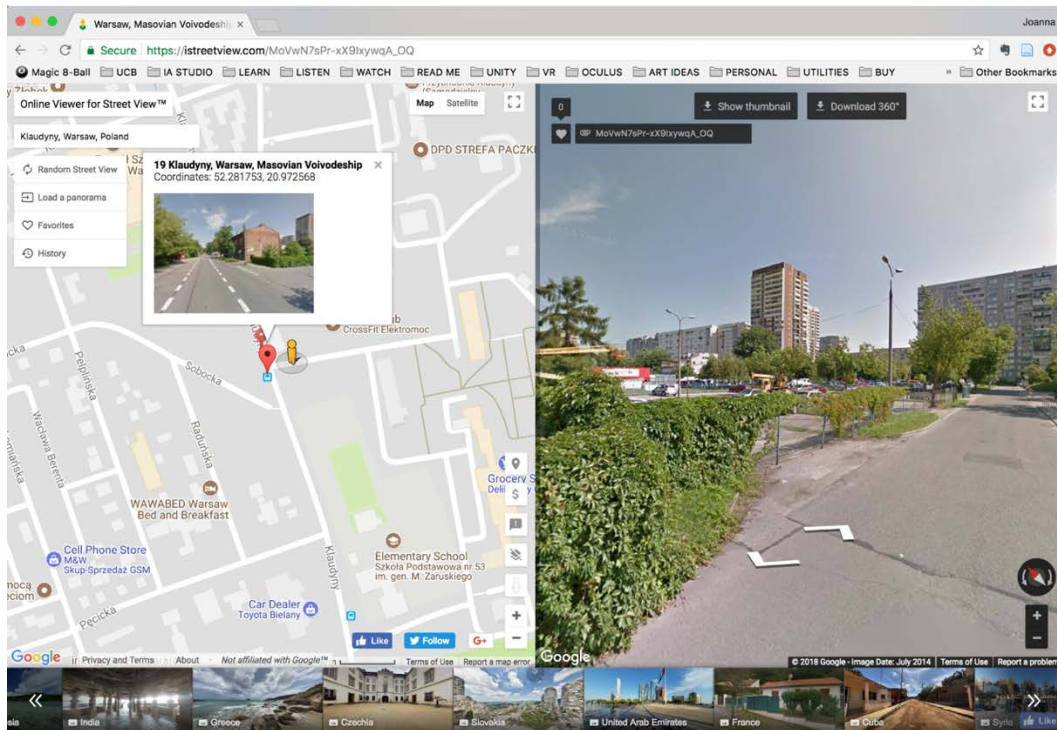


**Figure 28.** Screenshot of Unity 3D software showing tools and graphic elements used to sculpt, texture and paint the Pueblo landscape in Figure 15.

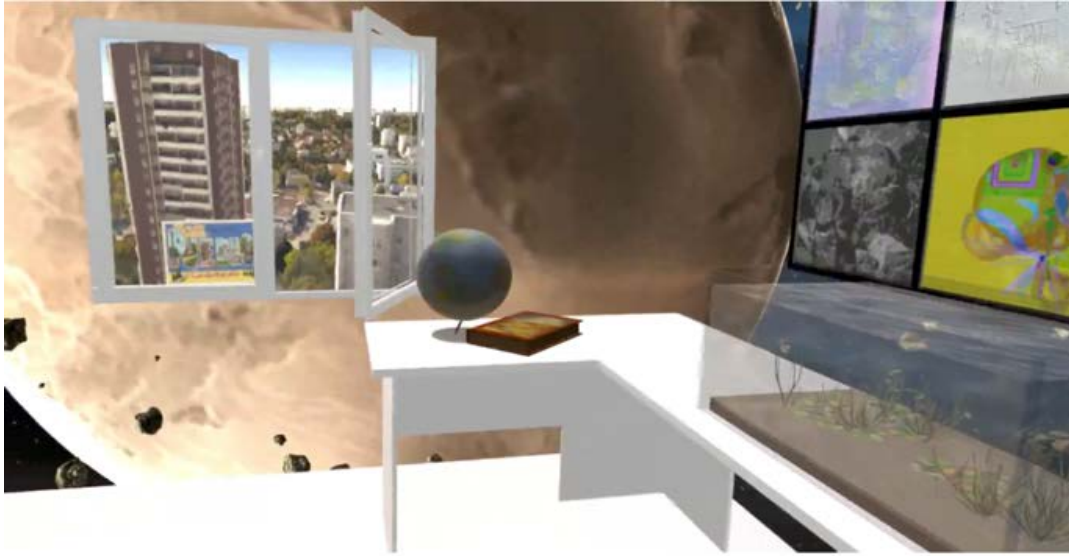
The real depth satellite map of the area (right) was downloaded from Terrain Party ([terrain.party](http://terrain.party)) and then used with a JavaScript script `HeightmapFromTexture` from Unity Wiki page ([wiki.unity3d.com](http://wiki.unity3d.com)) to shape the terrain. Terrain was then painted using various default brushes available in Unity 3D and finally textured with a Google Map screen shot image of the area overlapping the town of Pueblo (left). Lastly, water was added using water shader and dusk skybox was placed as the main lightmap for the environment.



# Google Street View



**Figure 29.** Screenshot of the istreetview.com website used to pull high resolution 360 panoramic images of real locations from Google Street View (top). The four 360 degree panoramic images show places I lived and played while growing up in Warsaw, Poland before moving to Pueblo, USA. With panorams of Pueblo, these images were used in Unity 3D to create a VR slideshow of these locations from my childhood.



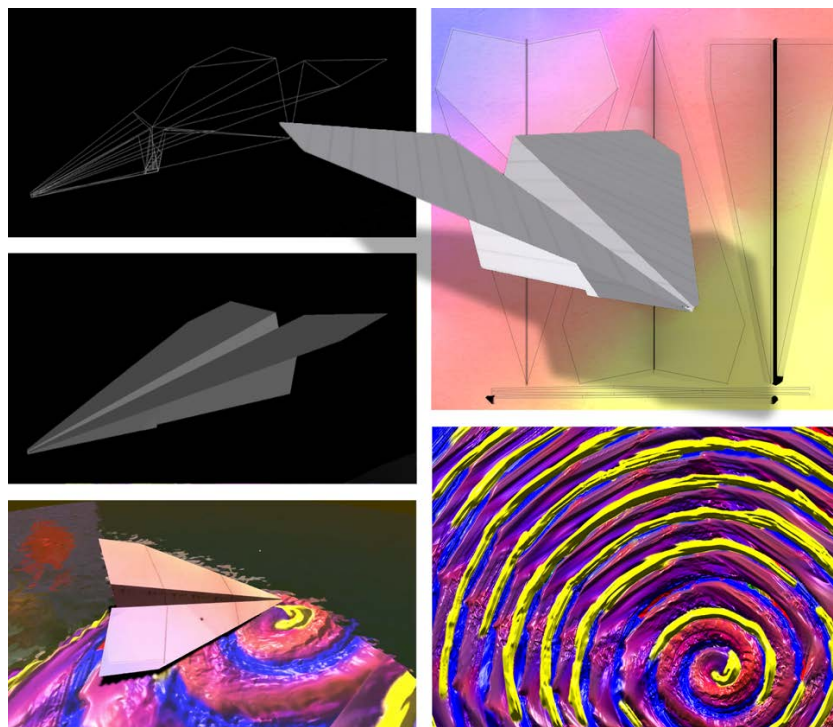
**Figure 30.** Image from Lost in Translation VR experience showing an image captured in Google Earth VR closely simulating the exact view from my childhood room in Warsaw, Poland.



## MODELS AND TEXTURES



**Figure 31.** Vintage postcard with the name of a location is used as a navigation device to change between locations in Poland and US.



**Figure 32.** 3D model of the paper plane throughout the “Lost in Translation” experience as a device to move between scenes.



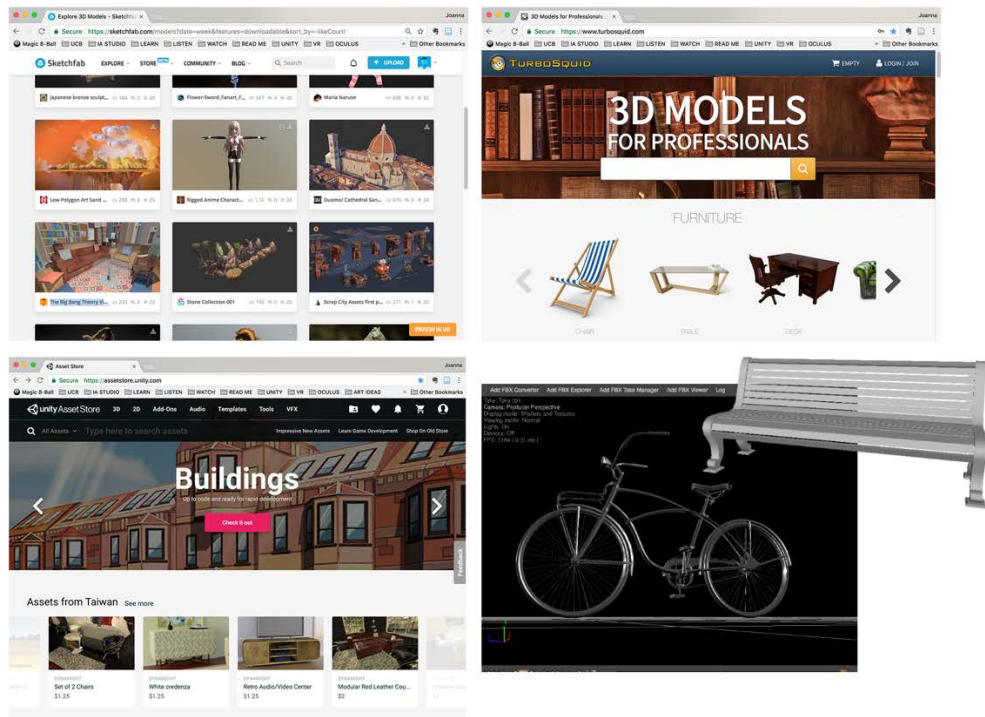
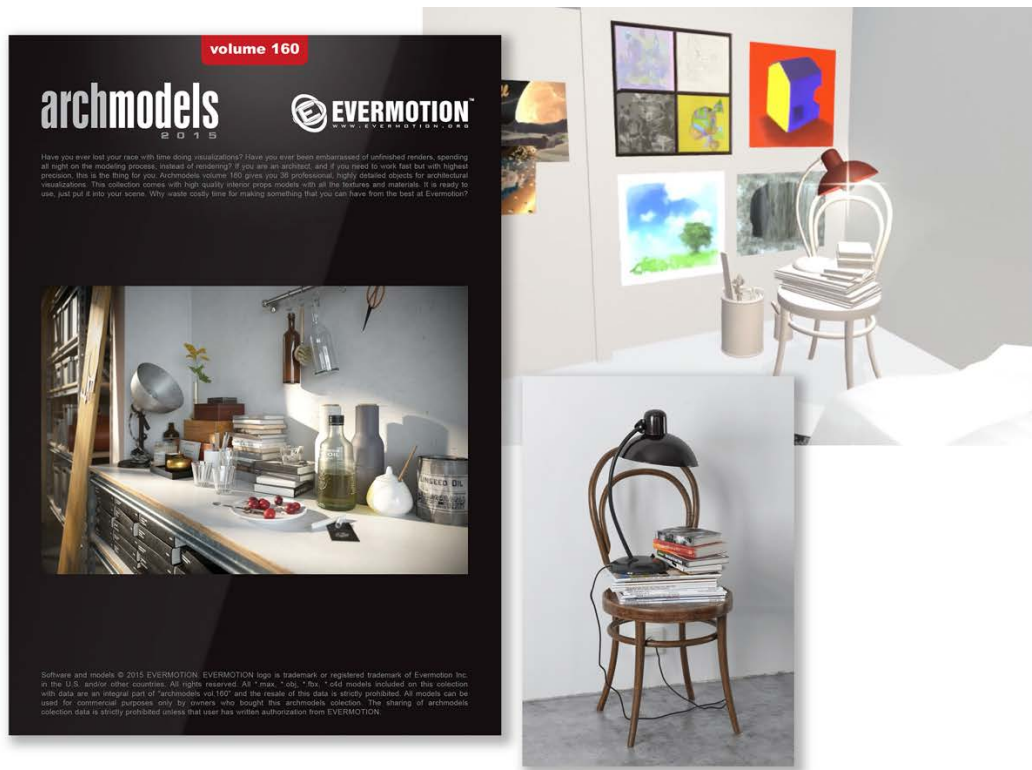
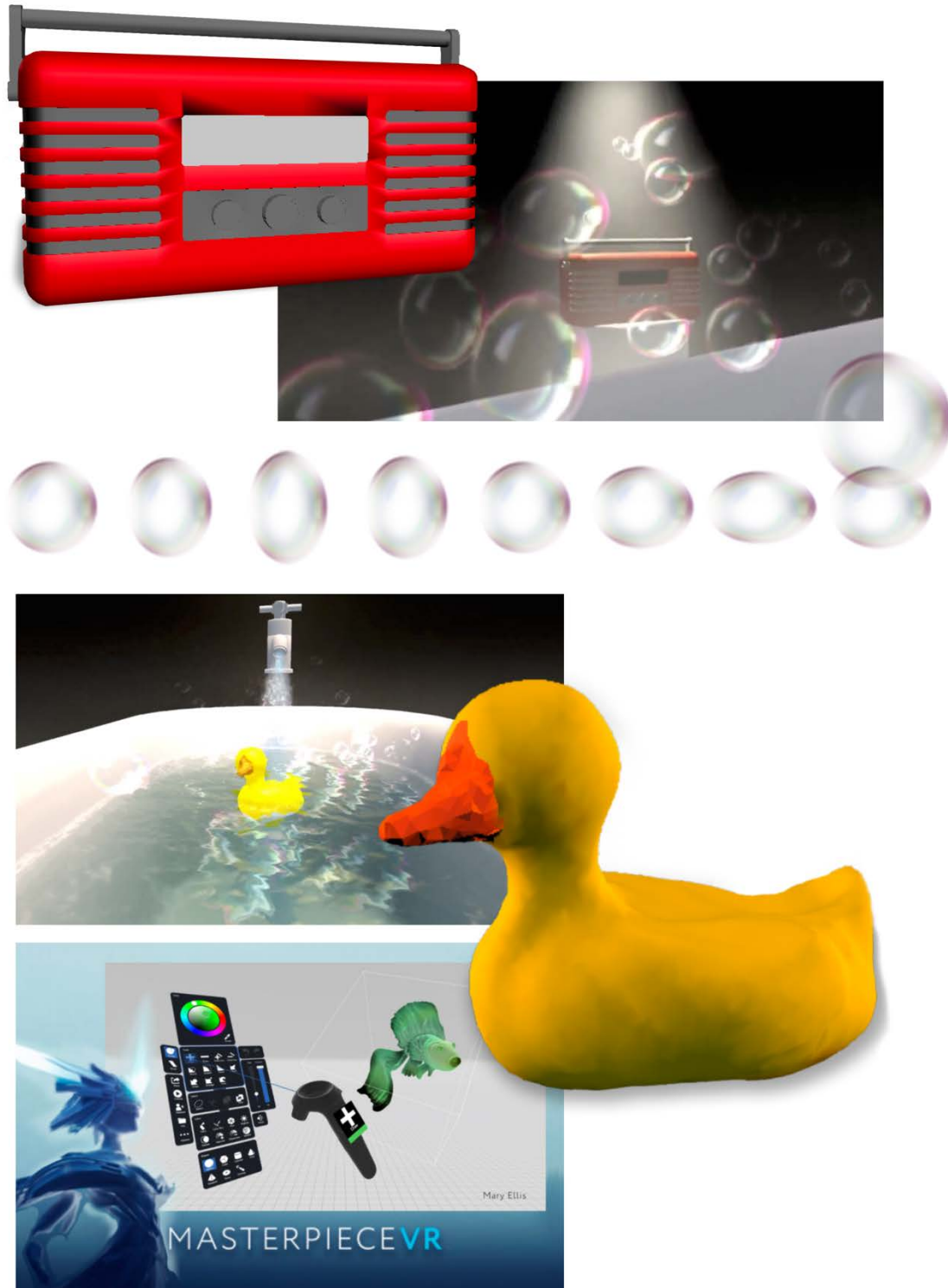


Figure 33. Examples of some resources to find 3D models for building a project like "Lost in Translation."

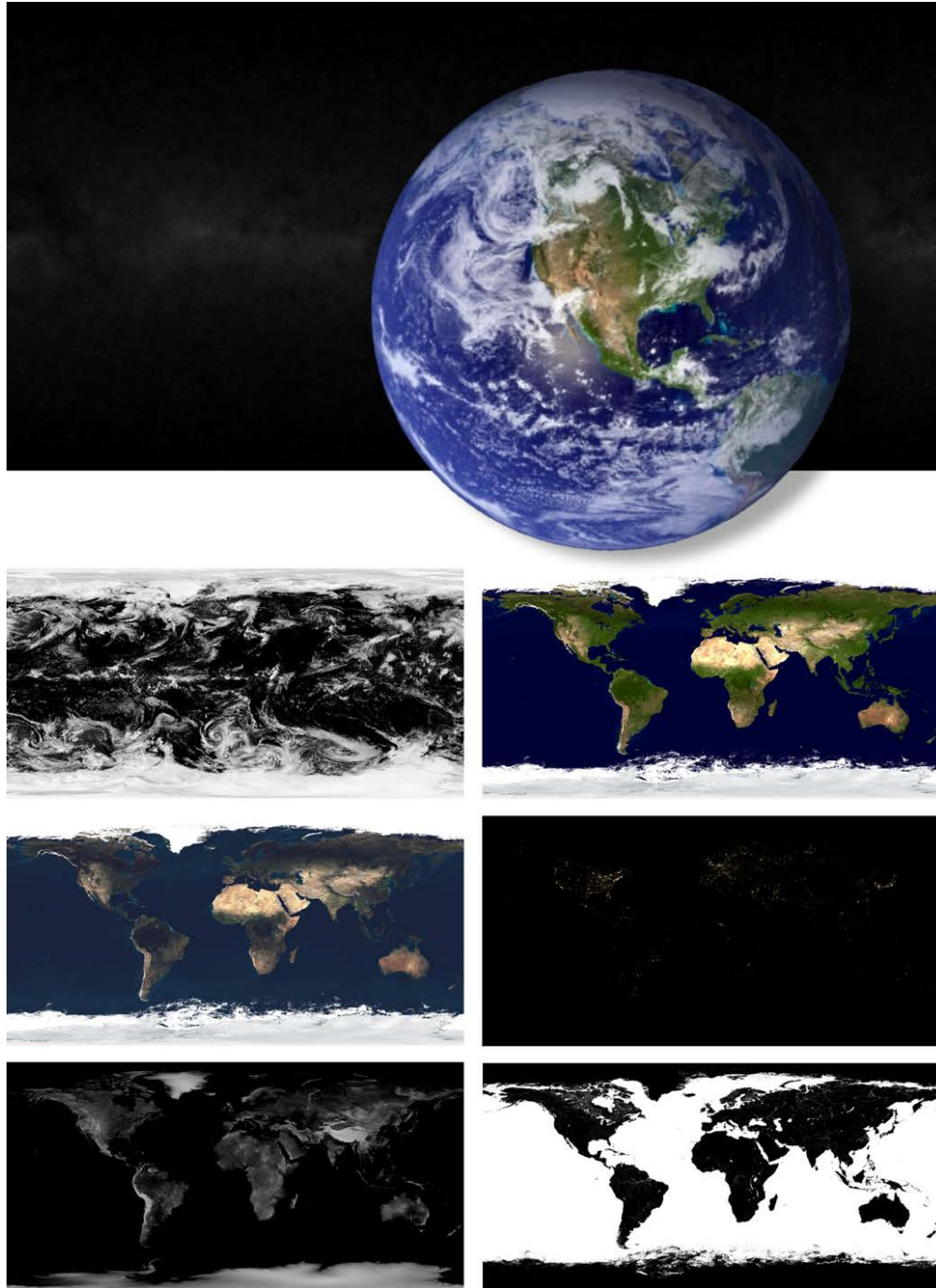


**Figure 34.** Examples of 3D models used in the “Lost in Translation” VR experience. The red antique radio is a free model from TurboSquid. The modeled was edited and painted before being used in a scene (top). The smoothed low poly bathroom duck is an original 3D model created in VR4VR content creation tool MasterpieceVR (bottom). The bubbles used in the radio are not a model but a 2D sprite sheet mapped onto a 2D plane usually referred to as billboard. The bubble jiggle sprite animation is a free asset at the Unity Assets Store (middle).



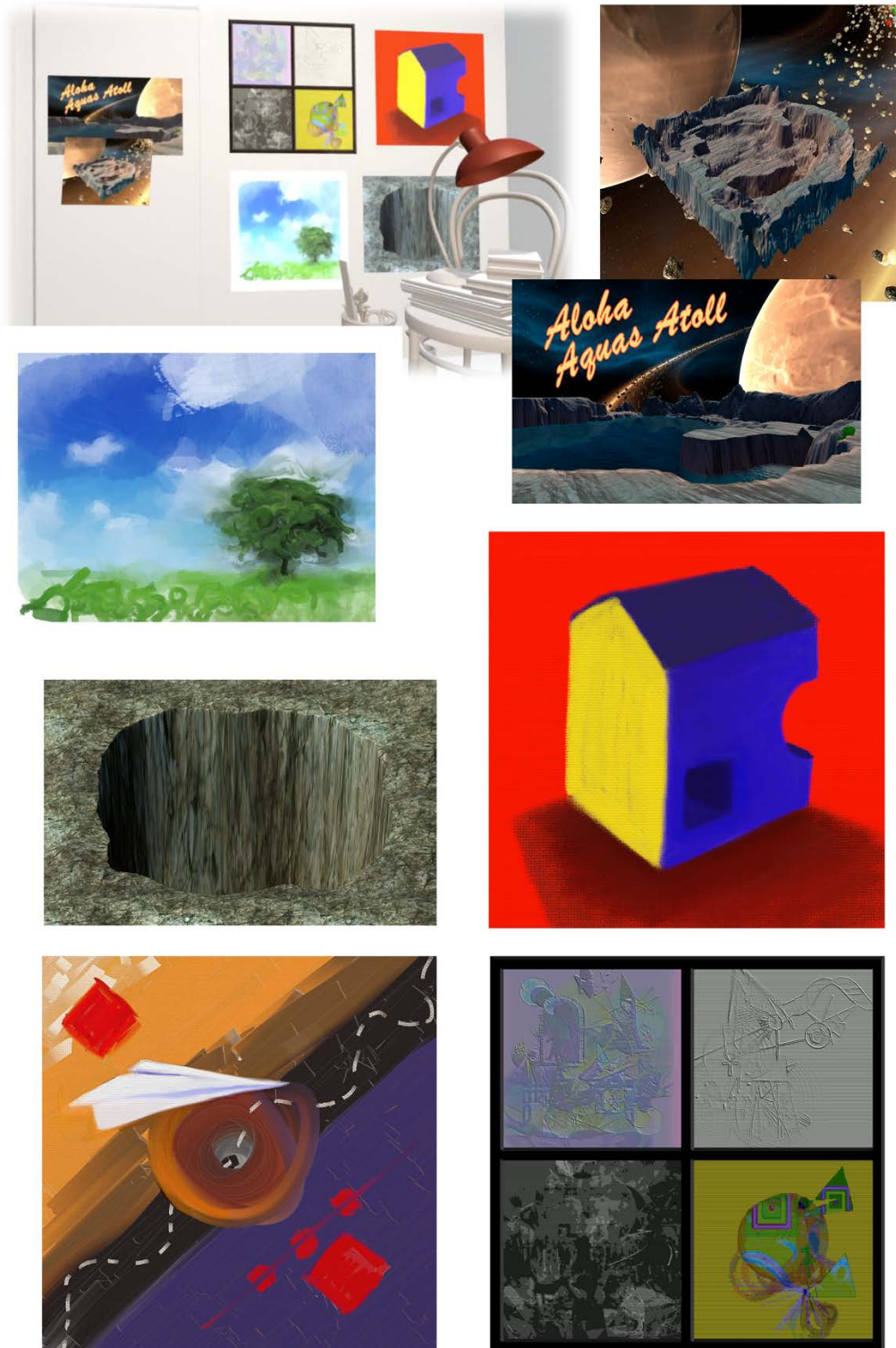
**Figure 35.** xBot female model used in the Gulliver's Travel park scene is a free pre-rigged 3D model with a library of motion capture clips from Microsoft Mixamo project (mixamo.com). Microsoft Mixamo site offering about 30 different humanoid 3D characters ranging in aesthetic from cartoony to realistic and has a free library of about 200 motion capture (mocap) files that can be mapped on their models or a customized or original model. For mapping to work, an original model needs to be rigged according to Mixamo guidelines available on their website. Downloaded 3D models and mocap files can be used in most popular 3D modeling and animation programs.





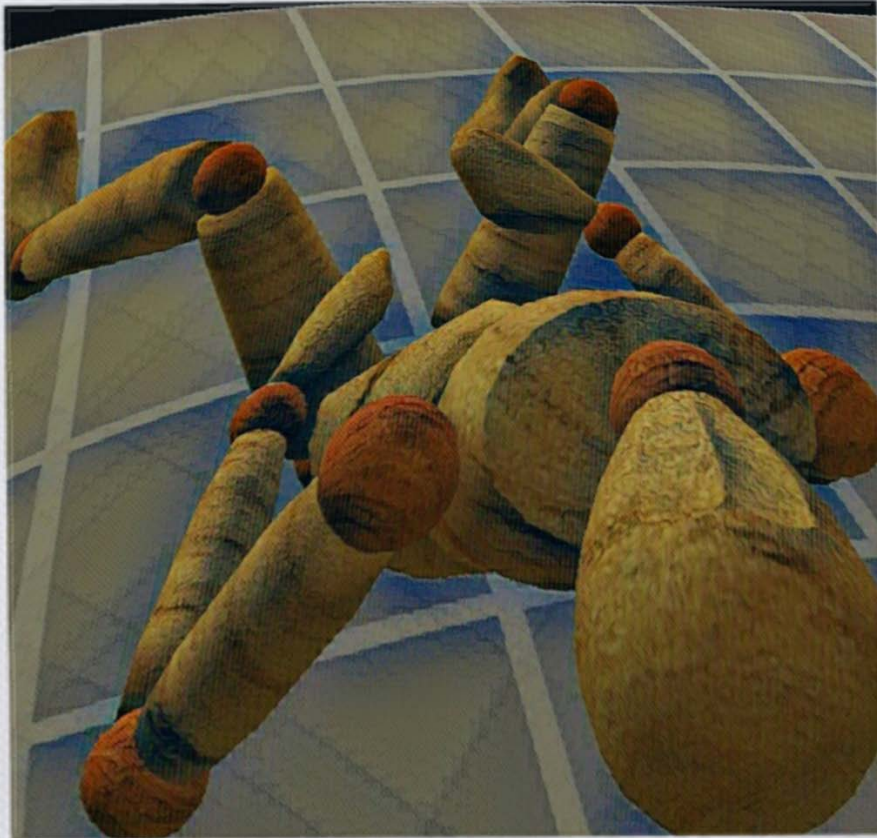
**Figure 36.** Planet earth model used in the final scene at the Space Atoll is a free model from the Unity Assets Store. The model comes with total of six shaders (image maps) which are applied in three layers in two groups, one for day and one for night. All maps are authentic NASA satellite images showing landmasses, clouds, and human activity as represented by the night lights. The model has an auto-rotation script assigned so the planet rotates and speed of the rotation and change between day and night can be controlled in the Unity Inspector. This is only one of many wonderful free assets available from the Unity Asset Store ([assetstore.unity.com](https://assetstore.unity.com)).

## POSTERS AND OTHER DIGITAL PAINTINGS



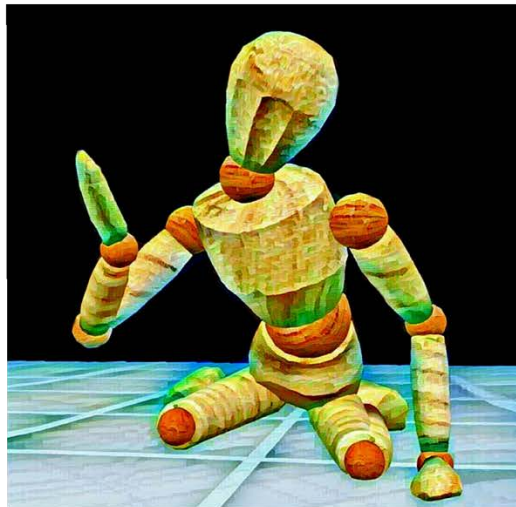


PAINTED SELFIES SERIES

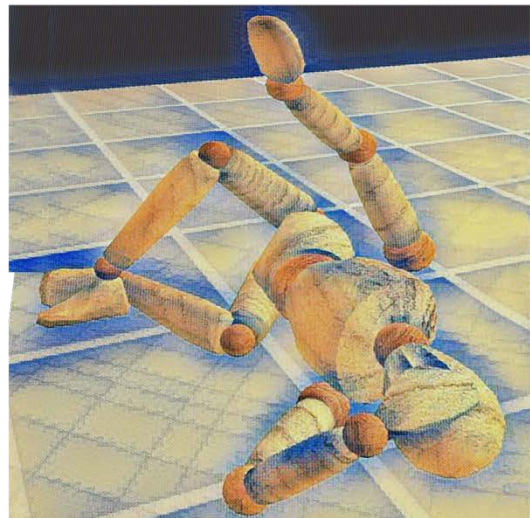
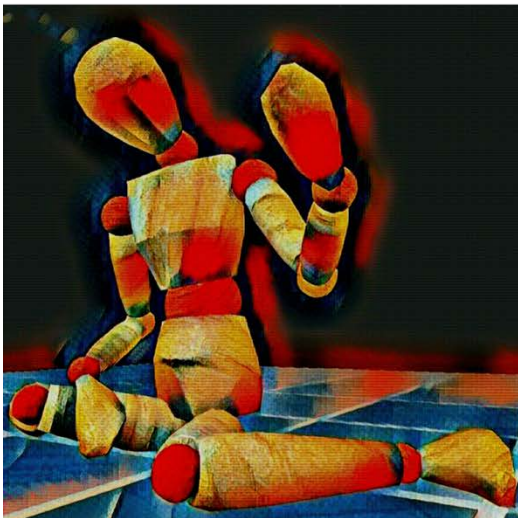
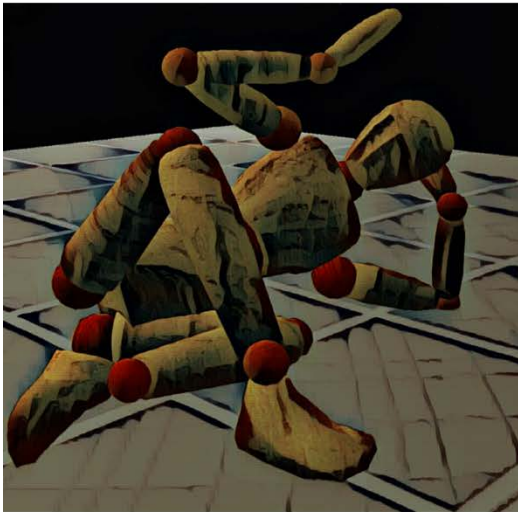


*Fight #4. You made it real, you can make it unreal.*

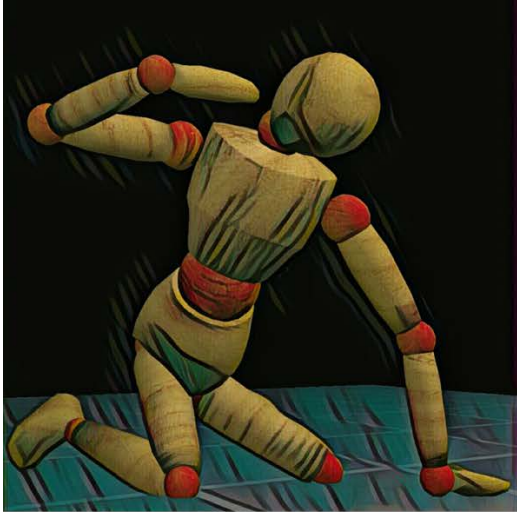
*Altered States, 1980*











# APPENDIX B

## WHO AM I?



**Figure 37.** Word-image response for Who Am I? art project. In collaboration with students from Art & Race/Ethnicity and Dr. George Rivera. 2017

## VISUAL ARTIST STATEMENT

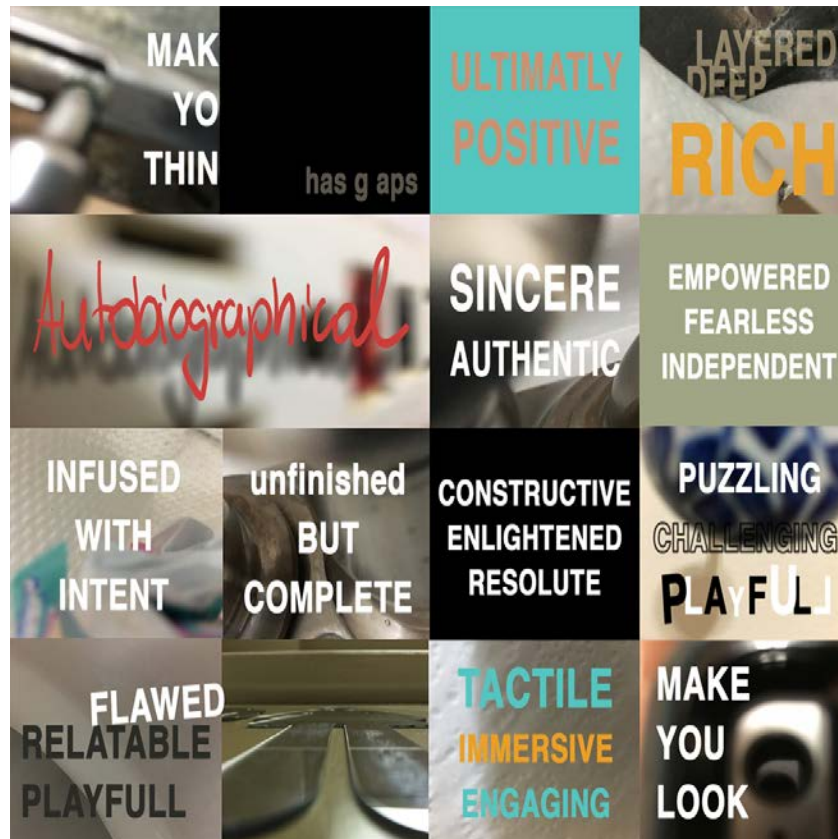


Figure 38. My visual artist statement.



Figure 39. Four picks for the thesis project: autobiographical, sincere or authentic, ultimately positive, and puzzling or playful.



# PLANNING A VR PROJECT

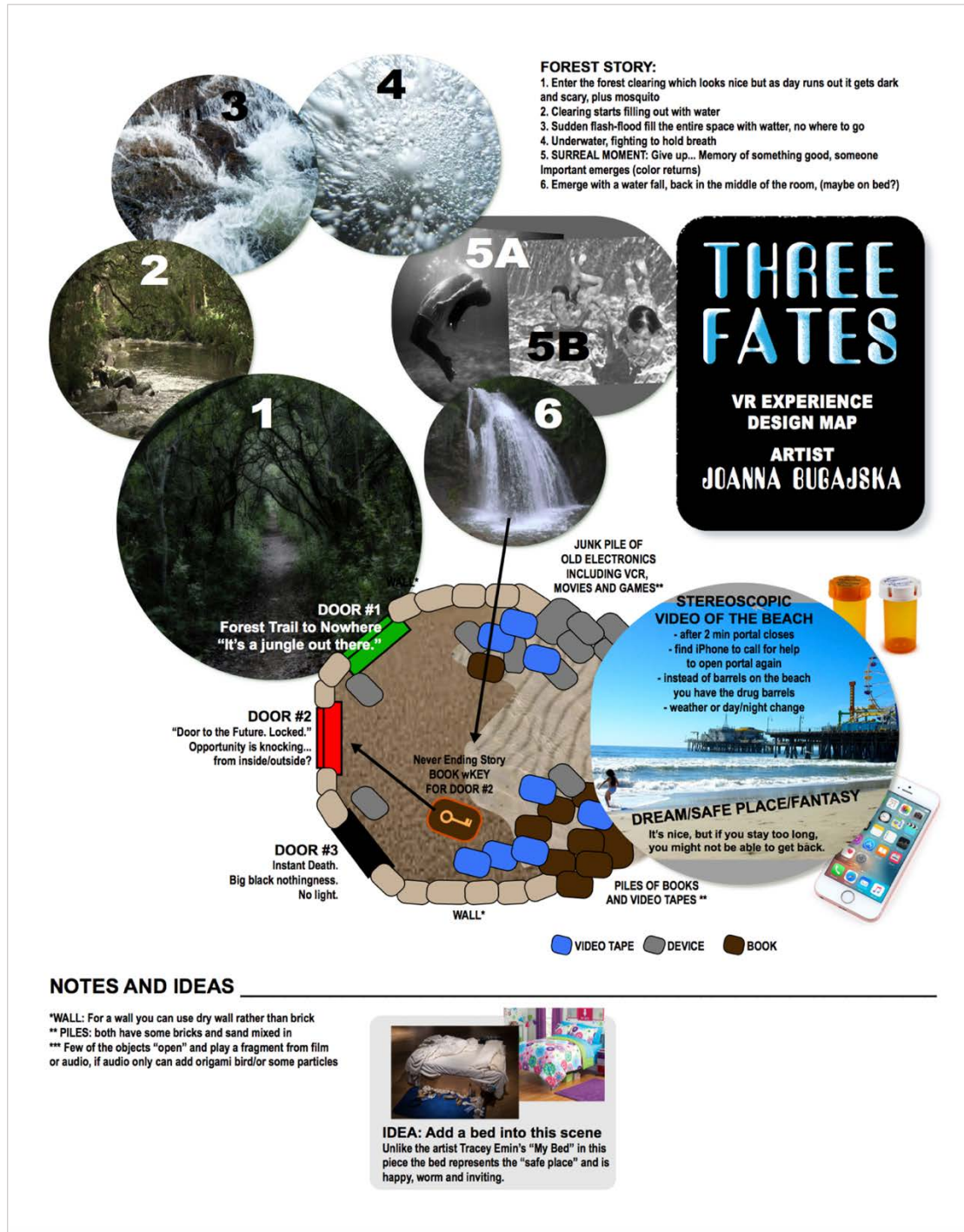


Figure 40. Top down concept map for a second version of my VR experience.

This way of laying out both environmental and narrative elements is used in the game level design as a means of communicating the idea just like a storyboard does in film or animation production.

## HOW I MADE “WITNESS: A VR EXPERIENCE OF WARSAW UPRISING” BY SAYAM GHOSH



**Figure 41.** “Witness: Warsaw Uprising” by Sayam Ghosh. Historical VR experience about Warsaw Uprising during WWII using archival materials and interviews. Muzeum Postania Warszawskiego, Warsaw, Poland.



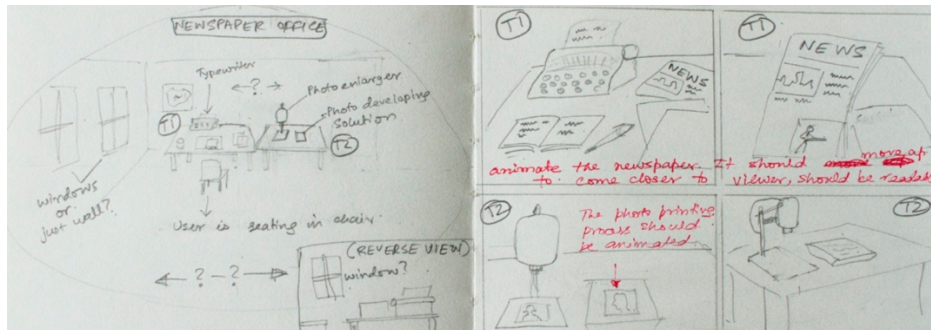


Figure 42. Traditional storyboard and Porotye #1 of the “Witness: a VR Experience of Warsaw Uprising.”



Figure 43. High resolution renders from Porotye #2 of the Witness VR experience. Testing various aesthetic integrations of archival content.

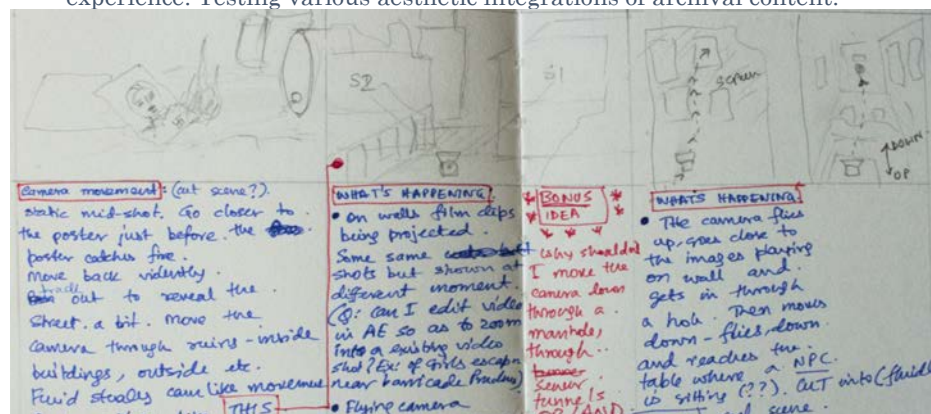
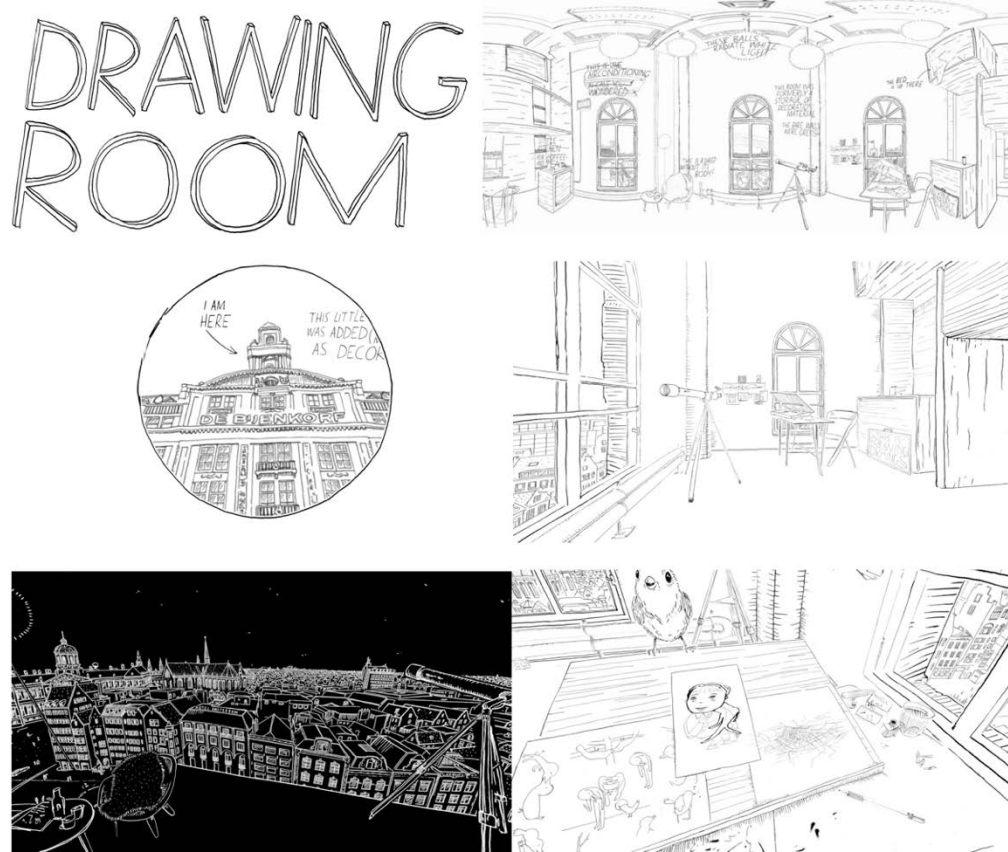


Figure 44. Traditional storyboard used in Prototype #3 of the Witness VR experience to develop story and camera work.



## “DRAWING ROOM” BY JAN ROTHUIZEN



**Figure 45.** Jan Rothuizen’s *Drawing Room* VR experience is entirely rendered using black & white line drawings.

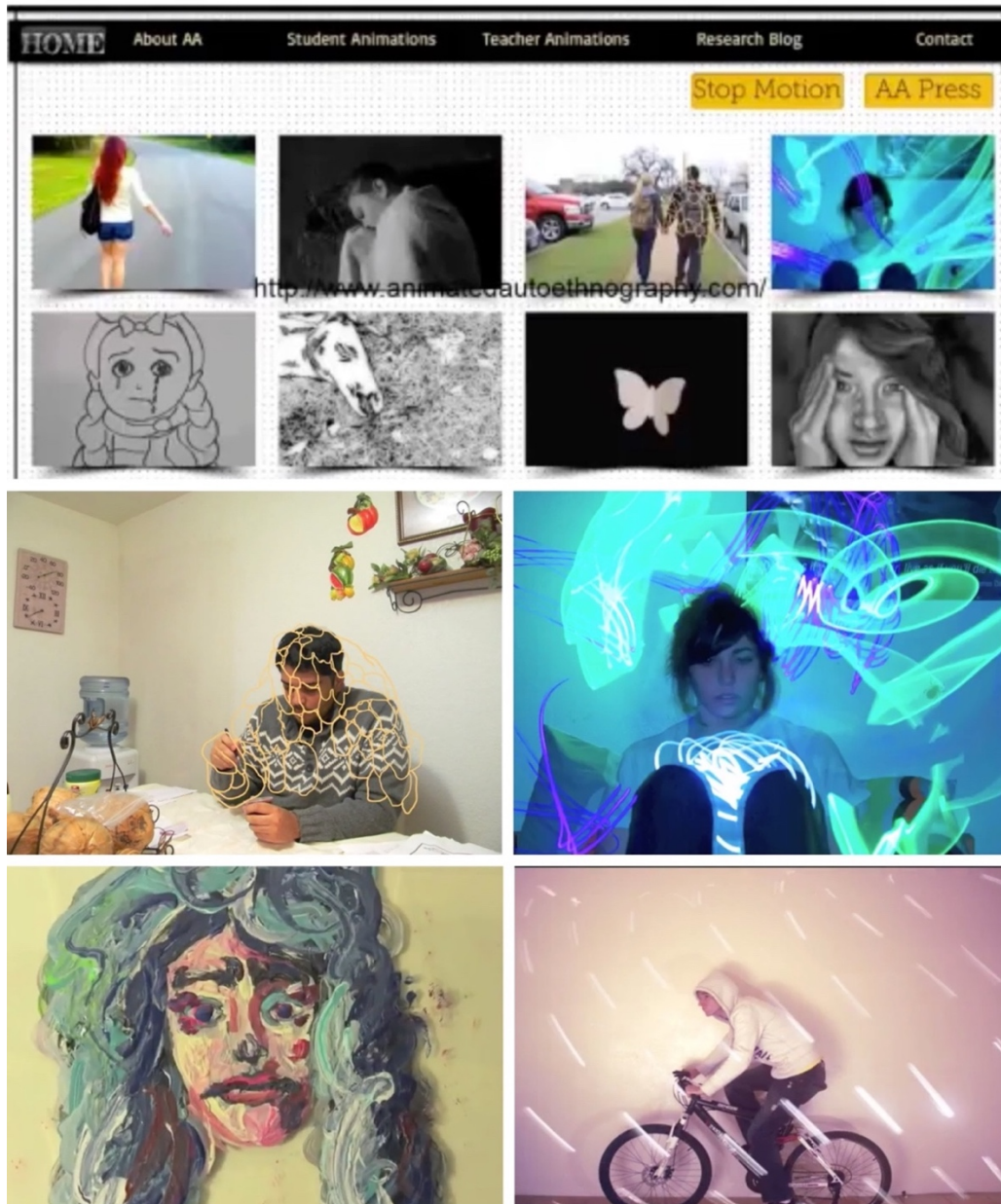
Artist Rothuizen works as an illustrator and in *Drawing Room* reflects on the creative process by recalling a residency in a clock tower of a town major shopping center. Hand drawn elements were digitized and then brilliantly staged in 3D space. *Drawing Room* is the winner of IDFA DocLab Award for Digital Storytelling.



**Figure 46.** 2015 IDFA participants from workshop by Jan Rothuizen are surrounded by the original artwork used to create the *Drawing Room* VR experience.

## ANIMATED AUTOETHNOGRAPHIES BY JEREMY BLAIR

### Animated Autoethnographies



**Figure 47.** Snapshot of a Jeremy Blair's website (top) and four frames from autoethnographic animated films made by Blair's students as part of his doctoral dissertation titled "Animated Autoethnographies." Source: Video of Jeremy Blair's lecture at the CU Anschutz Medical Campus in Nov. 2015.<sup>37</sup>

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<sup>37</sup> Blair, *The Day I Held His Hand*.



## CAO FEI



**Figure 48.** *RMB City* (2007-2011), is a virtual metropolis developed by Cao Fei's avatar, China Tracy, within the game *Second Life*. *RMB City* became a site for experimentation and collaboration where the historical, simulated and real mingled. Images from solo show *Cao Fei: Shadow Plays* organized by gallery The Mistake Room.

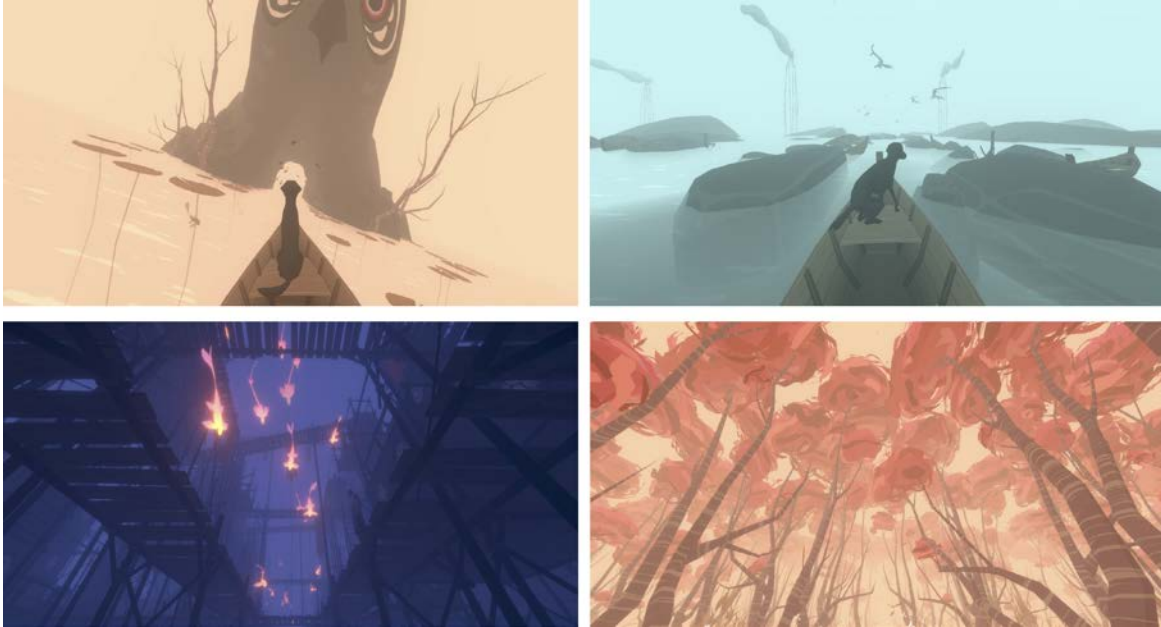
## KENT BYE AND “CROSSING GRIEF RITUAL”



**Figure 49.** Still image from *Crossover Grief Ritual* by Kent Bye, VR Evangelist and host of the most popular in the community *Voices of VR* podcast.

In the last four years Bye has interviewed on his podcast more than 800 creators, developers, theorist and scientists working with VR. In the episode #470 *The Art of Dying VR Art Show* of his podcast, Bye reflects on personal and intimate reasons how he got into VR. Bye goes on to speak about the first VR experience he created where his wife and him have a chance to speak again to a loved one who died by suicide. Bye's *Crossover Grief Ritual* was displayed together with work of 15 other artists working in new media and VR at Lindsay Saunders and Kelly Vicars' *Dream Logic* space at the Laundry, an AR/VR creative space in San Francisco, CA. Oct. 2016.

## “TRANSITION”



**Figure 50.** *Transition* VR experience by Mike von Rotz and Joost Jordens was shown during The Art of Dying VR Experience Art Show. *Transition* with its painterly images, pastel color pallet and iconography rooted in the Middle Eastern sensibilities for balance and harmony with nature. *Transition* reflects on passing on and journey into after life. Source: Images from Oculus Rift store.

## “FLATLINE”



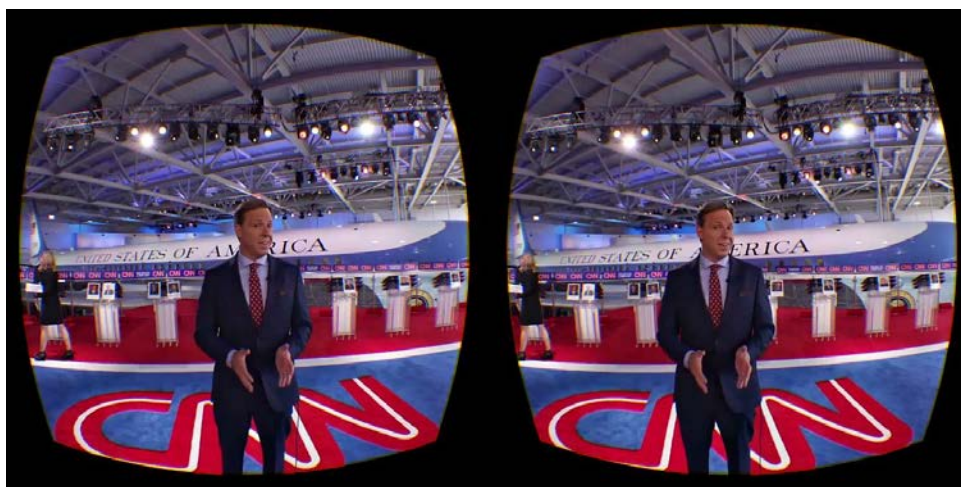
**Figure 51.** Still images from *Flatline: Experience the Other Side* VR experience directed by Jon Schnitzer about death, dying and Evangelist and host of the most popular in the community Voices of VR podcast.





**Figure 52.** “Flatline” at the NYC VR event *The Art of Dying* presented inside an ambulance for extra strong feeling of presence, as if you were really there. This is one of the most elaborate and interesting approaches to displaying VR work. Source: Images from Oculus Rift store and YouTube.

## IMMERSIVE JOURNALISM: REAL STORIES IN VR

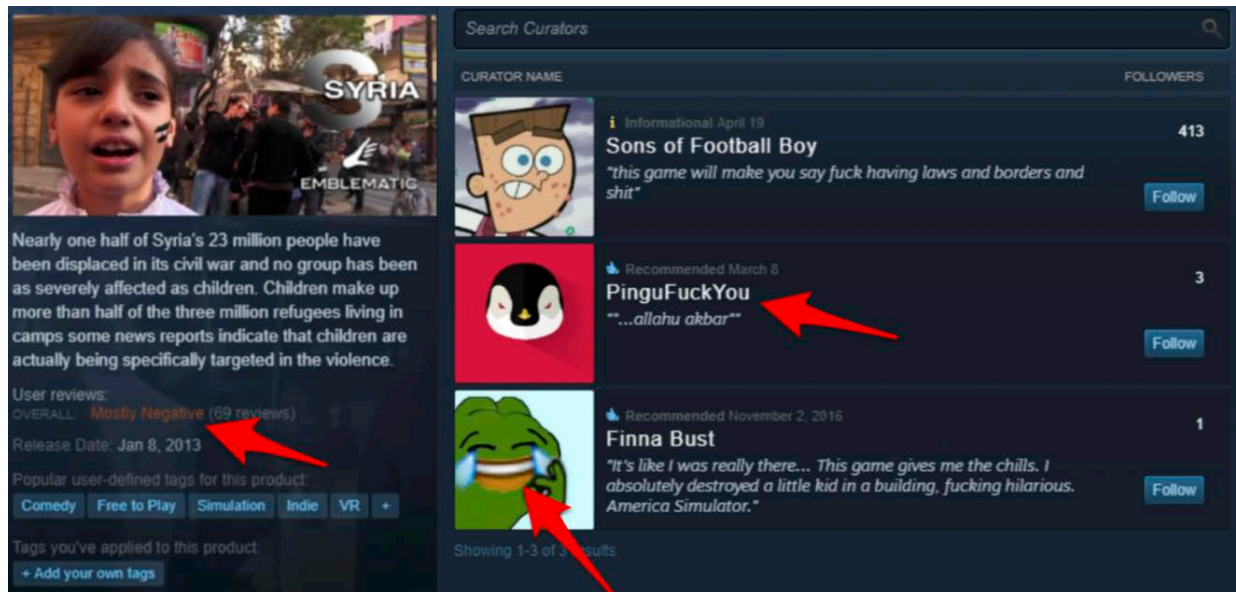


**Figure 53.** Immersive Journalism is still a novelty but VR's ability to allow people to embody presence or feel like they are present at the event has been recognized by all major news outlets like CNN as a great tool for telling important stories in a way that can elicit emotions and affect people.

## NONNY DE LA PEÑA AND THE EMPHATIC MACHINE



**Figure 54.** La Peña and many others hope that virtual reality can be used to reconnect people to each other and as a positive force for social progress. Above two reenactments of police shootings of black man. 2016.



**Figure 55.** *Project Syria: An Immersive Journalism Experience* by Nonny De La Peña show at UN to generate empathy for the plight of Syria refugees. Example of how toxic some gamer communities like 4CHAN and other anonymous social media posting sites have become. Source: Image from Steam.com illustrates how gamers community and other social media has made us less civil.





**Figure 56.** Still image from *Hunger* was Nonny De La Peña first virtual reality experience and attempt to build awareness about food shortages for the homeless in LA. La Peña is often referred within VR community as the “godmother of virtual reality and immersive journalism.”



**Figure 57.** La Pena and many others hope that virtual reality can be used to reconnect people to each other and as a positive force for social progress. Above two reenactments of police shootings of black man.

## JORDAN WOLFSON



**Figure 58.** People at Whitney Museum watching and reacting to Jordan Wolfson's controversial VR piece "Real Violence."

Visitors to the Whitney Biennial had to be at least eighteen years old to put on a headset and watch "Real Violence," an extremely bloody virtual-reality project by Jordan Wolfson. Response from the critics included calling the work repellant and showing the horrified reactions of people engaging with Wolfson's ultraviolent VR art piece.<sup>38</sup> Source: Whitney Museum. Photography by Bill Orcutt, except frame from actual VR experience (top right), which is property of the artist.

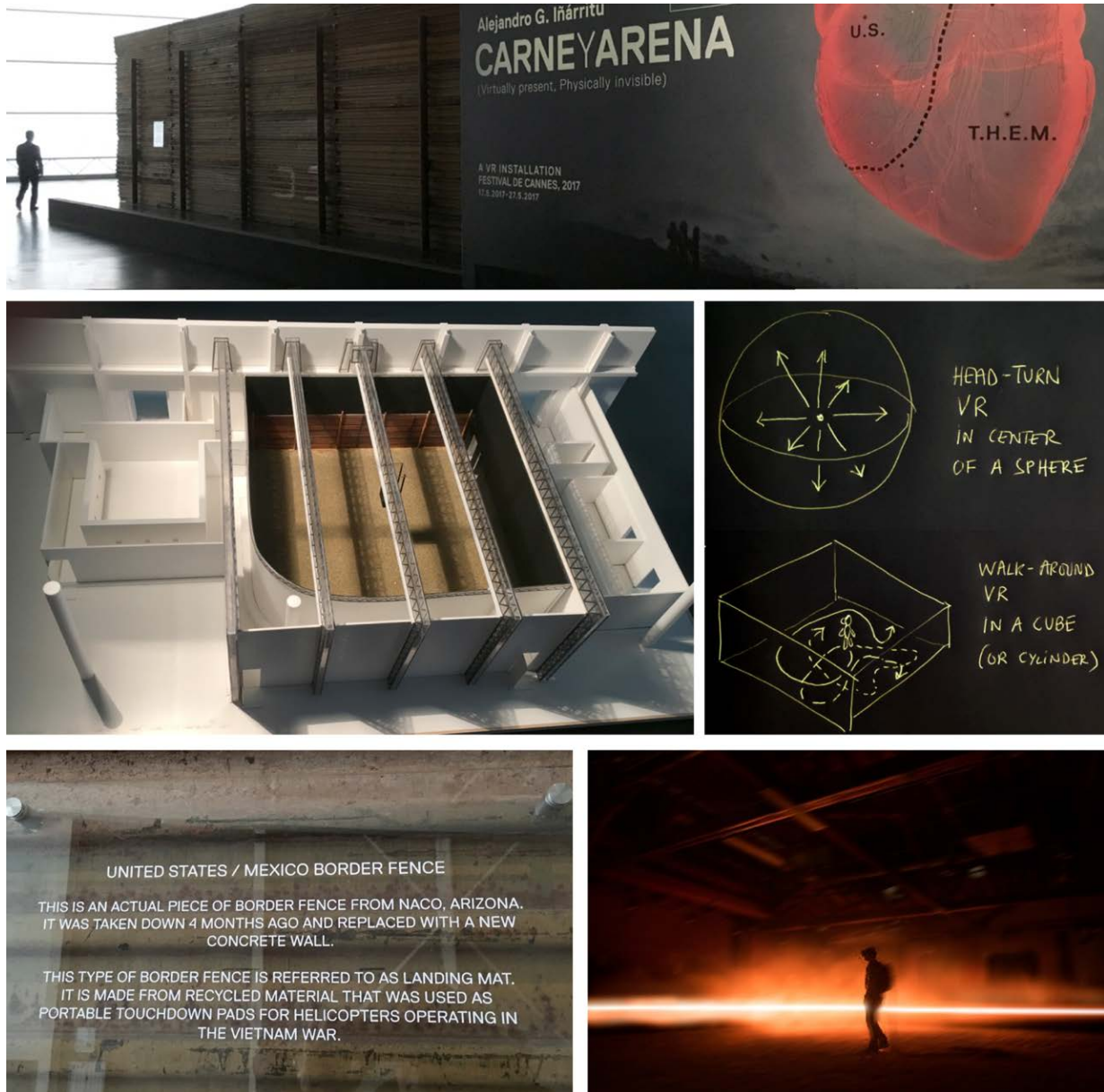
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<sup>38</sup> Eckardt, "The Work Is Repellant."

# APPENDIX C

## OTHER VR ARTISTS AND WORKS WHO INFLUENCED ME

### CARNE Y ARENA BY ALEJANDRO G. IÑÁRRITU



**Figure 59.** Image of the CARNE Y ARENA (Virtually present, Physically invisible) VR experience by Alejandro G. Iñárritu. Source: Los Angeles County Museum of Contemporary Art.





### CARNE Y ARENA (Virtually present, Physically invisible)

During the making of this project, I had the privilege of meeting and interviewing many Mexican and Central American immigrants and refugees. I invited some of them to participate in this project so that their personal journeys would not be just a statistic for the rest of us, but would instead be seen, felt, heard and experienced by others. Their life stories haunted me. In spite of their difficult pasts and current situations, their spirits are still armed with hope, defying the uncertain futures that await them.

By adapting the events experienced by one or many of the immigrants during their journeys across the border and adding specific details described by them, I wrote and staged a scene creating a multi-narrative space that integrates many of them in what could be called a semi-fictionalized ethnography.

There are no actors here. These are true stories re-enacted by the people who experienced them. Even some of the clothes they wear are pieces they wore while crossing the border.

Since this project started growing in my mind over the last four years, my main interest was to experiment with VR technology in order to explore the human condition while finding a personal way to represent it.

I took some creative risks, walked into never before visited layers, and learned many lessons. While both are audiovisual, VR is all that cinema is not, and vice versa; the frame is gone and the two-dimensional limits are dissolved... During this realistically unreal experience, our brain wires and most of our senses were tested.

No experience in CARNE Y ARENA will ever be the same for any visitor. We created a truthful alternate space where you as a visitor will walk alongside the immigrants (and into their minds) with infinite possibilities and perspectives within a vast landscape, but you will go on your own terms.

In collaboration with Emmanuel Lubezki and ILMxLAB, pushing the technology to a very high level, we digitally documented their undocumented accounts as they created their own photo-realistic avatars.

The experience was cathartic and emotional. After many years, their memories finally have a public face.

Alejandro G. Iñárritu

**Figure 60.** Image of the CARNE Y ARENA (Virtually present, Physically invisible) VR experience by Alejandro G. Iñárritu. Source: Los Angeles County Museum of Contemporary Art.



**Figure 61.** Filmmaker Alejandro G. Iñárritu accepts a Special Academy Award Oscar for his virtual reality installation Carne y Arena (Virtually Present, Physically Invisible). Officially the Oscar statue is "in recognition of a visionary and powerful experience in storytelling." [...] It has been 22 years since the Academy last presented a Special Award when it presented one to John Lasseter for creating the first feature-length computer-animated film in Toy Story. Source: hollywoodreporter.com. Oct. 27, 2017.

## “ZEN PARADE” BY KEVIN MACK



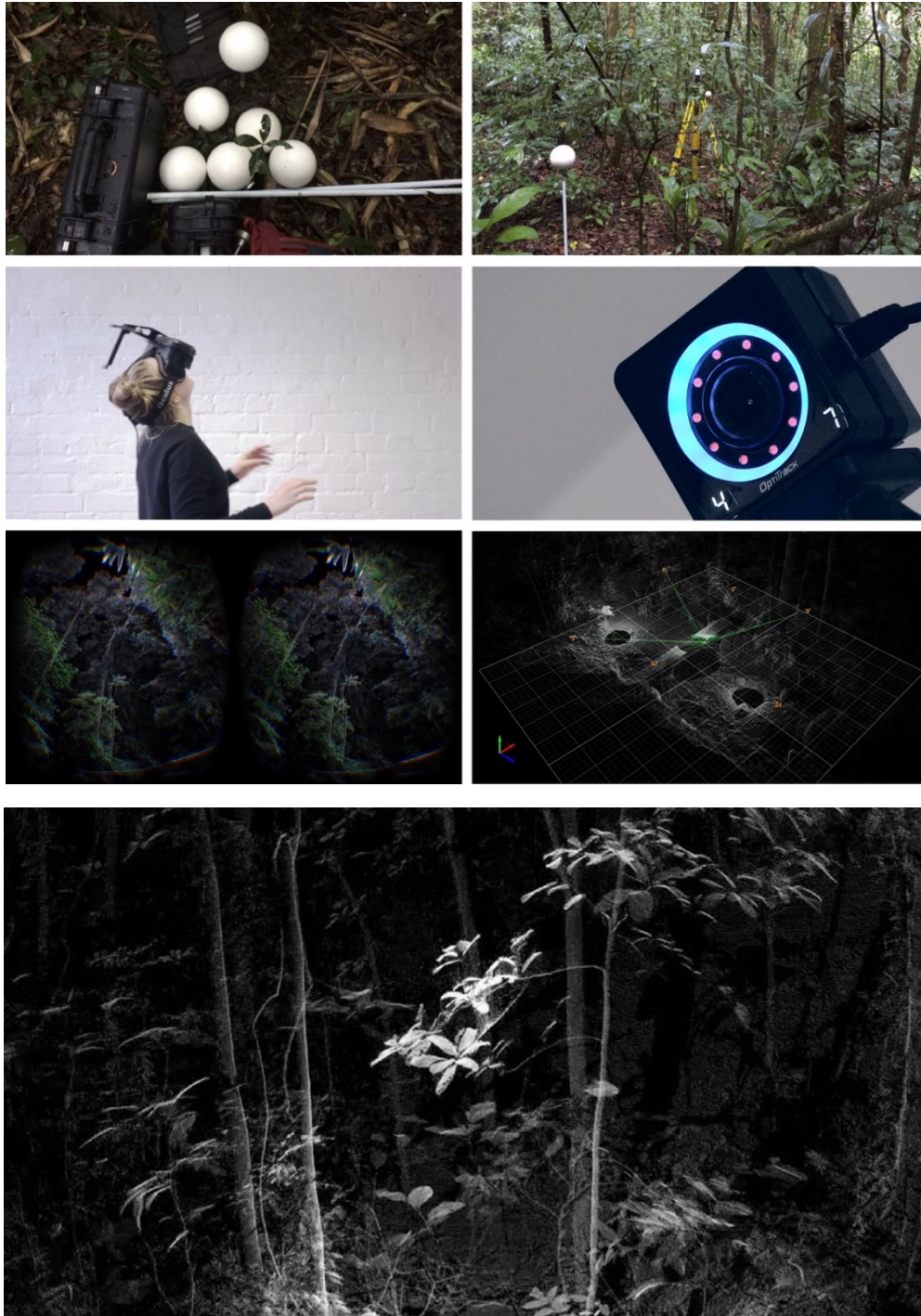
**Figure 62.** Images from Zen Parade, a meditative VR art experience by Kevin Mack. This meditative yet actively engaging self-generating animation and music can provide active engagement even during brain surgery and when certain forms of anesthesia are not possible. This use of medicine is currently being investigated using Zen Parade as a research tool. Source: Images from Oculus GearVR store.





**Figure 63.** Artist Jeff Koons first work in VR. Artist show directing dancer in the process of motion capture and working with CG artist creating in VR a photo realistic virtual environment for the 3D puppet of a ballerina. Same 3D model with same physical characteristic such as reflecting light show as a larger than life sculpture. Images from article *Marina Abramović & Jeff Koons Front New Online VR Gallery* published on Dazed.com. Anna Cafolla. June 11, 2017.

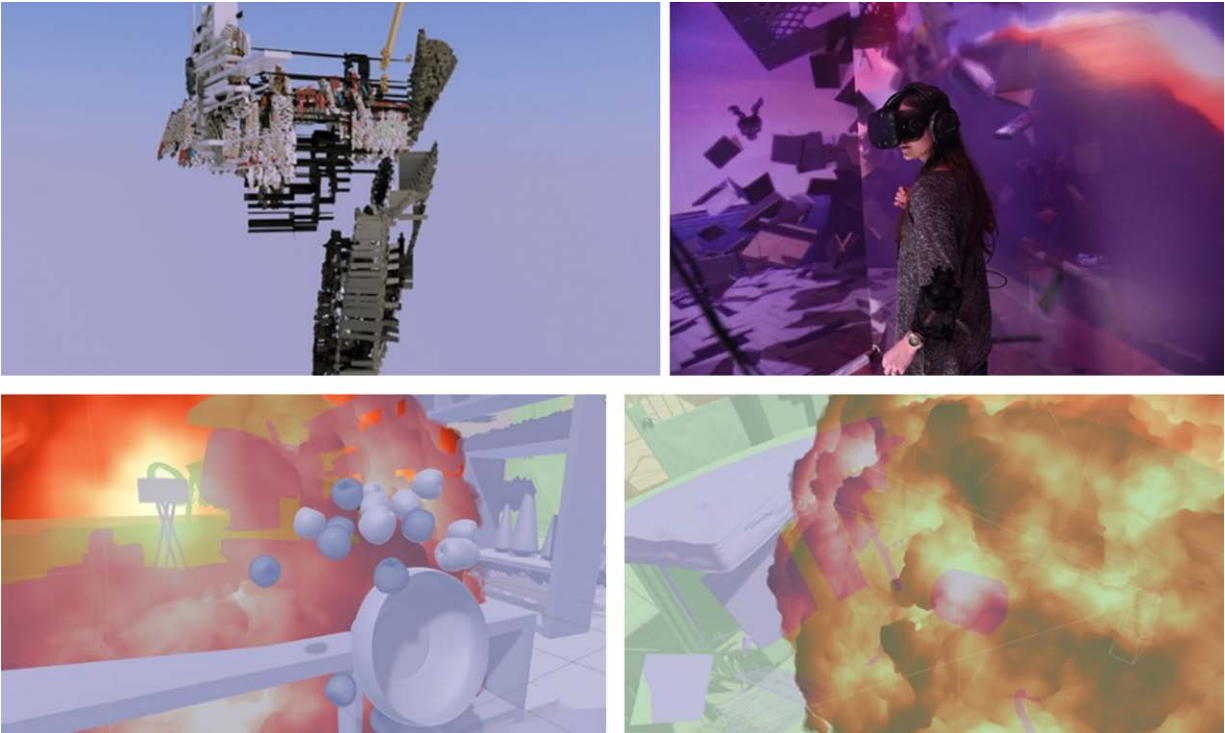
DANIEL STEEGMANN



**Figure 64.** *Phantom (Kingdom of All the Animals and All the Beasts is My Name)* virtual reality environment, oculus, optitrack tracking system. New Museum Triennial, Surround Audience, New York, 2015. Source: Images from artist's home page.



## RACHEL ROSSIN (MORE)



**Figure 65.** *The Sky Is A Gap* was made possible with support from: The Zabludowicz Collection, London; Patty Quillin; Nvidia; Alienware; Technicolor; and Borscht Corp.



**Figure 66.** *I Came And Went As A Ghost Hand*, 2015, Virtual reality, Ed. 1 of 5+AP, 2 min 30 sec.

# VR4VR CONTENT CREATION TOOLS AND ARTISTS USING THEM

## PAINT WITH TILT BRUSH BY GOOGLE



**Figure 67.** Promo image and art work for Tilt Brush for Google. Source: Images from Oculus Rift store.



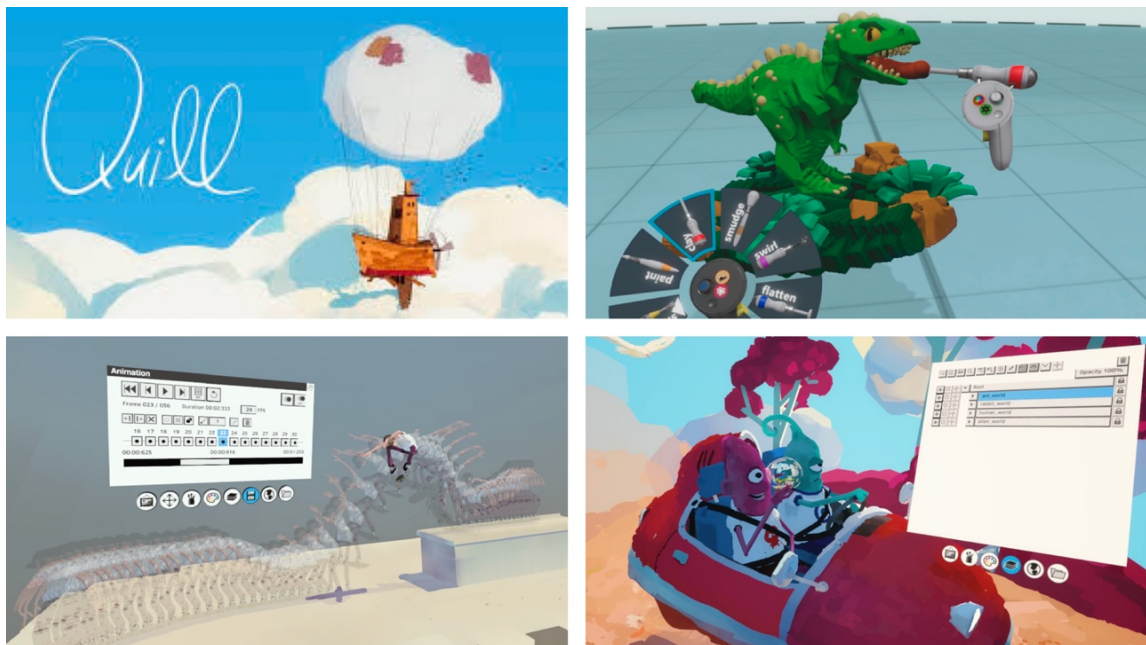
**Figure 68.** Painter Bradley Theodore standing between two of his abstract portraits (on the left) which are displayed alongside his first all-digital 3D portraits painted entirely in VR with Tilt Brush by Google. Source: Images from the Maddox Gallery, London, U.K.





**Figure 69.** Images illustrating steps by artist Jonathan Yeo to create self-portrait sculpture starting in VR and ending in casting in bronze. Source: How to Make a Sculpture in Virtual Reality, <https://goo.gl/RnbuJx>

## PAINT AND ANIMATE WITH QUILL

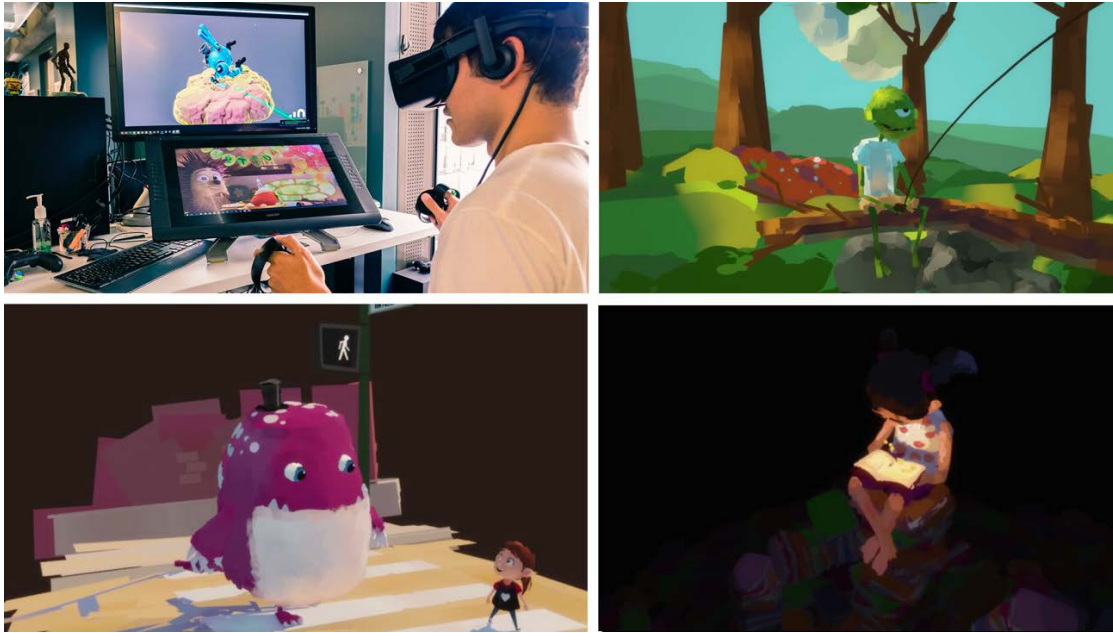


**Figure 70.** Quill is the Adobe Photoshop of the VR4VR content creation tool that has animation tools.

This tool like this are a standard in most cell animation software and have similar features like onion skinning, where you can see a ghost of previous and next image, and frame duplication allowing for the artist to animate faster and have more control over look and timing. Source: Images from Oculus Rift store.

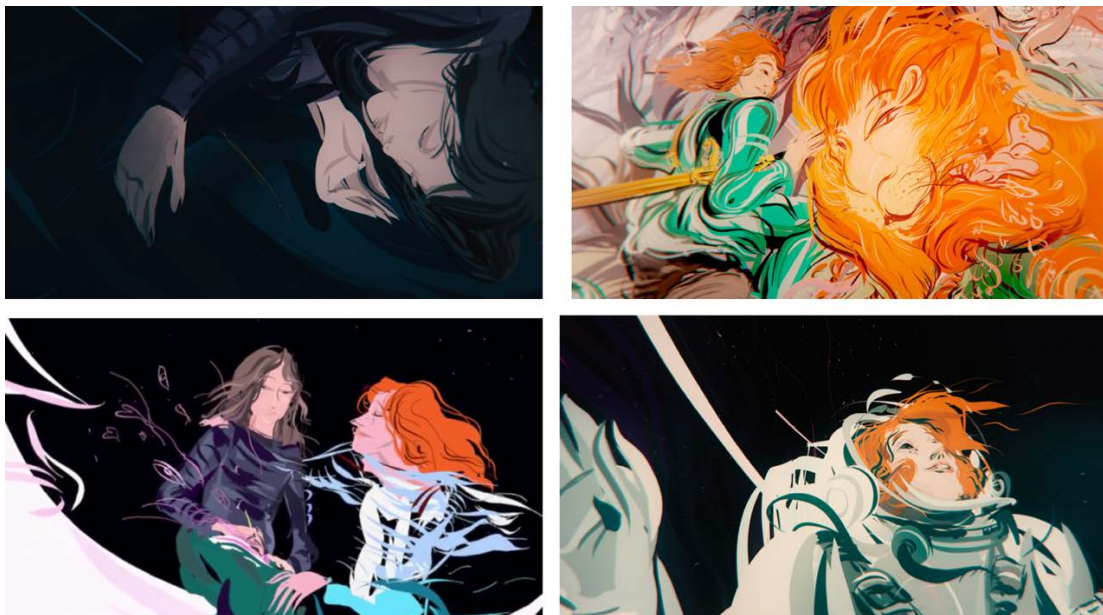


## GORO FUJITA



**Figure 71.** New generation CGI artist Goro Fujita (top right) shown modeling in VR using Quill. Fujita is an Art Director, illustrator and visual development artist based in the Bay Area California. Source: Images from Oculus Rift store. Image of Fujita working from iamag.co online article *Art in VR: Oculus Quill Paintings by Goro Fujita*.

## SASCHKA UNSELD'S “DEAR ANGELICA”



**Figure 72.** Images from Emmy Award winning *Dear Angelica* by artist Saschka Useld. This animated VR experience is a journey through the magical and dreamlike ways we remember our loved ones. *Dear Angelica*, plays out in a series of memories that unfold around you. An immersive, illustrative short story starring Geena Davis and Mae Whitman. Useld painted the whole film entirely by hand inside of VR with Quill. Source: Images from Oculus Rift store.

# WORKS CITED

- Abramović, Marina. *An Art Made Of Trust, Vulnerability And Connection*. Streaming. Ted2015. Accessed February 17, 2018. [https://www.ted.com/talks/Marina\\_Abramovic\\_An\\_Art\\_Made\\_Of\\_Trust\\_Vulnerability\\_And\\_Connection](https://www.ted.com/talks/Marina_Abramovic_An_Art_Made_Of_Trust_Vulnerability_And_Connection).
- “Acute Art.” Accessed February 17, 2018. <https://www.acuteart.com/about>.
- Acute Art Virtual Reality - Jeff Koons, Marina Abramovic & Olafur Eliasson*. Streaming. Acute Art Vr, 2017. [https://www.youtube.com/watch?Time\\_Continue=214&V=GvhiwqiW3j4](https://www.youtube.com/watch?Time_Continue=214&V=GvhiwqiW3j4).
- Akers, Matthew, And Jeff Dupre. *Marina Abramovic: The Artist Is Present*. Streaming, Documentary, Biography, History. Amazon.Com, 2012. <https://www.amazon.com/dp/B00drcq3qs>.
- Artez Studium Generale. *Timotheus Vermeulen And Robin Van Den Akker: Notes On Metamodernism*. Accessed January 30, 2018. <https://www.youtube.com/watch?v=9wpyfvb2dic>.
- Blair, Jeremy. *The Day I Held His Hand: An Animated Auto-Ethnography*. Streaming, 2015. <https://www.youtube.com/watch?v=Mysnq8wi0gy>.
- Bye, Kent. *Historical Context Of Virtual Reality - Kent Bye's Svr 2017 Keynote*. Streaming. Accessed February 2, 2018. <https://www.youtube.com/watch?v=Fp9cxbvmo4w>.
- . *Maps For Understanding Vr & Reality: Kent Bye's Itc Keynote*. Streaming, 2017. <https://www.youtube.com/watch?v=Xda83r3gi6m>.
- . *Mel Slater's Theory Of Vr Presence Vs An Elemental Theory Of Presence*. Voices Of Vr Podcast. Accessed February 18, 2018. <http://voicesofvr.com/556-Mel-Slaters-Theory-Of-Vr-Presence-Vs-An-Elemental-Theory-Of-Presence/>.
- . *The Art Of Dying Vr Art Show*. Mp3. Voices Of Vr Podcast. Accessed February 2, 2018. <http://voicesofvr.com/470-The-Art-Of-Dying-Vr-Art-Show/>.
- Eckardt, Stephanie. “‘The Work Is Repellant’: All The Horrified Reactions To Jordan Wolfson’s Ultraviolet Vr Art At The Whitney Biennial.” *W Magazine*. Accessed January 22, 2018. <https://www.wmagazine.com/story/Jordan-Wolfson-Whitney-Biennial-2017-Reviews-Reactions>.
- Jo, Monika. “52 Vr Definitions: Jaron’s Scientific, Cultural, And Personal Adventures.” *Arvr Journey: Augmented & Virtual Reality* (Blog), December 10, 2017. <https://arvrjourney.com/52-Vr-Definitions-Jarons-Scientific-Cultural-And-Personal-Adventures-66f04ed52301>.
- Lajeunesse, Félix. *Miyubi*. Vr Experience, Short, Comedy, 2017. <https://www.imdb.com/title/tt7896046/>.
- Lanier, Jaron. *Dawn Of The New Everything: Encounters With Reality And Virtual Reality*. Kindle Edition. New York: Henry Holt And Company, 2017.

- “Laurie Anderson.” *Wikipedia*, February 15, 2018.  
[https://en.wikipedia.org/w/index.php?title=Laurie\\_Anderson&oldid=825777172](https://en.wikipedia.org/w/index.php?title=Laurie_Anderson&oldid=825777172).
- Laurie Anderson Interview: A Virtual Reality Of Stories*. Louisiana Museum Of Modern Art: Louisiana Channel, 2017. <https://vimeo.com/233785242>.
- “Marina Abramović.” *Wikipedia*, February 15, 2018.  
[https://en.wikipedia.org/w/index.php?title=Marina\\_Abramovi%C4%87&oldid=825786022](https://en.wikipedia.org/w/index.php?title=Marina_Abramovi%C4%87&oldid=825786022).
- Matney, Lucas. “Embody An 80s Family Robot In Funny Or Die’s Feature-Length Vr Flick ‘Miyubi.’” *Techcrunch* (Blog), July 27, 2017.  
<http://social.techcrunch.com/2017/07/27/embody-an-80s-family-robot-in-funny-or-dies-feature-length-vr-flick-miyubi/>.
- Miller, Jason. *A Different Canvas: Chris Milk*. Streaming. Future Of Storytelling, 2013.  
[https://www.youtube.com/watch?v=5efd4\\_dlbds](https://www.youtube.com/watch?v=5efd4_dlbds).
- Opening Keynote: Mark Zuckerberg*. Streaming. Oculus Connect 3. Accessed February 17, 2018. <https://www.youtube.com/watch?v=Nlnk2ccirqm>.
- O’reilly, David. “Basic Animation Aesthetics.” Accessed February 18, 2018.  
<http://www.davidoreilly.com/downloads/>.
- Rossin, Rachel. “13 Artworks, Bio & Shows On Artsy.” Accessed January 22, 2018.  
<https://www.artsy.net/artist/rachel-rossin>.
- Schwendener, Martha. “In Rachel Rossin’s ‘Lossy,’ The Virtual Reality Of Living In A Painting.” *The New York Times*, November 5, 2015, Sec. Art & Design.  
<https://www.nytimes.com/2015/11/06/arts/design/in-rachel-rossins-lossy-the-virtual-reality-of-living-in-a-painting.html>.
- Shaw, Julia. *The Memory Illusion: Remembering, Forgetting, And The Science Of False Memory*, 2017.
- Vermeulen, Timotheus, And Robin Van Den Akker. “Notes On Metamodernism.” *Journal Of Aesthetics And Culture* 2 (November 15, 2010).  
<https://doi.org/10.3402/jac.v2i0.5677>.

# COMPLETE BIBLIOGRAPHY

- “A Short History of Maladaptive Daydreaming.” 2014. Dreaming Away My Life (blog). February 5, 2014. <https://dreamingawaymylife.wordpress.com/2014/02/05/a-short-history-of-maladaptive-daydreaming/>.
- Abramović, Marina. n.d. An Art Made of Trust, Vulnerability and Connection. Streaming. TED2015. Accessed February 17, 2018. [https://www.ted.com/talks/marina\\_abramovic\\_an\\_art\\_made\\_of\\_trust\\_vulnerability\\_and\\_connection](https://www.ted.com/talks/marina_abramovic_an_art_made_of_trust_vulnerability_and_connection).
- Abramson, Seth. 2015. “Ten Basic Principles of Metamodernism.” Huffington Post (blog). April 27, 2015. [https://www.huffingtonpost.com/seth-abramson/ten-key-principles-in-met\\_b\\_7143202.html](https://www.huffingtonpost.com/seth-abramson/ten-key-principles-in-met_b_7143202.html).
- “Acute Art.” n.d. Accessed February 17, 2018. <https://www.acuteart.com/about>.
- Acute Art Virtual Reality - Jeff Koons, Marina Abramovic & Olafur Eliasson. 2017. Streaming. Acute Art VR. [https://www.youtube.com/watch?time\\_continue=214&v=gVHiWqIw3J4](https://www.youtube.com/watch?time_continue=214&v=gVHiWqIw3J4).
- Adichie, Chimamanda Ngozi. n.d. The Danger of a Single Story | Chimamanda Ngozi Adichie. Streaming. TED. Accessed February 2, 2018. <https://www.youtube.com/watch?v=D9Ihs241zeg>.
- “Afterwardsness.” 2017. Wikipedia. <https://en.wikipedia.org/w/index.php?title=Afterwardsness&oldid=814706234>.
- Akers, Matthew, and Jeff Dupre. 2012. Marina Abramovic: The Artist Is Present. Streaming. Documentary, Biography, History. Amazon.com. <https://www.amazon.com/dp/B00DRCQ3QS>.
- Akpan, Nsikan. 2016. “How Cops Used Virtual Reality to Recreate Tamir Rice, San Bernardino Shootings.” PBS NewsHour. January 13, 2016. <https://www.pbs.org/newshour/science/virtual-reality-tamir-rice-3d-laser-scans-shootings-san-bernardino>.
- “Alejandro G. Inárritu: CARNE y ARENA (Virtually Present, Physically Invisible).” n.d. LACMA. Accessed January 30, 2018. <http://www.lacma.org/carne-y-arena#about-the-exhibition>.
- Amazing Art Installation Turns You Into A Bird | Chris Milk “The Treachery of Sanctuary.” 2012. Streaming. Creators Project. [https://www.youtube.com/watch?v=I5\\_9hq-yas](https://www.youtube.com/watch?v=I5_9hq-yas).
- Ambinder, Michael S., Ranxiao Frances Wang, James A. Crowell, George K. Francis, and Peter Brinkmann. 2009. “Human Four-Dimensional Spatial Intuition in Virtual Reality.” *Psychonomic Bulletin & Review* 16 (5): 818–23. <https://doi.org/10.3758/PBR.16.5.818>.
- “Ambisonics.” 2017. Wikipedia. <https://en.wikipedia.org/w/index.php?title=Ambisonics&oldid=809185504>.

- Baciu, Ciprian, Muşata Bocoş, and Corina Baciu-Urzică. 2015. "Metamodernism – A Conceptual Foundation." *Procedia - Social and Behavioral Sciences*, The 3rd International Conference "EDUCATION, REFLECTION, DEVELOPMENT", 3th - 4th July, 2015, 209 (December): 33–38. <https://doi.org/10.1016/j.sbspro.2015.11.226>.
- Ball, Philip. 2018. "We Might Live in a Computer Program, but It May Not Matter." September 5, 2018. <http://www.bbc.com/earth/story/20160901-we-might-live-in-a-computer-program-but-it-may-not-matter>.
- Bamieh, Mirna. 2016. Walk-through "Afterwardsness" Exhibition by Mirna Bamieh. Streaming. <https://www.youtube.com/watch?v=HHejTgAEX2o>.
- Bavor, Clay. 2017. "Virtual and Augmented Realities: Asking the Right Questions and Traveling the Path Ahead." Medium (blog). May 17, 2017. <https://medium.com/@claybavor/virtual-and-augmented-realities-asking-the-right-questions-and-traveling-the-path-ahead-2428b9d13c01>.
- Bayles, David, and Ted Orland. n.d. *Art & Fear: Observations On the Perils (and Rewards) of Artmaking*. Kindle Edition. Image Continuum Press.
- Benjamin, Walter. 2010. *The Work of Art in the Age of Mechanical Reproduction*. Lexington, KY: Prism Key Press.
- Beyond the Screen: Future's Made of Virtual Reality. n.d. Streaming. TIFF Industry 2014. Accessed January 30, 2018. <https://www.youtube.com/watch?v=iAJ10Mk6hBo>.
- Beyond VR. n.d. Streaming. FORA.Tv. Accessed January 30, 2018. <https://www.youtube.com/watch?v=12yHXpvMfZg>.
- Bhati, Kaustub. 2017. "Reconstructing a Crime Scene: Virtual Reality in Courtrooms." Tech Law Forum @ NALSAR (blog). February 8, 2017. <https://techlawforum.wordpress.com/2017/02/09/reconstructing-a-crime-scene-virtual-reality-in-courtrooms/>.
- Bigelsen, Jayne, and Tina Kelley. 2015. "When Daydreaming Replaces Real Life." *The Atlantic*, April 29, 2015. <https://www.theatlantic.com/health/archive/2015/04/when-daydreaming-replaces-real-life/391319/>.
- Bill Viola - "Ocean Without a Shore" - Venice Biennale 2007. 2008. Streaming. Bloomberg TateShots. <https://www.youtube.com/watch?v=cg1yxEW-ZFE>.
- Bill Viola's "Ocean Without a Shore." n.d. Streaming. Vol. 48. Accessed February 1, 2018. <http://www.ngv.vic.gov.au/essay/bill-violas-ocean-without-a-shore/>.
- Bishop, Bryan. 2013. "Digital Empathy: How 'Hunger in Los Angeles' Broke My Heart in a Virtual World." *The Verge*. June 14, 2013. <https://www.theverge.com/2013/6/14/4431308/digital-empathy-how-hunger-in-los-angeles-broke-my-heart-virtual-reality>.
- . 2017. "Alejandro González Iñárritu's *Carne y Arena* Proves That Great Virtual Reality Means Going beyond the Headset." *The Verge*. July 8, 2017. <https://www.theverge.com/2017/7/8/15941596/carne-y-arena-alejandro-inarritu-virtual-reality-installation-border>.
- Blair, Jeremy. 2015. *The Day I Held His Hand: An Animated Auto-Ethnography*. Streaming. <https://www.youtube.com/watch?v=mySnq8WI0gY>.



- Blascovich, Jim, and Jeremy Bailenson. 2011. *Infinite Reality: Avatars, Eternal Life, New Worlds, and the Dawn of the Virtual Revolution*. 1st ed. New York: William Morrow.
- Blumberg, Micah. 2016. "I Tried Hypnotherapy from a VR Therapist to Help Me Be More Productive." SVGN.Io on Medium (blog). November 18, 2016. <https://medium.com/@vrma/i-tried-hypnotherapy-from-a-vr-therapist-to-help-me-be-more-productive-e4a7b361ac17>.
- . 2017. "Art and Virtual Reality." SVGN.Io on Medium (blog). February 6, 2017. <https://medium.com/@vrma/art-and-virtual-reality-119f8ff85bc4>.
- Booth, Robert. 2014. "Facebook Reveals News Feed Experiment to Control Emotions." *The Guardian*, June 30, 2014. <https://www.theguardian.com/technology/2014/jun/29/facebook-users-emotions-news-feeds>.
- Broderick, Mick, and Antonio Traverso, eds. 2010. *Trauma, Media, Art: New Perspectives*. Newcastle upon Tyne: Cambridge Scholars.
- Bruney, Gabrielle. 2017. "I Experienced 'Virtually Real' 3D-Printed Art, Made in Virtual Reality." *Creators*. January 18, 2017. [https://creators.vice.com/en\\_us/article/vvy5xx/virtually-real-art-3d-printed-from-vr](https://creators.vice.com/en_us/article/vvy5xx/virtually-real-art-3d-printed-from-vr).
- Buchanan, Kyle. n.d. "Cannes 2017: Iñárritu's VR Experience Will Break Your Heart." Accessed January 30, 2018a. <http://www.vulture.com/2017/05/cannes-2017-irritus-vr-experience-will-break-your-heart.html>.
- . n.d. "Iñárritu's Border-Crossing VR Installation Will Break Your Heart." *Vulture*. Accessed January 30, 2018b. <http://www.vulture.com/2017/05/cannes-2017-irritus-vr-experience-will-break-your-heart.html>.
- Buchowski-Kurus, Mary. n.d. "Emotions - How To Understand, Identify and Release Your Emotions." *M.K. Projects*. Accessed January 30, 2018. <http://www.mkprojects.com/emotions>.
- Building "RMB City." n.d. Streaming. ART21. PBS. Accessed January 22, 2018. <https://art21.org/watch/extended-play/cao-fei-building-rmb-city-short/>.
- Bunyan, Dr Marcus. 2009. "Review: 'Ocean Without A Shore' Video Installation by Bill Viola at The National Gallery of Victoria, Melbourne." *Art Blart* (blog). February 24, 2009. <https://artblart.com/2009/02/24/review-ocean-without-a-shore-video-installation-by-bill-viola-at-the-national-gallery-of-victoria-melbourne/>.
- Burke, Sarah. 2018. "How Artists Are Using VR to Talk About Healing from Sexual Assault." *Broadly*. January 3, 2018. [https://broadly.vice.com/en\\_us/article/yw538g/how-artists-are-using-vr-to-talk-about-healing-from-sexual-assault](https://broadly.vice.com/en_us/article/yw538g/how-artists-are-using-vr-to-talk-about-healing-from-sexual-assault).
- Bye, Kent. 2017. *Maps for Understanding VR & Reality: Kent Bye's ITC Keynote*. Streaming. <https://www.youtube.com/watch?v=XDA83r3gi6M>.
- . n.d. *Crossover Grief Ritual*. Streaming. Accessed February 2, 2018a. <https://www.youtube.com/watch?v=xO-NPseFFxc>.

- . n.d. Historical Context of Virtual Reality - Kent Bye's SVVR 2017 Keynote. Streaming. Accessed February 2, 2018b. <https://www.youtube.com/watch?v=FP9CXBVmO4w>.
- . n.d. Mel Slater's Theory of VR Presence vs an Elemental Theory of Presence. Voices of VR Podcast. Accessed February 18, 2018c. <http://voicesofvr.com/556-mel-slaters-theory-of-vr-presence-vs-an-elemental-theory-of-presence/>.
- . n.d. Sundance's Shari Frilot on the Power of VR Storytelling to See Ourselves in a New Way. Voices of VR Podcast. Accessed January 30, 2018d. <http://voicesofvr.com/522-sundances-shari-frilot-on-the-power-of-vr-storytelling-to-see-ourselves-in-a-new-way/>.
- . n.d. The Art of Dying VR Art Show. Mp3. Voices of VR Podcast. Accessed February 2, 2018e. <http://voicesofvr.com/470-the-art-of-dying-vr-art-show/>.
- . n.d. Using Virtual Reality to Archive Art Installations with Matt Henderson. Voices of VR Podcast. Accessed February 1, 2018f. <http://voicesofvr.com/270-using-virtual-reality-to-archive-art-installations-with-matt-henderson/>.
- "Cao Fei." n.d. PBS Art21. Accessed January 22, 2018. <https://art21.org/artist/cao-fei/>.
- Cao, Fei. n.d. "Cao Fei - Artists Home Page." Accessed January 22, 2018. <http://www.caofei.com/news.aspx>.
- Cao Fei, Avatars. n.d. Streaming. ART21. PBS. Accessed January 29, 2018. <https://art21.org/watch/extended-play/cao-fei-avatars-short/>.
- Cao Fei in "Fantasy." n.d. Streaming. ART21. PBS. Accessed January 22, 2018. <https://art21.org/watch/art-in-the-twenty-first-century/s5/cao-fei-in-fantasy-segment/>.
- Carlton, Bobby. 2017. "Telling Stories of Sexual Assault Survivors and Their Journey To Healing in VR." VRScout (blog). June 1, 2017. <https://vrscout.com/news/telling-stories-sexual-assault-survivors-vr-testimony/>.
- "Carne y Arena Part 1 - VR by Alejandro G. Iñárritu with Emmanuel Lubezki, ASC, AMC." n.d. American Cinematographer. Accessed January 30, 2018. <https://ascmag.com/blog/the-film-book/carne-y-arena-vr-masterpiece-innaritu-lubezki>.
- "Carne y Arena Part 2 - Notes on VR Cinema Design." n.d. American Cinematographer. Accessed January 30, 2018. <https://ascmag.com/blog/the-film-book/carne-y-arena-notes-on-vr-cinema>.
- Chen, Angela. 2016. "Paul Bloom on Why VR Empathy Projects Won't Save the World." The Verge. December 6, 2016. <https://www.theverge.com/2016/12/6/13857268/paul-bloom-psychology-against-empathy-virtual-reality-politics>.
- Choe, Nancy. n.d. "Virtual Reality: Art Therapy and New Media." Accessed January 29, 2018. <https://arttherapytech.wordpress.com/tag/virtual-reality/>.
- "Chris Milk." 2017. Wikipedia. [https://en.wikipedia.org/w/index.php?title=Chris\\_Milk&oldid=813387443](https://en.wikipedia.org/w/index.php?title=Chris_Milk&oldid=813387443).
- "Chris Milk: Bio." n.d. Here Be Dragons. Accessed January 30, 2018. <http://dragons.org/creators/chris-milk/bio/>.

- Chung, Becky. 2014. "Points Of View' Interactive Web Documentary Captures Everyday Life In Gaza." Creators. August 15, 2014.  
[https://creators.vice.com/en\\_us/article/yp5wgj/points-of-view-interactive-web-documentary-captures-everyday-life-in-gaza](https://creators.vice.com/en_us/article/yp5wgj/points-of-view-interactive-web-documentary-captures-everyday-life-in-gaza).
- Cobley, Paul, and Litza Jansz. 2012. Introducing Semiotics.  
<http://public.eblib.com/choice/publicfullrecord.aspx?p=1822983>.
- Cone, Justin. 2009. "Marco Brambilla: Civilization." Motionographer. March 16, 2009.  
<http://motionographer.com/2009/03/15/marco-brambilla-civilization/>.
- Damiani, Jesse. 2016. "Storytelling in Virtual Reality: The Basics." Huffington Post (blog). June 16, 2016. [https://www.huffingtonpost.com/jesse-damiani/storytelling-in-virtual-r\\_b\\_10448832.html](https://www.huffingtonpost.com/jesse-damiani/storytelling-in-virtual-r_b_10448832.html).
- Dargis, Manohla. 2015. "Review: 'Heart of a Dog,' Laurie Anderson's Meditation on Loss." The New York Times, October 20, 2015, sec. Movies.  
<https://www.nytimes.com/2015/10/21/movies/review-heart-of-a-dog-laurie-andersons-meditation-on-loss.html>.
- Davis, Ben. 2016. "Will Virtual Reality Art Destroy Visual Art?" Artnet News, August 2, 2016. <https://news.artnet.com/exhibitions/will-virtual-reality-destroy-real-art-584384>.
- Donnelly, Joe. 2016. "How Virtual Reality Is Revolutionizing Clinical Therapy and Treatment Rehabilitation." Waypoint. September 22, 2016.  
[https://waypoint.vice.com/en\\_us/article/wdix8x/how-virtual-reality-is-revolutionizing-clinical-therapy-and-treatment-rehabilitation](https://waypoint.vice.com/en_us/article/wdix8x/how-virtual-reality-is-revolutionizing-clinical-therapy-and-treatment-rehabilitation).
- Dormehl, Luke. 2016. "VR Will Let Jurors Explore Crime Scenes as They Actually Appeared." Digital Trends. August 29, 2016. <https://www.digitaltrends.com/cool-tech/vr-crime-scene-robot/>.
- "Drawing Room." n.d. IDFA DocLab. Accessed January 30, 2018a.  
<https://www.doclab.org/2015/drawing-room/>.
- . "Drawing Room." n.d. Oculus Store. Accessed January 30, 2018b.  
<https://www.oculus.com/experiences/rift/1371598756291017/>.
- "Drawing Room: Hand Drawn VR." n.d. Accessed January 30, 2018.  
<https://zesbaans.nl/projects/drawing-room/>.
- Dredge, Stuart. 2016. "The Complete Guide to Virtual Reality – Everything You Need to Get Started." The Guardian, November 10, 2016.  
<http://www.theguardian.com/technology/2016/nov/10/virtual-reality-guide-headsets-apps-games-vr>.
- Eckardt, Stephanie. n.d. "'The Work Is Repellant': All the Horrified Reactions to Jordan Wolfson's Ultraviolet VR Art at the Whitney Biennial." W Magazine. Accessed January 22, 2018. <https://www.wmagazine.com/story/jordan-wolfson-whitney-biennial-2017-reviews-reactions>.
- "Embodied Cognition." 2018. Wikipedia.  
[https://en.wikipedia.org/w/index.php?title=Embodied\\_cognition&oldid=823405819](https://en.wikipedia.org/w/index.php?title=Embodied_cognition&oldid=823405819).

- “Emotional Contagion.” 2018. Wikipedia.  
[https://en.wikipedia.org/w/index.php?title=Emotional\\_contagion&oldid=820206175](https://en.wikipedia.org/w/index.php?title=Emotional_contagion&oldid=820206175).
- “Exhibitions: Cao Fei.” n.d. MoMA PS1. Accessed January 22, 2018.  
<http://momaps1.org/exhibitions/view/405>.
- Farago, Jason. 2017. “Virtual Reality Has Arrived in the Art World. Now What?” *The New York Times*, February 3, 2017, sec. Art & Design.  
<https://www.nytimes.com/2017/02/03/arts/design/virtual-reality-has-arrived-in-the-art-world-now-what.html>.
- Faramawy, Adham, and Jessy Jetpacks. 2017. “What Can Virtual Reality Bring To Art?” *HuffPost UK*, January 10, 2017. [http://www.huffingtonpost.co.uk/jessy-jetpacks/what-can-virtual-reality-\\_b\\_14082950.html](http://www.huffingtonpost.co.uk/jessy-jetpacks/what-can-virtual-reality-_b_14082950.html).
- Farr, Ian, ed. 2012. *Memory. Documents of Contemporary Art*. London : Cambridge, Massachusetts: Whitechapel Gallery ; The MIT Press.
- Feinberg, Scott. 2017. “Oscars: Alejandro G. Inarritu’s VR Installation to Get Special Award From Academy.” *The Hollywood Reporter*, October 27, 2017.  
<https://www.hollywoodreporter.com/race/oscars-alejandro-g-inarritus-vr-installation-get-special-honor-by-academy-1052518>.
- “Felix & Paul Studios.” n.d. Accessed February 17, 2018.  
<http://felixandpaul.com/?projects/miyubi>.
- Ferreira, Angela. 2007. “How Useful Is Semiotics as a Method for Analysing Works of Art?” *Art & Perception (blog)*. February 25, 2007.  
<http://artandperception.com/2007/02/how-useful-is-semiotics-as-a-method-for-analysing-works-of-art.html>.
- Fisher, Theresa. 2016. “When Daydreaming Replaces Dreaming.” *Van Winkle’s*. September 30, 2016. <http://vanwinkles.com/people-who-daydream-instead-of-sleeping>.
- Freeman, Nate. 2017. “A History of Violence: Jordan Wolfson on His Shocking Foray into VR at the Whitney Biennial.” *ARTnews*, March 1, 2017.  
<http://www.artnews.com/2017/03/01/a-history-of-violence-jordan-wolfson-on-his-shocking-foray-into-vr-at-the-whitney-biennial/>.
- Freud, Sigmund. 2004. “The Uncanny.” *Fantastic Literature: A Critical Reader*, 74–101.
- From Virtual to Reality: The World’s First Large Scale, 3D Printed Sculpture. n.d. Streaming. Google Arts & Culture. Accessed February 17, 2018.  
<https://www.youtube.com/watch?v=zXJtxSpFdro>.
- Fromm, Erich. 1956. *The Art of Loving*. Harper and Row.
- Gajsek, Dejan. 2016. “Ultimate Beginners Guide to Virtual Reality Storytelling.” *Medium (blog)*. April 14, 2016. <https://medium.com/@dgajsek/ultimate-beginners-guide-to-virtual-reality-storytelling-b00dbedbc093#.aqi11ja2q>.
- . 2017. “Immersive Storytelling Now Available for Every Journalist.” *Medium (blog)*. March 17, 2017. <https://medium.com/cinematicvr/immersive-storytelling-now-available-for-every-journalist-7cd88ba92387>.
- Garcia-Vasquez, Marina. 2015. “Virtual Reality Paintings Destroy Notions of the ‘Still Life.’” *Creators*. November 5, 2015.



- [https://creators.vice.com/en\\_au/article/53wjba/virtual-reality-paintings-destroy-notions-of-the-still-life](https://creators.vice.com/en_au/article/53wjba/virtual-reality-paintings-destroy-notions-of-the-still-life).
- Gaze, Technology, and Death With Marina Abramović And Jared Leto. n.d. Streaming. Accessed February 17, 2018. <https://www.youtube.com/watch?v=qbUQF1lliMs>.
- Ghosh, Sayam. 2017. "How I Made 'Witness': A VR Experience of Warsaw Uprising." Medium (blog). July 19, 2017. <https://medium.com/cinematicvr/how-i-made-witness-a-vr-experience-of-warsaw-uprising-9591c7fc4a03>.
- Glausiusz, Josie. n.d. "Living in an Imaginary World." Scientific American. Accessed February 1, 2018. <https://doi.org/10.1038/scientificamericancreativity1213-70>.
- Goldstein, Jessica M. 2017. "Rape Survivors' Stories Told through Virtual Reality in New Documentary." ThinkProgress. May 4, 2017. <https://thinkprogress.org/whats-it-like-to-watch-a-virtual-reality-documentary-about-sexual-assault-fbbaeeb141e4/>.
- Gottschalk, Molly. 2016. "Virtual Reality Is the Most Powerful Artistic Medium of Our Time." Artsy, March 16, 2016. <https://www.artsy.net/article/artsy-editorial-virtual-reality-is-the-most-powerful-artistic-medium-of-our-time>.
- Grunthaner, Jeffrey. 2015. "Tripping Through Digital Landscapes in Virtual Reality and on Canvas." Hyperallergic. November 11, 2015. <https://hyperallergic.com/252786/tripping-through-digital-landscapes-in-virtual-reality-and-on-canvas/>.
- Halpern, Sue. 2008. "Virtual Iraq." The New Yorker, May 12, 2008. <https://www.newyorker.com/magazine/2008/05/19/virtual-iraq>.
- Harari, Yuval Noah. 2017. "The Rise of the Useless Class." Ideas.Ted.Com (blog). February 24, 2017. <https://ideas.ted.com/the-rise-of-the-useless-class/>.
- Hardawar, Devindra. 2017. "We Lived through the History of Evolution in VR with 'Life of Us.'" Engadget (blog). April 24, 2017. <https://www.engadget.com/2017/04/24/life-of-us-vr/>.
- Hart, Vi. 2014. "Audio for VR Film (Binaural, Ambisonic, 3d, Etc)." EleVR (blog). August 31, 2014. <http://elevr.com/audio-for-vr-film/>.
- . n.d. "VR Video Bubbles for DK2." EleVR (blog). Accessed January 30, 2018. <http://elevr.com/vr-video-bubbles-for-dk2/>.
- "Here Be Dragons." n.d. Here Be Dragons. Accessed January 29, 2018. <http://dragons.org/creators/marco-brambilla/work/>.
- "HERE BE DRAGONS An Experience Studio." n.d. Here Be Dragons. Accessed January 30, 2018. <http://dragons.org/>.
- Hornsby, Emily. 2013. "With Only a Look, Marina Abramovic Is Making People Cry." Mockingbird (blog). July 18, 2013. <http://www.mbird.com/2013/07/with-only-a-look-marina-abramovic-is-making-people-cry/>.
- How Virtual Reality Is Transforming Art. n.d. Streaming. BBC NEWS. BBC. Accessed January 23, 2018. <http://www.bbc.com/news/av/entertainment-arts-38852720/how-virtual-reality-is-transforming-art>.

- How Virtual Reality Will Change Us. n.d. Streaming. TEDx. Accessed February 1, 2018. <https://www.youtube.com/watch?v=OO--K7z-oxE>.
- Iconic Turn: Bill Viola - Video Art, Sense Perception and Human Experience. n.d. Streaming. Accessed February 1, 2018. <https://www.youtube.com/watch?v=IY13ZocVePU&list=PLAMrXL7e6G3rIYCCR0cagJoA02V4kZ8Jo&index=40>.
- IDFA DocLab. n.d. Drawing Room Winner of IDFA DocLab Award for Digital Storytelling. Streaming. IDFA DocLab Awards. Accessed January 30, 2018. [https://www.youtube.com/watch?v=\\_uTkskqrM98](https://www.youtube.com/watch?v=_uTkskqrM98).
- Jankowski, Tomasz, and Pawel Holas. 2014. "Metacognitive Model of Mindfulness." *Consciousness and Cognition* 28 (August): 64–80. <https://doi.org/10.1016/j.concog.2014.06.005>.
- Jelevska, Agnieszka, and Michał Krawczak. 2015. "Art and Technology in Poland: From Modernity to Technoculture." *Culture.Pl*. September 2015. <http://culture.pl/en/article/art-and-technology-in-poland-from-modernity-to-technoculture>.
- Jo, Monika. 2017. "52 VR Definitions: Jaron's Scientific, Cultural, and Personal Adventures." *ARVR Journey: Augmented & Virtual Reality* (blog). December 10, 2017. <https://arvrjourney.com/52-vr-definitions-jarons-scientific-cultural-and-personal-adventures-66f04ed52301>.
- Judah, Hettie. 2017. "An Iconic Video Artist Takes Over Florence." *The New York Times*, March 14, 2017, sec. T Magazine. <https://www.nytimes.com/2017/03/14/t-magazine/art/bill-viola-palazzo-strozzi-florence.html>.
- Kaplan, Isaac. 2017. "The Gut-Wrenching VR Work That's Got the Art World Talking about Violence." *Artsy*. March 17, 2017. <https://www.artsy.net/article/artsy-editorial-gut-wrenching-vr-work-art-talking-violence>.
- Kelly, Spencer. n.d. What Future for Virtual Reality? Streaming. Accessed January 23, 2018. <http://www.bbc.com/news/av/technology-30778807/ces-what-future-for-virtual-reality>.
- Kennedy, Ashley. 2011. "When and Where to Make the Cut: Inspired by Walter Murch's In the Blink of an Eye." *The Beat* (blog). October 13, 2011. <https://www.premiumbeat.com/blog/when-and-where-to-make-the-cut-inspired-by-walter-murchs-in-the-blink-of-an-eye/>.
- Kfir, Zohar. n.d. "TESTIMONY." Accessed January 30, 2018a. <https://testimony.site>.
- . n.d. "ZOHAR KFIR — Media Artist." Accessed January 30, 2018b. <http://zzee.net/wordpress/>.
- Kirthiga, Ega. 2017. "Metamodernism." *Education*, June 1. <https://www.slideshare.net/KIRTHIGA1197/metamodernism-76562911>.
- Knight, Christopher. n.d. "In Alejandro G. Iñárritu's Virtual Reality Film at LACMA, the Immigrant's Story Finds Its Power from an Unlikely Place." *Latimes.Com*. Accessed January 30, 2018. <http://www.latimes.com/entertainment/arts/la-et-cm-alejandro-inarritu-lacma-20170816-htmlstory.html>.

- Knowles, Kitty. 2015. "VR Art: Meet a New Wave of Mind-Bending Virtual Reality Artists." *The Memo*. September 30, 2015. <https://www.thememo.com/2015/09/30/vr-art-virtual-reality-art-fish-island-labs-trampery-london/>.
- Kuramitsu, Kris. n.d. "Cao Fei: Shadow Plays." Accessed January 22, 2018. <http://www.tmr.la/cao-fei/>.
- La Peña, Nonny de. n.d. "Immersive Journalism." Accessed January 30, 2018a. <http://www.immersivejournalism.com/key-bios/>.
- . n.d. Project Syria: An Immersive Journalism Experience. Streaming. Accessed January 30, 2018b. [https://www.youtube.com/watch?v=jN\\_nbHnHDi4](https://www.youtube.com/watch?v=jN_nbHnHDi4).
- . n.d. The Future of News? Virtual Reality. Streaming. TEDWomen 2015. Accessed January 30, 2018c. [https://www.ted.com/talks/nonny\\_de\\_la\\_pena\\_the\\_future\\_of\\_news\\_virtual\\_reality](https://www.ted.com/talks/nonny_de_la_pena_the_future_of_news_virtual_reality).
- Lajeunesse, Félix. 2017. Miyubi. VR Experience. Short, Comedy. <http://www.imdb.com/title/tt7896046/>.
- Lang, Ben. 2017. "Now Available – Light-Field Captured 'Hallelujah' Is a Stunning Mix of Volumetric Film and Audio." *Road to VR* (blog). September 22, 2017. <https://www.roadtovr.com/shot-lytros-light-field-camera-hallelujah-stunning-mix-volumetric-film-audio/>.
- Lanier, Jaron. 2017. *Dawn of the New Everything: Encounters with Reality and Virtual Reality*. Kindle Edition. New York: Henry Holt and Company.
- "Laurie Anderson." 2018. Wikipedia. [https://en.wikipedia.org/w/index.php?title=Laurie\\_Anderson&oldid=825777172](https://en.wikipedia.org/w/index.php?title=Laurie_Anderson&oldid=825777172).
- Laurie Anderson Interview: A Virtual Reality of Stories. 2017. Louisiana Museum of Modern Art: Louisiana Channel. <https://vimeo.com/233785242>.
- LaVecchia, Gian. 2016. "Virtual Reality Is Becoming the Next Great Storytelling Canvas." *Adweek*, August 7, 2016. <http://www.adweek.com/brand-marketing/virtual-reality-becoming-next-great-storytelling-canvas-172797/>.
- Lessons From Hollywood: Making Movies in VR. 2015. Streaming. Oculus Connect 2. Oculus Story Studio. [https://www.youtube.com/watch?v=n2E\\_kfNPtA](https://www.youtube.com/watch?v=n2E_kfNPtA).
- Life inside the Bubble of a Virtual Reality World. n.d. Streaming. TEDx. Accessed February 1, 2018. <https://www.youtube.com/watch?v=yRUCU5FsvTY>.
- Logie, Andrew. n.d. Chris Milk - The Treachery of Sanctuary. Streaming. Accessed January 30, 2018. <https://www.youtube.com/watch?v=ehjklqL6g84>.
- Lund, Christian. 2013. Marina Abramović: Advice to the Young. Streaming. Louisiana Museum of Modern Art: Louisiana Channel. <https://www.youtube.com/watch?v=8Ck2q3YgRlY&app=desktop>.
- MacBride, Katie. 2017. "Can Virtual Reality Help Cure PTSD?" *Rolling Stone*, April 18, 2017. <https://www.rollingstone.com/culture/features/can-virtual-reality-help-cure-ptsd-w477388>.

- Maldonado, Eva. 2017. "The Godmother of Virtual Reality Spoils Us with Insight." Storybench (blog). October 12, 2017. <http://www.storybench.org/godmother-virtual-reality-spoils-us-insight/>.
- "Marco Brambilla: "There's Too Much Going On"." 2015. The Talks. January 28, 2015. <http://the-talks.com/interview/marco-brambilla/>.
- "Marina Abramović." 2018. Wikipedia. [https://en.wikipedia.org/w/index.php?title=Marina\\_Abramovi%C4%87&oldid=825786022](https://en.wikipedia.org/w/index.php?title=Marina_Abramovi%C4%87&oldid=825786022).
- Marina Abramović Speaks About Art and the Potential of the Mind. n.d. Streaming. Vol. 5. Art Meets Science and Spirituality. Accessed February 17, 2018. <https://www.youtube.com/watch?v=17BMY1yKc3A>.
- Marina Abramovic's Relentless, Violent Genius. 2016. Streaming. Vol. 26. Bloomberg's Brilliant Ideas. Bloomberg. [https://www.youtube.com/watch?v=ASB07-v\\_ADM&app=desktop](https://www.youtube.com/watch?v=ASB07-v_ADM&app=desktop).
- Marshall McLuhan - The Medium Is The Message. 1977. Streaming. Marshall McLuhan Speaks. <https://www.youtube.com/watch?v=UoCrX0scCkM>.
- Matney, Lucas. 2017. "Embody an 80s Family Robot in Funny or Die's Feature-Length VR Flick 'Miyubi.'" TechCrunch (blog). July 27, 2017. <http://social.techcrunch.com/2017/07/27/embody-an-80s-family-robot-in-funny-or-dies-feature-length-vr-flick-miyubi/>.
- "Metropolitan Museum Inaugurates Virtual Reality on Web Site." 2001. The Metropolitan Museum of Art. 2001. <https://www.metmuseum.org/press/news/2001/metropolitan-museum-inaugurates-virtual-reality-on-web-site>.
- Milk, Chris. n.d. How Virtual Reality Can Create the Ultimate Empathy Machine. Streaming. Accessed January 30, 2018a. [https://www.ted.com/talks/chris\\_milk\\_how\\_virtual\\_reality\\_can\\_create\\_the\\_ultimate\\_empathy\\_machine](https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine).
- . n.d. The Birth of Virtual Reality as an Art Form. Streaming. TED2016. Accessed January 30, 2018b. [https://www.ted.com/talks/chris\\_milk\\_the\\_birth\\_of\\_virtual\\_reality\\_as\\_an\\_art\\_form](https://www.ted.com/talks/chris_milk_the_birth_of_virtual_reality_as_an_art_form).
- . n.d. "The Johnny Cash Project." Here Be Dragons. Accessed January 30, 2018c. <http://dragons.org/creators/chris-milk/work/the-johnny-cash-project/>.
- Miller, Jason. 2013. A Different Canvas: Chris Milk. Streaming. Future of StoryTelling. [https://www.youtube.com/watch?v=5EFd4\\_dLBds](https://www.youtube.com/watch?v=5EFd4_dLBds).
- Mottaz, Margot. 2016. "Artist Marco Brambilla on Sensory Overloads and Video Collages." Hong Kong Tatler. September 29, 2016. <http://hk.asiatatler.com/life/packing-a-punch-marco-brambilla-theater-at-simon-lee-gallery>.
- Mufson, Beckett. 2015. "Can Virtual Reality Make Us More Human?" Creators Project. April 22, 2015. [https://creators.vice.com/en\\_us/article/jpvgy8/can-virtual-reality-make-us-more-human](https://creators.vice.com/en_us/article/jpvgy8/can-virtual-reality-make-us-more-human).
- Murch, Walter. 2001. In the Blink of an Eye: A Perspective on Film Editing. 2. ed. Los Angeles: Silman-James Press.



- “My Bed (1998) by Tracey Emin.” 2017. Wikipedia.  
[https://en.wikipedia.org/w/index.php?title=My\\_Bed&oldid=810507591](https://en.wikipedia.org/w/index.php?title=My_Bed&oldid=810507591).
- Nelson, Noah J. 2017. “Even Deeper Still: ‘CARNE y ARENA’ Reveals Hidden Truths.” No Proscenium: The Guide To Everything Immersive. July 5, 2017.  
<https://noprosceium.com/even-deeper-still-carne-y-arena-reveals-hidden-truths-64a4bf3b0039>.
- Newton, Katy, and Karin Soukup. 2016. “The Storyteller’s Guide to the Virtual Reality Audience.” VR/AR Media Experiments (blog). April 6, 2016.  
<https://medium.com/stanford-d-school/the-storyteller-s-guide-to-the-virtual-reality-audience-19e92da57497#.9llavm4aq>.
- Ohanesian, Liz. 2015. “At This Gallery Show, the Art Isn’t on the Walls — It’s in Virtual Reality.” L.A. Weekly, February 11, 2015. <http://www.laweekly.com/arts/at-this-gallery-show-the-art-isnt-on-the-walls-its-in-virtual-reality-5376015>.
- O’Neill, Kel. 2015. “The UN’s First Virtual Reality Documentary Puts You Inside a Syrian Refugee Camp.” Creators Project. February 3, 2015.  
[https://creators.vice.com/en\\_us/article/jpv5ng/virtual-reality-doc-puts-you-inside-a-syrian-refugee-camp](https://creators.vice.com/en_us/article/jpv5ng/virtual-reality-doc-puts-you-inside-a-syrian-refugee-camp).
- Opening Keynote: Mark Zuckerberg. n.d. Streaming. Oculus Connect 3. Accessed February 17, 2018. <https://www.youtube.com/watch?v=NLnk2cCirQM>.
- O’Reilly, David. n.d. “Basic Animation Aesthetics.” Accessed February 18, 2018.  
<http://www.davidoreilly.com/downloads/>.
- Parisi, Tony. 2015. Learning Virtual Reality: Developing Immersive Experiences and Applications for Desktop, Web, and Mobile. First edition. Sebastopol, CA: O’Reilly Media, Inc.
- “Participation and Audience Involvement.” n.d. MoMA Learning. Accessed February 18, 2018. [https://www.moma.org/learn/moma\\_learning/themes/media-and-performance-art/participation-and-audience-involvement](https://www.moma.org/learn/moma_learning/themes/media-and-performance-art/participation-and-audience-involvement).
- “Passive and Interactive Storytelling in VR.” 2017. Medium.com. Virtual Reality Pop (blog). March 27, 2017. <https://virtualrealtypop.com/passive-and-interactive-storytelling-in-vr-eea98b2f76c5>.
- Peña, Nonny de La. 2014. Nonny de La Pena - Journalism in the Age of Virtual Reality. Streaming. Future of StoryTelling 2014. <https://vimeo.com/105692519>.
- “Platonism.” 2018. Wikipedia.  
<https://en.wikipedia.org/w/index.php?title=Platonism&oldid=818915122>.
- Popescu, Adam. 2017. “These VR Systems Help Treat Veterans Recovering From PTSD.” Bloomberg.Com, March 16, 2017. <https://www.bloomberg.com/news/articles/2017-03-16/these-vr-systems-help-treat-veterans-recovering-from-ptsd>.
- Raab, Josh. n.d. “This Is the Future of Art.” Time. Accessed January 29, 2018.  
<http://time.com/vr-is-for-artists/>.
- Razzall, Katie. 2014. The Shocking Marina Abramovich. Streaming. BBC Newsnight. BBC.  
<https://www.youtube.com/watch?v=ZSz-ZhjDKuU>.

- Redonda, Casa. 2016. Watch Marina Abramović in Brazil: The Space in Between Online. Streaming. <https://vimeo.com/ondemand/thespaceinbetween>.
- Rhizome. 2017. "First Look: Artists' VR." Rhizome (blog). February 1, 2017. <http://rhizome.org/editorial/2017/feb/01/first-look-artists-vr/>.
- "Rhizome (Philosophy)." 2017. Wikipedia. [https://en.wikipedia.org/w/index.php?title=Rhizome\\_\(philosophy\)&oldid=808074825](https://en.wikipedia.org/w/index.php?title=Rhizome_(philosophy)&oldid=808074825).
- Robertson, Adi. 2016. "Virtual Reality Pioneer Nonny de La Peña Charts the Future of VR Journalism." The Verge. January 25, 2016. <https://www.theverge.com/2016/1/25/10826384/sundance-2016-nonny-de-la-pena-virtual-reality-interview>.
- . 2017. "VR Pioneer Jaron Lanier on Dystopia, Empathy, and the Future of the Internet." The Verge, December 8, 2017. <https://www.theverge.com/2017/12/8/16751596/jaron-lanier-dawn-of-the-new-everything-vr-interview>.
- Robertson, Jean, and Craig McDaniel. 2017. *Themes of Contemporary Art: Visual Art after 1980*. Fourth edition. New York: Oxford University Press.
- Rosedale, Philip. n.d. Life in Second Life. Streaming. TED. Accessed January 30, 2018. [https://www.ted.com/talks/the\\_inspiration\\_of\\_second\\_life](https://www.ted.com/talks/the_inspiration_of_second_life).
- Rosenthal, Emerson. 2015. "You Own the Royal Academy of Arts - In Virtual Reality, at Least." Creators. June 16, 2015. [https://creators.vice.com/en\\_us/article/8qvmgx/you-own-the-royal-academy-of-arts-in-virtual-reality](https://creators.vice.com/en_us/article/8qvmgx/you-own-the-royal-academy-of-arts-in-virtual-reality).
- Rossin, Rachel. n.d. "13 Artworks, Bio & Shows on Artsy." Accessed January 22, 2018. <https://www.artsy.net/artist/rachel-rossin>.
- Rothuizen, Jan, and Sara Kolster. n.d. Drawing Room. VR Experience. Accessed January 30, 2018a. <http://drawingroom-vr.nl/>.
- . n.d. Drawing Room: 360o Virtual Reality. VR Experience. Accessed January 30, 2018b. <https://www.youtube.com/watch?v=V6a3QlFOeYs>.
- . n.d. "Drawing Room (Trailer)." Vimeo. Accessed January 30, 2018c. <https://vimeo.com/155352897>.
- Rotz, Mike, and Joost Jordens. n.d. Transition. VR Experience. Accessed February 2, 2018. <https://www.oculus.com/experiences/rift/1098976800151952/>.
- "Royal Museums of Fine Arts of Belgium in Virtual Reality." 2016. FreeflyVR (blog). March 29, 2016. <https://freeflyvr.com/museums-fine-arts-belgium-virtual-reality/>.
- Safán-Gerard, Desy. 2014. On Art and Psychoanalysis. Streaming. <https://vimeo.com/107646302>.
- Sainsbury, Ben. n.d. PTSD Exposure Therapy - Dr. Albert "Skip" Rizzo Interview. Streaming. Javelin Technologies Inc. Accessed January 30, 2018. <https://www.youtube.com/watch?v=OK893GmwuhM>.
- Schwartz, Alexandra. 2017. "Confronting the 'Shocking' Virtual-Reality Artwork at the Whitney Biennial." The New Yorker, March 20, 2017.

- <https://www.newyorker.com/culture/cultural-comment/confronting-the-shocking-virtual-reality-artwork-at-the-whitney-biennial>.
- Schwartz, Casey. 2015. "Tell It About Your Mother." *The New York Times*, June 24, 2015, sec. Magazine. <https://www.nytimes.com/2015/06/28/magazine/tell-it-about-your-mother.html>.
- Schwendener, Martha. 2015. "In Rachel Rossin's 'Lossy,' the Virtual Reality of Living in a Painting." *The New York Times*, November 5, 2015, sec. Art & Design. <https://www.nytimes.com/2015/11/06/arts/design/in-rachel-rossins-lossy-the-virtual-reality-of-living-in-a-painting.html>.
- Scoble, Robert, and Shel Israel. 2017. *The Fourth Transformation: How Augmented Reality and Artificial Intelligence Change Everything*.
- Searle, Adrian. 2017. "Jordan Wolfson Review – Shock Jock With a Baseball Bat." *The Guardian*, May 2, 2017. <http://www.theguardian.com/artanddesign/2017/may/02/jordan-wolfson-riverboat-song-review-shock-jock-with-a-baseball-bat>.
- "Semiotics." 2018. Wikipedia. <https://en.wikipedia.org/w/index.php?title=Semiotics&oldid=822696883>.
- Shaw, Julia. 2017. *The Memory Illusion: Remembering, Forgetting, and the Science of False Memory*.
- Sollitt, Lucy. 2017. "Mixing Reality." *Creative Economy* (blog). March 22, 2017. <https://medium.com/intersections-arts-and-digital-culture-in-the-uk/mixing-reality-b656ad27c1c4>.
- Solon, Olivia. 2016. "Is Our World a Simulation? Why Some Scientists Say It's More Likely than Not." *The Guardian*, October 11, 2016. <http://www.theguardian.com/technology/2016/oct/11/simulated-world-elon-musk-the-matrix>.
- Stewart, Rachel. 2017. "Is Virtual Reality the Future of Art?" *DW.COM*. March 17, 2017. <http://www.dw.com/en/is-virtual-reality-the-future-of-art/a-37942941>.
- Stinson, Elizabeth. 2015. "These Trippy Paintings Depict Reality as Seen through VR." *WIRED*, November 13, 2015. <https://www.wired.com/2015/11/rachel-rossins-trippy-paintings-of-reality-as-seen-through-vr/>.
- Strange, Adario. n.d. "The Artist Blowing People's Minds in Virtual Reality." *Mashable*. Accessed January 23, 2018. <http://mashable.com/2016/12/20/virtual-reality-art-oculus-vive-tilt-brush-medium/>.
- Sural, Agnieszka. 2016. "You're Interactive, Therefore You Are - An Interview with Ryszard Kluszczyński." *Culture.Pl*. May 25, 2016. <http://culture.pl/en/article/youre-interactive-therefore-you-are-an-interview-with-ryszard-kluszczyński>.
- Surprenant, Chris. n.d. *The Good Life: Plato*. Streaming. *The Good Life*. Khan Academy. Accessed February 18, 2018. <https://www.khanacademy.org/partner-content/wi-phi/wi-phi-value-theory/wi-phi-good-life/v/the-good-life-plato>.
- Sword, Alexander. 2015. "5 World-Altering Virtual Reality Art Installations." *Computer Business Review* (blog). December 7, 2015.

- <https://www.cbronline.com/mobility/devices/5-world-altering-virtual-reality-art-installations-4745456/>.
- TechCrunch. 2016. The Era of VR Storytelling. Streaming. TechCrunch.  
[https://www.youtube.com/watch?v=5CqPyT3G\\_SE](https://www.youtube.com/watch?v=5CqPyT3G_SE).
- The Audiopedia. n.d. What Is AFTERWARDSNESS? What Does AFTERWARDSNESS Mean? AFTERWARDSNESS Meaning & Explanation. Streaming. Accessed January 30, 2018. [https://www.youtube.com/watch?v=cfwAvKXJ\\_O4](https://www.youtube.com/watch?v=cfwAvKXJ_O4).
- The Making of Hallelujah with Lytro Immerge. 2017. Streaming. Within Original.  
<https://vimeo.com/213266879>.
- The Theory of Forms by Plato: Definition & Examples. n.d. Streaming. Study.com. Accessed February 18, 2018. <http://study.com/academy/lesson/the-theory-of-forms-by-plato-definition-lesson-quiz.html>.
- The Visionary Behind Virtual Reality. 2018. BBC Ideas. BBC.  
<https://www.bbc.com/ideas/videos/the-visionary-behind-virtual-reality/p05tf380?playlist=visionary-humans>.
- “Theory of Forms.” 2017. Wikipedia.  
[https://en.wikipedia.org/w/index.php?title=Theory\\_of\\_forms&oldid=815030822](https://en.wikipedia.org/w/index.php?title=Theory_of_forms&oldid=815030822).
- Thompson, Anne. 2017. “Why Alejandro González Iñárritu Is the Director Who Finally Got VR Right — Cannes 2017.” IndieWire (blog). May 20, 2017.  
<http://www.indiewire.com/2017/05/alejandro-gonzalez-inarritu-carne-y-arena-cannes-vr-1201819096/>.
- Timotheus Vermeulen and Robin van Den Akker: Notes on Metamodernism. n.d. Streaming. A New Daw. Accessed January 30, 2018.  
<https://www.youtube.com/watch?v=9WPYFvB2DIc>.
- Tsoulis-Reay, Alexa. 2016. “What It’s Like When Your Daydreams Are Just As Real As Life.” The Cut. October 12, 2016. <https://www.thecut.com/2016/10/what-its-like-to-be-a-maladaptive-daydreamer.html>.
- Turner, Luke. 2011. “The Metamodernist Manifesto.” The Metamodernist Manifesto. 2011.  
<http://www.metamodernism.org>.
- Unsold, Saschka. 2019. Dear Angelica. Streaming. Oculus Story.  
<https://www.oculus.com/story-studio/films/dear-angelica/>.
- . n.d. “Dear Angelica” Launch Trailer. Streaming. Accessed January 30, 2018.  
<https://www.youtube.com/watch?v=Xj0u4srRLlA>.
- Using Virtual Reality to Treat Vertigo. 2017. Streaming. BBC NEWS. BBC.  
<http://www.bbc.com/news/av/uk-wales-38763911/virtual-reality-can-help-diagnose-and-treat-vertigo>.
- Van den Akker, Robin, Alison Gibbons, and Timotheus Vermeulen, eds. 2017. Metamodernism: Historicity, Affect and Depth after Post-Modernism. Radical Cultural Studies. London ; New York: Rowman & Littlefield International.
- Vermeulen, Timotheus, and Robin van Den Akker. 2010. “Notes on Metamodernism.” Journal of Aesthetics and Culture 2 (November).  
<https://doi.org/10.3402/jac.v2i0.5677>.

- Versions: The Creative Landscape of Virtual Reality. n.d. Streaming. NEW INC. Accessed January 22, 2018. <https://www.youtube.com/watch?v=lAk-ufEDn3c&feature=youtu.be>.
- Vicars, Kelly, and Lindsay Saunders. 2016. "The Art of Dying." June 8, 2016. <https://dreamlogicart.com/artofdying/>.
- Viola, Bill. 1986. Egg Hatch - I Do Not Know What It Is I Am Like. Streaming. <https://www.youtube.com/watch?v=DftfH1gYw0w&app=desktop>.
- Virtual Reality That's Better than the Real World. n.d. Streaming. TEDx. Accessed February 1, 2018. <https://www.youtube.com/watch?v=wFmfxZbUMzE>.
- Vivarelli, Nick. 2017. "Virtual Reality Films Take Hold at Fall's Film Festivals." Variety (blog). August 16, 2017. <http://variety.com/2017/film/spotlight/carne-y-arena-venice-virtual-reality-cannes-1202524881/>.
- VR Spacewalk Lets You Fly over Earth. 2017. Streaming. BBC NEWS. BBC. <http://www.bbc.com/news/av/technology-38774670/vr-spacewalk-lets-you-fly-over-earth>.
- Warburton, Nigel. 2016. David Chalmers: The Philosophy of Virtual Reality. Streaming. Aeon Video. <https://www.youtube.com/watch?v=1ur7eIKiwuA>.
- West, Presley. 2017a. "When Art and VR Collide in LA." VRScout (blog). March 18, 2017. <https://vrscout.com/news/next-art-vr-la/>.
- . 2017b. "How VR Is Changing the Way We Think About Therapy." VRScout (blog). August 18, 2017. <https://vrscout.com/news/vr-changing-therapy/>.
- What If We Could Live in the Matrix? n.d. Streaming. TEDx. Accessed February 1, 2018. <https://www.youtube.com/watch?v=Qib3QxuvXHI>.
- Whitacre, Eric. n.d. A Virtual Choir 2,000 Voices Strong. Streaming. TED. Accessed January 30, 2018. [https://www.ted.com/talks/eric\\_whitacre\\_a\\_virtual\\_choir\\_2\\_000\\_voices\\_strong](https://www.ted.com/talks/eric_whitacre_a_virtual_choir_2_000_voices_strong).
- Wikipedia. n.d. "The Four Fundamental Concepts of Psychoanalysis." Accessed February 1, 2018. [https://en.wikipedia.org/wiki/The\\_Four\\_Fundamental\\_Concepts\\_of\\_Psychoanalysis](https://en.wikipedia.org/wiki/The_Four_Fundamental_Concepts_of_Psychoanalysis).
- Winfrey, Graham. 2017. "Alejandro González Iñárritu Tells Marina Abramovic Why He Loves Virtual Reality — Tribeca 2017." IndieWire (blog). April 22, 2017. <http://www.indiewire.com/2017/04/alejandro-gonzalez-inarritu-marina-abramovic-virtual-reality-tribeca-2017-1201808215/>.
- "WONDER 360: Experience the Renwick Gallery Exhibition in Virtual Reality." n.d. Smithsonian American Art Museum. Accessed January 22, 2018. <https://americanart.si.edu/wonder360>.
- "ZieherSmith | Rachel Rossin | Works." n.d. Accessed January 22, 2018. <http://ziehersmith.com/artist/rachelrossin>.