

VIRTUAL REALITY

An unlikely intersection with Cinema Verité

INTRODUCTION

In *Leviathan* (2012) the viewer takes on the role as a passive observer of a commercial fishing vessel. We bear witness to fish being caught, rays being separated from their fins, and birds feasting on the remains all while being forced to hold this passive viewpoint¹. Through the long takes and visceral sounds of the commercial vessel, Lucien Casting-Taylor has firmly planted the observational senses into another world. In a way, Lucien Casting-Taylor has embodied the very essence of Virtual Reality without ever picking up a 360° camera, or distributing a Virtual Reality (VR) app/program. As an observational documentary, *Leviathan* shares a deceiving amount of similarities with media created in VR; and while VR is still in the early stages of development, we can still find these similarities very for the evolutions to come. Virtual Reality, as a medium, is essentially an infant in comparison to the more developed artistic practices. Traditional art such as painting and sculpture sport millenia of development, while even newer forms like filmmaking and photography have a century or two under their respective belts. VR has only recently found its footing in the world of artmaking, and that footing is largely in the sphere of video games and interactive entertainment. This is largely in part due to the undeveloped language that 360° filmmaking has to work with². Much of

¹ Barker, Michele. "A Cinema of Movement." *Screen Bodies* 2, no. 2 (12, 2017): 45-63.

² Lajeunesse, Nicole. "The Language of Spherical Video Will Take Years to Develop." *Videomaker* 32, no. 5 (November 2017)

the work that is being created right now is expressive and experimental in a way that echoes the early days of 1900's cinema. However, the experiential essence of the practice is still unchanged, and fundamentally intersects with that of observational documentary.

Fundamentally, observational documentary is defined by positioning the viewer as purely a passive observer. Long takes, diegetic sound, and little to no direct address all result in a two-dimensional experience that represents reality in its closest form. These elements in combination create an experiential film serving as a surrogate to experiencing the content of the documentary directly, especially powerful when the experiences shown are difficult or impossible to recreate personally. In *Titicut Follies* (1967), Frederick Weisman places us as an observer to the inner workings of a mid-century mental asylum. This classic observational documentary does very little to push its own narrative, and in turn is subject to individual interpretation about its meaning. In 1967 when the film was released, it was heavily censored and proposed to only be shown to students in relevant fields³. Today, viewing of the film prompts a shocking observation of the cruel treatment of patients suffering from mental illness. Rather than looking on and feeling pity for the patients, modern viewers instead carry a much more critical view of the system that has imprisoned them. Such is the power of observational documentary. By abstaining from a narrative position, and adopting a neutral stance, viewers are able to delineate their own meaning and narrative from the presented material.

³ Pearson, Jesse. "The Follies of Documentary Filmmaking." VICE, September 1, 2007.

In Lynette Walworth's *Collisions* (2016), we see the combination of nearly all of these elements into a VR documentary that drops us into an impossible-to-recreate experience. Our traditional filmic frame is broken, and our senses are reasonably convinced that we are experiencing what Walworth is showing us. This has an interesting effect on viewers, as the viewing experience was seemingly inescapable. Unlike traditional cinema, viewers are not able to give themselves a degree of separation from the subjects, and end up reporting a sense of "impoliteness" as a result of the increased intimacy that is created from the medium⁴. In this film, we see the intersection of VR and documentary. While not purely observational, *Collisions* gives us a crucial view into what the future of documentary may look like. Fundamentally, these two practices are inextricably linked and as a result they will eventually intersect into a newly fashioned practice. Through the remainder of this essay, I will break down the fundamental properties shared by both VR filmmaking and observational documentary, and provide a potential path to which these two practices will intersect. Although these practices will inevitably intersect, accessibility remains a pertinent issue. In addition to examining the fundamental structures of both VR and observational documentary, I will detail the progression of the consumption of VR film up to the modern day, and highlight possibilities of future evolutions to the medium.

Observational documentary is defined as a type of "fly on the wall" filmmaking.

The use of the camera to position the audience as a totally passive viewer of what is

⁴ MacFarlane, Kit. "IMPOLITENESS AND DESTRUCTION IN THE ENCAPSULATING FRAME: Lynette Wallworth's *Collisions* and Virtual Reality." *Metro : Media & Education Magazine*, 2017, 78-81

happening in the camera eye. In this style of filmmaking, we become (in a sense) the narrator.

THE INTERSECTION

Practically, observational documentary and VR media share a substantial amount of common threads. Fundamentally, both practices are created to poise the viewer as a type of pure observer, be that active or passive. This positioning ties the two together in a way that VR is not tied with any other medium other than the purely interactive.

While the goal of *cinema verite* is to position the audience as passive, immersed viewers, there is still a barrier between viewer and content that is nearly impossible to overcome in traditional filmmaking. The ability to look away, the confinement of content to a physical frame is one of the things that holds traditional *cinema verite* back from being truly immersive. This is an obstacle that has been completely surpassed with VR media.

The traditional (and often intended) method of viewing VR media is through a specifically designed headset that is affixed to the viewer. Where there once was solace in glancing away, now lies further investigation into the presented content. VR prompts a level of immersion and presence that is nigh unachievable in the traditional filmic space.

This immersion is also one of the downfalls of VR media. While some viewers are naturally adept at viewing VR media, many others *do* have trouble separating the visual medium from reality, often resulting in reflex-based action being taken as a reaction to visual stimuli. This difficulty is often likened to that of seasickness, and in a way, they are the same. Both result from a disconnect between the information gathered visually, and

the information confirmed by the inner ear. When these two conflict, the brain loses its sense of place, resulting in some kind of sickness. Though, the physical reflex rarely comes into play while on a watercraft, it is extremely common while experiencing a VR medium. However, this is no different from a crowd in a theater cowering in fear as a projected train came hurtling at the screen. We as viewers have yet to adjust to the experience.

Conceptually, *cinema verite* and VR are both centralized around the idea of observation and presence. Much of the focus of observational documentary over the years has been focused on individuals, places, situations, or even practices that we as viewers would otherwise be unaware of, or unable to observe. This thread is present in *Leviathan*, *Soldier Girls*, *High School*, and *Titicut Follies*, as well most other *cinema verite* works. However, as detailed earlier, an audience is only able to view what they are given permission and access to, by the hand of both the cinematographer and editor. This creates a distorted observation of the presented content, and may lead to false conclusions about what is being seen. Similar to how the obstacle of the filmic frame is surpassed with the usage of VR, the bias of the creator is also circumvented in this new medium. The handoff of audience focus from cinematographer to viewer represents a shift from the implied narrative present in observational documentaries, to the real “truth seeking” that the core of the practice has strived for. When bearing witness to whatever subject is being presented in an observational documentary, the freedom to craft one’s own experience creates a lasting impact, and imparts a stronger sense of

connection between viewers and the subject they are observing⁵. This connection is the true core of what *cinema verite* strives to be. This intersection between *cinema verite* and VR marks a potential future for both practitioners and viewers alike.

In Lynette Wallworth's experimental documentary *Awavena* (2020), we bear witness to a historical event for the Yawanawa community in the Amazon jungle⁶. We join in attendance with the rest of the community to be a part of the ritual welcoming one of the community to be the first woman shaman in their history. This is possibly one of the most quintessential examples of an experience that most, if not all, viewers of the documentary would never even pass upon the opportunity to take part of. However, the chief of the Yawanawa community decided to reach out to Wallworth and specifically request her to document the community, their daily lives, and their rituals. This piece of work presents an interesting case in respect to not only the politics of observation, but also to the ideas of orientalism, and consent to tell a story. When creating a documentary, the material collected is under the influence of many factors: cinematographer, director, subject, and organizations. This material is further influenced in post-production to craft a compelling narrative to retain viewer attention. It is sometimes the case that documentary subjects feel mis-represented by the final iteration of the work, and feel as though they have been portrayed in a negative light for the purpose of the story. This "fabricated truth" is present in all modes of documentary, and

⁵ MacFarlane, Kit. "IMPOLITENESS AND DESTRUCTION IN THE ENCAPSULATING FRAME: Lynette Wallworth's Collisions and Virtual Reality." *Metro : Media & Education Magazine*, 2017, 78-81

⁶ *Awavena*. Australia: Coco Films, 2018.

is never really absent, unless the subjects themselves are the ones crafting the story (though that comes with its own problems of journalistic integrity). In *Awavena*, the Yawanawa community takes the place of director, cinematographer, subject, and organization. Lynette Wallworth's unique style of documentary allowed the community to speak for themselves, and for viewers to interact with their way of life in a seemingly unfiltered medium. This community driven documentation of events presents a consent-based product that is both fulfilling the role that is traditional to *cinema verite*, as well as removing much of the authorship bias that is inherent in documentary media. This type of community consent-based work is reminiscent of the monumental *Tijuana Projection (2001)* by Krzysztof Wodiczko in which community members donned a camera headset, and spoke to their communities about traumatic experiences while being projected onto the massive Omnimax theater⁷. Speaking from the community to the community is a thread that is consistent between both *Awavena* and *Tijuana Projection*.

As time progresses, viewers will become more accustomed to the uneasiness that is common among VR media, whether that be physical or emotional uneasiness. In its current state, VR is extremely early in development. Although ideas and theories about the practice have existed for over a century, we are still just barely breaking through the surface of what is possible. However, we are still yet to overcome the biggest obstacle standing in the way of VR media becoming mainstream, and that is accessibility.

Equipment to both produce and consume VR media still has yet to find its way into the

⁷ Wodiczko, Krzysztof. "Tijuana Projection." UC San Diego Library | Digital Collections. Accessed May 2, 2022. <https://library.ucsd.edu/dc/object/bb69996474>.

mainstream market, and, as a result, has been relegated to specialists and wealthy hobbyists. With video hosting platforms such as Vimeo and Youtube (arguably the two largest and well known) starting to develop built in 360 capabilities, we are coming close to solving the issue of distribution. As far as consumption goes, companies such as Google, KnoxLabs, Zapbox, and many others have developed attempts at housings for smartphones to act as VR headsets; and while these housings are still in relatively early development, they represent a market interest for further development to occur.

EXPLORING VR/SPHERICAL VIDEO

The practice of 360 video, or VR, is a relatively new development of modern technology. While the theory has been present in science fiction media for over a century, practical developments have been few and far between⁸. In the modern sense of the word, VR is a state of media that can be achieved through a few different methods. Traditionally, the viewer wears some sort of headset that serves to encapsulate their field of vision while they observe something that has been specifically created (or adapted) for that format. Media designed for VR is most commonly created using one of two methods (or a combination of the two, though that is less common). For fully virtual spaces, an environment is created in a 3D modeling program, such as Blender or Cinema4D, then imported into an engine that will do the necessary preparations for distribution such as Unity or Unreal. This is the standard workflow for VR video games or virtual art

⁸ Barnard, Dom. "History of VR - Timeline of Events and Tech Development." VirtualSpeech. VirtualSpeech, August 6, 2019. <https://virtualspeech.com/blog/history-of-vr>.

installations (such as portions of Rasheeda Phillips' *ARE YOU FOR REAL*⁹). The other method, more intuitive for traditional filmmakers, is to record video with a purpose built 360° camera, edit the footage in a VR enabled software (such as Adobe Premiere), and distribute the finished product through a VR enabled hosting service (such as vimeo or youtube).

One of the main appeals of VR is the capability to construct your own experience separate from the intentions of the creator. The role of the viewer in VR is elevated from a passive observer, to an active investigator. Viewers must decide for themselves what things demand attention, and what things they feel comfortable letting fall to the wayside. Through this elevation, the viewer transcends their role, and begins to trespass into the world of the creator. This serves both a creative and utilitarian purpose. Creatively, this allows for an infinite expansion of viewer experience for any given piece created in VR. Each and every person to experience a piece of VR media will experience it differently, to some degree. Artists utilize this, and create work where the meaning derived from the work says as much about the viewer deriving it as it does the work it is about. In a utilitarian sense, the ability to craft one's experience in VR allows creators to capture a significantly wider field of content than in the traditional 2D frame. Perhaps the most purely utilitarian usage of VR that embodies this idea is Google Maps. Rather than having a constructed set of images to show viewers their surroundings, Google Maps uses VR technology to enable users to parse out only the information that they

⁹ Phillips, Rasheeda. "ARE YOU FOR REAL." Are you for real, 2020. <https://ru4real.de/en/>.

need, and discard the rest. This handoff of control to the viewer denotes a significant step forward for the practice of filmmaking.

Current trends in VR are as varied as their predecessors in traditional film a century prior. There has yet to be a standard developed for the production of VR media, so the things that are being created are all filtered through the individual lenses of creators rather than industrial influence. One of the most common utilizations of VR currently, is the immersive distribution of field journalism. Distributing immersive content based around world events has been a rising trend of contemporary journalism. VR media placed in mining sites, war-torn cities, places of extreme poverty, and other situations of hardship have made their way into the mainstream of VR media. News media is not the only market that has taken advantage of the utilitarian nature of immersive VR media, many traditional filmmakers have picked up 360° cameras and begun their foray into VR.

DEFINING OBSERVATIONAL DOCUMENTARY

At the core, observational documentary is a practice defined by its position of the viewer as a passive observer. Unable to interact or influence, the viewer has no choice but to simply *observe* the material that is being presented to them. In theory, a narrative position from the filmmaker is absent, but in reality that is nearly impossible to achieve. We as a viewer must know that “the filmmaker was always a present witness”¹⁰ to the content we are consuming, and we as the audience are only viewing the content that

¹⁰ Nichols, Bill. "The Voice of Documentary." *Film Quarterly* (ARCHIVE) 36, no. 3 (Spring, 1983): 17-30,51.

they have deemed necessary for us to view. The heart of Observational Documentary, or *Cinema Vérité*, is to strive for the absence of the filmmaker, to accelerate the death of the author. When *Soldier Girls* released in 1981, reviews of the film ranged from calling it “moving, [and] funny”¹¹, to expressing “[surprise] that *Soldier Girls* emerged with the permission of the US Army”¹². Both of these reviews are valid, and both of them are supported fully by the content of the film. The nature of *Cinema Vérité* dictates that the audience is free to imprint their own meaning onto the film. However, when projecting a certain meaning onto an observational documentary, there is a certain level of openness, of vulnerability, that is required. You cannot project meaning onto an observational documentary without simultaneously leaving a substantial piece of yourself on the table along with it.

Cinema Verité is both a conceptual and visual classification of documentary. While the “truth-seeking” nature of direct cinema will be touched on later, the visual style is something that is distinct to the style. Characterized largely by handheld camera and the intentional omission of both interview and voice over, observational documentary presides as one of the most accessible forms of filmmaking. The quintessential handheld style of observational documentary is not a purely aesthetic choice, it is motivated both practically and conceptually. On the surface, handheld camera is a simple solution to a complex web of problems. This includes setup times, equipment concerns, consistency

¹¹ Kempley, Rita. “Stunning 'Soldier Girls'.” *The Washington Post*. WP Company, April 16, 1982.

¹² Dell'oso, Anna-Maria. “Soldier Girls Dwells on Ugly Side of US Army.” *The Sydney Morning Herald*, July 7, 1983, sec. Arts and Entertainment - Films.

concerns, accessibility, and many others. Relegating the filmmaker or cinematographer to a constant camera mount frees the filmmaker from much of the shot planning, light designing, and other departmental concerns that are faced on a narrative set. Having the camera always ready, always available to record anything at a moment's notice also serves to the core of *cinema vérité*. Conceptually, the handheld camera mirrors the viewer. In *High School (1968)*, Richard Leitterman's camera work serves as the only view into Northwest Highschool. Leitterman's handheld camera wanders over faces and bodies occasionally stopping to hyper-fixate on something, a pair of lips, thick rimmed glasses, a hand holding a book. This style mirrors our own brain's search for information, and brings us a step closer to the subjects we are seeing.

Documentary, in direct opposition to fiction, has evolved as a result of the "truth-seeking" nature of filmmakers. *Cinema Vérité* was a natural progression towards this, departing from the "Voice of God" heavy Griersonian mode sometime after WWII.¹³ As a mode of documentary, observational or direct cinema prides itself on the complete absence of narrative input; however, regardless of intention, the hand of the author still remains present. While filmmakers such as Frederick Wiseman try to distance themselves from influencing the subject through a myriad of methods, the authorial imprint cannot be fully erased. In *High School*, we only observe that which we are allowed to observe. While this may seem like a tautological truism, it has meaningful implications in the world of *cinema vérité*. While one of the goals of observational

¹³ Nichols, Bill. "The Voice of Documentary." *Film Quarterly* (ARCHIVE) 36, no. 3 (Spring, 1983): 17-30,51.

documentary is to appear as neutral or passive as possible, one cannot overlook the filmmaker's role in crafting what we passively view. However, what if the "camera eye" could be eliminated? What if we could serve as our own surrogate observers? What if Richard Leiterman did not have to dictate which parts of Northwest High School are visible, and which are passed over?

CONCLUSION

The futures of VR media and observational documentary are intrinsically linked. The core principles upon which both of these practices are built ultimately lead to a future in which they exist both independently and as one newly forged entity. The "fly on the wall" style of *cinema verite* and the "active observer" style of VR media lead down paths to the same end, one which coincides with the work of Lynette Wallworth. Of course, not all VR media will be observational documentaries, and not all observational documentaries will take the form of VR, but I envision a future in which filmmakers have the opportunity to freely choose between the two, without the considerations of accessibility to equipment, distribution or consumption holding them back. I envision a future in which viewers are free to investigate documentary subjects for themselves, and simultaneously derive their own meaning from the work.

The ultimate goal of any documentary is to seek a form of truth. Whether that truth be fabricated or not is inconsequential to the practice. Observational documentary is poised to let the viewer find that "truth" for themselves, but the truth often gets lost through the layers of filtering that happen before anyone gets to observe it. Virtual

Reality as a concept was created to establish a level of immersion that was not previously possible. “Immersion” and “Truth” are two concepts that may be interchangeable in the context of documentary, as the goal of immersion is to fool our minds into believing that we are truly in the situation that is being displayed for us. The goal of truth is to convince our minds that whatever we are observing to be true has a ground in reality, and cannot be argued to be false. In a sense, these two things share the same goal: to convince us that something is real. Through this, we can find the common core thread between *cinema verite* and VR media.

Many traditional filmmakers are moving into the space of VR media as we speak, though not all of them (arguably most of them) are not practicing documentary. Much of the work that is being created is in the narrative sphere, which comes with its own challenges and obstacles separate from that of Observational VR Documentary. Films like *The Invisible Man (2016)* and *Ashes to Ashes (2017)* are two examples of VR narratives that have done well in their respective fields. Although they are both created using spherical video as a medium, there exists a huge amount of influence from traditional filmmaking left in these works. In *The Invisible Man*, we take on the role of an invisible member of a meeting of criminals. We do not speak, we do not interact, we only view the conversation (happening in a single direction of the screen). There is no room for us as the viewer to become part of the narrative, we can only look on as if we were watching a movie with a slightly worse aspect ratio. This type of film does not demand the medium of VR, nor does it justify the difficulties of VR production. As time

progresses, so will our capability to truly create media that both demands and justifies the usage of VR, and we as an audience will have to be adequately prepared to consume that media.

CITATIONS

- Alioff, Maurie. "Camera Eye: Peter Wintonick's Cinema Verite: Defining the Moment." *Take 1*, Winter, 2000, 6, Barker, Michele. "A Cinema of Movement." *Screen Bodies* 2, no. 2 (12, 2017): 45-63. doi:<http://dx.doi.org/10.3167/screen.2017.020204>.
<http://libproxy.temple.edu/login?url=https://www.proquest.com/scholarly-journals/cinema-movement/docview/2272760746/se-2?accountid=14270>.
- Bates, Joseph. 1992. "Virtual Reality, Art, and Entertainment." *Presence: Teleoperators and Virtual Environments* 1 (1): 133–38. <https://doi.org/10.1162/pres.1992.1.1.133>.
- Beckett, Jim. 1978. Review of *The Subjective Camera as Leading Character*. *American Cinematographer*, March 1978. Screen Studies Collection. Bowens, Max. "'The Flesh of the Perceptible': The New Materialism of Leviathan." *Film-Philosophy* XXII, no. 3 (2018): 428-447.
- Brooker, Will. "Camera-Eye, CG-Eye: Videogames and the "Cinematic"." *Cinema Journal* 48, no. 3 (Spring, 2009): 122-128.
- Cheng, B., C. H. Ritz, and I. S. Burnett. "Psychoacoustic-Based Quantisation of Spatial Audio Cues." *Electronics Letters* 44, no. 18 (Aug 28, 2008): 1-2. Dell'oso, Anna-Maria. "Soldier Girls Dwells on Ugly Side of US Army." *The Sydney Morning Herald*, July 7, 1983, sec. Arts and Entertainment - Films.
- Dooley, Kath. "Virtual Reality: MOVING BEYOND A CINEMA OF ATTRACTIONS." *Screen Education*, no. 88 (January 2018): 96–103. Geronazzo, Michele, Amalie Rosenkvist, David Sebastian Eriksen, Camilla Markmann-Hansen, Jeppe Køhlert, Miicha Valimaa, Brogaard Vittrup Mikkel, and Stefania Serafin. "Creating an Audio Story with Interactive Binaural Rendering in Virtual Reality." *Wireless Communications & Mobile Computing (Online)* 2019, (2019): 14. doi:<http://dx.doi.org/10.1155/2019/1463204>.
- Ginsburg, Faye. "DECOLONIZING DOCUMENTARY ON-SCREEN AND OFF: SENSORY ETHNOGRAPHY AND THE AESTHETICS OF ACCOUNTABILITY." *Film Quarterly* 72, no. 1 (Fall, 2018): 39.
- "How to Treat the Camera like a Character." n.d. E.M. Welsh. <https://www.emwelsh.com/blog/camera-character>.
- Joseph, Stephen Mandel. 2019. Review of 3 of the Best 360 Narratives so Far. *Videomaker*, October 2019.
- Kadner, Noah. "Surveying the Virtual World." *American Cinematographer*, 03, 2017, 56-62
- Kawaler, Miłosz and Andrzej Czyżewski. "Database of Speech and Facial Expressions Recorded with Optimized Face Motion Capture Settings." *Journal of Intelligent Information Systems* 53, no. 2 (10, 2019): 381-404. doi:<http://dx.doi.org/10.1007/s10844-019-00547-y>
- Kawin, B. (1977). *FICTION AND THE CAMERA EYE: Visual consciousness in film and the modern novel*. *Film Quarterly (ARCHIVE)*, 30(4), 44-46. Retrieved from KEIJZER, HUGO, dir. 2016. *The Invisible Man*. 360/VR. USA: Youtube.
- Kempley, Rita. "Stunning 'Soldier Girls'." *The Washington Post*. WP Company, April 16, 1982. <https://www.washingtonpost.com/archive/lifestyle/1982/04/16/stunning-soldier-girls/7e4590b4-7ed3-4635-b3e0-ba681e99a05a/>.
- LaRocco, Michael. "From Kino-Eye to Kino-Computer: Theorizing the VR Camera." *The Spectator*, Fall, 2020, 8-13,
- MacFarlane, Kit. "IMPOLITENESS AND DESTRUCTION IN THE ENCAPSULATING FRAME: Lynette Wallworth's Collisions and Virtual Reality." *Metro : Media & Education Magazine*, 2017, 78-81,
- Malham, Dave. "Book Reviews: "Spatial Audio," by Francis Rumsey." *Organised Sound* 9, no. 1 (04, 2004): 117.

- Mateer, John. 2017. "Directing for Cinematic Virtual Reality: How the Traditional Film Director's Craft Applies to Immersive Environments and Notions of Presence." *Journal of Media Practice* 18 (1): 14–25. <https://doi.org/10.1080/14682753.2017.1305838>.
- Mcintosh, Heather. "Direct Cinema: Observational Documentary and the Politics of the Sixties, Dave Saunders (2007)." *Studies in Documentary Film* 4, no. 1 (January 2010): 91–94
- Munro, Kim. 2020. "Envisioned Presences: Future Dreaming, Passenger and the Continuing Evolution of Virtual Reality." *Metro*, no. 204 (May): 68–73.
- Nichols, Bill. "The Voice of Documentary." *Film Quarterly (ARCHIVE)* 36, no. 3 (Spring, 1983): 17-30,51.
- Orchard, K. (2007). Kurt schwitters: Reconstructions of the 'merzbau'. Tate Papers, (8)
- Pink, Sarah. 2009. *Doing Sensory Ethnography*. 1 Oliver's Yard, 55 City Road, London, Ec1y 1Sp, United Kingdom Sage Publications Ltd.
- "SINGLE-CAMERA AND MULTI-CAMERA LIGHTING METHODS." *American Cinematographer*, 09, 1973, 1128-1131,1164,1202,
- Syrett, Hannah, Licia Calvi, and Marnix van Gisbergen. 2016. "The Oculus Rift Film Experience: A Case Study on Understanding Films in a Head Mounted Display." *Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering*, November, 197–208. https://doi.org/10.1007/978-3-319-49616-0_19.
- Thornley, Jeni. "The Eye of the Camera: ETHNOGRAPHIC DOCUMENTARY AND THE APERTURE FESTIVAL." *Metro : Media & Education Magazine*, Winter, 2014, 110-112.
- Verdurmen, Mylène, ed. 2017. *Ashes to Ashes. VR/360*. Directed by Steye Hallema, Ingejan Ligthart Schenk, and Jamille van Wijngaarden. Netherlands: AVROTROS.
- Whatley, Sarah, Rosamaria K Cisneros, and Amalia Sabiescu. 2018. *Digital Echoes : Spaces for Intangible and Performance-Based Cultural Heritage*. Cham, Switzerland: Palgrave Macmillan.
- Williams, David E. "The Future of Cinematography." *American Cinematographer*, 08, 2020, 22-28,30-32,34,
- Zhang, Wen, Parasanga N. Samarasinghe, Hanchi Chen, and Thushara D. Abhayapala. "Surround by Sound: A Review of Spatial Audio Recording and Reproduction." *Applied Sciences* 7, no. 5 (2017): 532. doi:<http://dx.doi.org/10.3390/app7050532>.