

CONSTRUCTING THE AFROCYBORG IN VR 360 CINEMA: A CRITICAL INVESTIGATION INTO HOW TWO AFRICAN WOMEN FILMMAKERS COLLABORATE TO CONSTRUCT PROSOCIAL AFRICAN SCIENCE FICTION IN VIRTUAL REALITY FILMMAKING



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Figure 1: Virtual Reality (VR) film poster for *The Eye of Rre Mutwa – An Afrocyborg Homage to Credo Vasamazulu Mutwa 1921–2020*.

Written, directed, shot and produced by Shmerah Passchier, in collaboration with The Afrocyborg Collective. This is an Augmented Reality (AR) film poster. If you download the UniteAR application (app) from Google Play Store on a smartphone, then launch the app and scan the image of the poster above, a VR trailer of the film will begin to play.

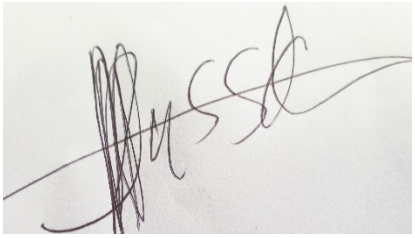
Plagiarism declaration and ethics clearance

I know plagiarism is ethically and legally wrong, and presenting what another author has written in your own words and thoughts is a crime. As such, I have followed the Harvard referencing method in presenting the theories, ideas, and terms of the various authors referenced and cited in the writing of this PhD.

I recognise that the University of the Witwatersrand may undertake disciplinary action against me should I fail to adequately acknowledge the source of the ideas and words cited in my writing. I, therefore, assert that all written work submitted here for assessment is my own unassisted and independently written work.

This research is collaborative, so I have cited my fellow animateur, Moratiwa Molema, and her various contributions with her permission. In these instances, creative contributions to making two Virtual Reality films are fully acknowledged, per the Harvard citation method.

This collaborative research is submitted towards the PhD by creative project and dissertation, in the Faculty of Film and Television, at the University of the Witwatersrand, Johannesburg. This research and writing have yet to be submitted for any other degree or examination at another university or institution.



Shmerah Passchier

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How to view the two VR films that are the outcomes attached to this creative work PhD submission

The Afrocyborg VR Film Masters are available to download here:

https://drive.google.com/drive/u/0/folders/1olhOeLtuaQEnIkoD8E-ODjoGC34i5PLb

The titles of the two VR films are:

1. *The Cosmic Egg* (2023.mp4)
2. *The Eye of Rre Mutwa* (2023.mp4)

Please do not watch the equirectangular video directly from this Google Drive as this is not the correct format for viewing 360-degree material.

These two video files must be downloaded to your desktop and installed onto a professional quality VR Headset such as an Oculus Go.

Please follow the instructions below to install the VR films onto your VR Headset:

1. Connect your Oculus Go/VR Headset to your computer using a USB cable.
2. Switch your Oculus Go/VR Headset on and give your computer permission to access your VR Headset's built-in storage
3. Drag and drop or copy and paste the two 360º videos into the **Movies** folder on the VR Headset or Oculus Go.
4. If you are working on an Apple Mac, you will need to download ***Android File Transfer*** – available here: ***https://www.android.com/filetransfer/*** to do this).
5. Put on your Oculus Go, and navigate using the hand controllers to click **Gallery,** then click on **Internal Storage**
6. Note the batteries in the hand controllers should have a charge to operate the VR device.
7. You should now see the videos you uploaded, and you can click either one to start playing it.

N.B. Ensure you have turned OFF developer mode in your Oculus Go app, or else your computer might not recognise the device, and you may not be able to transfer any files.

Viewing

To hear the ambisonic, spatial audio soundtrack in both films, please wear earphones that are plugged into your VR Headset via the mini-jack plug-in port.

N.B. Please ensure that you are sitting in a rotating chair and be sure to move your head and body around inside the 360-degree immersive video experience.

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I thank Dr Leloba Molema for her wisdom, mentorship and guidance, specifically in reviewing and editing both VR scripts and doing the impeccable Setswana translation and voice-over for *The Cosmic Egg.*

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Thank you to my supervisors, Professor Tanja Sakota Kokot and Dr Yolo Koba, for guiding me through this discovery process. Thank you to Professor Brigitte Gauthier at Université D’Evry, Paris, France, for publishing an earlier draft of this research as a chapter in her book, *Afrique du Sud, Cinéma et Enjeux Contemporains*. The chapter was translated as *La mise en place de l’afrocyborg au cinéma en réalité virtuelle à 360°*.

Acronyms

1IR	The First Industrial Revolution
2IR	The Second Industrial Revolution
3IR	The Third Industrial Revolution
4IR	The Fourth Industrial Revolution
AI	Artificial Intelligence
AR	Augmented Reality – digital artefacts superimposed onto "reality" via AR apps or *HoloLens*
CGI	Computer Generated Imagery
CGI VR	Computer Generated VR – typically created in *Unity* game engine design software
CVR	Cinematic VR 360 spherical video
DLA	Digital Lab Africa
DOF	Degrees of Freedom
HMD	Head-Mounted Display or VR Headset for watching VR media
PC	Personal Computer
SAFT	South African Film & Television Industry
SF	Science Fiction
STEAM	Science, Technology, Engineering, Art & Mathematics
STEM	Science, Technology, Engineering & Mathematics
SWIFT	Sisters Working in Film & Television – a South African feminist NGO
VR	Virtual Reality
XR	Extended Reality – a blend of VR & AR immersive media content

Glossary of terms

African Science Fiction – Nnedi Okorafor distinguishes African SF, which is "similar to Afrofuturism, but is more directly rooted in African culture, history, mythology, and perspective, where the centre is non-Western" (Okorafor 2019: 83).

Afrofuturism – is a global, African, science-fiction, multi-disciplinary genre (Anderson & Jones 2016).

Animateur – sociocultural actor, or "active agent of her development and of the qualitative development of the community to which s/he belongs" (Foth 2005: 645). "Keepers of the vision who mediate, facilitate and seek self-awareness, self-efficacy, reflexivity, and motivation to build community efficacy for community members" (Foth 2005: 645).

Behaviour Modification – refers to the work of the cognitive behavioural scientist B.F. Skinner, who designed a laboratory experiment to administer electric shocks to rats and dogs in an electrified cage to modify their behaviour (Lanier 2017: 58, 95).

Body transfer is a neuroscience term describing what happens when a VR user enters the "body" of a CGI avatar. When the user identifies with their avatar body, they "feel" what happens to their avatar (Bailenson 2018: 58).

CineVR – an abbreviation of Cinematic VR.

Embodied Cognition – is a somatic phenomenon distinct to VR learning experiences, according to Bailenson, who has conducted research affirming VR as a practical learning aid since people learn by "doing". VR simulates "learning by doing" relatively well: "… proponents of embodied cognition posit that by simulating an action in the brain, one can improve learning" (Bailenson 2018: 29).

Embodiment – in VR describes how a viewer/user can become someone else. They can step into the body of innumerable computer-generated avatars. Bailenson has conducted several experiments in his VR lab that describe the prophylactic effects of "an embodiment" and how the use of this phenomenon in the medium can treat and address critical issues such as ageism, sexism, racism, phobias, and environmentalism (Bailenson 2018: 60).

Empathy – in VR, initially referred to as "*The Ultimate Empathy Machine*", a popular Ted Talk by VR filmmaker Chris Milk who underlined the immersive properties of VR, which enable empathy and connection in profound ways through the ability of the medium to alter perception, more so than traditional media formats (Bailenson 2018: 53). The discourse of VR as "empathy machine" has since been widely rejected by Jones in, *Immersive Journalism as Storytelling: Ethics, Production, and Design* (2020).

Exponential Computing – developed by Ray Kurzweil, is based on "The Law of Accelerating Returns", his exponential interpretation of Moore's Law (Kurzweil 2005: 42).

Exponential Technology – technology emerging from 4IR, namely, AI, VR, AR, XR, robotics, drones, nanobots, 3D (three-dimensional) printing, wearable computing & digital implants/biology (Schwab 2018: 28).

High Techné – emerged from techno-cyber-culture in the 1990s, coinciding with the global adoption of the internet as a critical new technology and media-communication tool. "High techné" is a postmodern mutation of avant-garde "techné" (Rutsky 1999: 101).

Immersion – is achieved in VR because the movement of the head corresponds to the movement of the picture, enabled by gyroscope technology. The high frame rate in VR of 60-90 frames per second to refresh the image also leads to a greater feeling of "immersion" in the medium (Tricart 2018: 20).

Immersive Computing – a VR HMD is an immersive computer that can do almost anything a desktop or laptop computer can.

Immersive Media – any immersive experience created in VR, AR or XR.

Immersive Storytelling – places the viewer at the centre of the narrative (Jones 2020: 194).

Immersive Technology – VR, AR & XR (Jones 2020: 2).

Poiesis or Poietic – Hosale, Murrani & de Campo (2018 ch 1 para 20) define "poietic" as a term belonging to the domain of techné, which represents the aesthetics methods of worldmaking.

Presence – in VR refers to a feeling of "being there", which is unique to 360° filmmaking (Tricart 2018: 38).

Prosocial VR – is used in various "civic applications, including education, healthcare, journalism, enhancing mutual understanding, reducing gender and racial biases, and promoting altruistic behaviours" (Aitamurto, Stevenson Won & Zhou 2021: 2139). Pro-social VR is the conscious application of the technology used to change participant behaviour towards positive action and contribution to society.

Quantum Computing – is defined by IBM as harnessing "the phenomena of quantum mechanics to deliver a huge leap forward in computation to solve certain problems. IBM design quantum computers to solve complex problems that today's most powerful supercomputers cannot solve and never will" (ibm.com).

Techné – Heidegger approaches techné as a critical questioning of technology grounded in the praxis of concept formation. Heidegger uses the term "ge-stell" to question what lies beneath technology. "Ge-stell" equates to "enframing", a structuring of the gaze to probe the truth (Hosale, Murrani & de Campo 2018: ch1: para 7).

Technofeminsm – a sub-genre of post-feminism defined as "the complex ways in which women's everyday lives and technological change interrelate in the age of digitalization" (Wajcman 2004: 14).

VR Agency – when the viewer wears a VR head-mounted display (HMD), they can choose where to aim their gaze inside the 360-degree spherical image. This viewing experience differs vastly from traditional media formats, such as cinema and television, because VR does not dictate where viewers should fix their gaze. This viewer "agency" in VR fundamentally alters the grammar of cinema by comparison to single-lens cameras and traditional filmmaking syntax.

VR awe – is simulated in VR to treat depression in patients or to expedite convalescence in hospitalised patients. This results from VR's unique ability to induce awe through "presence", which is a feeling of being transported to a different place. Awe is simulated in VR by creating virtual encounters with natural phenomena such as starry night skies, forest scenes, or ocean vistas. Inducing awe in VR has been shown to have transformative capabilities to treat psychological and physical ailments (Chirico, Ferrise, Cordella, & Gaggioli 2018: 1).

VR synaesthesia – Miriam Ross argues in *Virtual Reality's New Synesthetic Possibilities* (2018) that VR possesses qualities of synesthesia. This neurological condition activates intertwined sensory experiences such as seeing music or hearing colour. VR-induced synesthesia collapses the senses into overlapping domains when the human body experiences "body transfer" via multisensory optical illusions, which teleport the brain into constructed parallel media worlds.

Worldbuilding – in VR filmmaking refers to the ability of the medium to deliver immersion, presence and embodiment (Tricart 2017: 89). VR places the viewer at the centre of ever-expanding concentric circles of imagery, effectively replacing the old rectangular/square cinema and TV formats that have been in place since 1896 (Hall & Takashi 2017: 1).

Abstract

The Afrocyborg semiotic construct is a neologism inspired by cyborg scholarship, beginning with Donna Haraway's 1985, *A Cyborg Manifesto*, which materialised at the zenith of the Third Industrial Revolution (3IR), and the appearance of the domestic personal computer (PC) in the late twentieth century. This contribution to cyborg discourse re-focuses the Western science/fiction gaze of "cyborgology" by foregrounding African cyborg realities at the centre of the new zeitgeist of 4IR-driven XR technologies, specifically the VR HMD as an immersive computing device, which is a cyborg prosthetic extension of human ocular abilities (Gray 1995: 1).

Moratiwa Molema and I formed the Afrocyborg VR Collective as an Afro-technofeminist coalition, and solidarity support group for collective womanist filmmaking. This methodology foregrounds the technological empowerment of women in relation to VR as a medium while focusing on prosocial subject matter in the domains of eco-justice and racial-gender-justice (Ogunyemi 2006: 21). For this reason, the Afrocyborg VR Collective make Prosocial VR films in the genre of African Science Fiction, which is a counter-hegemonic narrative lens through which to generate "cyborg consciousness" about "oppositional consciousness" (Sandoval 2020: 408; hooks 1992: 264). Cyborg oppositional consciousness is expressed as "Fourth VR" (Wallis & Ross 2020: 1).

An Afro-technofeminist, technopolitical framework advances filmmaking discourse and praxis by autodidactic online learning of how to operate VR equipment, thereby overcoming our tech-inferiority complex with a thought experiment we call the "Dora Milaje mind trick" (Coogler 2018). As we learn, we also teach VR skills to our students and communities of youth to share knowledge of 4IR tools, specifically with women, to empower them with 4IR STEAM skills as a technopolitical, educational and future-proofing empowerment strategy. The Afrocyborg Collective has made two VR films in the genre of Prosocial VR as part of the creative praxis of Quantum Botho/Ubuntu in the making of *The Cosmic Egg,* which is a call to elevated environmental consciousness, and *The Eye of Rre Mutwa,* which confronts "white fragility" about the technological developments of the 4IR (DiAngelo 2018). By experimenting with new gaze regimes offered by the exponential medium of VR, with its multiple lenses that create 360-degree spherical story worlds, we demonstrate how the "medium is the muthi" when used in the mode of Prosocial VR. Therefore, the construction of an expanded prosocial gaze in VR, in the genre of African futurism, contributes to the decolonial undoing of

oppressive power structures by generating representations of Africa that seek to apprehend the stereotypes of Hegelian racial prejudice and “poverty porn” that persist in global media representations (Kahiu 2017)

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The technogenesis of the Afrocyborg – introduction and chapter outline

This creative PhD describes how the African cyborg or Afrocyborg semiotics were constructed in Virtual Reality (VR) 360, spherical video, cinematic form by applying a twenty-first century African Science Fiction and technofeminist[1] conceptual framework. The central semiotic object under analysis and revision is the postmodern, neo-Marxist cyborg of Haraways' technofeminism. Haraway's cyborg is a prosocial polyvalent creature prone to multiplicity. As such, her cyborg, and our Afrocyborg, share multiple overlapping nodes of consilience, as does the conceptual framework, with social justice theory and Prosocial VR, in light of VR as a tool of the Fourth Industrial Revolution (4IR). An essential thread in the narrative of 4IR theory is the move towards exponential technologies becoming embedded in the human body as "wet devices" (Schwab & Davis 2018: 72; Musk 2020). VR is an example of wearable tech, a predecessor to "wet devices". Within this decade, Kurzweil predicts that nanobots will be injected into the bloodstream to enable a seamless VR interface (Kurzweil 2005: 98). Human modification or transhumanism is cyborg subject matter, the nexus of human-machine adaptation and evolution. As such, there is consilience between cyborg theory and 4IR theory, which begs the question of ethics and social justice to guide the age of exponential and quantum computing. These ethical debates must be urgently brought to the fore if Africa is to resist the algorithmic repetition of data colonialism amid the disruption of 4IR (Benyera 2021: 149; Marwala 2020: 211). We offer the neologism of Quantum Ubuntu to guide ethical and prosocial discussion of our technofeminist VR collaboration praxis. Prosocial use of 4IR technologies is critical, as data is now worth more than oil; and is being deployed as a weapons-grade political tool, which could destroy democracy in the wrong hands (Benyera 2021: 143; Marwala 2020: 211, 224). The Afrocyborg seeks to participate in the revolutionising capacity of 4IR XR media technologies, which could also be used to uplift humanity by working towards solving our most significant planetary challenges and the collective challenges we face on the African continent (Marwala 2020: 2).

As such, the research methodology was conducted by producing two VR short films in the genre of Prosocial VR, which foregrounds social justice societal concerns toward promoting

[1] Technofeminism builds on cyborg feminism, specifically the work of Donna Haraway, by delivering a critique of mainstream science and technology theory and practice (Wajcman 2004: 103). Technofeminism examines the mutually constituting components of gender and technology and how machines manifest gender relations (Wajcman 2004: 207).

prosocial behaviour change in addressing blind spots in the social fabric of our world (Aitamurto, Stevenson Won & Zhou 2021: 2139). Social justice informs this mode of African VR filmmaking, which is evident in the conceptual framework and formation of the Afrocyborg VR Collective and the thematic expression of the two films, which address "eco-justice" and the role of "white fragility" in decolonising 4IR (Molema 2020; DiAngelo 2018). Our collective intersects with concurrent pan-African communities of professional practice, namely WeAreVR Africa and Digital Lab Africa. This collaborative, communal, intra-connected thinking is vital for Molema and me as the primary members of the Afrocyborg Collective. Moratiwa Molema, my ally, colleague, media lecturer and professional animateur, based in Gaborone, Botswana, and I have embraced an African mode of collaborative filmmaking practice, informed by a synthesised philosophy that "Mwe", together named Quantum Botho, in Botswana, and Ubuntu in South Africa[2] (Siegel 2022: xxi). "Mwe" implies the integrated and intra-connected mode of our filmic praxis that shares consilience with Ubuntu (Siegel 2022: 14; 34). This bricolage theory conceptually informs our creative work, as evidenced in our two Prosocial VR films. It is the substance that binds and links us as artists and is the meta substance of our work. We insert the prefix of Quantum, adding this to Botho/Ubuntu to address the social justice and human rights issues unfolding in the domain of 4IR, where quantum computing is driving exponential advances in technology that society is not yet equipped to regulate or govern. Marwala affirms how 4IR technologies have disrupted democracy (Marwala 2020: 226). We turn to Ubuntu to seek guidance in this ethical lacuna. The African moral and ethical philosophy that informs all African philosophy may offer hope in the face of dystopian futures (Ramose 1999; 2003). Quantum Botho/Ubuntu is designed to address the misuse of 4IR technology towards producing a Prosocial VR film.

Quantum Botho/Ubuntu informs the Afrocyborg Collective's VR films, designed to move the conversation forward from Haraway's *Cyborg Manifesto,* written to address the zeitgeist of the Third Industrial Revolution (3IR) and the technology of the twentieth-century personal computer. This research, by contrast, is situated in the twenty-firstcentury context of the 4IR, where VR headsets are immersive computing devices used in the exhibition of VR films. In

[2] Mboti defines Botho/Ubuntu as: "*umuntu ngumuntu ngabantu*" (in Nguni languages), "*motho ke motho ka batho*" (in Sotho languages), "a person is a person through other persons" or "I am because we are" (in English) (Mboti 2015: 127). "My humanity is caught up, is inextricably bound up in yours" (Tutu 1999: 31).

this research, I argue that the VR headset is a cyborg[3] device that modifies the human body and consciousness in ways that the exhibition of formal cinema cannot achieve. The material object that is the VR headset has significant consequences to lived social realities, not only for those who use this medium but, in fact, for all humans using computers as immersive computing begins to replace laptops and desktops (Schwab 2018: 167). This moment in history is critical because it describes the beginning of wo/men in Africa negotiating access to VR, AR and XR, which are forecast to become the future of immersive computing in the twenty-first century (Schwab 2018: 6; Goldman Sachs 2016: 4; Scoble & Israel 2017: 22; Pell 2017: xv; Linowes 2017: 7).

In the production of two VR short films, I build on the "African cyborg" as an agent of "technological and social change" (Okoye 2014: 64). By blending African womanism with technofeminism, I draw on the work of Donna Haraway (1991, 2016, 2018 & 2021); Judy Wajcman (2004); Sue Short (2005), and Chela Sandoval (2000); to develop cyborg theoretical discourse to include a womanist, Africa centric filmmaking focus. I interrogate my own "white fragility"[4] (DiAngelo 2018) by questioning the role of technology outlined in Western technofeminism, which underpins various intersectional and technological inequalities. In doing so, I re-read the power structures embedded in the high techné medium of VR through a lens of afro-feminist and African Science Fiction authors, namely: Credo Mutwa (1965); Nnedi Okorafor (2014; 2015; 2019), Florence Okoye (2014); Obioma Nnaemeka (1995; 2004) Chikwenye Okonjo Ogunyemi (1985).

The VR camera, the central material object in this research, generates the cinematic images viewed in the VR headset when watching VR films; it also uses exponential[5] computing and AI technologies, which are coded into the VR camera, which is controlled via a smartphone application (insta360.com 2021). This technology, newly emerging from the promethean

[3] The term "cyborg" was first conceived in 1960 for NASA space travel to describe how "man" might merge with technology to adapt to life in space (Clynes & Kline 1960: 73).

[4] "White fragility" is defined by Robin DiAngelo as a distinct set of psychological behaviors triggered by racial tension when white people are confronted with racial inequality. Instead of acknowledging racism, white people become reactive and divisive, which is a strategy to maintain racial superiority, entitlement and advantage (DiAngelo 2018: v).

[5] Exponential computing is the basis for the technological Singularity theorised by Ray Kurzweil in *The Singularity is Near*: *When Humans Transcend Biology* (2005), where he claims that human to cyborg evolution will see nanobots interfacing with human biology "to vastly extend the human experience by creating virtual reality from within the nervous system" (Kurzweil 2005: 37). Kurzweil's Singularity has been the subject of much critique, particularly from VR pioneer Jaron Lanier who accuses Kurzweil of technological determinism and producing a totalising grand narrative based on Judeo-Christian eschatology (Lanier 2010: 117).

furnace of 4IR, builds on what Haraway said three decades ago by juxtaposing the biotech/infotech nexus, which defines the SF cyborg construct. Marwala describes cyborg programming built into the tools of 4IR as a "confluence of the physical, digital and biological spheres through AI, automation, biotechnology, nanotechnology and communications technologies" (Marwala 2020: 6). VR technology exhibits human-to-cyborg modification as it seeks to expand the human gaze from 180 degrees of the current human eye spectrum to a 360 degree fully immersive cyborg-gaze, or "exponential" gaze. This research focuses on how exponential computing has created these two critical devices, namely the VR camera and VR headset, which together produce the technology to generate a new kind of world-changing fiction. Like Haraway, I argue that these "communications technologies and biotechnologies are the crucial tools recrafting our bodies" (Haraway 1991: 164). My research observations, however, pertain strictly to the domain of VR technology and how these new 4IR tools enable new social relations for women in African filmmaking. For this purpose, this research explores the following questions:

1. In what ways does an Afrocyborg, technopolitical, technofeminist framework help advance an African filmmaking discourse and praxis?
2. How can African women filmmakers collaborate to construct prosocial African Science Fiction in Virtual Reality filmmaking?
3. What transgressive and transformative gaze regimes make a technofeminist Virtual Reality approach contribute to the decolonial undoing of oppressive power structures?

This research investigates the VR filmmaking process itself as a cyborg feminist technopolitical[6] alliance, which describes how the Afrocyborg VR Collective, namely Moratiwa Molema and myself, went about making two prosocial African Science fiction films while learning to use the VR tools that shaped the making of our VR "worlds". "Worlding" is an overwhelming responsibility and craft for the filmmaker, who must also be cognisant of the charge to ensure this nascent medium's endurance and conceptual cohesion (Tricart 2018: 114).

[6] The term "technopolitical" refers to "technopolitics", which is enhanced by ICTs. Technopolitics leverages the efficacy of communication technologies to achieve political freedom, empowerment and governance; while transforming traditional democratic practices (Kurban, Peña-Lopez & Haberer 2016: 515).

Secondly, this creative research will also focus on the cyborg nature of the VR medium, which can blur the boundaries of reality by fusing the digital with the physical domains. I argue this based on the capacity of the technological medium of VR to possess the ability to act on the body and consciousness of the viewer in exponential ways as a result of the heightened neurological and somatic phenomena in VR known as “presence”, “embodied cognition” and “behaviour modification” (Tricart 2018: 38; Bailenson 2018: 28; Schwab & Davis 2018: 167; Lanier 2017: 58, 95).

Lastly, in answering the research question of how prosocial VR might be constructed in the genre of African Science Fiction, I argue that the powerful somatic cyborg fusion of biotech and infotech in the VR medium, with its ability to impact the viewer in ways that produce a measurable change in terms of behaviour modification, can therefore potentially undo the damage of “poverty porn” and “Hegelian tropes” of misrepresentations of Africa in VR. This is possible when applied in the mode of Prosocial VR. The central idea of the Afrocyborg infuses current African realities into global cyborg discourse to position Africa at the centre of our collective VR narratives. The cyborg-esque splicing together of the Afrocyborg neologism is triangulated across the five chapters in this creative research PhD. The figure below shows patterns of “consilience” or overlapping common ground in the theoretical themes outlined by consolidating and signposting the linkages and connections explored across the five chapters.

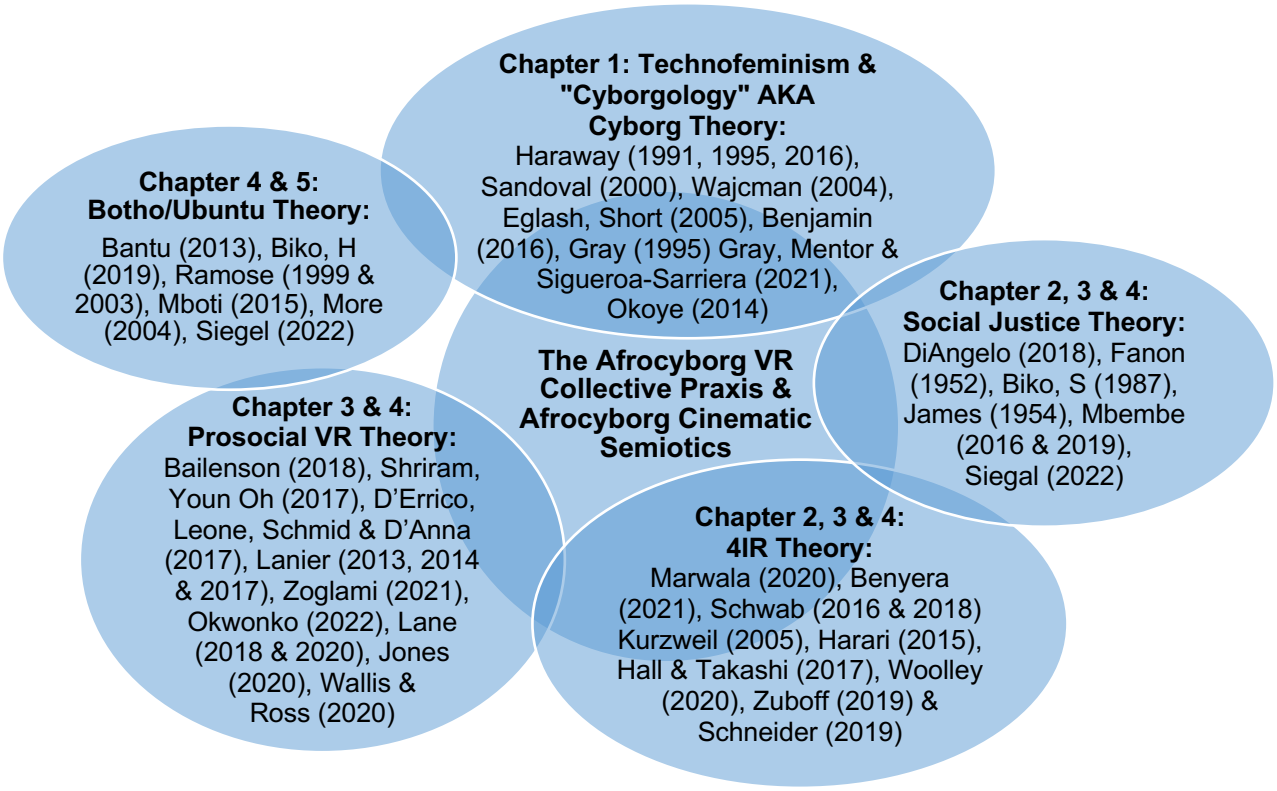


Figure 9: Circles of Consilience linking cyborg theory to social justice theory, 4IR theory, Prosocial VR theory and Ubuntu philosophy

Chapter outline

Chapter One: How the Afrocyborg VR Collective applies Technofeminist cyborg theory when making VR films in the African SF context.

This chapter will articulate how the Afrocyborg VR Collective applies technofeminism7 and cyborg theory as a practical methodology for making VR films in Southern Africa. Following Haraway's many examples of blending cyborg technofeminist and intersectional examples of Science Fiction with Science Fact, our Afrocyborg cinematic representations are technoscience manifestations of African Science Fiction interpretations of the cyborg, rendered in the high techné medium of VR. The Afrocyborg is both an embodied cinematic semiotic and a lived reality that informs the creative practice of technological agency and mutual support in this mode of collaborative filmmaking. This collaboration is necessitated by the fact that filmmaking is a resource and labour-intensive professional practice, requiring a crew or collective of people performing multiple tasks to achieve the outcome. As such, the

[7] Technofeminism is "the complex ways in which women's everyday lives and technological change interrelate in the age of digitalisation" (Wajcman 2004: 14).

Afrocyborg Collective embrace the methodology of technoscience empowerment through technofeminism to get our VR films made. We illustrate this point with a thought experiment called the “Dora Milaje mind trick”.

Chapter Two: How the Afrocyborg VR X applies 21st century and 4IR steam skills specific to VR film production as a political, educational future-proof empowerment strategy.

Chapter Two explores how VR 360 cinema is a form of STEAM (Science, Technology, Engineering, Art & Mathematics) technology, merging immersive computer technology with high-end techné filmmaking towards future-proofing our students for careers yet unknown as we travel deeper into the 4IR. The educational ethos informs our positionality as colleagues, lecturers and media practitioners of sharing knowledge with our students, especially women students because sub-Saharan African women and girls remain particularly disadvantaged in accessing STEAM education, where under-representation in STEAM careers is rooted in discrimination, biases, social norms and expectations according to UNESCO (UNESCO 2017: 32). Several barriers to entry alienate women from STEM careers that include: gender inequality, societal gender role stereotypes, various forms of discrimination and prejudice, including unequal remuneration based on the gendered division of labour (UNESCO 2018: 50). African women need improved access to STEM/STEAM education, which is a Human Right, not merely Woman’s Rights (UNESCO 2018:32; Wajcman 2004: 27).

Chapter Three: VR as a non-binary cyborg technology applied as a prosocial antidote to “poverty porn” and “Hegelian tropes” of misrepresentation in African VR narratives.

In this chapter, I outline the ethical and moral conundrum of 4IR in Africa and proffer Quantum Botho/Ubuntu as an Afrocentric solution articulated in the mode of Prosocial VR. This debate is pertinent since VR is a cyborg technology because it collapses boundaries between the observer and the observed, the filmmaker and the audience. This is evidenced by the fact that VR can augment and modify human behaviours across multiple domains, including the corporeal, psychological, somatic, educational, medical, and metaphysical. Specific VR phenomena include: “synaesthesia” (Ross 2018: 2), “awe” (Chirico, Ferrise, Cordella, & Gaggioli 2018: 1), “embodied cognition” (Bailenson 2018: 29), and “body transfer” (Bailenson 2018: 58). VR, therefore, has the unique capacity to act on the human body and mind to augment behaviour through the use of this tool. Therefore, VR is a cyborg technology.

Based on vexing socio-political-economic concerns around the recolonisation of Africa and data colonialism (Benyera 2021: 139), in addition to the amplified physiological effects produced by the medium of VR, the Afrocyborg VR X applied the theoretical lens of Prosocial VR as outlined by Aitamurto, Stevenson Won and Zhou (2021), Shriram, Youn Oh, and Bailenson (2017), and Herrera and Bailenson (2021). I argue for Prosocial VR as per Bailenson (2018), which I contrast with examples of "empathy machine" (Milk 2015), "poverty porn" (Kahiu 2017) and Hegelian stereotypes of African narratives in VR.

Chapter Four: Prosocial VR in the creative praxis of Quantum Botho/Ubuntu in the making of *The Cosmic Egg* and *The Eye of Rre Mutwa.*

In this chapter, I present a summary of applied semiotics evidenced in the making of *The Cosmic Egg* and *The Eye of Rre Mutwa* using Sue Short's rubric in *Cyborg Cinema and Contemporary Subjectivity* (2005), which underscores the theoretical constructs of neo-Marxism, Feminism, Postmodernism, and Post-Colonialism, all of which underpin Haraway's *Cyborg Manifesto*, as well as both VR narratives produced by the Afrocyborg VR X.

We apply the methodology of Phatsimo Sunstrum, who uses time re-mapping to transform ancient African mythological narratives into African futurism (Phatsimo Sunstrum 2013: 116). In the making of *The Cosmic Egg*, which was shot in Gaborone, Botswana; directed by Moratiwa Molema in collaboration with The New Moon ensemble – a collective of dancers, musicians, poets and singers; Molema locates the genealogy of the Afrocyborg in African antiquity, specifically San mythology. *The Cosmic Egg* is a traditional Setswana dance musical, where an anciently futuristic ostrich egg hunt turns into an eco-time-travel mystery featuring Afrocyborg dancers performing a call to environmental consciousness.

Similarly, in making the second VR film titled, *The Eye of Rre Mutwa – an Afrocyborg Homage to Credo Vasamazulu Mutwa 1921–2020,* I apply Phatsimo Sunstrum's method of generating African Science Fiction by transforming Mutwa's ancient accounts of Zulu folk mythology into intergalactic space travel. I experiment with the VR gaze by teleporting the viewer to a mythical planet in the shape of an All-Seeing Eye, thereby honouring Credo Mutwa as a seer. This is conceptually amplified by the viewer's cyborg ability to see in 360 degrees. Mutwa is depicted as a cyborg, living breathing, speaking planet. This is an ironic visual entendre for the medium of VR, which is fundamentally a worlding tool.

Drawing on the cyborg scholarship of Eglash (1999), I experiment with fractal VR cinematography as a cyborg gaze tool to fracture distinctions between the two characters who become one visually. This application of cyborg theory in generating fractal VR cinematography renders it almost impossible to tell where one character begins and the other character ends. This effect erases boundaries and binaries within the VR cinematic world. I argue that this is an instantiation of bell hooks' "oppositional gaze" because it is a critical gaze that collapses binary categories creating a representation of resistance, acknowledging the various struggles for freedom that politicise the act of "looking" to resist neo-colonial dominant power structures (hooks 1992: 116). In merging identities in the experiment with fractal cinematography, I interrogate my positionality as a white Semitic woman through DiAngelo's lens of "white fragility" (2018). Fractal cinematography becomes a way to assimilate African identities and cultures as per Haraway's Cyborg Manifesto, where forming networks of multi-cultural affinity is rendered visible. Here I apply the visual theory of Laruelle (2011), and the "fractal vision of the world", which he claims renews notions of "the self" as a "microcosm" and "God" as a "macrocosm". These ideas resonate with the central themes in *The Eye of Rre Mutwa*, which is a homage to a High Isanusi and luminary isiZulu Sangoma; fractal cinematography in VR, in this instance, is designed to simulate "awe" and generic SF conventions of the supernatural and spiritual dimensions.

Chapter Five: Findings and conclusions: The medium is the muthi.[8]

This chapter is a reflection on the technical and logistic lessons learned from the collective VR filmmaking process by summarising the key learning moments in the production and distribution of our two VR films at three South African festivals:

1. The Virtual National Arts Festival in 2020
2. The pan-African VR showcase at the RapidLion Film Festival in 2021
3. FNB Art Joburg: Open City Art Film programme in 2021.

These findings are triangulated with the summary of the cyborg film analysis, as echoed in the Quantum Botho/Ubuntu proposition. This conceptual plasma binds the films and the filmmakers together. Both *The Cosmic Egg* and *The Eye of Rre Mutwa* have sought to activate elements of healing, muthi or social redress in the two VR films we have made. As such, we argue that the medium of VR is indeed the muthi when used in the mode of

[8] "Muthi" is traditional African medicine (Ntshangase 2012: 48).

Prosocial VR. I paraphrase how these two films transgress and transform the neocolonial gaze of oppressive power structures.

Since an analysis of the two VR films appears in Chapter Four, synopses of *The Cosmic Egg* and *The Eye of Rre Mutwa* follow to illustrate the various theoretical arguments which will be made in Chapter One.



Figure 10: Virtual Reality film poster for The Cosmic Egg; written, directed, choreographed, production designed and produced by Moratiwa Molema in collaboration with The New Moon Ensemble and The Afrocyborg Collective. My role in this production was cinematographer, co-producer, on-set sound recordist, co-character stylist on set, and offline editing and sound design in post-production.

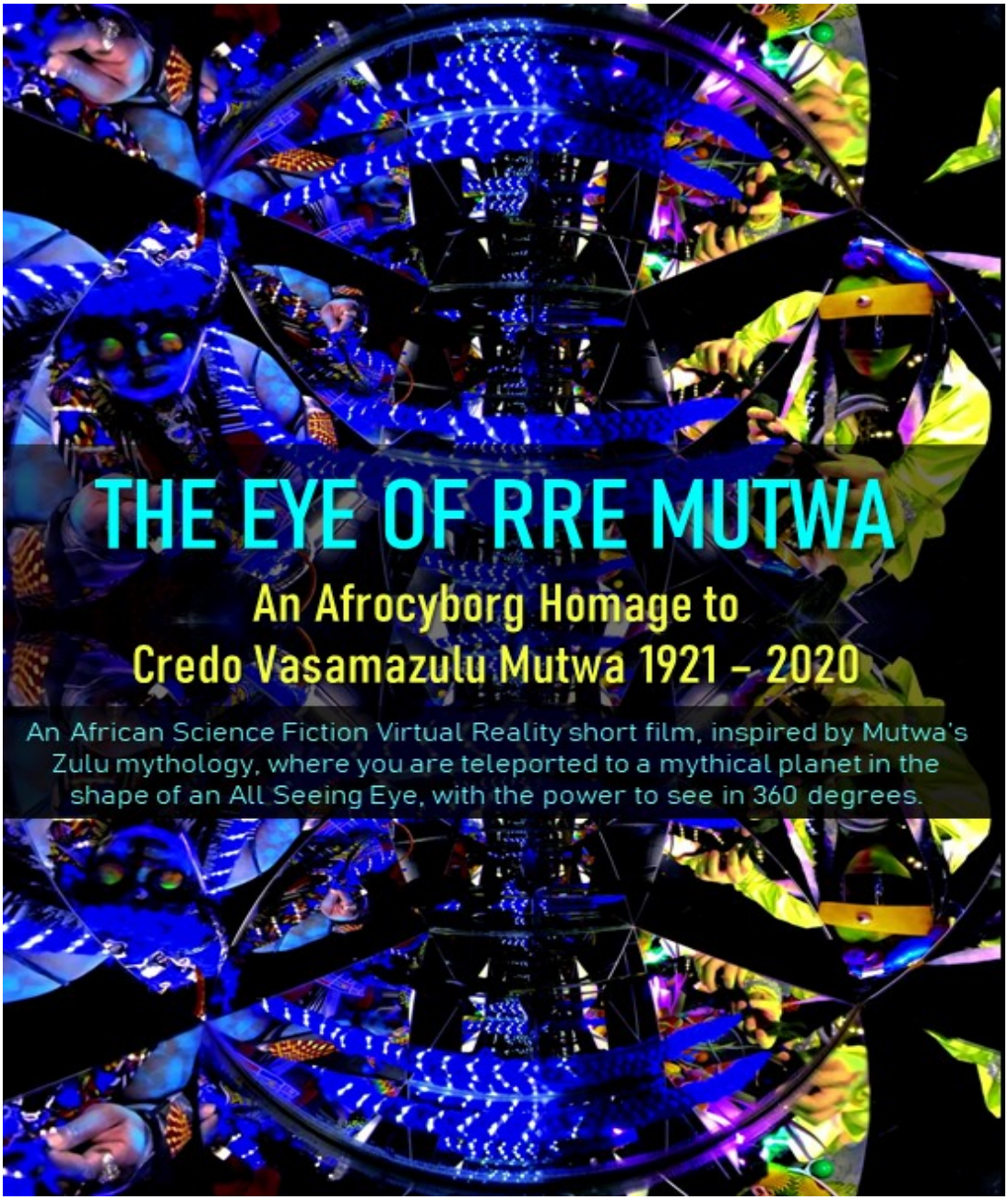


Figure 11: VR film poster for *The Eye of Rre Mutwa*. It uses a fractal VR cinematography technique inspired by Ron Eglash's examples of African hair braiding as fractal geometry in African ethnomathematics, which denotes infinite fluid identities of possibility (Eglash 1995: 22). The endless feedback loop conjures the divine (Eglash 1999: 83). This aesthetic shot design invokes the supernatural dimensions of SF as part of a spiritual honouring of the late Sangoma Credo Mutwa.

The Cosmic Egg synopsis

San rock art inspired the posthuman cyborg eco-myth in the VR film, *The Cosmic Egg,* written and directed by Moratiwa Molema and performed by the New Moon ensemble based in Gaborone, Botswana. In her traditional Motswana dance musical meets African Science Fiction film, anciently futuristic African cyborgs perform an ostrich egg hunt, which turns into

an eco-conscious time-travel mystery. Evidence shows pre-historic cyborgs in San mythology and rock art depicting human-animal transhuman beings from as early as 27 000 BCE (Lewis-Williams 2011: 27). As such, *The Cosmic Egg* features human-animal-spirit-machine-cyborg dancers who urge us to consider environmentally sustainable practices, if we are to avoid paying the ultimate price for our collective environmental degradation. Ostrich people play the protagonists in the film, where bird-human-cyborgs lay three metaphorical eggs, called Wisdom, Appreciation, and Harmony. Three time-travelling intergalactic wise women known as Egg Blessers arrive from the future when they hear the "sound of the fertilisation of hope. They arrived from a thousand galaxies, bringing blessings and sounding the rattles of creation" (Molema 2020). After a hunting party steals the eggs and drinks their cosmic muthi, the hunters become intoxicated and realise that these are not ordinary eggs. The Egg Blessers restore environmental equilibrium as sound waves penetrate the shells of the eggs and cause the chicks to hatch into future-cyborg dancers.

The Eye of Rre Mutwa synopsis

The Eye of Rre Mutwa, An Afrocyborg Homage to Credo Vasamazulu Mutwa 1921–2020, draws inspiration from the writing of Credo Mutwa and his African cyborg visions of mythic beings who animate Zulu mythology in *Indaba My Children* (1965). Ironically, Mutwa, the medicine man, sculptor, painter, prophet and cultural custodian of African orality, passed away just shy of 100 years old when the world went into global lockdown due to the Covid-19 pandemic. The film attempts to mitigate the fact that he was denied a state funeral considering his enormous contribution to Zulu cultural stewardship outlined in his writing and timeless knowledge of indigenous medicine.

The Eye of Rre Mutwa explores the interconnectedness of human suffering and technological "development", which equates to the price Africa has had to pay for "progress". The philosophical and material objects used to create this film are the VR camera and the VR Headset, media tools emerging from the Promethean furnace of 4IR. As such, the Afrocyborg characters portrayed by Albert Ibokwe Khoza and Patricia Boyer apply Marwala's injunction to analyse 4IR concerning the historic socio-political and economic inequalities embedded in the First (1IR), Second (2IR) and Third (3IR) Industrial Revolutions, as outlined in *Closing the Gap – The Fourth Industrial Revolution in Africa* (2020). Building on the work of Afrofuturist scholar Michael Chaney, I develop the concept of the "slave-cyborg" in *Slave*

Cyborgs and the Black Infovirus: Ishmael Reed's Cybernetic Aesthetics (2003) by examining my culpability in the process of techno-cultural imperialism via an exploration of "White fragility" (DiAngelo 2018). This reflexive contemplation examines what it means to be a white South African in the twenty-first century by learning to see the historical patterns of oppression built into Western wealth accumulation strategies endemic to 1IR, 2IR, 3IR and 4IR. In this context, slave-cyborgs and wo-man-machines are interpreted through an intergalactic, postmodern lens to become proto-African-cyborgs. *The Eye of Rre Mutwa* is an exploration of how an African female gaze in VR might be leveraged to disavow the techno-cultural imperialism that privileges the Western male gaze of Silicon Valley, which frames Africa as technologically "under-developed" or "lagging behind the rest of the world" (Schwab & Davis 2018: 60).

CHAPTER 1:
How the Afrocyborg VR Collective applies technofeminist cyborg theory when making VR films in the African SF context

"The cyborg is an agent of revolution and social change, not just a passive recipient of imposed technologies" (Okoye 2014: 76).

"Networking' is both a feminist practice and a multinational corporate strategy - weaving is for oppositional cyborgs" (Haraway 1991: 170).

In *A Cyborg Manifesto* (1991), Haraway calls for polyvocal "affinity" among multicultural women to build an anti-racist, anti-sexist, post-feminist network of cooperation in the domain of work and professional action (Haraway 1991: 155). The technogenesis of the Afrocyborg is a twenty-first century "call and response"[9] to Haraway, prompted by the question of how African women might forge new connections in visualising a prosocial, Africa-centric gaze in the exponential medium of VR through Afro-feminist-techno-science solidarity, in the process of collaborative filmmaking.

Haraway claims that the hybridised woman-machine cyborg[10] is a Science Fiction metaphor constituted from the international women's movements. This myriad pastiche of multiple identities is "a crucial collective object" of world-changing fact and fiction (Haraway 1991: 49). Women's solidarity is critical for the technopolitics of cyborg intersectionality and is explored in this research as a technofeminist stratagem to "seize the tools that mark us as other" (Haraway 1991: 175). We use these tools, namely the VR camera and Head-Mounted Display (HMD), to tell stories with the power to subvert signifiers and change narratives. This change produces agency and the possibility of apprehending oppression (Haraway 1991: 149).

[9] Referencing the work of Nketia (1952), Finnegan defines "call and response" as an antiphonal mode of song, occurring widely in Africa, featuring repeated vocal interchanges between a leader, and a group of people, singing or chanting in a to and fro manner (Finnegan 2012: 253).

[10] The term "cyborg" refers to a cybernetic organism. The cyborg is a transhuman and postmodern semiotic tech tool with which to read texts, written or visual. Cyborgs blur boundaries and erase binary ways of seeing the world. Cyborgs are post-gender and resist racial classification. Cyborgs appear in a multitude of forms, in any combination of human, machine or animal. Even multiplicities of beings living together symbiotically are considered "cyborgs". The cyborg is a mechanism to personify, anthropomorphise, understand, and critically visualise postmodernity in terms of ontology, embodiment and representation (Haraway 1991; Gray 1995: 2).

The semiology of the VR camera, like the sign of the cyborg, challenges dualism and destabilises dominant narratives of cyborgs as agents of neo-colonial *Star Wars*[11]. Like Haraway's cyborg, the Afrocyborg resists the teleology of *Star Wars*[12] played out in galactic cinematic syntax as colonial Sci-Fi narratives of space colonisation (Haraway 1991: 151). Afrocyborg representations in both SF VR films in this research project are concerned with the rehabilitation and decolonisation of Western Science Fiction cyborgs. By applying the lens of African Science Fiction, the production of Afrocyborg VR films are distinctly different constructions of a collective myth with which to see or visualise the shared political struggles of race, gender and class from multiple points of view, which mirrors our collaborative filmmaking methodology.

The discourse of African Science Fiction[13] is a counter-hegemonic teaching, learning and thinking tool. African Science Fiction[14] offers a liberatory framework to re-envision new Afro-futures, which subvert Hollywood metanarratives of cultural imperialism, built on privileging the Western male gaze, which sees Africa through the lens of Hegelian dehumanisation. For example, in the domain of VR distribution, the *with.in* VR platform exhibits VR films of a wide variety of genres; however, the films made on the African continent are primarily produced by Western filmmakers, who produce racist stereotypes of African representation. The VR film, *Waves of Grace* (Arora & Milk 2015), is shot in Liberia and follows the abject story of Decontee Davis, an "Ebola survivor". Her suffering is represented by labouring the trope of poverty porn. Dismantling this persistent neo-colonial gaze requires a "rehabilitation of reason" at a planetary scale to reinstall African futures (Mbembe 2019). The African cyborg is an instantiation of this call to rehabilitate reason. The Afrocyborg becomes the semiotic protagonist of oppositional politics, resisting the telos of *Star Wars* (Lucas 1987), where Sci-

[11] The original 1977 *Star Wars* Science Fiction film, directed by George Lucas, was inspired by World War II ideology and technology, evidenced in, *From World War to* Star Wars*: Imperial Officers*, *From World War to* Star Wars*: Rise of An Empire*, and *From World War to* Star Wars*: Spaceships, Submarines, and Seismic Charges* (starwars.com 2014). Haraway refers to *Star Wars* as an "apocalypse waged in the name of defence, about the final appropriation of women's bodies in a masculinist orgy of war" (Haraway 1991: 154).

[12] Haraway uses the metaphor of Star *Wars* as a play on Lucas' SF film but also to refer to the Reagan administration's appropriation of Star Wars language in the Cold War rhetoric against Soviet Russia, whom Reagan referred to as "the evil empire", going so far as to name the US Defence Programme operation "Star Wars" (Wacjman 2004: 96).

[13] Nnedi Okorafor defines African futurism or African Science Fiction as "somewhat similar to Afrofuturism, but is more directly rooted in African culture, history, mythology, and perspective, where the centre is non-Western" (Okorafor 2019: 83).

[14] African Science Fiction is defined as Afrodiasporic technoscience culture, which began as a science fiction literary and music genre. Twenty-first-century Afrofuturism expresses pan-African solidarity through transdisciplinary modes of imagining the future for all African people (Eshun 2003: 289; Womack 2013: ch1: para10; Phillips 2015: ch 1: para 14; Anderson & Jones 2016: ch 1: para 5).

Fi high-tech story worlds are militarised metaphors of global North domination (Haraway 1991: 196). This gaze, produced by Western Science Fiction, replicates an othering gaze of Africa. Haraway refers to this Scientific Western gaze, or "conquering gaze", as "the god trick". This gaze assumes power by techno-scientific "objectivity" to inscribe bodies of the "Other" (Haraway 1988: 581). This gaze signifies industrialised, militarised, racist, and male-dominant societies. The god trick[15] is the voracious eye of Western phallocentrism,[16] which seeks to dominate the world with autonomous power (Haraway 1988: 581). Haraway calls for new ways of seeing, invoking a feminist gaze to revisualise the world by turning it upside down (Haraway 1988: 586). The female gaze is, therefore, a revolt against the male gaze of "the master, the man, the One God, whose Eye produces, appropriates, and orders all difference" (Haraway 1988: 587). The Afrocyborg, like Haraway's cyborg is a Sci-Fi intersectional creature of the imagination, designed to resist and re-write neo-colonial, techno-paternalist narratives (Haraway 1991: 155). The VR camera, with its multiple lenses, which creates an exponentially expanded gaze, is an appropriate instrument to accomplish a rehabilitated gaze of African narrative representation.

The African cyborg, or "Afrocyborg", is devised to explore collective VR filmmaking, visualised in this research as a re-imagining of Haraway's *Cyborg Manifesto*, which materialised at the apogee of the Third Industrial Revolution (3IR), defined by the arrival of the personal computer (PC), which was adopted for the first time in the mid-1980s at a domestic level in society. The cyber-culture of the 1990s shaped Haraway's writing as the Internet became a global phenomenon. This is evidenced in *Simians, Cyborgs and Women* (1991), and *Modest_Witness@Second_Millennium* (1998). Haraway reads the polyvocal woman-machine cyborg as a politically active postmodern metaphor advocating technoscience empowerment. For Haraway, the arrival of the PC signals a major technological leap forward in human history, which mirrors the need for a revival of Marxist Feminism to embrace technofeminist and intersectional political affinities that elevate technologically relevant practices of connection and solidarity among global women's

[15] "The god trick" is Haraway's critique of white Western technoscience practice, which she claims is an artificially constructed idea of science being endowed with universal reason and rationality. Western science assumes the position of dominance by claiming to be objective and detached from the subject matter. This is false since all knowledge is a product of ontology – race and gender, for example. Modern science was conceived devoid of both (Haraway 1992: 189 & Wajcman 2004: 83).

[16] Phallocentrism is defined by Patti Lather as a male-dominated discourse of knowledge and social practices which define and constrain women. Familiarity with this discourse provides the tools to dismantle patriarchy (Lather 1991: 157).

movements at the end of the twentieth century. Here Haraway uses the language of semiotics to describe the practice of Science Fiction writing, computer coding and internet connectivity interchangeably. The PC constructed a new techno-cultural zeitgeist in society, stimulating the need for women to move beyond Marxist Feminist notions of technophobia, and the demonisation of technology, which eschewed the adoption of computing technology as a tool of masculine Capitalism. Haraway's cyborg was constructed as a myth/tool to see the need for women to embrace new technofeminist and intersectional coalitions concerning the emergence of the PC and, so too, techno-cyber culture.

The Afrocyborg construct adapts Haraway's theory into both the technofeminist VR film collective and the conceptual cyborg semiotic rubric applied in making the two VR research films. The Afrocyborg creative framework is mirrored in practice – both in front of; and behind the multiple lenses of the VR camera in the filmmaking process. This collective creative action is a contribution towards moving the conversation around *A Cyborg Manifesto* forward in time from the context of Haraway's 3IR cyborg, with a focus on feminist connections of the "networked" circuitry of the personal computer; towards the new zeitgeist of 4IR exponential technologies; specifically the VR HMD as immersive computing. A VR Headset is a computer strapped onto the head of the viewer/user, with hand controllers used to navigate the VR software interface, just like one uses a mouse on a laptop or desktop computer. The VR Headset is, therefore, a cyborg device because it disrupts the boundaries between human and machine by teleporting the user into an artificial world constituted by a computer interface.

The VR HMD needs to be connected to the Internet to operate. Immersive content is viewed from inside the HMD, where the viewer is immersed in the world of content. This connectivity of technology and collective creative action echoes Haraway's *Modest_Witness@Second_Millennium* (1998) text, which is an email address signalling a net of cyborg stories and narrative worlding via textual analysis to uncover the underlying politics of oppression in Western technoscience practices. Building on Haraway's work, the Afrocyborg enacts the technopolitical drama of race, gender and class alliances in the African context, struggling toward equitable inclusion for technofeminists engaged in the action of 360-degree cinematic narrative "world building"[17] in VR as technoscience (Tricart 2017: 96).

[17] "Worldbuilding" in VR filmmaking refers to the ability of the medium to deliver immersion, presence and embodiment (Tricart 2017: 89). VR places the viewer at the centre of ever-expanding concentric circles of

Our technofeminist practice mirrors the technoscience of VR. Like the HMD, the VR camera also requires connectivity to the World Wide Web to function via a smartphone-enabled application (app), which operates the camera remotely. Collaboration and computation are about connection. Like Haraway's cyborg, the Afrocyborg is needy for friendship, creativity and play. She is both "myth and tool", "representation and instrument", a figure interfacing automation and autonomy (Haraway 1995: 1). The creative collaboration between Molema and myself reflects the creative need for intimacy and "fruitful couplings between organism and machine" (Haraway 1991: 150). Since the cyborg is a "disassembled and reassembled, postmodern collective and personal self" that feminists must de/code (Haraway 1991: 163), the Afrocyborg, like Haraway's cyborg, is a creature of both fact and fiction. The transgression of binaries and boundaries creates the possibility of affinity and coalition politics as a generative cypher open to multiple interpretations that resist totalising readings of any one kind of feminism.

In situating the applied genres of feminism that inform our use of a new kind of Afro-technofeminism that constitutes the Afrocyborg, we hear the call of Nigerian womanist Obioma Nnaemeka who challenges African scholars to appropriate theoretical constructs rooted in African cosmology. The Afrocyborg construct answers this call at the level of filmic praxis. Nnaemeka is critical of what she sees as the self-indulgent cerebral "gymnastics" of Western feminism (Nnaemeka 2004: 364). Haraway's writing is the subject of critique by global South feminists who find the ironic tone of the *Cyborg Manifesto* "impenetrable", "infuriating", and even "bourgeois" (Wajcman 2004: 95). Furthermore, Haraway offers no decisive action as to how women should go about engaging technoscience, and undoing male domination in this sphere, other than by writing. By way of responding to Nnaemeka's critique of Western feminism, the Afrocyborg Collective makes an active effort to transform this theory into practice in the making of our two VR films. In the case study outlined below, we construct a thought experiment, which MWe name the Dora Milaje mind trick, as a theoretical construct rooted in African cosmology:

imagery, effectively replacing the old rectangular/square cinema and TV formats that have been in place since 1896 (Hall & Takashi 2017: 1).

This thought experiment is motivated by the fact that when Molema and I set out to correct the technologically gendered division of labour[18],[19] by overcoming our tech-inferiority complex about operating high techné[20] VR film equipment, we could not identify a single woman who could operate VR cameras or VR post-production to collaborate with. As a result, we applied an Afro-technofeminist[21] method to inform the autodidactic action required to learn and teach ourselves how to operate VR equipment to produce our SF films. Here, we apply strategies of "oppositional consciousness" since XR industries on the African continent are male dominated with 80.4% representation versus 19.6% of women working in XR on the continent, according to the *XR Africa Report* (Okonkwo et al. 2022: 32).

The Dora Milaje mind trick – a Technofeminist thought experiment

By way of overcoming my technological inferiority complex, there were many moments when I/we had to perform a motivational thought experiment, which we named the "Dora Milaje[22] Mind Trick". We subverted this from the "Jedi Mind Trick"[23], a *Star Wars* SF mind control technique, which we based on the *Black Panther* (Coogler 2018) warrior women of Wakanda. While critics might sneer at the idea of a comic book-based action superhero film as the

[18] SAFT perpetuates gendered division of labour by stereotyping women who are framed as inept and incompetent "sex objects" and routinely perform "unskilled", undervalued labour such as costume, make-up and styling (Ntoele & Atouguia 2017: 9). SAFT technically undermines women through institutionalised hiring practices, type-casting female filmmakers as production secretaries, personal assistants, "props mistresses" and "continuity girls" (Ntoele & Atouguia 2017: 15).

[19] Historically, the cultural construct of SAFT is shaped by racism, sexism, colonialism, and apartheid systems of political power, privilege and domination, which remain entrenched by patriarchal practices. SWIFT note that 78% of women in SAFT experience gendered division of labour and discrimination based on gender, while 58% of women experience racial discrimination (Ntoele & Atouguia 2017: 14 & 15).

[20] Heidegger describes technology as techné (1977), where the word "technology" is traced to the ancient Greek meaning, rooted in the word "*technikon",* which denotes *techné*. Techné delineates the art of the mind, fine art, and the art and skill of a craftswoman (Heidegger 1977: 5). "High techné" is cyber-culture or posthuman cyborg optimisation of the Heidiggerian term "techné" coined by Rutsky (1999).

[21] While acknowledging that technofeminism is a genre of postmodern feminism that refuses binary thinking and embraces gender fluidity, Haraway goes so far as to imagine the cyborg as a creature born of a post-gender world (Haraway 1991: 150); the context of gendered division of labour in SAFT cannot be immediately transcended through SF imagination alone. Critical community work still needs to be done. In this context, African womanism cannot ignore the impact of the post-colonial condition and persistent forms of neo-colonialism that continue to affect the lives of African women, as is the case in SAFT, where women continue to experience race, gender and techno-prejudice (Ntoele & Atouguia 2017: 15).

[22] The Dora Milaje cyborg-warriors in *Black Panther* who defend King T'Challa, played by Chadwick Boseman, are based on the real life "Warrior Women of Dahomey". "The Amazons of Dahomey" were an all-woman army in pre-colonial West Africa in the 18th and 19th centuries (New York Sun 2014).

[23] According to starwars.fandom.com a "Jedi Mind Trick" is a special ability bestowed upon Jedi by The Force. The Jedi Mind trick allows the mostly white male Jedi warriors to control the thoughts, behaviors and actions of others, for their own advantage (starwars.fandom.com 2020).

subject of Womanist research, Fanon affirms the damaging effects of semiotics on the minds of both black and white children. Socialisation and internalisation of popular culture representation play a formative role in consolidating identity and phycological agency. The decisive role that comic books play in the formation of stereotypes and their embedded political messages of power struggles and universal hierarchies of domination cannot be underestimated as they shape the consciousness of youth (Fanon 1952: 22). In the words of Fanon:

> The Tarzan stories, the sagas of twelve-year-old explorers, the adventures of Mickey Mouse, and all those "comic books" serve actually as a release for collective aggression. The magazines are put together by white men for little white men … In the magazines, the Wolf, the Devil, the Evil Spirit, the Bad Man, the Savage are always symbolised by Negroes or Indians; since there is always identification with the victor, the little Negro, quite as easily as the little white boy, becomes an explorer, an adventurer, a missionary who faces the danger of being eaten by the wicked Negroes (Fanon 1952: 112-113).

This racist misrepresentation causes psychopathology, where black children reading these comic books are misinformed by prejudice and mistakenly wish to be white. The *Black Panther* comics of the 1960s and later the African Science Fiction film became a significant turning point for black popular culture representation, albeit many decades too late. *Black Panther* (Coogler 2018), based on the Marvel comic book series of the same name, beginning in 1966, was infused with the liberation struggles of the Black Panther political party, who in turn were influenced by the writings of Frantz Fanon (Cleaver 1998: 253). Fanon inspired Steve Biko in South Africa to form the Black Consciousness Movement (Nel 2011: 157). The Dora Milaje mind trick is inspired by the posthumous words of Steve Biko, published after his murder in prison by apartheid police in 1977; where Biko describes Black Consciousness as working toward the psychological liberation from oppression in the form of an "inferiority complex" (Biko 1979: 110).

While acknowledging the horror of apartheid and colonialism and their flagrant disregard for Human Rights described by Fanon, and Biko, I could never equate my subjective experiences of relatively minor gender oppression contrast to their experiences. In the context of twenty-first-century social justice, I find the comparative analysis afforded by the premise of intersectionality useful for the sake of this argument. The Dora Milaje mind trick repurposes Biko's thinking about the need to overcome an "inferiority complex" as a wo/man in relation to the machine by calling into question the binaries of man/woman, nature/culture,

rational/irrational, superior/inferior. Dissolving dualism is the work of the cyborg. Binary thinking creates “universalising opposition” that spawns totalising conflicts of “one” or “other”, “sex/gender”, black/white (Haraway 1991: 148). The Dora Milaje mind trick is a self-actualisation technique to overcome inferiority and question superiority in technoscience domains. As Biko says: “Because of their inferiority complex, blacks have tended to listen seriously to what the liberals had to say. With their characteristic arrogance of assuming a monopoly on intelligence” (Biko 1979: 66). In the context of technoscience and technofeminism in Africa, in the zeitgeist of 4IR, we adapt this thinking to apply to women and technology. To overcome our “inferiority complex”, we must question male domination and gendered division of labour with regard to the monopoly on technological intelligence. However, we must also look inward and rehabilitate the psychopathology of sexism.

The Dora Milaje mind trick was my way of rehabilitating my psychopathology around my tech-inferiority complex, which consisted of technopolitical affirmations as I sat for hundreds of hours in the online immersion of autodidactic discovery learning via YouTube tutorials while teaching myself how to operate the Insta360One X VR camera, and the editing software to stitch the 360-degree orbital dual video feeds together in Insta360 Studio. I also taught myself how to edit immersive VR 360 video footage in Adobe Premier Pro, export media files, and watch these in an Oculus VR Headset. This was a complex and challenging undertaking since VR leans more towards unfamiliar media domains of ICT cultures than toward cinematic cultural practices that I am more familiar with. While learning these new skills, I would visualise the Dora Milaje in combat mode, brandishing their spears at the enemies of Wakanda. My enemy was my mind playing tricks on me, telling me I was not good enough or would never “get it”. I had to repeat over and over to myself: “I can do this. If I just put in the energy, concentration and notional hours, surely, I can achieve the same degree of competency as anyone else. I might be physically weaker than my male counterparts, but my brain is not impaired. Surely, I can defeat these obstacles with my intellect and dogged persistence?”

Learning to overcome feelings of inadequacy around the technical craft and skills required to operate VR technologies necessitated extensive positive self-talk to convince ourselves that we could overcome the various barriers to entry in the local XR industry. However, in watching *Black Panther*, we could see ourselves. We were blown away by the Dora Milaje, who surround T’Challa and protect Wakanda. Three Dora Milaje were cast from Uganda,

Kenya and Zimbabwe in an unprecedented move towards equitable representation in the Marvel Universe of popular culture Hollywood superhero blockbusters. The Dora Milaje represent a popular cultural interpretation of the Amazons of classical antiquity, the all-female army in the kingdom of Dahomey, West Africa, now modern-day Benin (Coleman 2018). *The Woman King* (Prince-Bythewood 2022) chronicles the warrior women of 1820 Dahomey, with Viola Davis in the lead role.

The Dora Milaje mind trick borrows from Fanon and Black Consciousness to generate a twenty-first-century black-tech-consciousness as a technopolitical empowerment strategy for African women working in XR. My rationale is an applied popular culture rendering of reverse psychology. If psychopathology is in part created by media misrepresentation, as Fanon puts it: "… there is a constellation of postulates, a series of propositions that slowly and subtly – with the help of books, newspapers, schools and their texts, advertisements, films, radio – work their way into one's mind and shape one's view of the world of the group to which one belongs" (Fanon 1952: 118). Then perhaps the converse is also true. I could perhaps overcome my psychopathology by replaying an empowering visualisation of the Dora Milaje wielding technologically futuristic vibranium weapons to crush my fear.

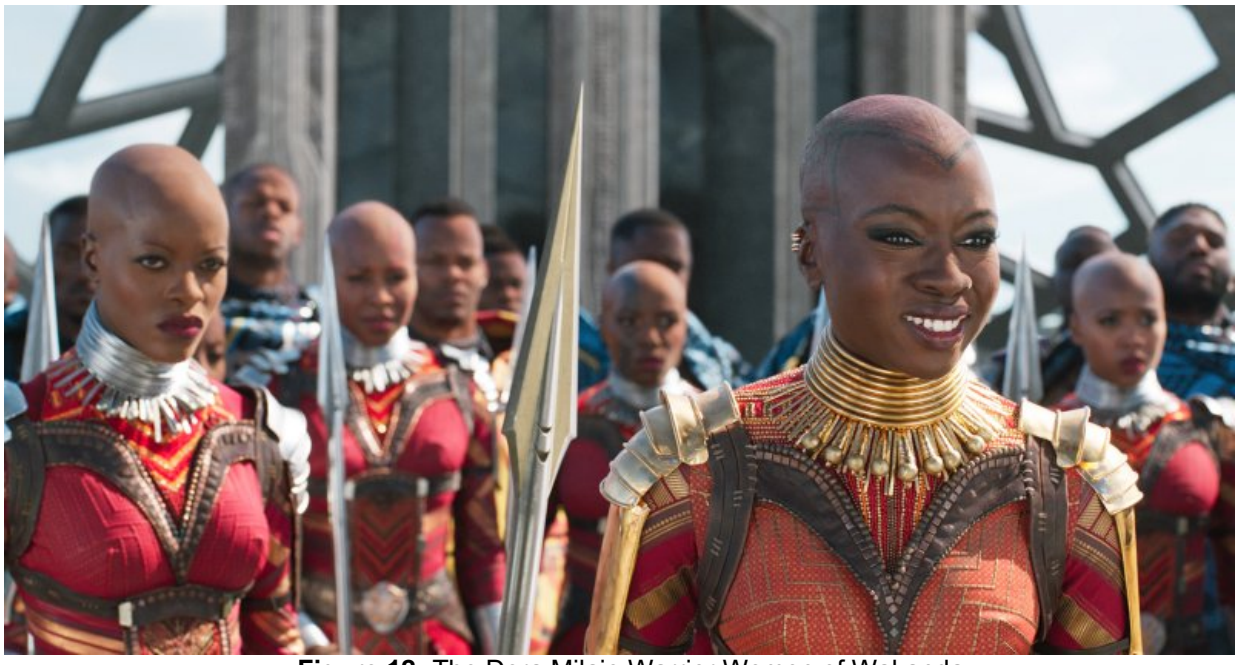
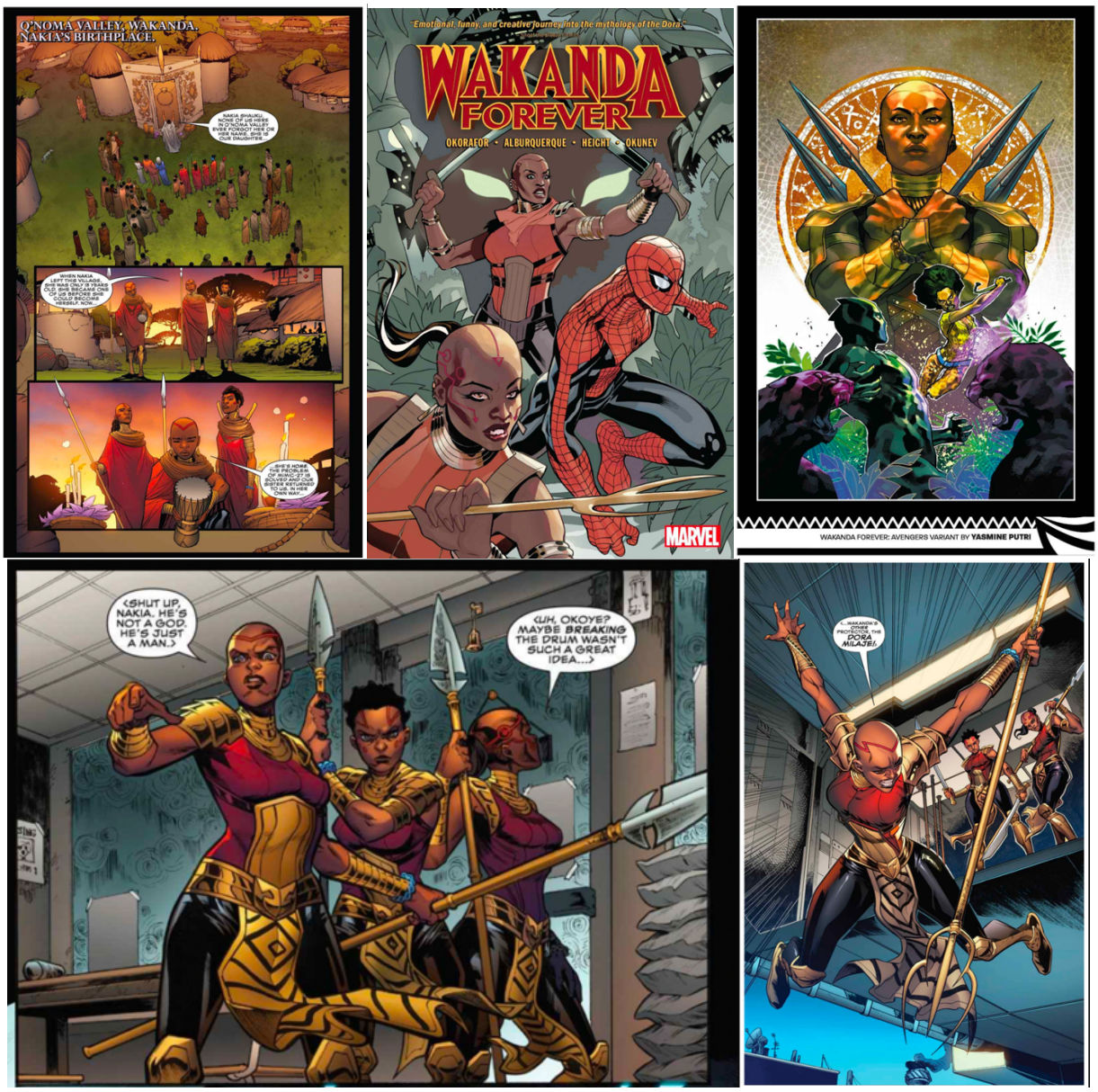


Figure 12: The Dora Milaje Warrior Women of Wakanda.
On the left is the Ugandan actress Florence Kasumba, who plays "Ayo". On the right is the Zimbabwean actress Danai Gurira, who plays "Okoye". Lupita Amondi Nyong'o from Kenya is also a Dora Milaje, but not visible in this image. The Dora Milaje were the inspiration for the "Dora Milaje Mind Trick", a strategy used by Afrocyborg Collective to overcome our "inferiority complex" around the daunting task of learning the high techné medium of VR Tabula Rasa, which required overcoming the mental barriers and insecurity around mastering this technology in a male-dominated field (Coogler 2018).



Figures 6, 7, 8, 9 & 10: Screen grabs from the Wakanda Forever comic book, co-authored by Nigerian SF author Nnedi Okorafor. In an interview with Marvel Comics, Okorafor describes how she wrote for the Dora Milaje in Wakanda Forever #1 as the series writer: "What I wanted to explore in this series was the Dora Milaje having secrets and struggles beyond just being amazing warriors and making and righting mistakes. I wanted to look at who they were and whom they have gradually become. A lot of these things are subtle in the plot, but if you are willing to look at nuanced moments, you can expect to catch glimpses of the human beings these women are. I think the Dora Milaje are ready for any part of the world! They can deal with any culture, and adjust to any environment, all while maintaining who they are. They are that hardcore!" (Okorafor 2018). This means that they can also flourish in XR tech cultures, and if they can adapt to any environment, surely the Afrocyborg VR X can do the same. This is the premise of our Dora Milaje mind trick. They give us hope for self-actualisation.

The Dora Milaje mind trick is an example of creating African indigenous knowledge epistemologies. It is an instance of answering Nnaemeka's call to action for African scholars to appropriate theoretical constructs rooted in African cosmology (Nnaemeka 2004: 364). This is important, as Nnaemeka finds the Western postmodern feminist mode of theorising foreign to African women because their theories fail the test of African needs and indigenous knowledge epistemologies. Western feminism becomes a harmful tool that essentialises the portrayal of women from the global South (Garritano 2000: 169). The Afrocyborg metaphor applies the principles of African womanist Ogunyemi, who calls on African women to; "aim much higher and knit the world's black family together to achieve black, not just female, transcendence" (Ogunyemi 2006: 22). The Afrocyborg construct is therefore a synthesis of Womanism and technofeminism, which we believe should be "grounded in black togetherness" as a result of our democratic collective African geo-specificity in the world (Ogunyemi 2006: 35). Our methodology of applied Afro-technofeminism is to merge Afro-feminism or womanism with technofeminism to affect technological self-empowerment in the field of VR media technology. While technofeminism as a discourse is primarily populated with white feminist voices, womanism is different in that it focuses on the past/present subjugation of black people in the face of Western control (Ogunyemi 2006: 22). This accords with the Afrocyborg volition to decolonise African VR narrative representations by disavowing the harmful stereotypes of "poverty porn".

Another example of VR poverty porn on the *with.in* VR platform (owned by Chris Milk) is the film *This is Climate Change: Famine* (Dennis & Strauss 2022). Similar to Milk's problematic VR film, *Clouds Over Sidra* (Milk 2015), which is also an example of poverty porn (discussed in Chapter Three); *This is Climate Change: Famine* (Dennis & Strauss 2022) is set in a Somali refugee camp and follows a young mother of eight children. Degaan Abdi's daughter, Rayaan, is dying of malnutrition. The film crew follow the mother and child into the emergency room, where Rayaan dies. Abdi's abjection and suffering are exploited using statistics on malnutrition to call on viewers to donate money to the cause. The message is clear: Africa needs rescuing from itself because it is too incompetent to take care of its dying children. The narrative of Africa needing to be rescued by the West perpetuates the same tropes that informed Hegel's racist assumptions about Africa and the imperialist conquerors and colonialists, who insisted that Africa needed to be enlightened by Christianity and therefore conquered for their good. The argument made by *This is Climate Change: Famine* (Dennis & Strauss 2022) is that white supremacy can take better care of Africans than they can care

for themselves. This is deplorable. The film was shot in 2022. Of all the extraordinary events happening across Africa last year, these filmmakers chose to make a VR film that conforms to every harmful stereotype of Africa. This is evidence of the Western worldview of Africa – a one-dimensional site of perpetual immiseration.

Resisting tropes of African immiseration, the Afrocyborg Collective deliberately works in the mode of Prosocial VR currently being produced in the global South, which is referred to as "Fourth Cinema" or "Fourth VR" (Wallis & Ross 2020: 1, 3). Fourth VR transcends the cinematic discourse of Third Cinema to "disrupt" contemporary neo-colonial cinematic practices (Wallis & Ross 2018: 3). Fourth VR is prosocial in negotiating the process of decolonisation and how post-colonial communities articulate their worldview with the tools emerging from the 4IR (Wallis & Ross 2018: 3). Fourth VR challenges stereotypes of indigenous cultures (Wallis & Ross 2018: 4).

Recognising the problematics of hierarchies of power at play in the politics of representation as co-equals in the game of "serious play", Molema and I resist the hierarchy of film crews by preferencing creative acts of collaborative jouissance (Haraway 1995: 149). Building on the work of Barthes, Sandoval proposes emancipatory love as a post-colonial strategy to produce social change. Following Sandoval's proposal to move through "bliss" and "pain" and then on to creative "jouissance" in making these films, our filmmaking methodology is a form of guerrilla filmmaking in the tradition of Third Cinema in post-colonial Africa. "Guerrilla filmmaking" historically began with "Third Cinema" as a visual theory to oppose the imperial gaze emerging from the cauldron of anti-colonial struggles to achieve political independence in the global South (Mistry & Schummann 2015: xvi). The Third Cinema manifesto,[24] written by Solanas and Getino in 1969, was inspired by the modes of guerrilla warfare in the revolutionary fight towards decolonisation (MacKenzie 2014: 207).

MacKenzie (2014) describes "Third Cinema" as a call for a new cinema that rejects the capitalist, escapist mode of Hollywood production, which celebrates the director as an "auteur". The Third Cinema manifestos argue for "a collective, politically engaged cinema" (MacKenzie 2014: 207). In 1969, guerrilla filmmaking borrowed from guerrilla political action,

[24] Argentinian filmmakers, Fernando Solanas and Octavio Getino wrote *Towards a Third Cinema: Notes and Experiences for The Development of a Cinema of Liberation in The Third World* in 1969 (MacKenzie 2014: 230).

where Solas and Getino describe their camera as a gun: "… the camera as our rifle, we do in fact move into a guerrilla activity. This is why strict disciplinary norms govern the work of a film-guerrilla group as to both work methods and security. A revolutionary film group is in the same situation as a guerrilla unit: it cannot grow strong without military structures and command concepts" (MacKenzie 2014: 243).

While the literal militarism of early guerrilla filmmaking may no longer be relevant in a post-colonial, post-apartheid South/ern African setting, particularly for progressive, pacifist women filmmakers with revulsion towards the masculinist obsession with violence to generate dramatic conflict in popular culture films, regrettably, many terminologies in the professional practice of filmmaking continue to use words borrowed from military traditions such as a film "shoot", or the "execution" or "shooting" of a film or scene. The film "recce", or act of "location scouting", is also borrowed from reconnaissance missions of scouting the enemy. The film crew is trained and socialised into operating like a troop of soldiers using a vicious pecking order to accomplish the filmic "mission" or military "operation". This ordains the "Director" with "Drill Sergeant", with godlike powers of dominance over the lesser members of the crew. As a feminist filmmaker, the language of military violence and dominance is a traumatic and disturbing practice. It is a phallocentric media culture to be arrested in light of the overuse of gun violence in global film cultures and the phenomena of mass school shootings and police brutality in the USA.[25] In this regard, our collaboration is based on the principle of co-equal "animatuers" as opposed to the "auteur" model of filmmaking. The Afrocyborg VR Collective subverts the idea of a deified director as an "auteur" because of the democratised formation of communal plurality, underscoring the conscious call to form a collective. This mode of production is liberatory in purpose as it mirrors the Third Cinema manifesto, which argues for collective, politically engaged cinema (MacKenzie 2014: 230).

The animateur is a cyborg since she has multiple identities. She is both artist and teacher, filmmaker and academic (Foth 2006: 640). As such, the animateur exhibits a natural aversion to the conventional hierarchies of film production. We prefer to operate as a music ensemble,

[25] The Afrocyborg VR X witnessed a prosocial VR film at the NewImage XR Festival in Paris titled *12 Seconds of Gunfire: The True Story of a School Shooting* (2019), animated with the VR software Tilt Brush. This film inspired the animated sequence in *The Cosmic Egg. 12 Seconds of Gunfire* (2019) is based on a true story covered by the *Washington Post* on school shootings in the USA. This VR film recounts how a boy, Jacob, was killed at school by following his best friend, Ava, as she struggles to deal with the trauma of losing her beloved friend. Ava writes a letter to Donald Trump asking him to change the gun laws of the USA (washingtonpost.com 2019). It is an example of prosocial VR, calling for a ban on guns in US schools.

where each member brings their instrument, tool or skill and performs with their degree of agency, and creative expression, within the confines of available resources. For Molema and I, the animateur reflects the cyborg's aversion to a binary chain of command forms of collective action, choosing instead to celebrate inclusive multiplicity.

While observing certain essential precepts of Third Cinema, we also note how guerrilla filmmaking has evolved over time to infer less of a revolutionary meaning and is more often used in the context of low-budget filmmaking. For instance, Eliot Grove, producer and lecturer in film studies, defines Guerrilla Filmmaking as a far cry from Third Cinema's origins in his book *Raindance Producers' Lab: Lo-to-No Budget Filmmaking* (2004). Grove gives examples of "Guerrilla Filmmaking" about economic constraints, advising guerrilla crews to shoot without permits to cut costs (Grove 2004: 129). In the making of *The Cosmic Egg*, location permits were not secured as this would have incurred costs we could not afford. For Molema and me, the animateur is also a cyborg, as she must perform multiple roles on set due to self-funding and budget constraints. As such, we perform multiple roles: writer, director, producer, costume designer and cinematographer. We also recorded sound on set and did the offline edit of the rushes to save time and money in post-production. As agents of technofeminism, we take pleasure in learning new skills and actively challenge ourselves to do so. In this way, the cyborg-animateur borrows from the guerrilla filmmaking methodology of Nollywood filmmakers in Nigeria, who perform multiple roles in the production process due to economic constraints. Like Nollywood filmmakers, the Afrocyborg Collective also embraces the cyborgian "Humanimal"[26] term, "raptor", which draws on the analogy of a bird of prey and its potent hunting abilities to describe a multi-skilled filmmaker. The term "raptor" is frequently used as informal jargon in global television industries to describe an exceptionally skilled practitioner in motion picture medium. Typically, a "raptor" is expected to be able to write, direct, produce, shoot and edit. Per the credits in *The Cosmic Egg* and *The Eye of Rre Mutwa*, Molema and I performed all these roles in making these two films.

Similar to the persistent militarism endemic to conventional motion picture production, VR also shares its origin in military training, first used as flight simulation technology for fighter pilots to train for combat (Bailenson 2018: 20, 45). The Afrocyborg, like Haraway's cyborg,

[26] "Humanimal" is a term used to describe the compound adjective of human and animal, used to describe human-animal figures in rock art (Ego 2019: 109). Molema's film, *The Cosmic Egg,* features humanimals and is inspired by the rock art of Botswana.

resists violence and media practices of capitalist male domination. Oppositional cyborgs are rehabilitated from war-craft and statecraft as they are the "illegitimate offspring of militarism and patriarchal capitalism" (Haraway 1991: 151). Like Haraway's oppositional cyborg who is "exceedingly unfaithful" to its inessential father, our Afrocyborg borrows from the oppositional consciousness of Sandoval in *Cyborg Feminism*[27] *and the Methodology of the Oppressed* (2020), where she explains how women from the global South embrace "cyborg consciousness" vis-à-vis techno-embodiment as "oppositional consciousness" (Sandoval 2020: 408). Since oppositional ideologies and politics emerged from liberation struggle discourse, namely the civil rights movement, the women's liberation movement, decolonisation theory and practice, and human rights movements that resist intersectional oppressions of race, gender, sexual identity, class and ethnic inequalities (Sandoval 2000: 42). Sandoval's methodology applies the principals of "equal rights", the "revolutionary", and the "differential", which applied together form a kaleidoscopic theoretical and methodological tool to generate new cinematic and kinetic powers with the potential to transform dominant power relations (Sandoval 2000: 43).

Following the methods of Haraway and Sandoval's articulation of "cyborgology",[28] the purpose of this methodology was to determine to what extent the VR camera might be leveraged to experiment with this high techné[29] 4IR media tool to articulate collectivist strategies for multi-cultural collaboration in the global South. The Afrocyborg engages this "oppositional consciousness" in our united cause against neo-colonial practices, including gendered division of labour and technological paternalism in technical domains of filmmaking and immersive media practices (Sandoval 2000: 3; Haraway 1991: 118). As such, I argue that this new form of technologically empowered guerrilla filmmaking in the twenty-first century is an instantiation of "cyborgology", as all analogue skills become disrupted by the Digital Revolution (Gray, Mentor & Figueroa-Sarriera 2021). As political revolutions give way

[27] It is important to distinguish between Sandoval's Cyborg Feminism from the global South and Cyberfeminism from the global North, which carry different meanings and serve different intellectual projects as the socio-political and economic contexts are distinctly different. Cyberfeminism also builds on the work of Cyborg Feminism as evidenced in Sadie Plant's, *Zero's and Ones* (1997: 58 & 59). There are many "circles of consilience" linking cyborg theory to Cyberfeminism. Both schools of thought operate at the intersection of gender, culture and technology, but Cyborg Feminism from the global South is focused on how race, ethnicity and global power play a critical role in shaping access to cyber technologies.

[28] "Cyborgology" is not merely a theoretical practice; it is about making cyborgs or becoming a cyborg, an act of creativity, beginning with imagination (Gray, Mentor & Figueroa-Sarriera 2021: 8).

to technological revolutions under the new zeitgeist of 4IR, this technoscience focus on technofeminist action foregrounds the practice of the Afrocyborg Collective. The VR camera is used as an “oppositional technology of power” (Sandoval 2000: 81). It is a creative tool to think and feel with and is applied here as social praxis in Prosocial VR. I assert this based on learning the entire spectrum of VR workflow to operate all the VR equipment before making these two films from script to exhibition. We accomplished this by winning the Digital Lab Africa artist residency in France.

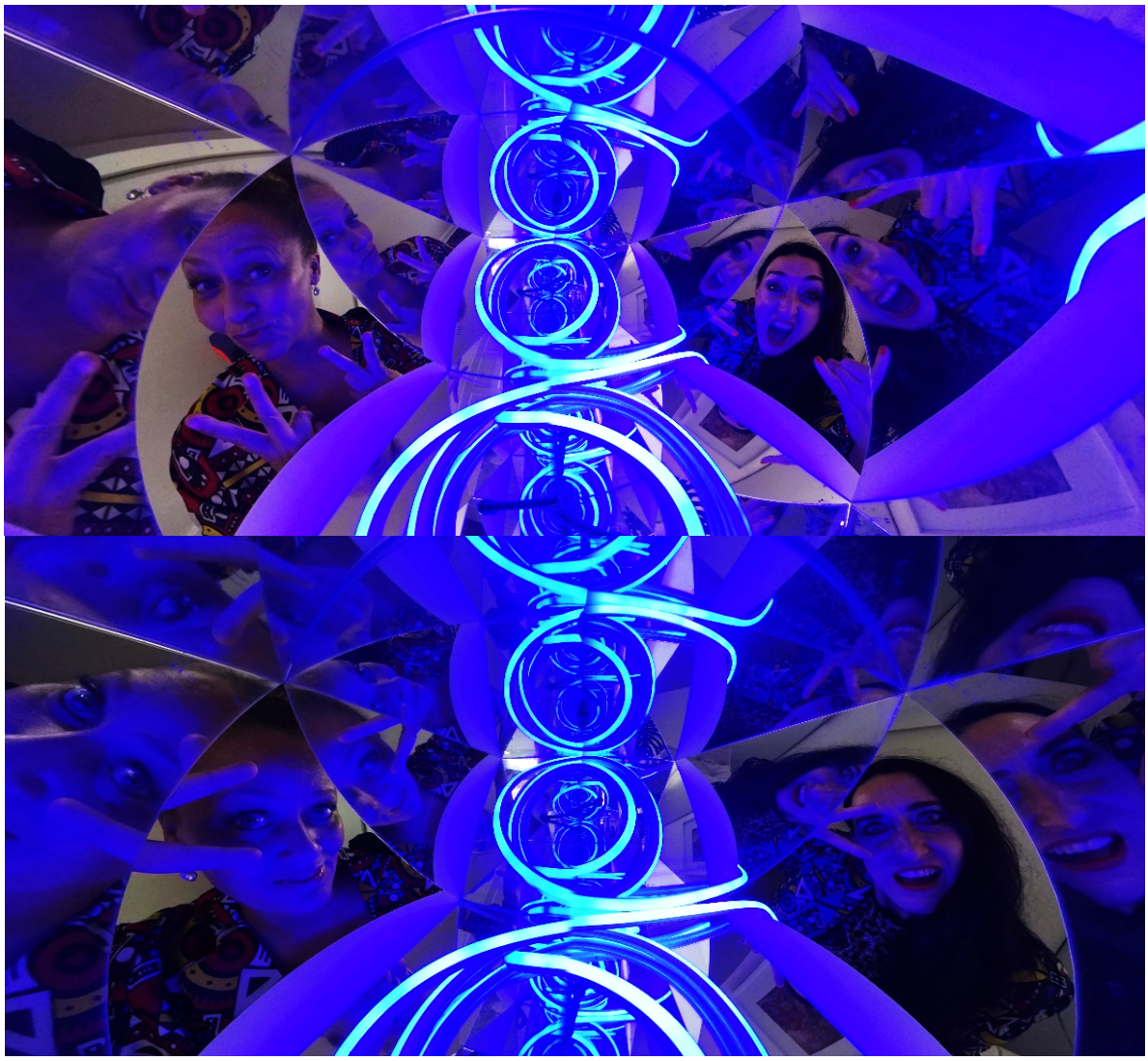


Figure 11: Afrocyborg VR Collective self-portrait stills. LEFT: Moratiwa Molema, RIGHT: Shmerah Passchier. These Afrocyborg VR, Collective self-portrait stills were made using a fractal photography technique with the Insta360One_X Virtual Reality camera. These portraits reflect Haraway’s technofeminist cyborg constructs as prone to playfulness, irony and humour, which is a technopolitical strategy for producing cyborg SF narratives (Haraway 1991: 149). These images reflect an intersectional aesthetic of multiple, open-ended, “fractured identities” (Haraway 1991: 155). Benjamin suggests that the fractures created by fractal imagery disrupt the reception of the image in such a way as to cause a visual parallax, which might reframe perception and consciousness (Benjamin 2016: 92). Cyborg feminism resists any one kind of totalising feminism. See our archive on ***Afrocyborg.com***.

Molema and I stayed for three weeks in June/July of 2019, attending Masterclass workshops at *Institut National de L'audiovisuel* (INA) in Paris. It was during the Digital Lab Africa artist residency that we drafted the Afrocyborg Manifesto as part of our application for funding, where Molema and I defined our modus operandi as:

> The Afrocyborg VR Collective is a multi-cultural duo of women filmmakers from South Africa and Botswana who explore a democratised and decolonised African Female Gaze on the technopolitical tools of VR that enable self-representation of women in African Science Fiction. The Afrocyborg Collective constructs African women as future-gazing cyborgs who counteract the ubiquitous misogyny of Hollywood cyborgs, which tend to reinforce gender oppression through hyper-sexualized representations of woman machines. After all, in the words of Donna Haraway, "It matters which worlds, world, worlds" (Haraway 2016: 165).

While the above manifesto is a counter-hegemonic vision for African cyborgs who challenge the platinum blonde, cat-suit-clad, breast-implanted, weapon-wielding women of Western Science Fiction, our imperative is to fill the void of underrepresentation in technoscience. Learning to operate the VR camera, VR ambisonic sound recording, and VR software for post-production to make our films is an example of technofeminist empowerment. For the Afrocyborg Collective, we aimed to immerse ourselves in VR's techno-culture to operate technical equipment independently in the production process. The work of the Afrocyborg VR Collective is, therefore, an instance of technofeminist action by entering the "engine-rooms of technological production" in order to grab hold of "levers of power" (Wajcman 2004: 111). It is essential to note, however, that in the context of technofeminism, technological determinism[30] is at the forefront of ethical concern. Our practice is not "machine-centric" but is interested in how women find agency to operate technology, despite being socialised into a tech-inferiority complex (Lanier 2014: 157).

[30] In *Who Owns the Future* (2014), VR engineer Lanier, describes technological determinism as prioritising machine agency over human agency. This undermines human dignity and self-determination (Lanier 2014: 312).



Figure 12: Merging with the Machine: Molema and I at NewImage XR Festival in Paris, France, while on the Digital Lab Africa artist residency in 2019. Until this point, we had not been fully immersed in the medium of VR since we did not own VR headsets. We had only watched VR on smartphone-powered Google cardboard devices, which is nothing like experiencing VR in an Oculus or HTC Vive headset since head-tracking technology simulates a heightened sense of presence and embodiment. With the Digital Lab Africa grant funding of R42 000 the Afrocyborg VR Collective could procure and learn how to operate the VR camera, editing software, VR sound and HMD equipment used to produce *The Cosmic Egg* and *The Eye of Rre Mutwa.*

Eschewing both technological determinism as well as the "demonology of technology", the Afrocyborg Collective acquired entry-level VR tools to learn the new language of this medium (Wajcman 2004: 87). French VR filmmaker Celine Tricart notes that "VR is a new language" (Tricart 2018: 81). The Digital Lab Africa artist residency provided us with the opportunity to immerse ourselves in the professional practice of 360 cinematic VR. For us, learning the language of VR is not only an example of technofeminist empowerment through technoscience; but also an instance of cyborgology since it is an act of becoming a cyborg by merging our identities with VR technology. This is evidenced in the cyborg images above, where Molema and I have "merged with the machine" in search of new ways of seeing and speaking for the purpose of storytelling. Sandoval links "cyborgology" to "feminism",

specifically global South feminism, which she argues is also a form of subaltern[31] theory (Sandoval 2020: 409). In the recent re-release of *Can the Subaltern Speak, Reflections on the History of an Idea* (Morris 2010); Spivak notes that while the "colonised subaltern" is "irretrievably heterogeneous", "the ventriloquism of the speaking subaltern is the left intellectual's stock-in-trade" (Morris 2010: 44). Noting this critique, the Afrocyborg Collective adopts a "sympoietic" strategy for collaboration and co-creation in the production of two VR films.

In *Staying with the Trouble-Making Kin in the Chthulucene* (2016), Haraway uses the term "sympoietic" to describe her theoretical practice of co-creation, informed by SF (Haraway 2016: 31). The act of co-creation or "sympoiesis", means "making-with" or "becoming-with" (Haraway 2016: 40). Since "nothing makes itself" Haraway argues that "sympoiesis" offers a generative friction, a symbiotic dance exhibited by rain spiders when weaving a web for instance" (Haraway 2016: 48). Subsequently, the Afrocyborg VR Collective weaves both cyborgology and sympoiesis as a form of postmodern Third Cinema where our "revolutionary manoeuvres" or "movidas" are interwoven with the principle of "revolutionary love" (Sandoval 2000: 140). Molema and I have worked together for seven years and collaborated creatively for the past four years. In that time, we developed a deep love for one another. We are silicon sisters operating in an "integrated circuit" (Haraway 1991: 149). If Mabogo More refers to ubuntu as African communalism/humanism, expressed as "brotherhood", then, indeed, sisterhood expresses this notion concurrently along with: "caring, sharing, hospitality, forgiveness, compassion, empathy, honesty, humility, or brotherhood" (More 2004: 156).

In this chapter, I have illustrated how cyborgs are as subversive as they are ubiquitous in Science Fiction literature and cinema. They proliferate in the parallax between fact and fiction. They are chimaeras, reflections of lived and simulated realities, and optical illusions of imagination (Haraway 1991: 149). The VR Headset, an immersive computer used to watch VR films, is a technological object that reflects the parallax between simulation and reality, revealed in the contrapuntal term Virtual Reality. Benjamin observes that contemporary cyborg identity occurs in the parallax experienced by the VR "user" when traversing between virtual and real worlds (Benjamin 2016: 7). The VR HMD, coded with interactive AI, signals the beginning of human-to-cyborg evolution in the confluence of biotech and infotech (Marwala 2020: 1; Schwab 2016: 12). The VR camera also encoded with AI programming

[31] "Subaltern" refers to Gayatri Spivak's 1988 essay, "*Can the Subaltern Speak*?"

has the potential to create new restorative gazes of African representation. Together these two tools produce new ways of narrating African cyborg identities that contribute to global cyborg discourse from an Africa-centric vantage point. Therefore, this research contributes to cyborgology at the technogenesis of 4IR in Africa. Constructing a prosocial gaze of Africa-centric narrative worlding is vital because future casting tells us that with the merger of VR and AI, we will soon spend most of our time in virtual environments as immersive computing gradually becomes more ubiquitous (Lane 2019: 18, 22). Young adults spend up to ten hours daily interfacing with digital devices (Lane 2019: 22). As immersive computing becomes a reality, crafting prosocial worlds online is critical. Therefore, the VR camera and HMD used in this research exemplify "art science worldings as sympoietic practices for living together on a damaged planet" (Haraway 2016: 67). This corrective gaze contributes to technopolitical, technofeminist applied methodology. It is one of the ways in which the Afrocyborg VR X contribute to advancing an African VR filmmaking discourse and praxis. To this end, the Afrocyborg applies the nexus of hooks' "oppositional gaze" brought into play with Sandoval's "oppositional consciousness" to leverage the high techné VR camera to articulate collectivist strategies for multi-cultural technofeminist collaboration in the global South. This is a second way in which the Afrocyborg VR X use VR as a tool to build prosocial African Science Fiction futures.

The excursion into overcoming our technological inferiority complex around learning the language of VR; is a third way we have contributed to advancing an African VR filmmaking discourse and praxis. In the process of invoking the Dora Milaje mind trick as a positive psychological series of affirmations to empower ourselves to learn to operate VR tools, our journey to technical competence began with internalising Haraway's injunction to "seize the tools that mark us as other" (Haraway 1991: 175). Haraway's theory guided my skills development strategy of techno-science empowerment, driven by the volition to neutralise the gendered division of labour in the XR and film industries, where women seldom perform technical positions such as cinematography, sound recording and design, as well as editing. Not only did we learn how to wield VR technology effectively, but we also made a point of sharing our learnt knowledge with fellow women filmmakers. I do this in my lectures at AFDA, but I also volunteer to conduct free master classes whenever asked, at no charge. This I motivated by a personal conviction that women need to be exposed to demystifying technology in such a way that it builds their tech confidence. In this way, I share the fruits of the Dora Milaje mind trick in the context of education. This is a critical way we contribute to

an African VR filmmaking discourse and praxis. This principle of knowledge sharing is directly inspired and infused with the need for a quantum ubuntu to guide the ethics of praxis in the 4IR. Molema and I have two engagements lined up for later in 2023, where we will curate VR festivals combined with VR masters classes, where we will teach participating youth communities how to shoot, edit and record sound on set to make music videos for local artists in VR. We will conduct these VR master classes at a festival in Mahikeng called Bokomoso and at the Lagos Biennale in Nigeria. This is another way African women filmmakers collaborate to construct prosocial VR filmmaking – through community workshops.

The Afrocyborg is an imagined semiotic construct and has not been subjected to previous research. The study fills a research gap by contributing to the debate around the mis/under/representation of African women filmmakers in technoscience as agential actors with a polyvocal voice, a cyborg politics, and the ability to imagine SF African futures through VR media tools. A research gap exists in technofeminist African filmmaking, specifically VR filmmaking, due to the recently emergent nature of VR filmmaking technology, which has only become technologically viable and sustainable globally within the past ten years.[32]

[32] Nonny de la Peña's Hunger in Los Angeles debuted at Sundance Film Festival in 2011. Palmer Luckey was her assistant at the time (Tricart 2017: 17). After the success of de la Peña's film, Luckey went on to build the Oculus HMD prototype, selling it to Mark Zuckerberg in 2012 for $2 billion (Scoble & Israel 2017: 57; Bailenson 2018: 23; Schwab & Davis 2018: 167).

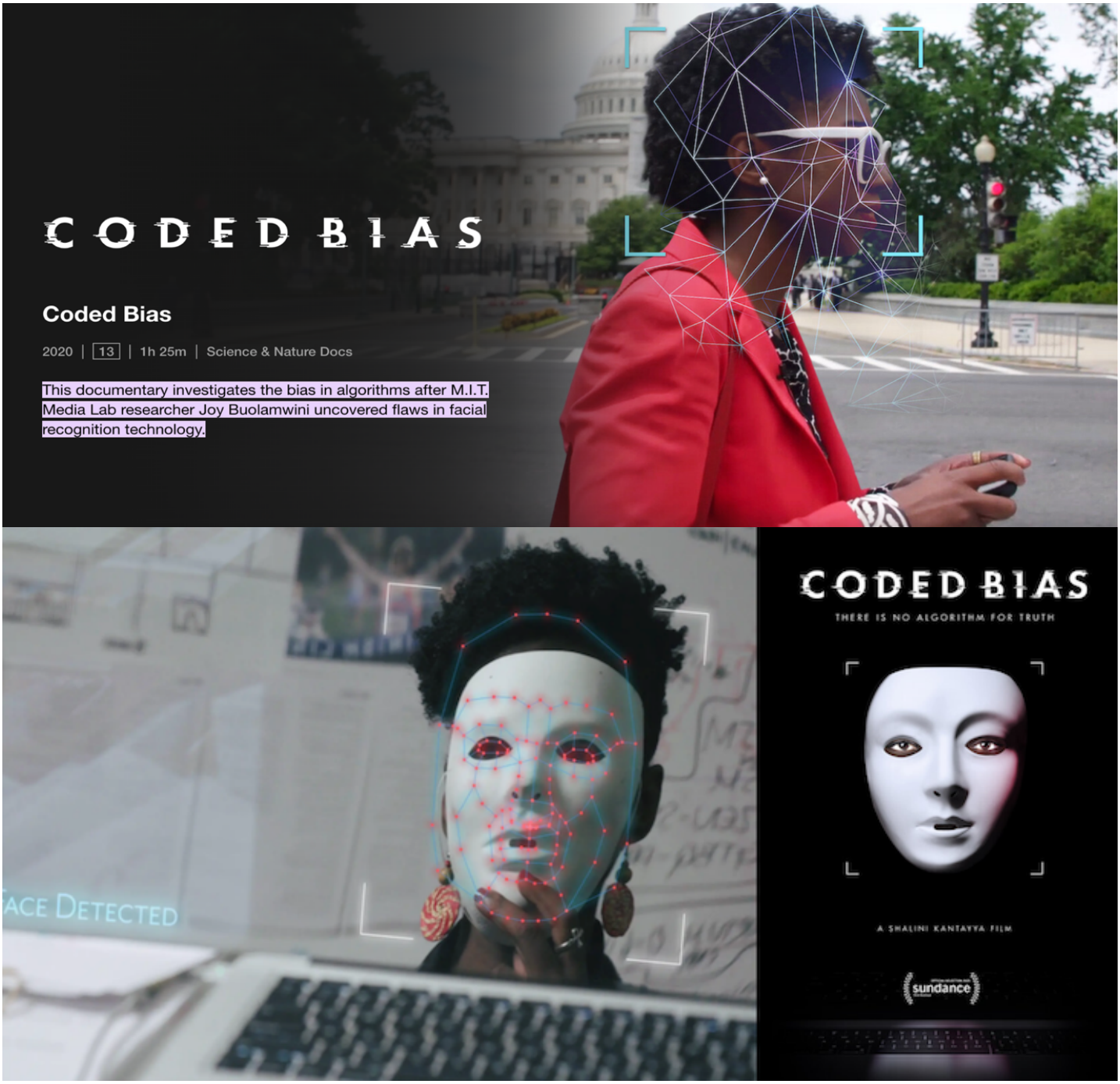


Figure 13: A screen grab from the Netflix documentary, *Coded Bias*, follows the protagonist Joy Boulamwini as she uncovers racist algorithms driving AI.
Figure 14: In the image below, Boulamwini has to wear a white mask so that AI algorithms can scan and read her face. This dehumanising image of identity betrayed by technology, and its implied semiotics, is a twenty-first-century ricochet of Frantz Fanon's assertion of white assimilation being a prerequisite to becoming human in *Black Skins, White Masks* (1952).

CHAPTER 2:
How the Afrocyborg VR X applies 21st-century and 4IR STEAM skills specific to VR film production as a political, educational and future-proofing empowerment strategy

A new generation of black skin is being subsumed by white masks in the opening images of the investigative Netflix documentary, *Coded Bias* (Kantayya 2020), revealing the extent of race and gender prejudice embedded in ubiquitous AI and 4IR technologies. Buolamwini has to wear a white mask so that the AI-driven facial recognition software will recognise her humanity. AI automation, built into VR technology, is also a driving force in global media production and consumption, posing a severe threat to civil rights (Pihlajarinne 2022: 1, 3). *Coded Bias* (Kantayya 2020) affirms that these omnipresent AI algorithms are responsible for racist human rights violations. Marwala supports these findings by illustrating how global North prejudice is built into facial recognition algorithms that routinely misidentify African Americans in the US police system, which leads to innocent people being unjustly incarcerated or worse. These incidents of police brutality and use of excessive force have given rise to the Black Lives Matter movement in the fight against racial injustice. (Marwala 2020: 105). Forced to wear a white mask for the computer to mis/recognise her, Buolamwini is a visual representation of the continuity of neo-colonial oppression, once again, rendered visible, by echoing Fanon in *Black Skin, White Masks* where whiteness must be assimilated and performed in order to attain humanity in the eyes of the coloniser (Fanon 1952: 14). Buolamwini says; “As a woman of colour working in tech, expect to be discredited” as she fights for Human Rights by forming the “Algorithmic Justice League”. Buolamwini’s activism activates agency for women in the same way that Sandoval describes Fanon as a racially charged chiasmic cyborg in his depiction of assimilated “double-consciousness”[33] in *Black Skin, White Masks* (Sandoval 2000: 84). Sandoval asserts; “skin” is biology and “mask” is technology, spliced together, they produce a physical, psychic, recoding of consciousness that collapses the mores of colonisation. Similarly, the Afrocyborg semiotic construct that informs the collective filmmaking methodology, the cinematic cyborgs in our films, and our teaching methodology are designed to collapse the behaviour patterns of technological gender injustice.

[33] “Double-consciousness” is described by W.E.B. Du Bois in *The Souls of Black Folk* initially published in 1903 as: “… this sense of always looking at oneself through the eyes of others, of measuring one’s soul by the tape of a world that looks on in amused contempt and pity. One ever feels his two-ness, an American, a Negro; two souls, two thoughts, two unreconciled strivings; two warring ideals in one dark body, whose dogged strength alone keeps it from being torn asunder” (Du Bois 2003: 9).

Buolamwini's fight for "algorithmic justice" mirrors the more significant problem of social injustice in current global ethics debates around the use of AI in the nexus of 4IR tools currently posing severe threats to democracy and Human Rights. The most infamous example of ethical debate in the VR ecosystem is Zuckerberg's gross misuse of personal data harvested by AI bots on Facebook (Marwala 2020: 91, 225). Facebook user data was processed to swing political votes on social media by pushing pro-Trump advertising to undecided voters in the Cambridge Analytica scandal (Marwala 2020: 225; Zuboff 2019: 263, 259; Woolley 2020: ch 2 para 35). The ensuing Cambridge Analytica legal trial revealed the most prescient example of Human Rights violations enabled by 4IR technologies (Marwala 2020: 91, 225). Furthermore, Palazuelos affirms how dependency is programmed into social media algorithms to harvest user data which feeds advertising algorithms, and is ultimately monetised through user addiction. (Palazuelos 2023: 21) As Safiya Umoja Noble observes, these "algorithms of oppression" not only reinforce racism but operate at the intersection of inequality in the 4IR (Umoja Noble 2018: 59). As Umoja Noble observed back in 2018 when writing this text; "I believe that artificial intelligence will become a major human rights issue in the twenty-first century. We are only beginning to understand the long-term consequences of these decision-making tools in both masking and deepening social inequality" (Umoja Noble 2018: 22). Now, in 2023, the global dialogue around AI since the release of ChatGPT through OpenAI has unleashed a new form of atomic weapon as public intellectuals like Yuval Harari have begun openly petitioning and calling for prison sentences for big tech companies who allow AI-bots to proliferate on social media, which he says could lead to the collapse of democracy (Devlin 2023).

In the wake of the Cambridge Analytica trial, the argument for human agency and accountability is outlined by Woolley, who calls on human agency to intervene, saying 4IR technologies such as AI and VR "will bring about a slew of newer and even more potent challenges to reality and the truth" (Woolley 2020: ch1 para 2). Human beings must activate their agency and realise that social media platforms are communication services and that VR and AI platforms providing immersive media encounters are neither inherently good nor evil. The human intention, and failure to regulate/litigate the IT sector, are at fault. Woolley warns of the potentially nefarious use of VR: "virtual reality and augmented reality can be exploited for coercion and influence campaigns. Virtual reality and the advanced technology that underpins it can be used to transmit computational propaganda more effectively. In the hands of people hoping to manipulate public opinion, these tools can provide multi-sensory

disinformation or spin to receptive users" (Woolley 2020: ch 6 para 4). Warranted fears of AI extracting code from social media platforms, including Oculus VR Headsets, render these data harvesting algorithms as weapons that can manipulate our behaviour for pernicious political ends (Woolley 2020: ch 1 para 21). Woolley states: "… social media and the internet have become the latest tools of war, that Facebook, YouTube, and Twitter have been weaponised by the powerful … VR and AR have already been used as tools for political manipulation … VR, in short, is a superior medium for manipulating others" (Woolley 2020: ch 6 22, 23). Social media propaganda constitutes political harassment (Woolley 2020: ch 6 para 46). This is particularly vexing since Zuckerburg owns Facebook, now Meta, and the world's dominant VR brand, Oculus. For this reason, professor of AI, Marwala, who heads up the Presidential Commission for the Fourth Industrial Revolution (PC4IR), urges African politicians to generate the laws and ethical guidelines required to prevent history from repeating itself. Marwala makes a concerted effort for readers to understand the residual effects of the First, Second and Third Industrial Revolutions and how these moments in history impacted Africa egregiously in the form of slavery, colonisation and apartheid (Marwala 2020: 12, 13, 271).

As per the UN charter of 1945, "Freedom from slavery" is a recurring concern in the discourse of 4IR, as Marwala states: "The 4IR will widen income gaps, increase inequality, introduce new forms of slavery and thus sharpen the contradictions – and, in Marxist thinking, sharpening the contradictions naturally leads to violent revolution" (Marwala 2020: 277). President Ramaphosa's determination for South Africa to benefit from 4IR, as opposed to repeating Africa's historical legacy of remaining beleaguered in the face of previous industrial revolutions, was expressed in his speech: "We were left behind by the first industrial revolution, the second and so forth, but the fourth one is not going to leave us behind – we are going to get ahead of that fourth industrial revolution" (Marwala 2020: 280).

Ethical litigation of the 4IR technology sector is essential to throwing off the shackles of 1IR, 2IR and 3IR, as the new age struggle of 4IR in South Africa threatens to automate jobs. This is what Safiya Umoja Noble means when she calls for the apprehension of the "algorithms of oppression" (Umoja Noble 2018). Patterns of historic socio-political-economic oppression cannot be permitted to repeat into our collective futures. To this effect, Marwala urges the preservation of digital heritage and the archiving of the collective memory of slavery to avoid the repetition of such atrocities in the future (Marwala 2020: 270).

While unemployment in South Africa has risen to 40%, the historic Hollywood screenwriters strike lasting five months has come to an end with unionised contractual agreements between writers and studios to restrict the use of ChatGPT in generating screenplays (Marwala 2020: 39; Silberling 2023). The release of ChatGPT not only threatens screenwriters and their livelihoods, but it also threatens the education sector as tertiary education institutions scramble to figure out how to adapt to AI-generated academic submissions from students. If AI generates academic content, why would students be motivated to read and engage with written texts? Surely this also threatens literacy, critical thinking and analysis. For me, as a teacher, it is vital to educate students in twenty-first-century 4IR skills to effectively navigate the terrain of exponential disruption where adaptation to new technologies constantly evolving is critical to establishing a meaningful career in the media landscapes of the future. Learning to incorporate AI into the constantly evolving curriculum will be a critical learning curve for both teachers and students as we grapple with ways to future-proof the careers of our graduates. While some members of the education sector call for the banning of AI, others advocate for AI inclusion into the curriculum as future careers will be AI-driven. Students who are not exposed to AI may struggle to adapt to an increasingly AI-driven world (Shah 2023: 49 & 64). As educators, we must adapt quickly to the needs of graduates who will find themselves needing to keep pace with rapidly changing mediascapes as AI begins to permeate media production workflows. The shift from lower-level thinking skills to higher-order thinking skills is critical as lower-level skills become outsourced to AI (Shah 2023: 201). Adaptation to AI is essential as the world of work shrinks and inequality increases says Marwala. “When inequality rises, the aggregate demand decreases, thereby depressing the markets. Suggested remedies include the introduction of a universal basic income (UBI), but the reduction in the workforce will obviously result in a smaller tax base, thereby making the UBI unaffordable” (Marwala 2020: 29). While global north economies might be able to sustain UBI by massively taxing AI companies, tech giants operate globally, yet pax tax locally. Silicon Valley’s economic disruption affects global south economies but contributes nothing by way of tax compensation for accessing global south foreign markets. This renders UBI in the face of job decimation from AI adoption a fallacy that will further devastate global south economies (Marwala 2020: 164).

In questioning how society might be rehabilitated towards technological inclusion and diversity, it is critical to acknowledge the implications of Human Rights and Women’s Rights regarding accessing STEAM/STEM (science, technology, engineering and mathematics)

education and careers to future-proof collective African interests in 4IR. Including "art" in the revised acronym STEAM invites the promise of innovation and societal renewal, which echoes Marwala's call for a multi-disciplinary or interdisciplinary approach to 4IR education, which merges humanities, and social science, with technology and art practices. While access to STEM education is a human right,[34] several gender barriers still exist that alienate women from STEM careers, which include gender inequality, societal gender role stereotypes, and various forms of discrimination and prejudice, including unequal remuneration based on the gendered division of labour. Sub-Saharan African women and girls remain particularly disadvantaged in accessing STEM education, where under-representation in (STEM) education is rooted in discrimination, biases, social norms and expectations that influence the quality of education they receive and the subjects they study. According to UNESCO, *"*Girls' disadvantage in STEM-related subjects in sub-Saharan Africa cannot be disassociated with the wider socio-economic and cultural obstacles girls face in education in general in this region, such as poverty, early marriage, sexual abuse at school, or social norms valuing boys' education more" (UNESCO 2017: 32). Women students' sense of agency about technology, or their sense of self-efficacy about STEM subjects, affects their educational outcomes, and their self-determination to realise a career in STEM-related fields (UNESCO 2017: 46). In an attempt to subvert these imposed social norms, the Afrocyborg VR X leverages 4IR STEAM skills specific to VR film production as an educational and future-proofing empowerment strategy. We do this by teaching, learning and sharing the language of VR.

As a woman working in the high techné medium of VR and as an educator teaching VR to my students, I observe a technological inferiority complex in myself and in the woman students I teach VR. A common phenomenon appears in tech workshops when I teach VR competency training. The young men eagerly take front-row positions and confidently handle the equipment with innate curiosity. In contrast, the young women retreat to the back rows with a visibly hands-off approach to the VR camera, preferring to watch the men safely. Since I suffer from this same technological inferiority complex, I can name it and address it with

[34] UNESCO's contribution towards gender equality in STEM began in 1945, with the Charter of the United Nations, stating: "The purpose of the Organization is to contribute to peace and security by promoting collaboration among the nations through education, science and culture to further universal respect for justice, for the rule of law and for the human rights and fundamental freedoms which are affirmed for the peoples of the world, without distinction of race, sex, language or religion" (UNESCO 2018: 32).

young women and men to conscientise the class about the socialisation process in tech culture. Using my autoethnographic encounters with technology as examples, I intend to break down the teacher/student barrier and show that becoming conscious of one's educational challenges is a way to overcome them. In naming my inferiority complex, I demonstrate to my students how to apply critical thinking and analysis, which also erases hierarchy and unites us in the classroom. In seeking connection with my students, I can show them that this technological inferiority complex becomes less daunting when deconstructing how we have been socialised into it.

I remain convinced that my inferiority complex about technology began in childhood when my sister and I were given lifelike dolls to play with to socialise us into seeing childbearing and motherhood as an inevitable destiny. On the other hand, my younger brother was given an electronic trainset, remote-controlled motor cars, guns and TV games to play with. Barthes shows how toys prefigure adulthood identities. Teaching girls to identify with dolls is a way to socialise us into domestic servitude (Barthes 1972: 53). Since my sister and I are neither married nor have children, we become alienated from our identity as women, seeing ourselves as failures for not achieving what we were socialised into as children, and seeing ourselves as technologically inferior, lacking innate technical talent. My brother's ability to service his vehicle as an adult does not come from innate technical talent but rather the fact that he was socialised into technological confidence from early childhood onwards to see technology as something to be figured out with the curiosity and joy of playful discovery. Not only have I paid enormous amounts of money to mechanics to fix my cars over the years, but I have also paid an entire month's salary to a male colleague to assist me in the post-production of my two PhD VR films. This instance of male dependency is what Fanon refers to as "sociogeny" (Fanon 1952: 4). Fanon describes the inferiority complex as socio-diagnostic – a dual process governed by economics and internalisation (Fanon *ibid.*). Sociogeny enables the "dependency complex" (Fanon 1952: 73). This dependency complex is rendered visible in the classroom, where the young women participate in their technological gender prejudice by moving into the background and giving the young men full access to explore the VR technology in a hands-on capacity, believing falsely, that men are naturally more gifted at operating technology.

I recall passionately embracing androgyny as a teenager to erase my femininity, believing women to be subhuman and inferior. Freudian psychoanalysts might call this "penis envy"

(Neu 2006: 172). While loathing the controversial “Oedipus complex” and the inherent misogynist term “penis envy”, I nonetheless desperately wished I had been born a man since men enjoyed so much more privilege and technical prowess than women (Neu 2006: 172). This phenomenon is not unfamiliar with what Fanon describes as the “disintegration of psychic structure”, where the inferiority complex manifests in the subject wishing to be white (Fanon 1952: 74). In my case, I wished to be a man. A situation given to neurosis since growing a penis would be impossible without unaffordable modern surgery. Instead, I have learnt to embrace what Deleuze and Guattari refer to as “becoming-woman” (Deleuze & Guattari 1980: 106 & 134). This requires an understanding of “woman” as “minoritarian” with the view to “becoming-woman” as an act of experimentation with love and consciousness (Deleuze & Guattari 1980: *ibid.*). As a psychoanalyst, Fanon prescribes bringing the unconscious to consciousness. Fanon proposes “black consciousness” as remediation for the sickness of racism (Fanon 1952: 103). In the remainder of this chapter, I explore black consciousness in the context of 4IR African STEAM skills, offering a curative twenty-first-century black tech consciousness or multicultural African tech consciousness. Fanon’s therapeutic strategy, namely black consciousness, is not to dissuade his patients from the latent desire to become white, or in my case, to become male, but instead that society requires confrontation and rehabilitation towards greater equality (Fanon 1953: 75).

Rehabilitating the false belief that women are technically incompetent is critical for technopolitical empowerment strategies for women’s education in the 4IR, as STEAM skills are critical for employment. Chiweshwe argues that if African girls are educated in STEM subjects, economic growth and employment could increase (Chiweshe 2019: 4). While Chiweshe urges African governments to initiate STEM programmes for African women to be empowered with 4IR skills, citing examples of international companies like Google, Amazon and NASA; the South African National Development Programme (NDP) bemoans a lack of funding for STEM research, saying; there are still too many graduates emerging from the humanities, with very few STEM graduates (Chiweshe 2019: 4). This problem leads to continued misalignment of supply and demand in the South African labour market. As a teacher of VR, itself a STEAM technology, I am acutely aware of the oversupply of humanities graduates that may lead to unemployment. This is a source of ethical anxiety for me and points towards a need for African women to access the high techné tools of 4IR, specifically XR, to activate future agency and employment in African media industries.

African women need improved access to STEM/STEAM, a Human Right, not merely Woman's Rights.

Furthermore, my positionality is informed by Marwala, who guides my thinking when he conjures up cyborg futures to prepare 4IR-ready graduates: "Because of the convergence of man and machine, it will reduce the subject distance between humanities and social science as well as science and technology. This will necessarily require much more interdisciplinary teaching, research and innovation" (Xing & Marwala 2017: 1). Marwala's solution to prepare students for future job markets is that education needs to change to facilitate the skills required for 4IR with an emphasis on a multi-disciplinary approach that includes technology, mathematics and critical thinking skills. In this inter-disciplinary approach, technical sciences should cross-pollinate with social science and technology (Marwala 2020: 30). Marwala confirms the threat of rapidly changing job markets and the need to adapt in anticipation of cyborg-careers saying: "While the 4IR will result in massive job losses, even making some careers obsolete, it will also pave the way for new silver-collar jobs, especially in the fields of STEAM" (Marwala 2020: 32).

As a lecturer and filmmaker, my researcher positionality is also informed by the need to actively promote positive images of women in STEM through the medium of VR towards creating gender-diverse representations of STEM, to challenge stereotypes about gender-based technical abilities (UNESCO 2017: 70). To this end the genre selection of the Afrocyborg Collective to produce VR films in the mode of African Science Fiction is particularly relevant to enable African women to see themselves in science narratives of the future. Through African cyborg character identification, these films might work towards building self-esteem and affirmation about STEM, whereas Science Fiction might translate into Science Fact. The Afrocyborg Collective explores global technopolitical representation through the specific Science Fiction genre of "cyborg cinema"[35] and the cyborg semiotic construct, primarily understood as a Western/Hollywood construct. In making these two VR films, we construct African cyborgs, with their semiotic roots located in the genealogy of the cyborgs found in BCE African mythologies, which are re-interpreted through African Science

[35] Sue Short defines "cyborg cinema" as a subgenre of Science Fiction, beginning in 1979 with the film *Alien* (Scott 1979), followed by *Blade Runner* (Scott 1982). Cyborg genre films are satirical, questioning and provocative, constructing contemporary myth by ritualising "collective ideals, celebrating temporarily resolved social and cultural conflicts, and concealing disturbing cultural conflicts behind the guise of entertainment (Short 2005: 22).

Fiction VR lenses to create postmodern representations of contemporary African Science Fiction. This genre also opens up a meaningful space to discuss the “technogenesis” of VR filmmaking since it is inherently a discourse about global African technocultural production (techné) and representation (Anderson & Jones 2016 intro: para 2). VR as a 4IR technology in this research, evidenced in the making of two VR films, enables cyborg realities designed to affirm the woman/machine nexus as human beings seem poised to take another evolutionary leap from “Homo Naledi” to “Homo Cyborg” as technology and biology merge on the horizon of 4IR in Africa (Christie & Yach 2016: 1).

The positionality of the Afrocyborg Collective is that as teachers, working and sharing our technical knowledge of VR with our students, has the power to be affirming by helping to dispel the myths of gender stereotyping to influence more women to participate in breaking down the barriers that seem to mystify technology as the domain of male students only (UNESCO 2017: 56).

Gender inequality is not unique to Africa. It is a global problem and one that defines gender justice in 4IR. The World Economic Forum states that it will take another 100 years for the world to achieve gender parity at the current rate of hiring practices and equal pay for equal work (Schwab 2020: 4). Even women who work in Silicon Valley, the headquarters of 4IR, are disadvantaged by hegemonic hiring practices. Emily Chang outlines the entrenched culture of the gendered division of labour where she documents the misogynist working conditions of women, where wealth and power are concentrated in the hands of white male plutocrats resulting from corporate practices, which discriminate against ethnic minorities and women (Chang 2018: 60). As Wajcman puts it: “… the very notion of what constitutes skilled work is still fundamental to how the gender division of labour is being reproduced today. Machine-related skills and physical strength are basic measures of masculine status and self-esteem, and by implication, the least technical jobs are suitable for women. The result is that men design machinery with men in mind – the masculinity of the technology becomes embedded in the technology itself” (Wajcman 2004: 27). This programming of technology as masculine persists where gender discrimination is widely practised by Silicon Valley technology giants such as Google, Microsoft, and Twitter, who Chang says “have been the target of gender discrimination lawsuits” carried out by women employees (Chang 2018: 11).

In this chapter, I have shown how the Afrocyborg VR X applies the twenty-first century 4IR STEAM skills specific to VR film production as a political, educational and future-proofing empowerment strategy; by actively nurturing positive affirmation with women about STEAM and ICT technologies. This is an educational strategy to build resilience, enabling women to resist bias and discrimination by stimulating a sense of technological self-efficacy. Developing tech-confidence and expressing positive affirmations for the young women in my VR tech workshops, I am conscious of the harm gender stereotypes may have on their levels of self-confidence, especially in relation to their major subject selections. Gender prejudice in women's subject selections further confirms the reality of gender stereotyping about technical media subjects, such as cinematography, media editing, and sound engineering, which remain male-dominated. Women who assimilate these stereotypes around subject selection go on to accept the gendered division of labour in the workplace, which leads to low self-esteem, self-efficacy and confidence in their careers. This negatively affects women's engagement in STEM and discourages them from pursuing careers in STEM-related fields of employment. This is a result of socialisation around technology focused subjects and vocations belonging to the domain of men (Wajcman 2004: 14). I make this statement based on what I see in class when technological gender discrimination is named and discussed in terms of socialisation from early childhood, specifically around the toys we were given to play with as children. Almost all the women I speak to confirm they were also given dolls to play with as children. When I ask the young men what they were given to play with as children, the answers are most often: soccer balls, Lego and video games. We then discuss how this affects women's levels of tech confidence as adults. Once the women become conscious of their behaviour, they move to the front rows to explore the VR equipment hands-on. The young men, now also engaged in conscious awareness, give women the space to come forward and explore the technology instead of unconsciously asserting themselves as naturally technologically endowed with a superior ability to figure things out. An environment of conscious equality is slowly forming in this way.

STEAM education and access to these careers for African women is not only a Woman's Rights issue but the fulfilment of Human Rights because an unequal society cannot attain equality on a global scale if African women are excluded. Access to STEAM education is crucial for women if the human race is to achieve the United Nations 2030 Sustainable Development Goals (UNESCO 2017: 71). Confronting humanity's most significant challenges – poverty, hunger and climate change, cannot exclude the 1 billion people living

on the African continent. Nor can 50% of this population be ignored, explicitly women. Access to STEAM education in the context of 4IR is critical if we consider how XR and AI will merge in the future, assigning power to AI algorithms to make complex decisions on how to solve the world's biggest problems (Schwab 2016: 7).

4IR exponential technologies are poised to transform the human experience as they embed themselves in our lives and, eventually, our biological bodies, creating an advantage for some and aggravating inequality for others (Schwab & Davis 2018: 34). Mixing digital-and-analogue life will augment humans with biotechnologies, neurotechnologies, brain science, and virtual and augmented reality devices (Schwab & Davis 2018: 72). This technological disruption may cause a posthuman evolutionary leap where cyborg adaptation in the context of 4IR, might happen sooner than we think. Regardless of the readers' preferred school of thought, either pro or anti-4IR, Marwala asserts that it is in Africa's best interest to remember that intelligent technologies will permeate all aspects of life (Marwala 2020: 279). Innovation cannot continue to emanate from the global North only to be superimposed onto Africa. This would merely be a repetition of previous industrial revolutions, which came with slavery, colonisation and apartheid, as evidenced in the First and Second Industrial Revolutions. Africa cannot remain a passive, disempowered market to be exploited (Marwala 2020: 279) The previous three industrial revolutions may have bypassed Africa, but we cannot afford to miss this fourth one (Marwala 2020: 280).



XR Cyborgs in Africa (Okonkwo et al. 2022; The Royal Society 2019)

Figure 21: TOP LEFT: Meta, formerly Facebook, is partnering with African organisations such as Africa No Filter, Electric South and Imisi3D to showcase XR talent on the African continent (Okonkwo et al. 2022: 5, 15).
Figure 22: TOP RIGHT: The "iHuman" cyborg-VR gamer is wearing a Neurable Brain-Computer Interface (BCI) VR HMD. This BCI detects brain signals used in VR gaming capable of predicting behaviour based on brain data, which pre-empt how users respond to stimuli in the VR environment (The Royal Society 2019: 40).
Figure 23: 2nd ROW LEFT: Woman at the TMRW Gallery in Johannesburg (Okonkwo et al. 2022: 297).
Figure 24: 2nd ROW RIGHT: Meta's new BCI-VR reading Electronic Brain Waves decoded from the "user" in the EEG graph showing brain activity to the left (Meta Connect 2022).
Figure 25: 3rd ROW LEFT: Eugene Ohu – lecturer at Lagos Business School (Okonkwo et al. 2022: 151).
Figure 26: 3rd ROW RIGHT: Research participant testing Neurable BCI-VR (Blewitt 2017).
Figure 27: BOTTOM LEFT: Eugene Ohu wearing an HTC Vive VR Headset (Okonkwo et al. 2022: 154).
Figure 28: BOTTOM RIGHT: Meta's new BCI-VR can control a digital avatar via telekinesis. The controller is worn on the wrist (Meta Connect 2022).

CHAPTER 3:
Why the Afrocyborg Collective makes Prosocial VR

In this chapter, I provide an overview of the socio-political-economic context of VR emerging from the 4IR and how various Human Rights violations are currently shaping the need for a renewal of ethics to govern what Benyera refers to as the "recolonisation of Africa" through "data coloniality" (Benyera 2021). By citing examples of what VR is, what it can do, and how these technological evolutions are vastly more potent than traditional cinema, I assert that VR is a cyborg technology that eschews binaries, including the ethics of right and wrong. VR is thus neutral and can be used for both positive and negative outcomes, foregrounding the need for human agency and ethics in its application. The non-binary cyborg, like VR, is a double agent of 4IR, offering the potential for both "promise and peril" as "disruptive technologies" "displace human relevance" (Hall & Takashi 2017: 8; Marwala 2020: 75). Haraway's writing reflects this multiplicity as liberation from binary thinking, which creates "universalising opposition" that spawns totalising conflicts of one or "other": "nature/culture", "sex/gender" (Haraway 1991: 148). VR itself is not neutral. VR as a product of 4IR requires ethics and human agency to determine to what extent "exponential technologies" "disrupt" the socio-political-economic status quo in Africa, as is the trend of 4IR technologies globally (Diamandis & Kotler 2015: 10). I see this as a way to open up a productive discussion around the ethics of VR within the nexus of 4IR.

For this reason, the Afrocyborg VR Collective has consciously chosen to produce two VR films in the mode of Prosocial VR. Prosocial VR acknowledges socio-political problems in society, and its primary aim is expanding human consciousness towards prosocial change. Aitamurto et al. have identified a turn towards prosocial VR where this nascent medium is being used in various "civic applications, including education, healthcare, journalism, enhancing mutual understanding, reducing gender and racial biases, and promoting altruistic behaviours" (Aitamurto, Stevenson Won & Zhou 2021: 2139).

In answering the research question of how African women filmmakers can collaborate to construct prosocial African Science Fiction in Virtual Reality filmmaking, I expand on how the Afrocyborg VR Collective applies VR as a prosocial antidote to "poverty porn" (Kahiu 2017) and Hegelian patterns of misrepresentation in African VR narratives. To this end, the Afrocyborg VR Collective have made two VR films in the mode of Prosocial VR. Both films

construct a philosophy of Quantum Botho/Ubuntu[36] to inform the conceptual framework of Prosocial VR. Quantum Botho/Ubuntu is a renewed call to invigorate the term "Ubuntu", which may have lost its original philosophical force from mass media overuse post the Rainbow Nation euphoria of 1994, and our entry into democracy. The pre-fix "quantum" is inspired by Black Quantum Futurism, or BQF, which is a sub-genre of African futurism, coined by Rasheedah Phillips, who describes her theory and practice as an "Anthropology of Consciousness" meshing quantum physics with black liberation traditions in the arts to subvert linear time frames, which connects future-present-past (Phillips 2015: 13). Quantum Botho/Ubuntu is synthesised here to conjure up a new potency to address the need for ethics to protect and govern collective African interests amid 4IR.

Both films made by the Afrocyborg Collective are examples of Quantum Botho/Ubuntu. This is the link that connects the VR films conceptually. Quantum Botho is expressed in *The Cosmic Egg* as eco-consciousness, where Molema asks the viewer to see Botho at a planetary scale. If "I am because we are", then I am also the Earth, and the Earth is me. This film is prosocial in asking the viewer to see the environment as an extension of self. Quantum Botho is a synthesis of 4IR technology used in the mode of African humanism as a philosophical solution to the social problem of Capitalist greed destroying the planet. Similarly, *The Eye of Rre Mutwa* articulates Quantum Ubuntu as a critique of 4IR Capitalism, with a history of Human Rights violations beginning in the First, Second and Third Industrial Revolutions (Marwala 2020 & Benyera 2021).

VR is non-binary cyborg technology

In *The Question Concerning Technology* (1977), Heidegger argues that modern technology does not bring about poiesis, for example, about distilling uranium to construct an atomic bomb (Heidegger 1977: 15). In the context of 4IR, the "atomic bomb" is supplanted by the ethical dilemmas of Brain-Computer Interfaces (BCIs) and Artificial Intelligence (AI), in VR technology. The double bind becomes apparent as Heidegger admits that there "is no demonry of technology, but rather there is the mystery of its essence" (Heidegger 1977: 28). The ethical question of human agency in immersive technologies presents multiple ethical perspectives around the "essence of technology". Technology is neither good nor evil. It is

[36] Mabogo More describes "Ubuntu/Botho" in *Philosophy in South Africa under and after Apartheid* as "socio-political action", and an ethical/moral practice of communal respect, dignity, welfare and prosperity for all (More 2004: 157).

not “demonic”, as per Heidegger, but it is also not neutral. Recent research into 4IR technologies argues the case for dehumanisation and inequality programmed into the technology by the hands and minds of those who forge these tools (Marwala 2020: 15, 16 & 29). 4IR technologies are not neutral, which is why the ethically questioning mode of techné is helpful in examining VR as one of the many tools emerging from 4IR. As such, techné serves this research mode, which combines the theoretical, creative and practical intention to explore the VR medium to reveal the process of truth-seeking, cinematic praxis and the collective making of VR films.

Cyborg mutation through Extended Reality (XR) media technology presents a profound ethical dilemma for Human Rights in light of Facebook mogul Mark Zuckerberg’s acquisition of Oculus VR technology in 2012 for $2 billion (Scoble & Israel 2017: 57; Bailenson 2018: 23; Schwab & Davis 2018: 167). Zuckerberg lost credibility in the eyes of the global public when he was convicted and fined for his role in manipulating global politics, evidenced in the Cambridge Analytica scandal, which enabled the Trump election and Brexit vote of 2016 (Marwala 2020: 225; Zuboff 2019: 263, 259; Woolley 2020: ch 2 para 35). As a result of the Cambridge Analytica trial[37] investigation and consequent public outrage, VR is situated at the centre of the global ethical debate around the violation of Human Rights. A renewed call for focused attention on ethics in 4IR, which must drive more prosocial behaviour to stop the abuse of illegally harvesting user data from eye tracking technology embedded in VR Head-Mounted Displays (HMDs). Eye tracking technology embedded in VR Headsets are capable of decoding human consciousness as eye tracking encompasses visual perception and cognition. (Palazuelos 2023: 2). Data gathered from eye tracking is then used to feed the big data algorithms of advertising and Artificial Intelligence.

While Zuckerberg has the power to leverage the symbiotic technologies of Facebook and Oculus[38] with nefarious intent, thereby imposing negative consequences on the future of VR as a medium; conversely, there are also many examples of VR being used to elevate the human experience via VR media. For example, the VR research emerging from Stanford

[37] After a yearlong investigation into the Cambridge Analytica data breach, Facebook was fined $5 billion in penalties by the US Federal Trade Commission for deceiving users that their private information was being used for commercial purposes without their consent or knowledge (theguardian.com 2019).

[38] Oculus.com public announcement to all Oculus VR Headset users states that as of October 2020: “Everyone using an Oculus device for the first time will need to log in with a Facebook account” (Oculus.com). This suggests that Mark Zuckerberg and Facebook intend to harvest data from VR users wearing Oculus headsets via eye tracking and data harvesting technologies.

University VR Lab run by Professor Jeremy Bailenson, who has guided and mentored several consciousness-expanding research projects in VR, which tackle significant socio-political-economic problems such as education, racism and climate change (Bailenson 2018: 40). The revolutionising 4IR capacity of immersive media technologies could therefore be used for the upliftment of humanity by working towards solving our most significant planetary problems. We face collective challenges on the African continent (Marwala 2020: 2).

Conversely, XR can also be leveraged to manipulate world views negatively through behaviour modification since "embodied cognition" is a feature of VR technology (Bailenson 2018: 28; Schwab & Davis 2018: 167). The phenomena of embodied cognition and behaviour modification, therefore, render Virtual Reality (VR) a cyborg technology because they are disruptive 4IR tools that merge biology with technology,[39] to modify human vision where; "your digital world and your physical world become one" (Schwab & Davis 2018: 6). 4IR technologies are cyborg as they will erase the physical, digital and biological boundaries when quantum computing becomes ubiquitous (Schwab 2016: 7).

Schwab predicts that by 2025, 86% of the human population will be wearing smart glasses, or simply put – a computer on your face. Presently, a Virtual Reality Headset is a clunky external device, literally strapped onto your head, but Schwab affirms such devices, including; "wearable computers to virtual reality headsets—will almost certainly become implantable in our bodies and brains" (Schwab & Davis 2018: 28). These VR/AR smart glasses will become the next computer interface as built-in eye-tracking devices (read data harvesting AI) will be programmed with machine learning algorithms, which read biometric data from human eyes in the same way that we read a book (Bailenson 2018: 126). These eye-tracking algorithms will become increasingly "intelligent", reading minute eye movements to decode fluctuations in human behaviour and reactions to online products and services. Human eyes will become the primary connection to the internet and online devices; in the same way, we now command our smartphones with a swipe of the finger; in future, our gaze will surf the World Wide Web. Online eye-tracking[40] technology will feed this

[39] One of Donna Haraway's many definitions of the cyborg – the central semiotic protagonist *of A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century,* defined early "cyborg-feminism" or cyber-feminism, which later evolved into technofeminism: "A cyborg is a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction" (Haraway 1991: 149).

[40] Jaron Lanier, the "father of Virtual Reality", explains eye tracking technology and precisely how it works in the medium of VR in *Dawn of the New Everything: Encounters with Reality and Virtual Reality* (Lanier 2017: 351).

biometric data to tweak individual immersive XR media responses to online goods, services and products. This data captured and converted into algorithms will be (and is already being) designed to modify your behaviour to the highest bidder (Lanier 2017: 61). This technology will change human behaviour across all spheres of life, from education to entertainment and consumption (Schwab 2016: 114).

The eye-tracking/data harvesting capacity of VR technologies represents a dystopian cyber-colonisation of human eyes, often described as the "window to the soul", which render cyborg futures deeply disturbing at a moral and ethical level. As Schwab explains, 4IR technology commands the power to dehumanise and robotise humanity and expand consciousness by creating a shared planetary destiny capable of solving the urgent problems of global civilisation, like climate change, for instance (Schwab & Davis 2018: 12).

This harvesting of data from our eyes, enabled by XR-augmented smart glasses, presents profound ethical dilemmas for Human Rights because technology is not neutral and is in dire need of societal values to be encoded into their production (Schwab & Davis 2018: 41). This moral lacuna is particularly concerning for the domain of VR technology as a medium of expression. Since the acquisition of Oculus by Facebook, VR has begun to show signs of Zuckerberg's intended end game – a tool to leverage Big Data (Marwala 2020: 91). Silicon Valley insider Jaron Lanier, a computer scientist and public intellectual affirms how the plutocracy who owns VR and the surveillance data it generates, compounds wealth accumulation from online advertising revenues (Lanier 2013: 146). Wealth and power precipitate more wealth and power, which will affect everyone using a computer in the coming decades since the future of VR is Immersive Computing (Hall & Takashi 2017: 4).

Lanier describes how Big Data drives the "Siren Servers" of quantum computing, which colonise social media data to generate ambient advertising capable of manipulating human behaviours toward "operant conditioning" (Lanier 2017: 58). Behaviour modification is the result of operant conditioning, potentially making VR as a medium a "perfectly evil Skinner Box"[41] (Lanier 2017: 86). Consequently, VR pioneer, Lanier has been publicly outspoken about how people should disengage with all forms of social media. Post Cambridge Analytica, Lanier's anti-social media stance is well justified. The egregious conduct of

[41] Cognitive Behavioural Scientist B. F. Skinner designed a laboratory experiment to administer electric shocks to rats as a form of "operant conditioning" to modify their behaviour (Lanier 2017: 58, 95).

Facebook AI algorithms[42] that harvested the data to enable the Brexit, and Trump votes of 2016 may well also underpin the business model of Oculus VR since Zuckerberg owns both companies. Zuckerberg intends to force all Oculus VR Headset consumers to sign into their VR devices using their Facebook account login details to harvest data from their VR devices and experiences in these virtual worlds (Robertson 2020 theverge.com; Oculus.com 2020).

The Great Hack (Amer & Noujaim 2019) and *The Social Dilemma* (Orlowski 2020) Netflix documentaries affirm that manipulated social media data is now worth more than oil and is classified as a weapons-grade tool to incite war and political conflict (Duggins 2020 theindependant.co.uk; Dreyfuss 2019 wired.com). Marwala describes data as "the new oil" and a vital driver of the 4IR (Marwala 2020: 43). Marwala, who is the knowledge repository behind the Presidential Commission on the Fourth Industrial Revolution in South Africa (PC4IR), urges us to own our data, stating: "We ought to start collecting data in all areas of national importance. Data is the new oil in the 4IR, so we must invest in data-collection technologies. Africa must also create a law that makes data an IP asset" (Marwala 2020: 211).

Data harvested by ubiquitous computing frames a neo-Marxist perspective, presented by Zuboff, who describes how ubiquitous computing translates into living in an invasive and immersive world of unbridled greed featuring omnipresent advertising. Woolley affirms Zuboff's moral dystopia enabled by Facebook, which generates pandemics of fake news through a mercenary leveraging of computational propaganda. Citing Cambridge Analytica and their ability to sway voters using social media data harvesting "bots",[43] Woolley argues that 4IR technologies must be human rights centric if AI and VR are not to be used against the global public (Wooley 2020: ch 1: para 4). Woolley cites the United Nations charter of 1945, arguing that human rights are being violated by computational propaganda as they remove our right to *"*life and liberty, freedom from slavery and torture, freedom of opinion and expression*"*. Woolley calls for awakening global consciousness surrounding 4IR disruptive

[42] The duplicitous nature of the Facebook business model, built on the extraction of user data to sell to advertisers, as well as the details of the trial are outlined in this article: *Mark Zuckerberg is Standing Trial for the Entire Tech Industry* (2018) by Timmons & Kozlowska (qz.com).

[43] "Bots" are algorithms used on social media, specifically Facebook, which use AI to spread politically motivated misinformation to sway users' public opinion. Wooley argues that this amounts to "computational propaganda" (Woolley 2020: preface).

technologies, which need an ethics overhaul in their creation and dissemination (Woolley 2020: ch 1: para 4).

In accord with Ramaphosa's strategy to stimulate national socio-political-economic opportunity, South Africa's National Development Plan (NDP) outlines its 4IR strategy (2020), stating that the focus of the NDP is to eliminate poverty and inequality and increase employment (NDP 2030: 2020: 4). The NDP argues that the "hype" around 4IR is generated by Klaus Schwab and the privileged elite of the World Economic Forum, who foster obsequious relationships with the Western private sector, and set the pace for global economic agendas. While 4IR technologies are presented as ushering in an age of unprecedented economic prosperity, the NDP questions the preconditions for this advantage, particularly concerning the First, Second and Third Industrial Revolutions and how these failed to distribute wealth equally but merely benefited those already in power (NDP 2020: 48). These are critical social justice issues we must face as a nation, and continent, and prepare our youth for. This is why the Afrocyborg Collective makes Prosocial VR so that we can learn about 4IR tools and how to use them ethically to empower the next generation of African media practitioners.

Prosocial VR as a way to govern the ethics of 4IR

Prosocial VR is the conscious application of the technology used to change participant behaviour towards positive action and contribution to society. Prosocial VR harnesses "social presence", which is described as "being with" members of any given community by entering into their VR world (Aitamurto, Stevenson Won & Zhou 2021: 2141). This method of "being with" activates feelings of agency in the participant to act after the encounter of empathising with the other. This method of "being with" rejects the "empathy machine" discourse, which has been the subject of much critique. New research shows how "empathy machine" approaches engender negative responses from participants because these experiences galvanise an undesirable response from the observer while negating the perspective of the observed. This phenomenon becomes an echo chamber of prejudice iterated similarly on social media platforms. Lanier observes how the Black Lives Matter movement spawned the retaliation and normalisation of racism in America and how Gamergate gave rise to the alt-right (Lanier 2017). Therefore, the representation of social justice issues must be carefully

constructed to avoid engendering negative responses that the VR filmmaker intends to counteract. The evolution of VR discourse from “empathy machine” to prosocial VR could become a double bind for filmmakers working in social justice.

Prosocial VR offers a way for empathy to become compassionate and prosocial action when the theory of “embodiment” is applied effectively. Bailenson cites two influential prosocial VR experiments conducted by his students where participants inhabit the body of a cow avatar about to be slaughtered in the first simulation. The students tracked meat consumption in the participants after their encounter with embodying the virtual cow. They noted a decline in meat consumption as a result of their engagement with the VR experience (Bailenson 2018: 68). The reason why VR outstrips the ability of traditional media to affect this degree of prosocial behaviour change in its viewers is the result of “embodied cognition”, which is a psychological phenomenon, distinct to VR experiences, which affirms VR as a practical learning aid since people learn by “doing”. VR simulates action in the brain, with quantifiably improved learning outcomes compared to any other mode of tuition (Bailenson 2018: 29). VR simulates body movements in the real world, with corresponding proprioceptive cues mirrored accurately in the virtual world.

Similarly, in the second experiment with VR embodiment for prosocial change, the students created a lumberjack VR avatar for participants to inhabit. While embodying the eco-enemy avatar, the participant was made to cut down enormous virtual trees in a forest; which came crashing down with thunderous impact as the users’ virtual chainsaw felled it. The students then tracked the participants’ use of paper after this embodied experience. They found that participants became more conscious of wasting paper afterwards (Bailenson 2018: 75). These quantifiable results in producing real change in human behaviour point to the full potential of prosocial VR to expand human consciousness and transform anti-social behaviour patterns in society.

Bailenson warns that VR should not be used for the sake of VR but should be thoroughly considered and motivated due to the potency of the medium to affect real change in the world. He goes so far as to caution against “unbridled enthusiasm” for prosocial VR as it balances precariously on the double bind of the Silicon Valley Kool-Aid-cum-cliché of “making the world a better place” (Bailenson 2018: 142). VR filmmakers should respect the medium and focus on the integrity and ethics of prosocial VR since “making the world a better place” is also a duplicitous marketing strategy trotted out by Silicon Valley for gross capitalist

profiteering (Bailenson 2018: 148). In mapping prosocial VR as a key terminology in the embryonic language of VR, it is critical to interrogate this slogan to understand its bearing on the medium's ethical use since VR possesses the incredible psycho-somatic potential for societal transformation supersedes its comparatively antiquated predecessors in motion picture medium. It is, therefore, vital to problematise the current state of VR as an immersive media device in the cache of 4IR. Lanier laments how technocrats such as Oculus, owned by Facebook, now Meta, misappropriate user-generated data to compound wealth accumulation from online advertising revenues (Lanier 2013: 146). Lanier describes how Facebook colonises social media data to generate ambient advertising capable of manipulating human behaviours toward “operant conditioning” (Lanier 2017: 58). This is particularly poignant for VR filmmakers to be aware of since Facebook and YouTube are powerful platforms for 360 VR content distribution. Data mining is evidenced by Zuckerberg’s intention to force all Oculus VR users to sign into their VR devices using their Facebook account login details. This move seems motivated by profit extracted from illegally harvested data from each Oculus device while users explore virtual worlds (Robertson 2020 Oculus.com 2020). This pernicious form of capitalism is a source of anxiety as Meta launches XR programs and funds projects across Africa.

The WeAreVR Africa community recently published the Africa XR Report (2022), which confirms that: “Meta partnered with Africa No Filter, Electric South and Imisi 3D to establish the Future Africa Grant for Extended Reality Creators, under which Future Africa: Telling Stories, Building Worlds program was created. Six finalists will each receive funding of up to $30,000 and participate in XR-industry events to showcase their creativity and drive interest in their projects” (Okonkwo et al. 2022). As a member of this community, I understand that lack of funding is a significant obstacle to XR production on the continent. 71% of the XR community cannot raise funding for their projects (Okonkwo et al. 2022: 9). Meta seems poised to take advantage of this statistic, which prompts consideration of what manner of economic exploitation might follow, given Zuckerberg’s track record.



Figure 29: Africa No Filter and Meta announce a new fund to improve VR in African storytelling (africanofilter.org 2021). Facebook has 3 billion subscribers and is valued at $780 billion (Zoghlami 2021). AR/VR Africa's hackathon goes hybrid for the first time, expanding it from a ten-country event to one with 28 countries, the largest XR event on the continent (Okonkwo et al. 2022: 15).

The images of Brain-Computer Interfaces (BCIs) at the beginning of this chapter show how BCI technology is embedded in VR Headsets and primed to harvest data directly from the human brain; an ethical conundrum must be considered for the future of prosocial VR. Being conscious of this technological agenda and its manifestation in the medium of VR is one of the ways in which the Afrocyborg VR Collective applies a transgressive and transformative gaze regime towards decolonising the oppressive power structures of Silicon Valley and its leverage of 4IR machinery. In light of "data coloniality" and the recolonisation of Africa under the zeitgeist of 4IR, I harness prosocial VR in the making of the *Eye of Rre Mutwa* by engaging the subject of how 4IR repeats the patterns of 1IR, 2IR and 3IR in so far as they echo patterns of slavery, colonialism and apartheid (Benyera 2021: 115; Marwala 2020: 69-75). From the perspective of narrative and semiotic construction, I use prosocial VR to confront the need for ethics in current global technocultures to avoid repeating historical patterns of economic extraction in the previous Industrial Revolutions. An excerpt from the script and corresponding imagery shows:



Figure 30: Patricia Boyer laughs ironically as she chimes: “Oh yes, I see how that works … If you blind yourself hard enough, the truth will just disappear?”

PATRICIA

I spy, with my virtual eye,
How wealth and power is built on blindness.
I spy why,
White power becomes enraged,
When confronted with the truth of how it’s so-called “progress.”
Shaped the 1st Industrial Revolution,
Leading to the 2nd, the 3rd and now the 4th.
How wealth was generated by the Triangular Trade, the selling and buying of slaves,
Led to the 1st Industrial Revolution
And how White capitalism would rather gouge out its eye
Then acknowledge how it came into being and continues to fly to this day with the wings of racism, sexism and classism;
How the Homo Deus of Silicon Valley built their wealth on all three.

Rejecting VR as an empathy machine, poverty porn & Hegelian trope

Though admittedly, the dialogue is far too didactic and expository, lacking the nuance of subtlety by being “preachy” and “on the nose”, I argue that *The Eye of Rre Mutwa* is nonetheless a valid experiment towards dismantling persistent patterns of racist representation of Africa. Mbembe argues that nineteenth-century racism continues into the twenty-first century, as is evident in Hegel’s lectures on world history, where he states: “All our observations of African man show him as living in a state of savagery and barbarism, and he remains in that state to the present day. The Negro is an example of an animal man in all his savagery and lawlessness” (Hegel 1975: 224). Achille Mbembe shows how Hegel’s ideas continue to repeat themselves in global media misrepresentations of Africa. He

describes the pernicious effects of Hegelian thought as dehumanising stereotypes in global media of Africans as subject to failure, famine, poverty, violence, brutality, despotism, corruption, war, plunder, rape, HIV, Ebola, and malaria (Mbembe 2016: 318). Dismantling the Hegelian patterns of prejudice requires the "rehabilitation of reason to heal our broken world" (Mbembe 2019). Prosocial VR can be a therapy, rehabilitation, or vital antidote to racism. VR interventions have promoted prosocial behaviour change, reducing racial bias (Shriram, Youn Oh & Bailenson, 2017: 304). If, however, prosocial VR is misconstrued and used without integrity, and ethics, its application is forced into the domain of "empathy machine" misrepresentation.

VR filmmaker Chris Milk delivered a TedTalk titled "*The Ultimate Empathy Machine*", where he underlined the immersive properties of VR, which enable empathy through the ability of the medium to alter perception, more so than traditional media formats (Bailenson 2018: 53). However, there has been considerable backlash against "empathy machine" discourse. Jones notes how critics of the "empathy machine" concept in VR have become "increasingly vociferous in recent years". Internationally, VR filmmakers began to distance themselves from VR as an "empathy machine" as early as 2017 at the Tribeca Film Festival and were looking for ways to evolve beyond this reductionist and disingenuous approach to empathy (Jones 2020: 86). This was a result of the altruistic ambition of VR filmmakers and the VR experiences being created that were not able to translate into long term meaningful action after the encounter of the film (Jones 2020: 88). Jones equates the problematic nature of so-called prosocial documentary production highlighted by the i-docs (interactive/transmedia documentary) movement, who question the value of emotional empathy in VR as vacuous, without real prosocial action as it is akin to "disaster tourism" or "organised tours" to "shantytowns" in the global south (Jones 2020: 89).

"Empathy machine" discourse shares many similarities with "poverty porn", described by Kenyan filmmaker Wanuri Kahiu in her 2017 Ted Talk titled, *Fun, Fierce and Fantastical African Art*, where she says: "We are so used to narratives out of Africa being about war, poverty and devastation" (Kahiu 2017). Kahui calls for the equivalent of the "Bechdel test" to measure "poverty porn" stereotypes in the cinematic representation of Africa. Named after cartoonist Alison Bechdel, the test is used in Western feminist film analysis to ascertain whether the representation of women in popular culture meets a minimum standard of feminist representation, namely that the film should contain: 1. at least two women; 2. the

women should talk to each other; 3. they should not be talking about a man. Kahui suggests a similar “poverty porn test” ought to apply to avoid misrepresentation in African films, namely: 1. the characters need to be healthy; 2. the characters should not need to be rescued in any way or in need of aid; 3. the characters should be happy and enjoying life.

“Poverty porn” tropes are visible in Milk’s VR documentary *Clouds Over Sidra* (2015), which follows a 12-year-old girl through her makeshift environment in a Syrian refugee camp in Jordan. Firstly, this raises ethical concerns around recruiting minors for film production since they should be in school, not assisting Milk with his career. Minors may also not fully comprehend the meaning of “informed consent”. Secondly, the spectacle of Sidra’s circumstance of abjection and poverty was used by Milk to advance his vocation, garnering a staggering 1 660 358 views from his “empathy machine” TedTalk in 2015 after *Clouds Over Sidra* was distributed via a *New York Times* app and 1.2 million free VR headsets to subscribers (Jones 2020: 37). This film was made by Milk for an audience of decision makers at the United Nations, where Milk claimed, “We are showing them [Syrian refugees] to the people that can change the lives of the people inside of the films” (Bailenson 2018: 52). This implies that the VR headset enabled UN funding donors to witness a first-person perspective of the refugee camps without “getting their hands dirty” by physically going there. The hygienically mediated yet virtually firsthand experience that removes the observer from the observed seems to elicit a repulsion of “the other”; in this instance, by removing the elite, privileged audience from the reality of hardship and misery of those confined to life in a refugee camp. This representation is disingenuous on several levels and amplifies the objectification of suffering through the costly mediated experience of VR. “Empathy machine” discourse and application in VR could perhaps be better described as the ultimate machine for “tolerating repulsion” from a “safe and sanitised distance”. My views are corroborated by game developer Robert Yang who says: “The myth of the ‘empathy machine’ is that it nurtures compassion, when in fact it simply feeds the ego. VR empathy machines are fundamentally about mining the experiences of suffering people to enrich the self-image of VR users … If you do not believe someone’s pain unless they wrap an expensive 360-degree video around you, then perhaps you do not care about their pain” (Yang 2017 cited by Jones 2020). Jones affirms, Yang’s position that the term “empathy machine” is “fundamentally malicious and ethically deplorable” (Jones 2020: 90).

However, Bailenson also critically reflects on empathy in VR by citing more complex examples from his Stanford Lab experiments that have added to the "VR empathy" discourse. Bailenson reflects on high-stress professionals, for example, those working in the medical sector such as nurses, doctors, and therapists, who suffer from "compassion fatigue", a condition all human beings are prone to experience as a coping mechanism to buffer the ongoing suffering and inequality of the world we live in (Bailenson 2019: 54). VR can re-awaken compassion through immersion where the viewer in VR experiences a collapsing of the boundaries between the self, and the other – taking on the perspective of another human being fosters feelings of prosocial compassion (Bailenson 2019: 55).

The Afrocyborg Collective experiments with how an expanded, exponential fractal gaze in VR can be generated as a bricolage theory of Quantum Ubuntu inspired by African interdependence, or "Botho and Ubuntu".[44] The conceptual idea of Quantum Ubuntu links back to Haraway's Cyborg Manifesto and her computer "integrated circuit" of the 1980s, which now takes on a whole new meaning in the context of quantum computing in 2023 (Haraway 1991: 127). Revisiting African ethics is critical in quantum computing converging with XR and AI (Schwab & Davis 2018: 6, 8). Schwab states that quantum computing will be the most disruptive technology to emerge from the nexus of 4IR (Schwab & Davis 2018: 74). I weave my anxiety about the unknown outcomes of these predicted disruptions in the African 4IR to produce a fractal gaze in VR cinematography. Linking ideas of quantum computing and Botho/Ubuntu ethics, I turn to a mathematician, Ron Eglash, who argues that all computing began in Africa. Eglash shows how digital circuits are based on Bamana sand divination, which uses deterministic chaos and early binary number generation that replicates "addition modulo 2" (Eglash 1999: 98). "Divination of the Earth" or geomancy uses the figures I or II, which were replaced with 0 and 1 to form the binary code that is now the basis of all computing (Eglash 1999: 100). Fractal recursion found in African art forms across the continent is the basis of fractal geometry (Eglash 1999: 195). This recursion is seen in the fractal gaze created in the making of *The Eye of Rre Mutwa*.

Quantum computing poses an enormous risk to Africa and Africans. Benyera states that quantum computing signals a race for global dominance and warns that Africa will be re-colonised by humanoid robots of the West. Benyera argues that these humanoids are

[44] Buntu describes the interdependency of "Ubuntu" as: "I am because we are. I can only be a person through others" (Buntu 2013: 6).

replicants of imperialism whose purpose is to recolonise Africa and Africans (Benyera 2021: 226). Benyera takes exception to transhumanism as electronic beings interact with analogue beings, rendering the interaction between the two species questionable (Benyera 2021: *ibid*.). Benyera warns that as AI, a primary 4IR technology, becomes infused into human beings, Human Rights will be compromised yet again, as was the case in all three preceding industrial revolutions (Benyera 2021: 223). While these 4IR-enhanced cyborgs are a source of much anxiety, the Afrocyborg conceptual framework asks us to be conscious of the technological disruptions that are about to change African societies fundamentally. Prosocial law and ethics are required to protect African futures as the 4IR unfolds.

VR is a cyborg technology

VR is a cyborg technology that collapses human/machine binaries. It's a cyborg technology because VR Head-Mounted Displays (HMDs) are audio-visual prosthetic extensions of human physiology and psychology. Like the first moon-walking cyborgs, VR is also a "psycho-physiological" extension of human sensory perception systems (Clynes & Kline 1995: 31). Lane refers to VR as a "consciousness simulator par excellence" (Lane 2019: 3) VR is not cinema or television. It is not like the transition from silent film to "talkies" or black and white to colour. It is a different medium with real, tangible and measurable psychological effects on the participant (Bailenson 2018: 10). VR can simulate actual psychological arousal in the viewer as if the VR experience were happening in real life (Bailenson 2018: 24). VR is capable of changing perception and modifying behaviour towards prosocial action that far supersedes the capacity of traditional motion picture formats because of the capacity to leverage embodied cognition (Bailenson 2018: 47, 148). Bailenson verifies that the power of VR-simulated learning environments lies in embodied cognition. The brain and the body, with all its sensory functions, engulf the user in ways that no other media can affect the human sensorium (Bailenson 2018: 28). By contrast, traditional screen media is entirely incapable of such visceral feats since it possesses no such haptic functionality and is entirely disconnected physically to the viewer. This ability to augment the human being in profound ways is why VR is a cyborg technology. It is capable of enhancing the human experience with measurable outcomes.

The origin story of the cyborg connects Science Fiction with Science Fact as both harness the SF genre tropes of space travel. To this end, the Afrocyborg VR X also invoke space/time

travel themes in our VR films. The term “cyborg” was first coined by Clynes in 1960 for a NASA conference on human modification for space travel in preparation for the 1969 moon landing (Clynes & Kline 1960: 73; Gray et al. 2021: 2). This idiomatic “cyborg” was used to describe how “man” might merge with technology to adapt for life as an astronaut (Clynes & Kline 1960: 73). While cyborgs owe their technogenesis to the moon landing, Cold War[45] and space race,[46] the new race to colonise and capitalise space travel has re-emerged, according to Marwala, who extends the metaphor of the Science Fiction classic, *2001 A Space Odyssey* (Kubrick 1968) to discuss the inequalities of recent astronaut adventures by Bezos, Musk and Branson, who are reinventing the space race using new digital technologies driven by 4IR (Marwala 2021). While the citizens of planet Earth were under global lockdown to curb the spread of the pandemic, these billionaires were floating in zero gravity.

For those of us planted firmly on terra firma, the twenty-first century VR cyborg is more “internaute”[47] than astronaut. Reconfigured by the method of “cyborgology”, which is the study of “cybernetic organisms” and how humans are modified by culture and technology, the creation of cyborgs begins with imagination (Gray 1995: 1; Gray et al. 2021: 8). The latest update on this school of thought is, *Modified: Living as A Cyborg* (2021), which looks back on a quarter of a century since the inception of “cyborgization”, where current scholars in the field claim; “You are a cyborg, deal with it!” (Gray et al. 2021: 1). Though admittedly totalising and over-deterministic, the cyborg is a generative trope or cliché (depending on your point of view), describing the ubiquity and excess of “human-machine symbiosis” (Gray et al. 2021:16).

Examples of medical cyborgs abound, from patients modified through cochlear implants, to immunisation and birth control injections. Medicinal psycho-active substances, even anti-depressants, are considered cyborg modifications (Hables-Gray 1995: 4). The psycho-physiologically modified cyborg was a medical solution at its genesis (Clynes & Kline 1995: 31). Similarly, VR has vast medical applications with quantifiable outcomes. The medical domain may well usher in the evolution of “Cyborg Homo Sapien” as biotech and infotech

[45] Haraway explains how A Cyborg Manifesto was a critique of Reagan’s Strategic Defence Initiative, dubbed operation “Star Wars”. US administration’s adoption of Cold War politics was infused with references to the popular culture film franchise *Star Wars,* which conceptually inspired her landmark essay (Haraway 2018: xxvi).

[46] Haraway asserts: “Cyborgs are named in 1960 in the context of the space race” (Haraway 2018: 223).

[47] “Internaute” is a term used to describe technologically adept people who surf the internet (Benjamin 2016: 46).

merge with the invention of Brain-Computer Interfaces (BCIs) and BCI-enabled VR (Gray et al. 2021:15).

Marwala affirms how 4IR-cyborgs are fashioned in the “confluence of the physical, digital and biological spheres through AI, automation, biotechnology, nanotechnology and communications technologies” (Marwala 2020: 6). Enter the cyborg – upgrades are now available for iHuman 2.0 as BCIs are designed to interface directly with the brain’s visual cortex, which will enable humans to see in Virtual Reality (Kurzweil 2005: 33; MacKellar 2019: ch 4: para 89, ch 5: para 47). Observing how humans design machines and machines redesign humanity, Benjamin notes, “The slow evolution of the human into the cyborg is both symptom and cause of digital technology, emerging both simultaneously and in advance of the culture and alternate reality of the cybernetic era” (Benjamin 2016: 36). VR is a hybridising Information Technology, which is a part of the ongoing evolution of “Homo Cyborg Sapiens to Cyborg Homo Sapiens” (Gray et al. 2021:15). While this research is informed by the praxis of cyborgology, the ocular cyborg prosthetic extensions under examination in this chapter are the newly emerging theoretical constructs driving the discovery of a new visual language to define the technological application of VR cameras and HMDs.

Learning to speak the language of VR

The ability of the viewer to watch a film in 360 degrees fundamentally changes the syntax of formal cinema. When the viewer wears a VR head-mounted display (HMD), they can choose where they want to aim their gaze inside the 360-degree spherical image. This viewing experience vastly differs from traditional media formats, such as cinema and television, because VR does not dictate where viewers should fix their gaze. It, therefore, requires the filmmaker to guide audience perception to activate their agency. This viewer “agency” in VR alters the grammar of cinema by comparison to single-lens cameras and traditional filmmaking. “Directing” in the VR medium is about guiding the audience to explore the spherical orb and discover the world of the story for themselves. The images below illustrate how head-tracking VR technology enables unprecedented audience agency in the context of cinematic VR.

French VR filmmaker Celine Tricart uses the analogy of an African archaeological artefact to draw linguistic parallels when learning to speak the language of VR by comparison to the

Rosetta Stone, inscribed with three ancient languages, which led Egyptologists to decipher Hieroglyphics (Tricart 2017: 81). Tricart urges VR filmmakers to conscientiously investigate the nascent medium of VR by way of comparative analysis in observing the rules of its media predecessors, such as theatre, gaming and cinema to avoid audience rejection of the medium through poorly executed projects. Tricart cautions VR filmmakers to learn the rules and not break them by editing too quickly or using close up, which are oddly disconcerting in VR due to the proximity of the HMD to the viewer. It is critical to instead focus on mastering embodiment, presence and immersion in this medium (Tricart 2017: 114).



Figure 31: The diagram shows the mechanics behind audience agency, which is the ability of the VR participant to interact with the media of their own volition when inside a VR Headset (medium.com 2018). The top row indicates the movement of three Degrees of Freedom (3DOF) experiences, while the bottom row indicates the additional movement abilities of six Degrees of Freedom (6DOF) VR experiences.

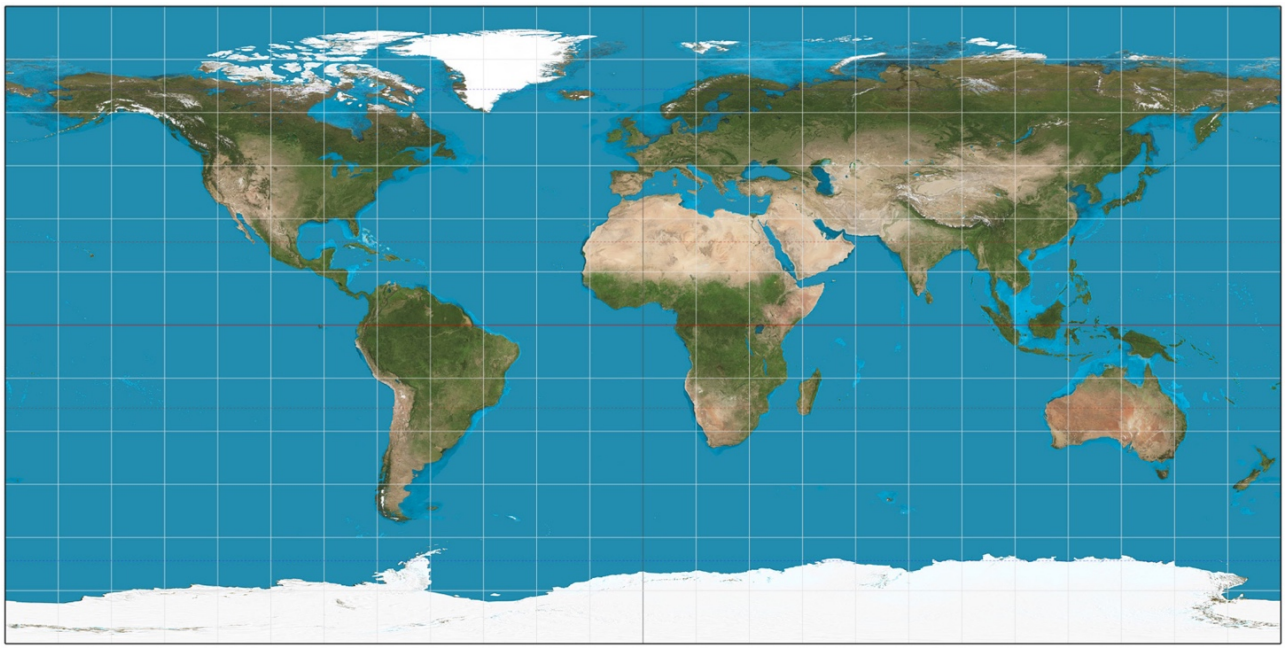


Figure 32: VR's map-like equirectangular format is represented as a 2:1 ratio rectangle, which wraps around a 360-degree orb to form a VR "world" (El-Ganainy & Hefeeda 2016 & Tricart 2018: 45). Tricart describes the spherical medium of VR in terms of "worlding", which is an overwhelming large image canvas compared to traditional cinematic formats and requires constant previsualization, or "previz", a colloquial industry term used to ensure cinematic and conceptual coherence (Tricart 2018: 29).

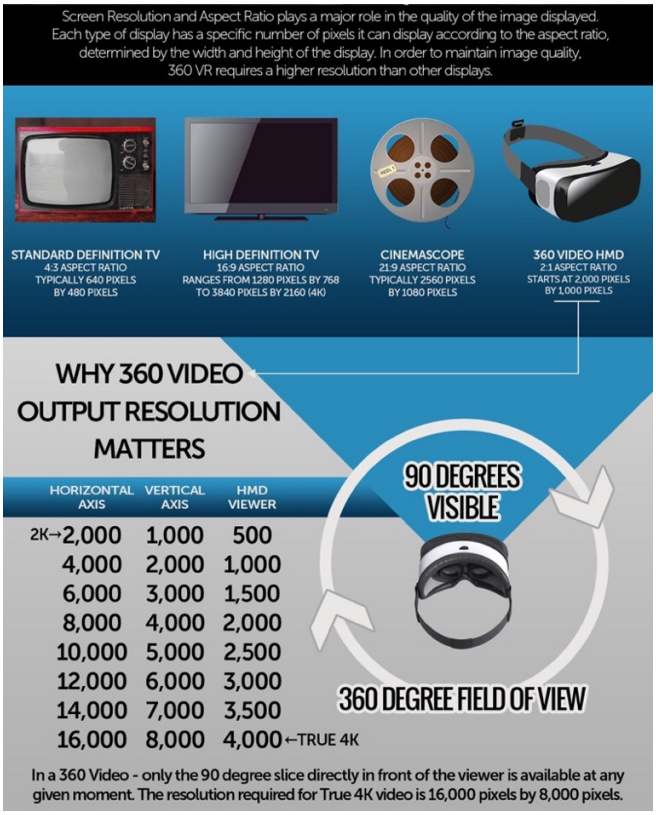


Figure 33: Compared to traditional media formats, the expansive VR canvas is significant (360rize.com 2017). VR therefore offers an exponential gaze afforded by the agency that the scale of the image provides in conjunction with 3DOF and 6DOF head tracking. Audience volition to explore the world of story accords them the power of co-creation since no two people will watch a VR film in precisely the same way. This audience agency is a step towards co-creation where the audience can select how they want a scene to unfold by choosing from various endings of a story or scene. This is facilitated by combining 360 video and VR game engine technologies to create interactive XR media experiences.

The equirectangular image generated by 360 VR video has an enormous aspect ratio of 2:1. It is a flat representation of a 360-degree sphere. The subsequent project files are massive by current standards – 4K resolution (4000 pixels), as opposed to 2K (2000 pixels), the resolution of most contemporary motion picture files (Tricart 2018: 21). Watching rectangular 16:9 format films the audience has zero agency because the director is fixated with "directing" or dictating the gaze of the audience. This becomes a critical point of departure to understanding the language of VR because the rules of formal cinema no longer apply. Montage, which is the basic sentence structure of motion picture medium, is rendered null and void in the medium of VR. To construct the narrative, you cannot cut to a different shot every few seconds. In VR, the filmmaker must hold the shot far longer than in traditional montage cinematic shot construction because of this new phenomenon of audience "agency". The filmmaker must give the audience time to explore the virtual world of the story at their own pace and level of curiosity. It is, therefore, an unavoidable fact that no two people will view or experience the same VR film in precisely the same way because they have the "agency" to explore the VR story according to their own subjective volition. For this reason, VR filmmakers are still grappling with developing this new language to understand how the viewer's gaze might be guided towards a specifically curated VR experience. Tricart describes audience "agency" as a result of VR being an art form that bridges what was previously considered to be "the missing link between gaming and traditional filmmaking" (Tricart 2018: 2).

In cinematic VR experiences, which are usually exhibited in a 3DOF (degrees of freedom) headset, such as the *Oculus GO*, the viewer is neither "spectator" nor "player", which is why she adopts the term "participant" to refer to the "user". "3DOF", or "three degrees of freedom", is VR headset technology that allows the user to track 360-degree rotational head movements but does not correspond with associated head movements of bodily movement in a forward or backward direction. In other words, the audience in a 3DOF VR experience cannot walk through a door into another location of the story. 3DOF technology allows the user to turn their head in a full 360 circle on a left/right horizontal axis and tilt it on a vertical axis up and down. Though somewhat limited, this is still profoundly different to formal motion picture, where the audience cannot explore the world of the story at all because the narrative is strictly dictated and not negotiable in terms of audience agency. The experience of VR cinema is like inserting your head into the world of story as opposed to the far removed and

distant gaze of the darkened cinema theatre experience, where the audience gaze is situated at a distance from the rectangular screen.

The audience is endowed with far more agency in a "6DOF" or "six degrees of freedom" VR experience, where they can move physically in the VR world, with corresponding body movement in the "real world" (Tricart 2017: 55). A 6DOF VR Headset, such as the *Oculus Quest*, provides far more "agency" than the 3DOF headset because it is built primarily for gaming where the "user" becomes an active "player" rather than a more passive "participant". 6DOF signals the evolution of VR media towards convergence, where participants will become increasingly more active and capable of incremental agency as the technology evolves. For instance, films with multiple endings, "story branches", or "parallel narrative structure" have been under discussion since the 1960s in the formal film industry, where the audience can, for instance, select their ending to a particular story (Hales 2015: 36). Like VR, "interactive cinema" also suffered many false starts but has remained outside of mainstream production (Hales 2015: 46). Transmedia online narratives have shifted the technological possibilities of interactive cinema, facilitated by the agency of the personal computer. With immersive media and Extended Reality (XR) technologies, interactive cinema is finally a reality. Interactive cinema, like VR, is an essential turn towards audience co-creation of the narrative as game engine software, such as Unity[48] is used more often in post-production to create VR and XR story worlds.

Molema could effectively apply audience agency via the choreographed movement of the dancers in concentric circles around the VR camera. Molema's proficiency in the domain of dance theatre afforded her a far more productive experience of applied agency since she had previously produced *The Cosmic Egg* as a successful public immersive dance theatre production in Gaborone. She was, therefore, confident of the conceptual feasibility of the project and focused her exploration of this dance theatre performance as a process of adaptation from live theatre to the new medium of VR. Choreographed dance translates well into VR because there is an intimate proximity between the dancers and the VR participant since both parties are "inside" the same story world. VR viewers experience raised heartrates and a desire to move with dancers when watching VR dance films (Tricart 2018: 83). In the emerging language of VR, it is easy to assume the verisimilitude of immersive dance and

[48] Unity is an interactive gaming software that combines computer coding and three-dimensional design. Increasingly, Unity is used worldwide in film and animation post-production industries to streamline workflows as the gaming engine can render complex effects in real time (Unity.com 2022).

theatre and VR. This visceral experience results from being there, or "presence", because it is an immersive encounter. There is no "frame". You are with the dancers inside the film. This feeling of being with the actors or dancers develops the argument for increased agency from an audience perspective, in addition to the audience being free to focus on any aspect of the staged mise-en-scene (Tricart 2018: 82). To it put another way, the audience is not only there, but they are also not forced to assume the point of view (POV) of the director and cinematographer in terms of framing and shot size. However, this does not equate to a reductionist assumption that dance or theatre equals VR or vice versa. The similarities between theatre and VR are only in the specific domain of "Immersive Theatre",[49] which is known to "break the fourth wall", as does VR (Tricart 2018: 82).

Molema's dancers beckon the audience to follow them as their movement guides the viewer's curiosity to follow the story by following the actors' movements. The action, therefore, takes place around the viewer, who is at the centre of the action. This mirrors Brecht's notion of breaking the fourth wall as a rejection of the illusion of theatre pretending to be a self-contained room, in which the curtain rises or falls; to reveal or conceal the "fourth wall", rendering it temporarily visible or invisible (Brecht 1964: 23). This outdated technique is problematic in that it renders the audience a voyeur and guilty of eavesdropping (Brecht 1964: 23). In *The Cosmic Egg,* the viewer is at the centre of the world of the story, thus breaking with this tradition. The Brechtian-inspired mode of "immersive theatre" almost always breaks the fourth wall by asking the audience to participate in the world of drama (Tricart 2018: 82). Agency and presence in VR are interconnected and facilitate deeper audience engagement with the film. This increased intimacy and agency afforded by the modified medium of VR is also symptomatic of the cyborg trope with its ability to enhance audience perception through a merger with the machine. The quantifiable effect on the audience's physiology is further evidence of an expanded gaze measured by increased heart rate and the urge to dance. "Breaking the fourth wall" takes on a new meaning in VR. VR breaks the boundaries between the real world "wall" and the virtual world "wall". This perceptual "error of parallax" is now a ubiquitous feature of the medium that further amplifies

[49] Immersive Theatre is defined by Adam Alston as the "production of thrilling, enchanting or challenging experiences, which feature as an important part of an immersive theatre 'artwork' that audiences co-produce by doing more than watching, or by augmenting the productivity of watching as a prospectively participating spectator" (Alston 2016: 3). Alston asserts that in Immersive Theatre experiences, the audience interacts freely.

the gaze in VR as the barriers between the viewer and the actor become increasingly vague; and more participatory, enabled by audience agency.



Figure 34: The still image above from *The Cosmic Egg* is in an equirectangular format. To see this image animated in spherical VR, click the link below: ***https://s.insta360.com/p/1d0532378a78329b7c0cdefaf54404e7?fbclid=IwAR3VYssC2nfLpWQ5PD80PiDCt02yXxckBdOHasYc_VCCSb4Zz2lRgCBI-1Y&e=true&locale=en-us.*** In VR mode, you will see the dancers form concentric circles of performance around the VR camera, echoing the trance dance methodologies of San healing ceremonies (Lewis-Williams 2015: 60). This choreographed circular movement guides the viewer's attention to explore the orbital format of VR in the headset by activating audience agency.

The cyborg language of Cinematic VR (CVR)

The power of VR lies in the fact that it abolishes notions of the square or rectangle by nature of its spherical orb form, where the VR experience escapes the frame and the walls. Audience interaction or POV in VR is critically expanded to the point where the language of cinema is incoherent to describe VR, which is why there is so much emphasis placed on the question of “Why VR?” when conceptualising a VR film. Molema answers the “Why VR?” question through the process of transmogrification from dance theatre to VR, where she succinctly breaks the fourth wall by placing the VR camera at the centre of the San trance dance, where the fire traditionally would take centre stage. San trance dance is performed in a circular motion around a fire. Molema uses these circles of action around the VR camera, which further echo the egg's circular aesthetics, the geoid shape of the earth, and the orblike VR viewing experience itself. /Xam trance dance is central to spiritual practice and used for healing (Lewis-Williams 2015: 60). In /Xam mythology, Kaggen, the cyborg trickster, is an

incarnation of Prometheus who steals fire from the gods (Lewis-Williams 2015: 66). Sandoval affirms that the trickster in global South mythologies is a shapeshifting chimaera of Haraway's cyborg (Sandoval 2000: 168).

The Cosmic Egg also uses the spherical nature of image design in VR by using the language of Cine-CV or CVR, which is based on the Solar System and orbits around the spherical camera to plot the continuously evolving lexicon of VR image construction (Williams, Love & Love 2021: 24).

The language of shot sizes and frame sizes now refer to the proximity to the VR camera where the close-up, medium close-up, mid shot, long shot, and wide shot have developed into "I-N-F-O orbits": Inner, Near, Far and Outer orbits (Williams, Love & Love 2021: 22). The new lexicon of Cine-VR, or CVR, invokes terminology from astronomy and physics to explore VR shot compositions about camera coverage such as: "gravity", the "Newton configuration" and the "Copernicus configuration" (Williams, Love & Love 2021: 24).

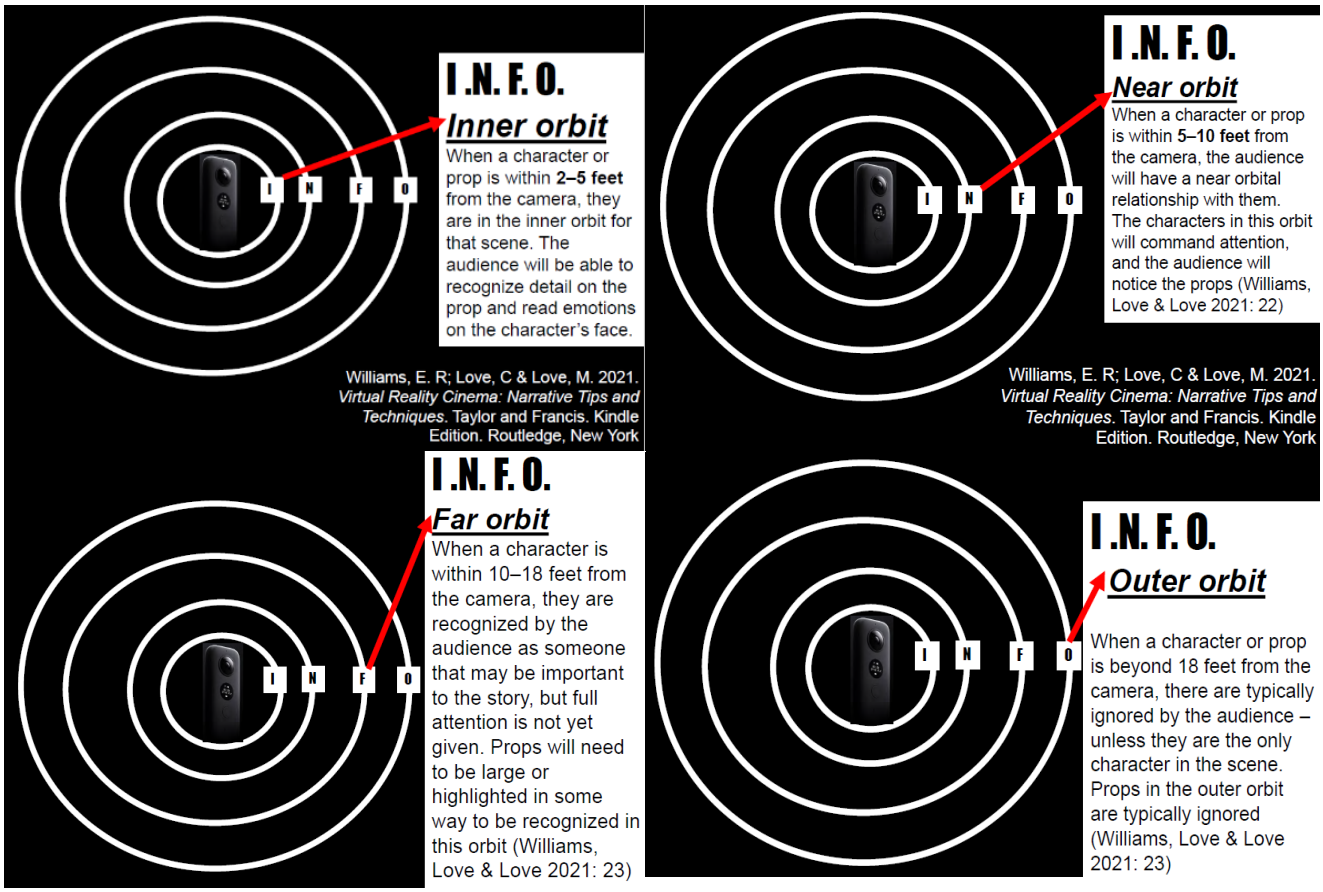


Figure 35: Extracts from a lecture on VR

VR cinematic gaze = traditional cinematic gaze[2]

Building on the language of physics applied to the evolving lexicon of CVR, I adopt Williams, Love and Love's vocabulary, which appropriates terminology from astronomy to comprehend the creation of 360 video VR. Through visualisation and prototyping, I hypothesised that the VR camera squares the gaze of traditional filmmaking. I make this claim based on the mathematical calculation of multiple wide-angle lenses that increase the field of view when stitched together to form a 360 orb. This dramatically expanded image endows the audience with the agency to direct their own gaze with unprecedented volition across a considerably bigger picture.

I also base this claim on how VR opens the aperture of the mind's eye due to the cyborg synesthesia this technology asserts on the human perceptual system. Miriam Ross (2018) argues that VR possesses qualities of synesthesia, a neurological condition which activates intertwined sensory experiences such as seeing music or hearing colour. VR-induced synesthesia collapses the senses into overlapping domains when the human body experiences "body transfer" via multisensory optical illusions, which teleport the brain into constructed parallel media worlds. Ross argues that the whole body is being assimilated into the machine, which produces potent media experiences which are the result of almost two centuries of media practice (Ross 2018: 2). This phenomenon significantly amplifies the gaze, elevating the VR cinematic encounter, which subsumes the viewer into the digital realm via "neural seduction" (Lane 2018: 47). This is a result of the participant encountering a "subjective experience, rather than the purely observational experience like that of television or film" (Lane 2018: 9). This subjective encounter is a result of VR's unique ability to deliver audience agency, as the viewer navigates their own gaze. This is a hitherto unknown phenomenon in the hundred years of motion picture production history. The consequent theory of "neural seduction" posits how "VR demands your attention", rendering it "fundamentally different to all other technological innovations" (Lane 2018: 10). The neurological chicanery of VR convinces human perception that an image is real, which short-circuits the cause-and-effect response in the mind of the viewer, causing the participant to assimilate virtual stimulus with measurable corporeal response in the virtual domain (Lane 2018: 20). Audience agency, body transfer and "neural seduction" render the gaze of VR squared in comparison to traditional media formats, which cannot achieve these effects on the human perception system (Lane 2018: *ibid*.).

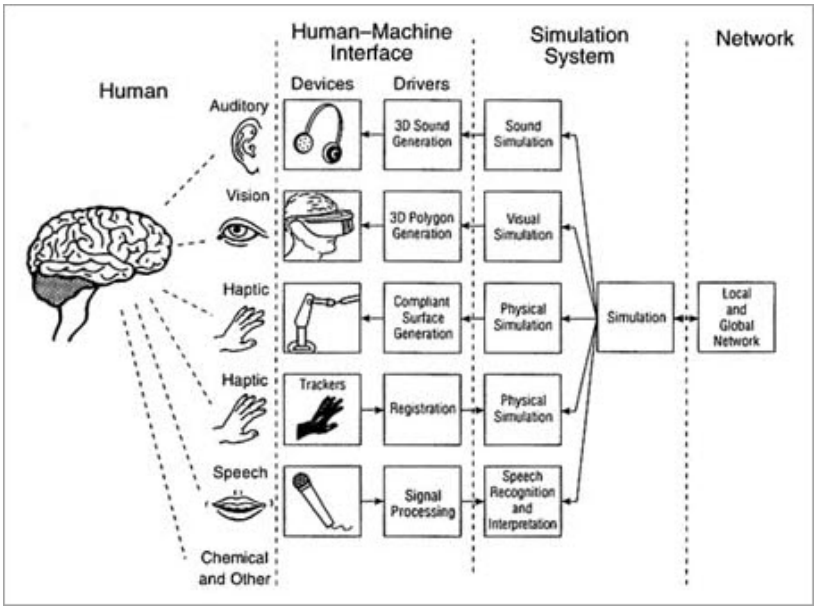


Figure 36: The diagram illustrates how the sensory perception systems in humans are captivated by VR technology (softwaretestinghelp.com 2021). Ross argues that VR endows the viewer with synesthetic abilities (Ross 2018: 2).

Experimenting with awe and synesthesia in *The Eye of Rre Mutwa*

VR squares the gaze of traditional cinema. I argue this based on Beilenson's assertion that: "VR is more psychologically powerful than any medium ever invented and is poised to transform our lives dramatically" (Bailenson 2018: 7). This is one of the reasons why the medical profession is experimenting with VR to induce awe in patients suffering from depression, or to expedite convalescence in hospitalised patients. This results from VR's unique ability to induce awe through "presence", which is a feeling of being transported to a different place. Awe is simulated in VR by creating virtual encounters with natural phenomena such as starry night skies, forests, or ocean vistas. Inducing awe in VR has been shown to have transformative capabilities to treat psychological and physical ailments (Chirico, Ferrise, Cordella, & Gaggioli 2018: 1). Furthermore, inducing feelings of awe has the prosocial benefit of enhancing human consciousness to become "wide-open" and aware. Awe expands the conception of the self to where one can perceive reality with a broader lens on one's own identity (Siegel 2022: 69). Awe enables human beings to transcend negative emotional states and fosters a sense of connection with people and the planet as opposed to seeing ourselves as sperate solo individuals. Dan Siegel, professor of clinical psychiatry, calls this Intraconnection. Siegel's thesis of seeing the self as a multiple "Mwe", not an I – alone and separate in the world, creates this phenomenon of intraconnection, which he links to the early wisdom traditions from around the globe, including Ubuntu (Siegel 2022: 45).

Connection and integration is critical wellbeing. Connecting regularly with the experience of awe offers human beings palliative benefits to overall health and wellness (Siegel 2022: 56)

In making *The Eye of Rre Mutwa*, I generated two moments of awe informed by Chirico et al. 2018. The first moment is when the viewer puts on the headset and is instantly teleported into a Science Fiction space setting where they hover, in defiance of gravity, just above a tiny planet in the shape of a human eyeball. The character of the All-Seeing-Eye is a cyborg incarnation of Credo Mutwa. When viewers look down and see the talking planetary eye below them, most would say, *"Wow!"* I interpret this to be a moment of awe. In a recent encounter, a busload of school pupils came to visit the Fak'ugesi Digital Art Festival where the Afrocyborg VR Collective were showing our two films. A young boy who appeared to be seven or eight years old exclaimed: "*Jesus!"* when he looked down and saw the Eye of Mutwa as a tiny planet talking back at him. As Chirico et al. 2018 suggest, I set the world of story around a miniature fictitious planet in space, which, by the manipulated spatial scale of the virtual world, would imply "awe" to the viewer (Chirico, Ferrise, Cordella, & Gaggioli 2018: *ibid.*). For some, the semiotic of an All-Seeing-Eye conjures the sinister surveillance metaphor of Foucault's "panopticon" (Foucault 2019: 250). I would argue against this interpretation as "Pantopticism" functions from a top-down perspective, whereas the Eye of Mutwa is strategically placed facing the audience in an upward direction from below (Foucault 2019: 244). This bottom-up perspective cannot be an instance of "panopticism" as it defies the top-down hierarchical gaze of all-seeing power. The creative intention in constructing this gaze was that the viewer would feel like an astronaut or rather an "Afronaut[50]" as they hover above the eye-ball planet, much like what one would imagine the experience of walking on the moon to be.

[50] The term "Afronaut" is a reference to the Senegalese Afrofuturist fashion designer, graphic artist and VR filmmaker, Selly Rabe Kane who collaborated with photographer, Cristina de Middel on the book titled, *The Afronauts on a Mission to Mars* (Ngué 2013). Their work was inspired by Edward Nkoloso, who founded the Zambian Space Station in 1960, stating; "If black people aren't allowed to dream, how can we create something?" (Heidenreich-Seleme & O'Toole 2016: 38). Nkoloso's astronaut ambitions were also realised from beyond the grave in a short film titled, *The Afronauts* (2014), by Ghanain filmmaker Frances Bodomo, where Diandra Forrest floats in an oneiric space-pod. Bodomo's African woman in space subverts the cybernetic origin of Kline and Clynes's intention to put a white man in space through cyborg modification (Kline & Clynes 1961). The African cyborg, it seems, has the potential to redeem cyborg ontology from Western telos and its propensity for "escalating dominations of abstract individuation, an ultimate self, untied at last from all dependency, a man in Space." (Haraway 1991: 151).

Viewers did relax when the two actors are teleported into the scene north and south of the viewer. On the other hand, some viewers experienced a moment of vertigo and thought they might “fall” into the galactic void due to the weightlessness of floating above the planetary eye throughout the film. A recurring problem we noticed with audience agency in the viewers who watched our films at RapidLion Film Festival and FNB Art Fair in 2021 were not familiar with VR and therefore did not always know that they could look around in 360 degrees. Many viewers sat facing forward like in a traditional cinematic encounter, expecting the mise-en-scene to be dictated to them from the perspective of the director’s gaze. In VR, South African audiences still expect the film to unfold before them in a 90-degree field of view. They are often unaware that the field of view extends to 360 degrees in all directions and therefore requires their interaction to absorb the film's intended meaning. We found that at both physical festivals, we had to engage in a lot of viewer education at the exhibition of the films so that the audience could begin to activate their hitherto unknown agency.

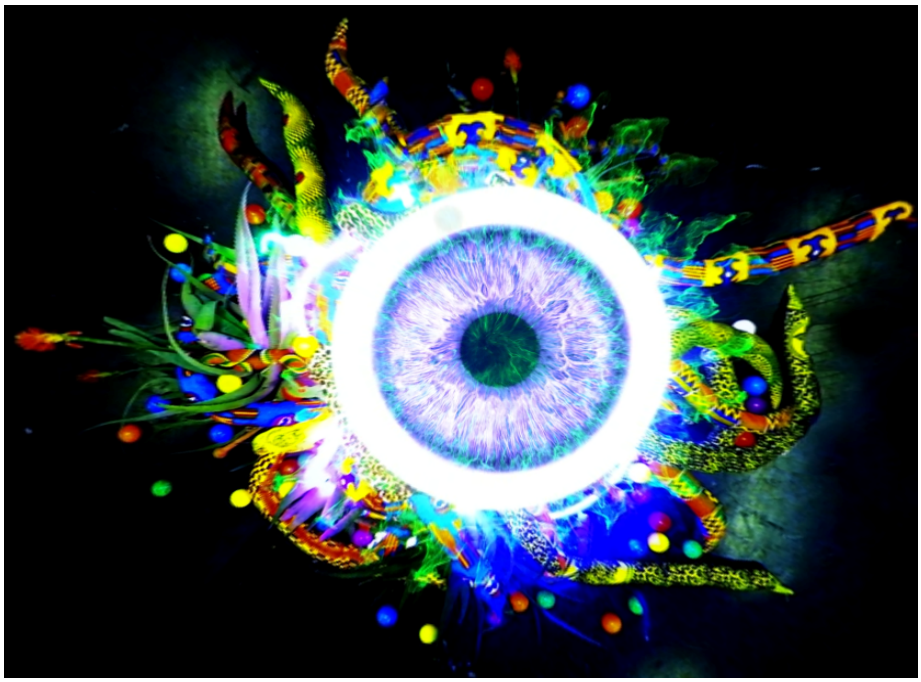


Figure 37: A still image extracted from *The Eye of Rre Mutwa.* In this VR film, Credo Mutwa is represented as “The All-Seeing Eye”, an ancestral spirit in the shape of a talking miniature planet-sized eyeball, which changes colour and emits Sci-Fi supernatural smoke ripples as the cyborg character speaks. *The Eye of Rre Mutwa* is a pan-African bricolage of semiotic references to “The Eye of Ra”, who is the daughter of the Egyptian Sun King Ra, or Re. The floating eye in this VR film represents a mythical ancestral biome. The ancient Eye of Ra is co-opted to represent a timeless, genderless African cyborg gaze as a metaphor for the multiple lenses imbricating the expanded cinematic gaze of the VR camera.



Figure 38: RIGHT: The Insta360One_X VR camera inside the mirror prism while shooting the final scene of *The Eye of Rre Mutwa*. In this scene, the actors plaited their green and blue braids into each other's hair. The plaits had LED lights woven into them and were made long enough to extend through this triangular mirror tube and light the shot from within so that the viewer could see Ibokwe and Boyer braiding their hair into one another's plaits. The camera remained in the centre of the mirror pyramid, with the two plaits placed on either side of the camera. While this scene was tiny to shoot and execute, the effect when watching the film is expansive. This results from fractal geometry's "infinite" aesthetics and fractal cinematography.

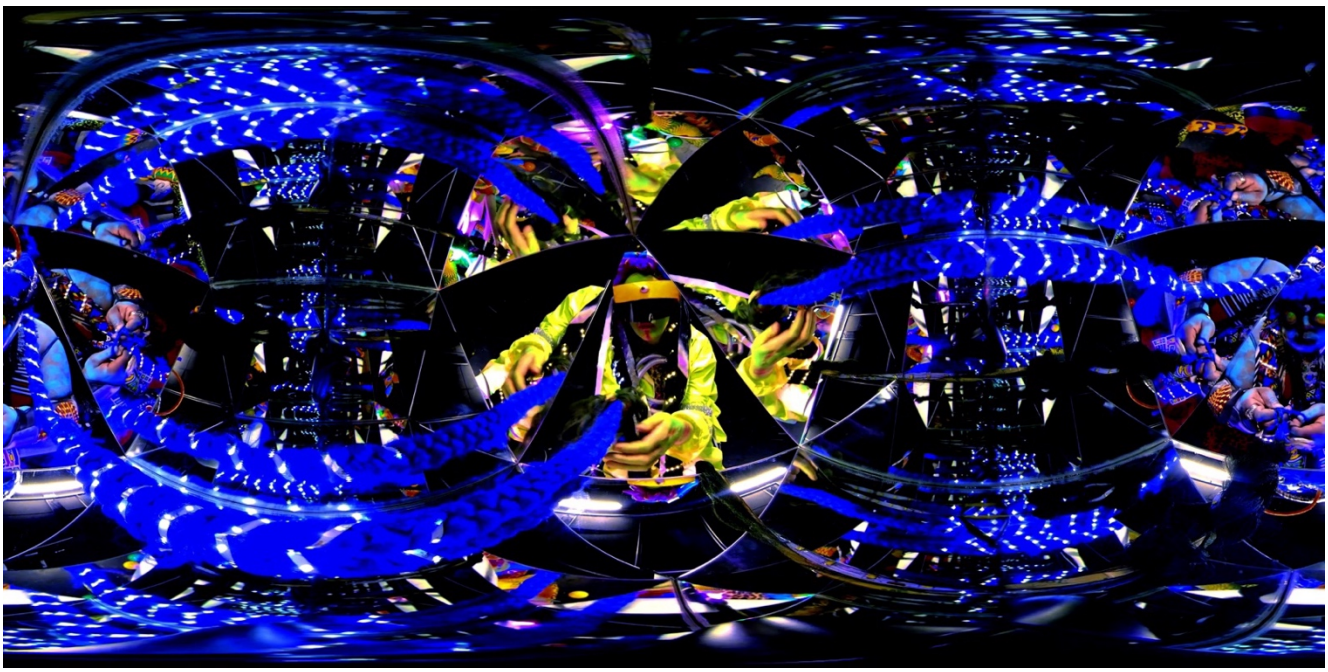


Figure 39: Fractal VR cinematography in *The Eye of Rre Mutwa.* The still image from *The Eye of Rre Mutwa* is in an equirectangular format. To see this image animated in spherical VR, click the link below:

https://s.insta360.com/p/9bcab78bef8f1c4f221dab691db230df

Both actors are positioned at either end of a mirror pyramid tunnel with the VR camera placed inside. In VR mode, you can click & drag the image with your mouse to activate your audience agency. You have the freedom to choose how you want to explore the image. The VR image is not confined to a frame. Fractal cinematography exemplifies Haraway's "pleasure in the confusion of boundaries" (Haraway 191: 150).

The second moment of awe I could create was by harnessing fractal cinematography in VR. In this scene, the actors are connected via their blue and green braids to form an unbroken circular shape around the VR camera, placed at the centre of the action. In this fourth act climax or dénouement, the aesthetics of infinity observed in fractal cinematography enhanced the conceptual relevance of this scene, where the conflicts raised in earlier scenes needed to be resolved. The visually arresting multiplicity of fractal cinematography represents a way to motivate the fractured identities explicated in the previous scenes that explore the power struggles of the global North and South through the trajectories of 1IR through to 4IR. In this scene, I was trying to create a visual metaphor for my connection with Molema by forming the Afrocyborg VR X, which would illustrate our interconnectedness per Haraway's analogy of the computer-integrated circuit (Haraway 1991: 127). The integrated circuitry of Haraway's cyborg takes on an exponential gaze by the fractal imagery, which amplifies multiplicity in reflecting the anxieties of 4IR amid the twenty-first century. The fractal geometry reflects fractured identities but also delights in the erasure of boundaries. In this scene, I explore Haraway's blurring of divides made visible as fractal cinematography renders it almost impossible to tell where Ibokwe and Patricia begin or end. Their interconnectedness becomes a visual representation of my notion of Quantum Ubuntu. It asks the viewer to take a leap of consciousness out of the self into a limitless kaleidoscopic, quantum view of human intraconnection or interdependence. Siegel links Mwe with awe and Ubuntu as states of expanded consciousness when we embrace the multiplicity of our being-with. A part of all beings and all substance, right through to the quantum realm of electrons and photons (Siegel 2022: 32). An extract of dialogue and the corresponding visuals from this scene illustrates how I have tried to generate a feeling of awe that suggests Quantum Ubuntu.

IBOKWE VOICE OVER

What we need is a new Pantheism to save the planet.
A New Singularity informed by Black Quantum Futurism.
Deus Sive Natura!
Quantum Ubuntu – we are all particles –
Atoms, neutrons and protons,
Spinning in infinity,
Orbiting around,
One another.
For all eternity.

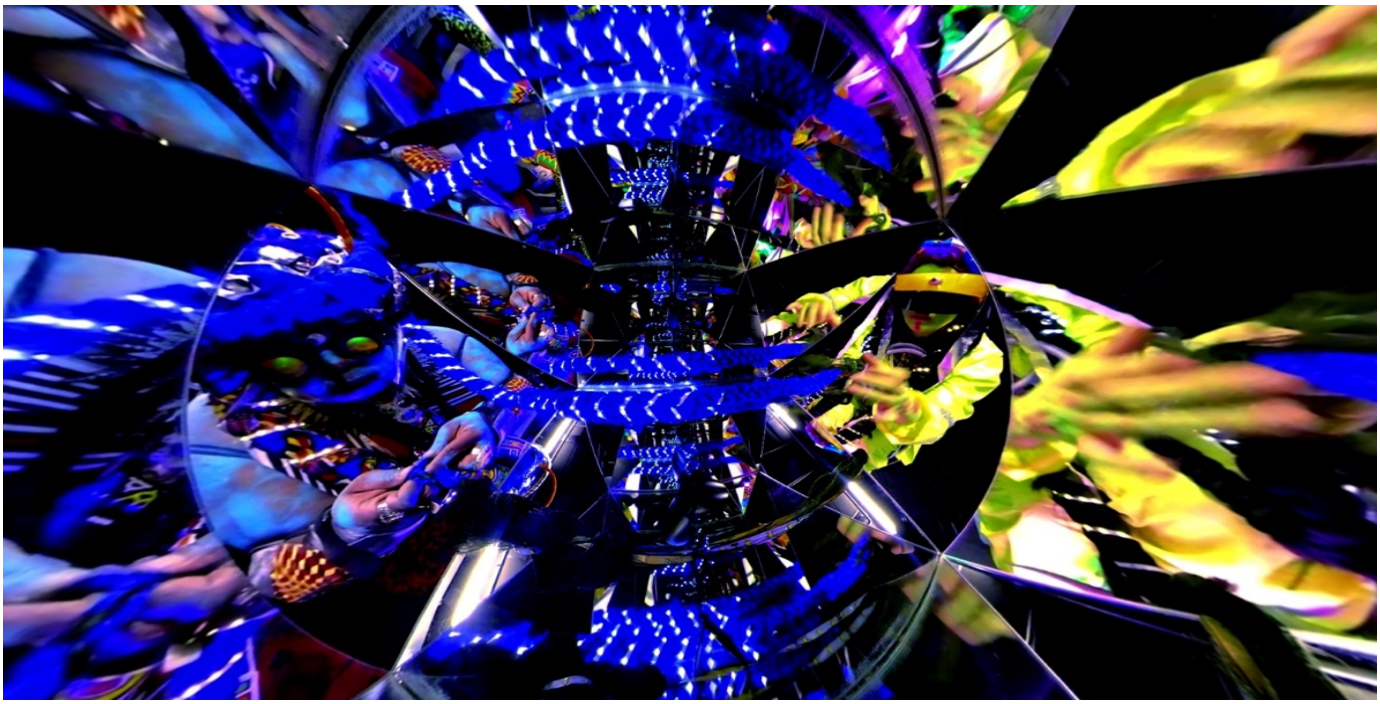


Figure 40: Fractured identities: non-binary representation in fractal VR cinematography. The image describes fractured identities, representing the coalition of gender, race, and class that refutes 'essential' unity. Race, gender and class consciousness result from the socio-political realities of colonialism, patriarchy and capitalism (Haraway 1991: 155). Fractal cinematography creates a semblance of algorithmic repetition, which is irreducible to representation (Roberts 2020: 333). Fractal cinematography liberates possibilities of new virtual worlds (Laruelle 2012: 81). Fractal cinematography "challenges long-held views about our thinking about photography by rejecting totalising universal notions of binary constructs. The fragmented fractal image is non-binary (Rubinstein 2020: 338). Fractality celebrates multiplicity.

In this scene, I aimed to resonate with Haraway's 3IR cyborg, hoping that my 4IR Afrocyborg might forge quantum affinities and infinities as illustrated by the notion of infinity in the form of geometric fractals found in ethnomathematics throughout Africa. This technique seemed to conjure the "infinite" as feedback loops, invoking the divine (Eglash 1999: 83). The geometric fractals created inside the mirror prism generate recursive patterns, which is a semiotic choice informed by Eglash, who attests to the widespread use of fractal geometry

across the African continent in the variant forms of basket weaving, cloth design, sculpture, architecture and hair braiding (Eglash 1999: 53). Recursion in African fractal geometry as a mode of ethnomathematics, that calls on the problematic notion of infinity to express the divine (Eglash 1999: 18). In the construction of this virtual mise-en-scene, I was able to create a feeling of “awe” in the viewers who expressed a mixture of surprise and amazement at the use of fractal cinematography in VR.

Laruelle affirms the connection between the mathematics of fractal geometry and a feeling of awe. This moment of awe using fractal cinematography was achieved by summoning the infinite in what Laruelle calls a “vision-in-One”, which he argues can be “applied to the transcendence of perception” (Laruelle 2011: 139). Laruelle describes the philosophical nature of the “fractal vision of the world”, which he claims renews “old philosophical themes”, such as notions of “the self” as a “microcosm” and “God” as a “macrocosm” (Laruelle 2011: 139). These ideas remain very useful in communicating the central themes in *The Eye of Rre Mutwa*, which by being a homage to a High Isanusi and luminary isiZulu Sangoma, embrace the supernatural and spiritual dimensions of the Science Fiction genre. Laruelle postulates that if we can see God, God must see us too. The fractal geometry that cascades into infinity are both continuous and interdimensional. Here the real and the reflected reality become “immanence, and a fractal artist can want nothing other than immanence, even when she speaks of God” (Laruelle 2011: 139). In *The Eye of Rre Mutwa,* God is “uNkulunkulu, the Great Spirit” (Mutwa 1965: 32). As reflected in the opening lines of dialogue by Ibokwe, God is “The formless, ageless, immortal uNkulunkulu, The Highest of the High” (Mutwa 1965: 35).

As the image fractures into countless repetitions, the ability to distinguish between the aesthetic geometric recursive reflections and fractal philosophy becomes uncertain and open-ended. The fractal image appeals to both “concept and logic”; as such, I anticipated this technique would point the viewer towards catharsis in contemplating their relationship to the infinite. The “infinite” being known to simulate “awe” in the mind of the viewer (Chirico, Ferrise, Cordella, & Gaggioli 2018: 1). In this spherical engagement with infinite fractality, I was trying to create a moment of potential transformation and metamorphosis where the philosophy of fractal cinematography might prove true in the “real world”. In doing so, I posit an “exponential” gaze in VR, which might conceive of a new vision of consciousness expansion. Laruelle’s theory of fractal imagery implies the interconnectedness or “interbeing”

found in the philosophy of Ubuntu. Interbeing and Ubuntu woven together to become a quantum "rhizome", which "has no beginning or end; it is always in the middle, between things, interbeing, or *intermezzo*" (Deleuze & Guattari 1980: 25).

My creative intention with this shot design was to engender a prosocial gaze of African-ness in VR by simulating a sense of Quantum Ubuntu, which might merge the scientific with the spiritual, to achieve a higher state of consciousness by applying aspects of techné working together to create awe. Quantum Ubuntu is not the tired-out trope of rainbow nation rhetoric. It is a new mode of rhizomatic interbeing which is always in conjunction with the self and the other. Quantum Ubuntu is a revolutionary ontology and alliance required to overthrow and apprehend the "algorithms of oppression", which "do away with foundations, nullify endings and beginnings" (Umajo Noble 2018; Deleuze & Guattari 1980: 25).

My intention was to place the viewer inside the fractal loop, which generates a kaleidoscopic mode of seeing. The viewer can gaze at both actors, positioned north and south of the two VR camera lenses, which I anticipated would dissolve boundaries to construct a visual simulation of "Ubuntu", "Botho" or "Interbeing"[51] (More 2004: 174 & Hanh 2020: 32). Mabogo More describes Ubuntu as defying a single character but is endowed with multiple overlapping meanings, which add to its richness. "Ubuntu" in isiXhosa or isiZulu, or "Botho" in Setswana, refers to "African communalism" or "African humanism", which communicate a range of ethics and values, including sisterhood, humility, empathy, compassion, honesty, sharing and caring (More 2004: 174).

Calls for the rejuvenation of Ubuntu in the legal sphere of African jurisprudence offer critical scholarship now emerging to draw our attention to the pitfalls of posthumanism. Nhemachena, Warikandwa, & Amoo (2018) caution against the "contemporary crusade" for cyborg hybridisation as biotech and infotech give rise to nanobots, human cloning and gene editing, which are harbingers of humanity trying to transcend their "mortality and morbidity". Nhemachena, Warikandwa, & Amoo cite slavery and colonialism as predecessors to transhumans in the context of 4IR, as these new species of beings will threaten the very notion of African humanity and cancel their concomitant Human Rights (Nhemachena,

[51] "Interbeing" has multiple open-ended meanings. From a metaphysical point of view, Hahn describes "interbeing" as a theological strategy for the transformation of consciousness: "We need to look deeply into the nature of interbeing because all of us have the seeds of discrimination in the depths of our consciousness which need to be transformed … we have to transform this tendency of dualistic thinking" (Hanh 2020: 32).

Warikandwa, & Amoo 2018: 31). Nhemachena, Warikandwa, and Amoo argue that cyborg beings disrupt Human Rights as they destabilise the boundaries of humanity when human-machine hybridity calls into question the nature of the human being. For instance, humanoids cannot own property, and have no rights, since they do not conform to the category of "human". To prevent this disruption, Nhemachena et al. suggest a directive towards correcting this dehumanisation by calling for "African Ubuntu-informed jurisprudence". Ubuntu-jurisprudence implies restoration, reparations and restitution to victims of Human Rights abuses (Nhemachena, Warikandwa, & Amoo 2018: 26). The implementation thereof, unfortunately, remains a matter of speculation. Resistance to neo-colonial patterns of data colonisation begins with consciousness. We must know and think about what is happening in the world. Denialism or aversion to 4IR is not helpful. 4IR is happening whether we like it or not. Being informed about it is the beginning of safeguarding Africa's collective interests. We cannot take action without knowledge to generate a strategy to apprehend data coloniality. Technology, like money, is neutral. It is human intention that creates the outcome. It is precisely for this reason, and the need for this message, that the Afrocyborg VR X make Prosocial VR.

Regardless of your ethical conviction on hybridising humanity, surgically implantable BCIs, or "wet devices", are already available on the market, evidenced by Musk's *Neuralink and Neural Lace* (neuralink.com). Big data is the currency of 4IR, and its extraction is currently not subject to regulation or law because "Africa lacks strong institutions to regulate data mining" (Benyera 2022: 44). With data harvesting akin to the wealth generated by the oil industry, the invention of *Neural Lace* and *Neuralink*, allows the manufacturers of these devices to harvest data directly from the fountain of knowledge – the human mind itself.

Data colonialism seems plausible as 4IR merges neurotechnology with XR and AI devices, which are predicted to be soon adopted as consumer goods (Schwab & Davis 2018: 72; Musk 2020 neuralik.com). The closing lines of dialogue in *The Eye of Rre Mutwa* summarise the concerns of cyber-colonisation by citing Mbembe, who speaks through the voice of the All-Seeing-Eye, which channels seer, Credo Mutwa:

THE ALL SEEING EYE (Voice Over)

(IBOKWE channeling Mutwa)

The only way we can fix the future is by seeing each other eye-to-eye.

Achille Mbembe warns of a planetary turn:

"The destiny of our planet will be played out,

to a large extent, in Africa.

This planetary turn of the African predicament

will constitute the main cultural and philosophical event of the

21st century."

Africa represents the last frontier of capitalism.

Keep your eyes open.

Indaba, My Children.

While the potency may have been robbed from the word "ubuntu", resulting from corporate/capitalist misappropriation, the millennial generation of young Africans is asking for a return to the unifying power of this quintessential African philosophy. Zoghlami wants us to think critically about the challenges of the Metaverse and Meta infiltrating the African XR ecosystem. The "born-digital" generation is asking for a renewal of Ubuntu ethics to guide us through the tumultuous disruptions of 4IR (Zoghlami 2021). The virtual world needs ethics, as the "Facebook Files" have shown (bbc.com 2021). These ethics are the values held dear by our ancestors; "respect, integrity, humility, sharing, community, generosity, benevolence, trust, determination, commitment, efficiency" (Zoghlami 2021). We need to reinvigorate Ubuntu to counteract the ethical problems posed by the cyborg fusions of infotech and biotech in the tools of 4IR.

In this chapter, I have explored the idea of twenty-first-century Quantum Ubuntu to destabilise the patterns of past/present/future histories of economic oppression that threaten to repeat themselves algorithmically from 1IR to 4IR (Benyera 2022: 44). Hlumelo Biko

reimagines the pan-African philosophy of Ubuntu and Botho as a belief system based on the intraconnection of life, in so far as “everything is everything”, which Biko claims generates the perspective of abundance and wealth (Biko 2019 ch 1: para 33). If everyone and everything are interconnected, the perception of our collective lives and well-being may evoke Ubuntu, which ensures life, liberty, happiness and prosperity for all through communalism (Biko 2019: 74, 151). This idealist vision of Ubuntu has been the subject of critique by Nyasha Mboti in, *May the real Ubuntu please stand up?* (Mboti 2015: 125). Riffing off the lyrics of Slim Shady, Mboti implies that there is a lot of fake Ubuntu in circulation. Mboti interrogates Ubuntu used as a totalising platitude to suggest that all Africans are harmonious, communal beings. Mboti calls this the “greatest harmony” principle, which he equates to a hegemonic imposition (Mboti 2015: 126). Mboti proposes that we re-read Ubuntu through an isotropic lens, meaning that Ubuntu, like the messy realities of life, is not binary (Mboti 2015: 143). Ubuntu should be seen as isotropic, offering a multiplicity of omnidirectional uses.

Following the recommendations of Mboti, I offer a creative visual rendering of Quantum Botho/Ubuntu as an isotropic philosophical framework that informs the Afrocyborg mode of Prosocial VR filmmaking; and how this can be used as a way to think and act on the need for renewed ethics to govern our collective interests in the African 4IR. In this way, I have answered the research question of how African women VR filmmakers construct prosocial African Science Fiction in VR.



Figure 41: photographs by Moratiwa Molema from the opening night of the RapidLion Film Festival in 2021, where *The Cosmic Egg* and *The Eye of Rre Mutwa* were exhibited to an audience for the first time as Covid protocols were somewhat relaxed. **Figure 42 & 43:** BOTTOM LEFT & RIGHT: the pan-African VR showcase posters for RapidLion Film Festival 2021. As part of the research for this creative PhD, I curated the pan-African VR showcase at the RapidLion Film Festival in collaboration with Electric South, AFDA and Digital Lab Africa. Eight films from across the continent were featured: Ghana, Senegal, Kenya, Zimbabwe, Botswana and South Africa.

Figures 42 & 43: BOTTOM LEFT & RIGHT: the pan-African VR showcase posters for RapidLion Film Festival 2021. As part of the research for this creative PhD, I curated the pan-African VR showcase at the RapidLion Film Festival in collaboration with Electric South, AFDA and Digital Lab Africa. Eight films from across the continent were featured: Ghana, Senegal, Kenya, Zimbabwe, Botswana and South Africa.

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Figure 44: San rock art informs the eco-myth in *The Cosmic Egg*. Evidence shows pre-historic cyborgs in San mythology and paintings depicting human-animal transhuman beings from as early as 27 000 BCE (africanrockart.org; Lewis-Williams 2011: 27). Ostriches depicted in the rock art above are one of 4 000 images located in the Tsodilo Hills of Botswana, south of the Okavango Delta, which became a World Heritage Site in 2001. (Ego 2019: 157, 295). Archaeological evidence shows 70 000 years of San occupation of this site (Brower Stahl 2005: 321)

CHAPTER 4:
Prosocial VR in the creative praxis of Quantum Botho/Ubuntu in the making of *The Cosmic Egg* and *The Eye of Rre Mutwa*

The African origins of the Afrocyborg

This chapter weaves together the Afrocentric influences that inform the conceptual framework for constituting the Afrocyborg representations in the two VR films, *The Comic Egg* and *The Eye of Rre Mutwa*. The meta-narratives of *the egg* and *the eye* articulate technofeminist, postmodern, post-colonial and neo-Marxist modes of thought, expressed as Quantum Botho/Ubuntu in the genre of African Science Fiction, which informs the sub-genre of cyborg cinema (Short 2005). In this chapter, I will show how both films are examples of cyborg cinema. The multiplicity of the cyborg, as per Haraway's post-modern construct, is central to both films. The fundamental difference is that in *The Cosmic Egg* and *The Eye of Rre Mutwa*, our cyborgs are re-interpreted through an Africa-centric lens to decolonise the cyborg and re-read it as an intraconnected, multi-species being that reflects communal identities or Ubuntu/Botho. Our Afrocyborg protagonists are exemplars of Quantum Botho/Ubuntu. This central philosophical notion connects the two films and informs how we have made these two Prosocial VR prototypes in the context of VR as a tool of 4IR. Both VR films are analysed here individually by focusing on the theoretical constructs that inform concept, narrative, performances, aesthetics, and the innovative use of the VR medium as ocular "muthi". Our Prosocial VR theory of Quantum Ubuntu/Botho, linking the two films conceptually, is a conscious expression of how a decolonised gaze of African futures can be generated when all elements of the mise-en-scène work together in the mode of Prosocial and Fourth VR (Aitamurto et al. 2021; Bailenson 2018; Wallis & Ross 2020). This chapter will elaborate on the analysis of each film, detailing specific semiotics in both films that equate to Prosocial VR informed by Quantum Botho/Ubuntu. I will demonstrate how both films answer the second research question by practising transgressive and transformative gaze regimes in VR, contributing to the decolonial undoing of oppressive power structures.

The pre-historic origins of Afrocyborg representations in *The Cosmic Egg*

By applying Sunstrum's creative methodology of collapsing myth into SF, this theorem allows the genesis of African cyborgs to be located in Southern African San paintings, which is the

primary source of inspiration for *The Cosmic Egg*. The cyborg constructs evidenced in this film can be traced back to 5723–4420 before present (BP), which resonates with the mythologies of the!Kung, Ju/'hoansi, Nharo, !Xo and G/wi San communities of Botswana (Ego 2019: 12). In constructing her Afrocyborgs, Molema locates their technogenesis in the rock art representations of ostriches and their munificent eggs in Botswana. This accords with the genre of science fiction writing, where Haraway contends: "The cyborg appears in myth precisely where the boundary between human and animal is transgressed" (Haraway 1991: 152). The protagonists in *The Cosmic Egg* VR film are human-animal (cyborg) ostrich beings who adapt the complex mating dance of ostriches to compose an African Science Fiction exploration of the philosophy of inter-being or Quantum Botho. Molema's interpretation of Quantum Botho is to read the whole of Earth as a giant multi-species-inter-being cyborg designed to express interdependent planetary eco-consciousness. Molema's central message in *The Cosmic Egg* implies that humankind should practice Quantum Botho at a planetary scale to foster peace, harmony and sharing of Earth's resources because Botho is the "universal force" that connects all "be-ings" (Ramose 2003: 381). The central cyborg in Molema's film is our collective home, our shared cosmic egg, planet Earth. While Haraway's *Cyborg Manifesto* ends with a resonant posthuman phrase: "Though both are bound in the spiral dance, I would rather be a cyborg than a goddess" (Haraway 1991: 181); her later scholarship focuses on the synthesis of these two constructs as ecologically interconnected. Molema's rendering of Earth as a galactic cyborg applies Haraway's theoretical mutation based on the Gaia hypothesis, where the earth is a cyborg-superorganism (Haraway 1995: 94). Haraway reconfigures her new green cyborgs in recent writing as "staying with the trouble" of environmental collapse (Haraway 2016: 30). Her earthbound, eco-conscious cyborgs urge us to make trouble. To be prosocial in our actions by confronting the ecological problems we face, which she names the "Anthropocene and the Capitalocene". Both are dangerous and "exterminating forces" (Haraway 2016: 2). Earth, with all her Earthlings spawned; human, non-human, animal, botanical, sea, sky, soil and water. All are one interconnected galactic cyborg being.



Figure 45: The opening shot of *The Cosmic Egg* is a planetary visual representation of the interconnectedness of all living organisms that inhabit this astronomic cyborg we call “home”. Molema uses the 360 spherical image generated by the VR camera to create an intergalactic sacred gaze of Earth, which suggests a “Deus Sive Natura” view of our fragile world (Spinoza 2007: 296). It is a gaze that implies the need for cosmic Botho to deal with the challenges of climate change.
Botho is expressed as: “*motho ke motho ka batho.”* For Batswana, this maxim describes the cultural practice of “mutual recognition and respect complemented by mutual care and sharing in the construction of human relations. According to this understanding of the human family, it is unethical to withhold or to deny Botho/Ubuntu towards a member of the family (Ramose 2003: 385).” Molema asks the viewer to see all of MmaModimo as a living, breathing world-wide-web of “be-ing” encompassing all beings, human and non-human alike (Ramose 2003: 382). *The Cosmic Egg* is a geo-be-ing calling on the universal need to share and care for our ecologically interdependent multispecies family. “I am because we are, and because we are, therefore I am (Mbiti 1970: 106).” All Earthlings are because of other Earthlings.

needed to deal with climate change as a collective human species requires tangible visualisation of the interconnectedness of all earthbound living organisms, as the future of our planet depends on this foresight. In the context of Botswana, Gaia shapeshifts into MmaModimo.[52] Her innumerable faces, forms, myths and names span all continents, cultures and languages. She is a multispecies celestial cyborg "whose webs, braids, tentacles and tap roots twist together" (Haraway 2016: 49). While Haraway may be considered a leading postmodern scholar, her interconnected Gaia hypothesis is far from new. Africans have possessed this knowledge for aeons. Pre-colonial African "humanism" or "communalism", also described as ''consciencism" or "ubuntuism", prefigures postmodernity by centuries (More 2005: 156, 157, 341).

This cosmological configuration of their worldview is an ancient philosophical practice for Batswana. "The well-being of an individual is not a personal affair but is a function of his or her relationship with other people, ancestral spirits, and even nature" (Denbow & Thebe 2006: 38). The well-being of the community is inseparable from the psycho-physiological, social and spiritual realms. Botho is "the harmony between people, nature, ancestors and Modimo [God]. If harmony is disrupted, it is explained as illness" (Denbow & Thebe 2006: 38). In *The Cosmic Egg*, this illness is a result of human greed and exploitation of earth's resources, which is the source of climate change and global warming. Haraway refers to this avarice as the "Capitalocene", a neo-Marxist critique of modernity, progress and rampant materialism (Haraway 2016: 50). MmaModimo is the Batswana answer to Haraway's Gaia and the voice of the Mother of God in *The Cosmic Egg.* Gaia and MmaModimo are creation goddesses who weave science fiction and scientific fact to form a cyborg nexus of issues: the politics of climate change, culture and ecology. The politics of climate change are represented in *The Cosmic Egg* as rapacious Capitalism causing systems to collapse as Earth fails, water dries up, animals die, and humans despair. Like Haraway's Gaia, *The Cosmic Egg* is being provoked into "brutal mutation that threatens both human and nonhuman liveable presents and futures" (Haraway 2016: 44). Haraway points out that we are facing more than just climate change. It is a major systems collapse (Haraway 2016: 100).

[52] "Modimo" is the Setswana name for "God" (Denbow & Thebe 2006: 225). Adding the prefix "Mma" implies that "MmaModimo" is the mother of God. She is a technofeminist subversion of Modimo, mainly interpreted as a male God. This is a creative subversion of "motherism" (Gqola 2011: 70).

Molema's answer to the catastrophic problem of the "Capitalocene" is found in her concept of eco-Botho. In African cosmology, there is no separate self. No "one" or "other". The "self" is represented inside of the collective consciousness of the community, which: "is defined through its relationships to other selves. This dependency on the other is epitomised by the Setwana expression: 'Motho ke motho ka batho ba bang'" (More 2004: 157). The "interbeing" expressed in Ubuntu/Botho is a timeless African axiom that Haraway's postmodern philosophy of "sympoiesis" has only just uncovered (Haraway 2016: 58). "Symbiogenesis" and sympoiesis are conjoined theories in Haraway's technofeminist articulation, which Molema interprets as Quantum Botho; the need for "connections for sustaining kinship, behaviour, relational action for … humans and nonhumans" (Haraway 2016: 91). Molema has articulated in the representation of *The Cosmic Egg*, what Haraway refers to as "art science worldings as sympoietic practices for living on a damaged planet" (Haraway 2016: 67).

MmaModimo is the voice of Haraway's "Chthulucene", denoting the "chthonic realm", which is a vital aspect of African mythology, narrative and theatre performance as explicated by Wole Soyinka as the "chthonic realm", which is a "seething cauldron of the dark world will and psyche, the transitional yet inchoate matrix of death and becoming" (Soyinka 1976: 142). Soyinka describes chthonic transcendence and redemption by the actor who must be plunged into this universal womb and navigate the earthly abyss to create communal catharsis for the audience (Soyinka 1976: 142) *The Cosmic Egg* does precisely this. It is a call to "make kin" with a dying, poisoned planet in need of re-wilding. While Haraway's Gaian cyborg is predicated on the postmodern recurring theme of hybridity and multiplicity, enabled by "boundary transgression", which liberates women from totalising homogeneity, and anti-science stereotypes, MmaModimo is not an anti-technoscience stereotype or instance of "motherism"; or "Mother Nature", or "the goddess" (Gqola 2011: 70; Haraway 1991: 181). MmaModimo is the mother of God, but also "conceived as a perpetual and universal movement of sharing and exchange of the forces of life" (Ramose 2003: 382). This sharing of life force is a defining feature of Botho. In the context of VR as a cyborg tool of 4IR (as argued in Chapter Three), we argue that our mode of prosocial VR is an instantiation of Quantum Botho.

Botho reads God and Nature as one and the same. This view is affirmed by the Yeyi and Mbukushu communities of Khoisan speakers in the Okavango, who ascribe reverence and

power to the trickster gods of the natural world (Denbow & Thebe 2006: 48). This resonates with Spinoza's non-binary concept of "Deus Sive Natura", meaning "God or Nature" (Spinoza 2007: 296). The erasure of a binary perspective on God/Nature defines Spinoza's pantheism, which suggests that all living organisms, the animate and inanimate, right down to the molecular, atomic and quantum scale, all share universal inter-be-ing since we are all made of one "infinite substance". That substance is "God or Nature" (Spinoza 2007: 41, 296).

Ubuntu/Botho expresses the idea that caring and compassion for the community is a sacred gift from God, and life without this collective care and compassion would be unimaginable (Masango 2005: 915). The African concept of caring involves all members of the community, living and dead. Molema's configuration of cosmic, or Quantum Botho makes the connection clear – we are the Earth. The Earth is us. We come from the Earth; when we die, we return to earth, soil, and dust. Molema creates an ecological perspective of the global African village in the mode of African Futurism by inverting the ancient concept of Botho to show how environmentalism is a deeply African notion. Though highly controversial then, "*Deus Sive Natura*" prefigured postmodern cyborg theory by four centuries. However, Ubuntu/Botho prefigures pantheism, as this philosophy existed long before Imperialism and Colonisation, dating back to pre-historic, ancient Africa, forming the basis of all African philosophy (Ramose 1999: 35; More 2004: 156).

While Spinoza rejected anthropomorphic interpretations of God, the personification of the Afrocyborg geo-be-ing, animated by MmaModimo, reinforces the interconnectedness of people and planet to amplify the eco-conscious message of the film. The cosmic gaze of earth from space shows how we are all made of this "infinite substance" (Spinoza 2007: 41, 296). It is the cosmic gaze of God as Nature. The awareness of this sacred gaze reinforces the sense of a sacred connection to Earth because, through the double lensing of Spinoza's pantheism and the timeless African philosophy of Botho, we see how there is no boundary between ourselves and the environment. With this view in mind, we might be more motivated to be proactive and prosocial in our environmental actions towards Earth.

In Sarwa communities, animals contain supernatural potency known as "*n/um"* that shamans use to cure illness (Denbow & Thebe 2006: 49) Molema's trance dance of planetary healing reflects Batswana cultures of medicine dances used to cure social and medical problems by entering states of altered consciousness by trance dancing through the night. Trance dances are typically performed with rhythmic clapping and songs calling on the spirits of wild animals

where their healing power or n/um is said to come from when the shaman connects with animal spirits while in this state of altered consciousness or trance (Denbow & Thebe 2006: 50).

The conceptual semiotics of Molema's eco-egg are multi-layered. Egg whites were pivotal to the production of San paint-making (Ego 2019: 14). Emptied ostrich eggs were used as water-carrying and storage vessels, often buried underground in strategic places during droughts to sustain hunters along their journey to find food (Ego 2019: 27). Ostrich eggs remain a bountiful source of nutrition to /Xam communities. An ostrich egg weighs 1.5 kilograms, equating to 18-24 chicken eggs (Hollman 2001: 68). Ostrich eggs are also associated with "*n/um",* a term used by the Ju/'hoansi, which refers to "magic power", and "vital energy". "*N/um"* can be conjured up during trance dance and is said to boil up inside the dancer (Ego 2019: 109). Molema uses the muthi of song and dance in the medium of VR to shape her message of environmental consciousness. Molema's cosmic egg is an Afrocyborg construct at a metaverse level that depicts a call for cosmological healing through song and dance for the purpose of planetary survival.

The narrative structure of *The Cosmic Egg*

One of the critical traits of Fourth VR is to engage oppositional political strategies in resisting the perpetuation of tired old colonial narrative tropes (Wallis & Ross 2020: 1). Molema's *Cosmic Egg* is an example of Fourth VR because it brings "Indigenous Futurism" into play with "Indigenous Activism" (Wallis & Ross 2020: 1). *The Cosmic Egg* is *a* traditional Motswana Dance Musical meets African Science Fiction VR film, which calls the audience to environmental action. Molema's logline reads: "It is an anciently futuristic myth about an ostrich egg hunt, which turns into an environmentally conscious tale in the form of a time-travelling eco-mystery. *The Cosmic Egg* features human-animal-spirit-machine-cyborg dancers who urge us to consider environmentally sustainable practices if we are to avoid paying the ultimate price of for our collective environmental degradation (Molema 2020). The

voice-over is performed in perfect old-school Setswana by Dr Leloba Molema. Molema's English version of the script reads as follows:

MmaModimo (Voice Over)

It was mating season, and Ms Ostrich and Mr Ostrich had eyes only for each other.

The year had been a drought year. People had cut down trees and killed animals, and everywhere plastic overwhelmed the land and sea.

However, it was time to create a new life and build nests with dreams of a healed environment.

Ms Ostrich and Mr Ostrich became parents. Ms Ostrich laid three eggs called Wisdom, Appreciation, and Harmony.

The travellers into the future heard the sound of the fertilisation of hope, and they arrived from a thousand galaxies, bringing blessings and sounding the rattles of creation.

Waves of sound swept through the shells, into the chicks, Wisdom, Appreciation, and Harmony.

The villagers carried on with their daily work.

The hunters went hunting.

They saw ostrich tracks and followed them, happy their wives would make beautiful necklaces.

The hunters thought only of the beauty of their wives. They found the eggs and ate them.

But these were no ordinary eggs. The hunters began to stagger and to see what they thought was a red light. The future struck back.

Ms Ostrich and Mr Ostrich were angry. They were also sad. When they had calmed down they called the people together, and all of them, birds and humans, sang and danced together until they all understood that they are one and that past, present and future are intertwined.



Figure 46: Dr Leloba Molema, Moratiwa Molema's mother, affectionally known as MmaMora (Setswana for Mother of Moratiwa), translated the script for *The Cosmic Egg* from English to Setswana and is the voice of MmaModimo. Dr Molema was the script editor on both *The Cosmic Egg* and *The Eye of Rre Mutwa*.

As evidenced in the script above, *The Cosmic Egg* delivers a neo-Marxist critique of the "Anthropocene", which is an androcentric term to describe the damage human beings have done to the planet and how this has impacted climate change and ecological collapse. Haraway prefers to use the Marxist term "Capitalocene", which describes Western colonisation of the Earth through globalised enterprise, including the histories of slavery, plantations, colonialism, genocide, mining, and fracking, all of which have significantly transformed our planet through capitalist practices (Haraway 2016: 48). When the hunters eat the three cosmic eggs, "Wisdom, Appreciation and Harmony", they become an idiom for corporate capitalism. Molema's *Cosmic Egg* is an example of Prosocial VR as it attempts to elicit prosocial action from the audience to feel the effects of climate change. While producing prosocial eco-conscious VR, Bailenson has observed that; "unless an individual has a strong ability or inclination to imagine environmental damage, or has been directly affected by issues like climate change, he or she will likely be unwilling to make the hard choices needed

to address this major challenge" (Bailenson 2018: 71). The power of prosocial VR is that it delivers the message more potently than conventional cinema because seeing is not only believing; but also feeling in VR, as a result of "embodiment" (discussed in Chapter Three).

Molema's narrative is an example of Fourth VR in that it uses "Indigenous-centred storytelling" (Wallis & Ross 2020: 4). *The Cosmic Egg* script reads like an African Science Fiction adaptation of a Batswana narrative form known as "mainane". Mainane are Setswana myths, which function as oral tradition and cultural records of didactic education in the form of entertainment. Mainane also have therapeutic and moral functions (Nhlekisana 2014: 10). In this instance, *The Cosmic Egg* is both therapeutic and thought-provoking in terms of environmental awareness. Molema applies the healing attributes of traditional San song and dance towards a restorative action for people and planet. Sarwa communities in Botswana use dance as a form of medicine to treat social and medical problems by entering into states of altered consciousness invoked by song and rhythmic dance. While in a trance, animal spirits are said to endow the participant with "n/um" or healing power (Denbow & Thebe 2006: 50).

The Egg Blessers as shamanic time-travelling Afrocyborgs

Initially, the three women who play the Egg Blessers were cast as a singular male shamans in the live dance theatre productions of *The Cosmic Egg*. In the adaptation for VR, Molema re-directs the performance of the Egg Blessers as three opera-singing, time-travelling women from the future who hear "the sound of the fertilisation of hope" as they arrive "from a thousand galaxies, bringing blessings and sounding the rattles of creation." They remix time and bless the three eggs, Wisdom, Appreciation, and Harmony, with musical sound waves of magical muthi that sweep through the eggshells and into the chicks to restore cosmic equilibrium. Molema's Egg Blessers resonate with Kodwo Eshun, who articulates the burgeoning genre of Afrofuturism at the height of cyberpunk techno-culture in the late 90s, where a Pan-African techno-futurist "Afrodelic" aesthetic is used to describe the contributions of black global diaspora music (Eshun 1998: 2). Molema composes an eco-homage to Herbie Hancock in her track titled, *Mother Nature, Kea Leboga;* which begins when the Egg Blessers land from outer space to consecrate the Cosmic Eggs, which are a metaphor for planet Earth. Molema matches Hancock's SF tropes beat for beat, as Eshun describes his contribution to sonic-cyborg electro ecology as dissolving hierarchies, which connect to a

“chameleonic circuit” generating “mutantextures” in a “futurhythmaze” which “exemplifies the mutagenic” (Eshun 1998: 6). In his lyrical SF writing of twentieth-century black global techno-culture, Eshun is riffing with Haraway and theorising the sonic-electro-cyborg as audiophile: “Sound machines throw you onto the shores of the skin you are in. The hypersensual cyborg experiences herself as a galaxy of audio-tactile sensations” (Eshun 1998: 10). Molema endows her Egg Blessers with an Afro-operatic “cybotronic” aesthetic, infused with the futuristically ancient magic of San muthi (Eshun 1998: 101). Molema’s star track, *Mother Nature, Kea Leboga*[53] is an eco-mantra repeated in a ritual sonic loop, part incantation, part chronopolitical eco-intervention. Music, song, dance and ritual are interconnected to mirror cosmic Botho and Deus Sive Natura to become Quantum Botho.

One of the salient tropes of Afrofuturism is chronopolitics, which is both an imaginative and a political re-structuring of time (Anderson & Jones 2016: 79). *The Cosmic Egg* re-maps time, remixing past/present/futures for the viewer to see how earthlings have always been interconnected in the webbed ecologies of MmaModimo. The Egg Blessers' engagement in chronopolitics is a manifestation of Quantum Botho that meshes the fluidity of “posthuman possibility” with the transdisciplinary “speculative sphere” of global Pan-African diasporic arts (Anderson & Jones 2016: x). In this way, African SF expressions are a form of quantum Ubuntu/Botho as it weaves together the threads, roots, braids and tentacles of twenty-first-century freedom struggles intertwined with the cyborg politics of intersectionality.

Molema’s Egg Blessers are African SF incarnations of pre-historic San shamans in Batswana rock art, which carbon dating affirms their paintings to be as old as 5723–4420 BP (before present) (Ego 2019: 12). Cyborgs are ubiquitous in these rock art representations, revealing hybrid creatures, or “humanimals”, to be “born from sensorial intercourse that transgresses the species barrier” (Ego 2019: 11). These paintings project recurring themes of shamans “seeking the aid of the supernatural to benefit their communities” (Denbow & Thebe 2006: 58). Like San shamans, the Egg Blessers restore environmental equilibrium as they time travel back from the future to bring the three eggs a n/um or “muthi” to “strike back” at the community for commodifying the eggs into beads to wear as jewellery. Shamans, depicted in a trance state, show the transition into the spirit world as altered states of consciousness are brought on by trance dance for healing (Lewis-Williams 2011: 72; Hollmann 2001: 63). In San cosmology, painting is a spiritual act of muthi and magic. When

[53] Kea Leboga is Setswana for thank you.

the future strikes back, Molema's message is the muthi. MmaModimo, like Gaia, is not always the nurturing type. Haraway warns, "Gaia can flip out, in system collapse after system collapse; there are limits to the power of systemic processes of homeostasis and reformulating order out of chaos at ever more complex levels. Complexity can unravel; earth can die" (Haraway 2016: 189). Here the Hunters are taught a critical lesson by the Egg Blessers, who represent a neo-Marxist intervention in their apprehension of voracious capitalism and the reckless consumption of Earth's precariously dwindling resources – fossil fuel, water, oil, minerals, trees, metal and stone. The Egg Blessers restore eco-equanimity.



Figure 47: In this interactive VR image, Molema draws our attention to the interconnectedness of the arts in the creative conception of Botho. The community sing and dance in a circle while the Egg Blesser paints an electronic rock art tableau. To see this image animated in spherical VR, click the link below: ***https://s.insta360.com/p/6f3012c9e0701659cba1c298d80724c1?fbclid=IwAR3UP7eFgpB5ZWUquhX6pK83gOUxQowgmviRhdNfBWuZ6WXHKLaWncpxBuw&e=true&locale=en-us***

The medium is the muthi – painting with healing magic

The visual effects depicted in *The Cosmic Egg* above are a twenty-first-century echo of early rock art paintings, which were said to be a "veil" between earthly reality and the paranormal spirit world of San cosmology. The visual effects were initially supposed to be painted in TiltBrush54 and composited on top of the live-action VR footage in the scene where the "Time Travelling Egg Blesser" paints the ostrich people in the style of /Xam cave paintings. Due to constrained resources, we opted to produce the CGI (computer-generated imagery)

[54] TiltBrush is VR painting software made by Google (tiltbrush.com).

artwork in Adobe After Effects instead while mimicking the magical aesthetics of TiltBrush. This paranormal moment of painting enables a Sci-Fi transition to the final scene of the film, where the Egg Blessers teleport the three eggs to the intergalactic Star-People. In an operatic dénouement, the cosmos blesses the three eggs as a closing creative chant towards restoring well-being to the world. This is an African Science Fiction expression of Ubuntu/Botho since both traditional healers and shamans mediate the spirit world for healing because physical and psychological illness is seen as an expression of spiritual sickness (Denbow & Thebe 2006: 47). *The Cosmic Egg* implies that this sickness is manifest as the "Capitalocene"; a toxic consequence of gross capitalism (Haraway 2016: 47, 48).

In San cosmology, trance dance, music and rock art are intertwined modes of healing (Lewis-Williams 2011: 64-84). Molema infers this in the second last scene of her film, where the central Egg Blesser paints a tableau of the ostrich people and their three magical eggs with computer-generated "threads of light" (Lewis-Williams 2011: 81). This scene reflects the "threads of light" that appear to shamans when they enter the spirit realm. These threads are said to be a supernatural ladder of sorts with which to "climb up to God's house in the sky … where they plead for the sick" (Lewis-Williams 2011: 81). Trance dance or medicine dance is a mode of achieving the altered state that catapults the shaman into the spirit realm to perceive these threads of light. These "medicine dances are central to daily life and are frequently performed: the dance and its experiences suffuse San thinking" (Lewis-Williams 2011: 81). Ramose affirms that music and dance are cultural expressions of the Pan-African philosophy of Ubuntu/Botho. The interplay of music is a harmonious concept of African be-ing. The universe is conceived of as a musical construct (Ramose 1999: 42). Dance is also a performative aspect of in-ter-be-ing. "For the Africans, the invitation of the dance of be-ing is undeclinable since it is understood as an ontological and epistemological imperative … To dance along with be-ing is to be attuned to be-ing" (Ramose 1999: 43). In the making of *The Cosmic Egg*, Molema applies the philosophy of Botho manifest as the arts be-ing interdependent as song, dance and painting all serve as Sci-Fi acts of divination towards the healing of our planetary home, *The Cosmic Egg*.



Figure 48: LEFT: Chedza Pilare and Tebogo Gaetsewe (RIGHT) perform the role of The Egg Blessers. The eco-aesthetics in *The Cosmic Egg* are artfully realised in the costume design for the Egg Blessers, whose shamanic-astronaut outfits are made from the inner silver plastic linings of box wine containers. This exercise took months of collecting and recycling on Molema's part as she applied the eco-mantra of "*Reduce, Re-use & Recycle*" to amplify the conceptual relevance of her film, with its central theme of human greed and the wasteful exploitation of earth's resources. Molema transforms discarded waste objects into Afrofuturist expressions of eco-consciousness. Molema adds a subversion of "motherism" to her ironic playfulness in the costume design.

In sum, *The Cosmic Egg* is inspired by the pre-historic human animals, and shamans depicted 27 000 BCE in paintings on cave walls across Southern Africa, which are said to have enabled people to travel to spiritual dimensions to heal the sick (Lewis-Williams 2011: 61). The act of painting would teleport the painter or shaman through the "veil" of the rock, through cracks and apertures that leaked "threads of light" through which the San are said to have teleported to the cosmos where people would be transformed into space travelling multispecies beings (Lewis-Williams 2011: 101). The painting then was a form of medicine that Molema re-mixes into past-present-futures in *The Cosmic Egg*. The Egg Blesser paints for the well-being of all earthlings as an act of quantum Botho. Her healing is performed for the immediate community and all – people and the planet. This prosocial message is designed to elevate eco-consciousness for the viewer by appreciating the interconnected nature of Botho and, consequently, the well/ill-being of the earth.

In my analysis of *The Cosmic Egg*, I have shown how this prosocial African Science Fiction VR film was designed to communicate the Afrocyborg configurations of MmaModimo and

the Egg Blessers as incarnations of African cyborgs. MmaModimo insinuates technofeminism since she is an SF subversion of Modimo. She supersedes Modimo because God, like humans, must have a Mother. This visual act portraying MmaModimo as a gargantuan planetary cyborg is a transgressive and transformative reconstruction of African gaze regimes. It is a visual representation of decolonisation because it points to the pre-historic origins of Ubuntu/Botho, which predate postmodern concepts of Haraway's non-binary interconnectedness (Ramose 1999: 35; More 2004: 156). This is an act of decolonising philosophy, which has historically been subjected to racism and the denial of Africa as the true fount of Western Enlightenment, as evidenced in the extensive scholarship of Magobe Ramose (1999); Cheikh Anta Diop (2012), George James (1954), and Martin Bernal (2011). The film's opening image is a decolonised gaze of our tiny planet because "it matters which worlds, world, worlds" (Haraway 2016: 165). Eco-Botho worlds Molema's world in the Gaia-esque words and form of MmaModimo. This is an undoing of oppressive power structures since it critiques global capitalism.

MmaModimo, a tiny planet pictured from outer space, is the Egg Blessers Afro-shamanic-astronaut gaze of Earth. MmaModimo is a postmodern rendering of a timeless, non-binary-Botho voice of the cosmos. Her galactic inter-be-ing is an Afrocentric visualisation of Haraway's Gaia hypothesis as a "superorganism" or web of cyborg "sympoiesis" (Haraway 2016: 49). "Sympoiesis" means making with (Haraway 2016: 58). Molema makes us aware of the Earth as a fragile interstellar egg, which must be cared for and treated with the conscious, nurturing of eco-Botho. This act makes her film a prescient example of prosocial VR in so far as it serves to raise awareness of the "environmental fragility of the planet" (Bailenson 2018: 73). Molema's critique of the "Capitaloscene" asks us to reform our economic activities, which aggressively deplete Earth's resources, causing the erosion of natural ecosystems through agriculture, farming, deforestation, pollution and carbon emission.

In the chapter above, I have shown how Quantum Botho is expressed in *The Cosmic Egg* as a mode of Prosocial VR in the genre of cyborg cinema. Molema's film addresses the prosocial need for eco-consciousness in the 21st century by calling on the time-travelling Egg Blesser cyborgs of the future, who may be endowed with advanced AI consciousness, giving them vastly superior problem-solving abilities to fix the environmental degradation of the present. Like the present, the future draws on the ancient wisdom of the past by invoking

Botho. Quantum Botho arises as a philosophical hybrid resulting from quantum computing and AI in the context of 4IR. *The Cosmic Egg* asks the contemporary citizens of Earth to use future tech wisely and with Eco-Botho so that we can harness 4IR tools to fix the world's challenges and not merely amass more wealth through Capitalist greed. In this configuration, Capitalism is the antithesis of Botho because it is short-sighted and selfish. 4IR Capitalism is argued to be a more vociferous form of Capitalism, resulting in various forms of Human Rights violations, as seen in Chapter Three. The degradation of Earth's resources is a Human Rights violation. These effects exacerbate the economic inequalities for our planet's most vulnerable populations who can no longer sustain their lives off nature's bounty. Quantum Botho is a synthesis of 4IR technology used in the mode of African humanism to ask ourselves and the audience how the potential of AI-enhanced intelligence might be leveraged from 4IR tools. Quantum Botho is a philosophical solution to fix the social problems in our world for all to benefit equally and not merely to enrich the titans of Silicon Valley, as is currently the practice of 4IR Capitalism.

Botho in Setswana has the same meaning as Ubuntu in isiZulu. In the next chapter, which analyses *The Eye of Rre Mutwa*, I will show how Quantum Ubuntu is the conceptual and philosophical thread that links these two VR films. Quantum Ubuntu is articulated in *The Eye of Rre Mutwa* as the need to embrace cyborg inter-being, expressed in the multiplicity of identities and the axiomatic phrase that describes Ubuntu: "Umuntu ngumuntu, ngabantu", or "People are people because of other people". *The Eye of Rre Mutwa*, like *The Cosmic Egg,* is also a critique of 4IR Capitalism, with a history of Human Rights abuses in its technological predecessors, namely the 1st, 2nd and 3rd Industrial Revolutions (Benyera 2021). The film asks the audience to embrace Quantum Ubuntu as a way to perceive inter-being, or "I am because you are". This phrase can also be paraphrased as "My well-being is attached to your well-being".

South Africa has a long history of ignoring this in white communities. Historically, white people in South Africa have used the racist othering of colonialism and apartheid as a convenient system of wealth accumulation by economic oppression. The philosophical notion that underpins *The Eye of Rre Mutwa* is Quantum Ubuntu, which I use to critique "white fragility" (DiAngelo 2018), particularly in the South African context of colonialism, racism and apartheid. *The Eye of Rre Mutwa* shows how white South Africans have been complicit in the economic exploitation of African people, evidenced in the socio-political-

economic oppression experienced by Africans in the 1st, 2nd and 3rd Industrial Revolutions (Marwala 2020; Benyera 2021). Quantum Ubuntu asks how we might use the intelligence of 4IR tools to leverage an expanded consciousness that enables us to see our collective inter-being to free global humanity from economic oppression and inequality. Quantum Ubuntu is posed here as an antidote to the technological determinist sales pitch of 4IR Capitalism, which falsely asserts that "God will emerge from the machine" or "Deus Ex Machina". In Silicon Valley, the "Deus Ex Machina" dogma is re-phrased as "We are making the world a better place" (Bailenson 2018: 160). While "making the world a better place" might sound like a prosocial cause, it is, in fact, the opposite in light of the Cambridge Analytica scandal (discussed in Chapter Three). *The Eye of Rre Mutwa* asks us to see through this commercial lie by pointing to the real prosocial need for a new kind of "Deus Sive Natura" (Spinoza 2007), or pantheism informed by "Black Quantum Futurism" (Phillips 2015), the resulting synthesis is Quantum Ubuntu.

Following Sanstrum's algorithm for generating African SF, I argue that the genealogy of the cyborg is located in ancient African mythology as the cyborg's true source of origin and ancestry. For instance, a panoply of human-animal cyborgs proliferates in the ancient Egyptian pantheon of Gods and Goddesses in *The Book of the Dead*,[55] redacted from *The Pyramid Texts,* which originated around 2350 BCE (Scalf 2017: 17). Like Haraway's cyborg whose technogenesis "appears in myth precisely where the boundary between human and animal is transgressed" (Haraway 1991: 152), my Afrocyborg re-reads the sun God Ra depicted with the body of a man and the head of a hawk while sporting a human beard, who emerged in the Old Egyptian Kingdom (2686–2181 BCE) (Remler 2010: 14). Implanted in Ra's crown lives the "goddess of beauty, love, dance, and music" known as the Eye of Ra (Obenga 2004: 40). She has multiple modes of representation, she is wife, mother and daughter to Ra, but in the form of the Eye of Ra, she is Ra's daughter and protector (Remler 2010: 44, 95; Pinch 2002: 128). According to myth, Ra placed the Eye in his crown. The pupil of the Eye could be considered a womb in which all gods and beings were formed (Pinch 2002: 129). The Eye of Ra, therefore, represents a panoply of beings with multiple genders, identities, magical powers, and mythical narratives, which are semiotically reconstituted through the lens of African Science Fiction to become Afrocyborgs in the making of *The Eye of Rre Mutwa*.

[55]Foy Scalf says, "*The Egyptian Book of The Dead* is one of the most important religious texts ever written in the past 4 000 years of human history" (Scalf 2017: 11).

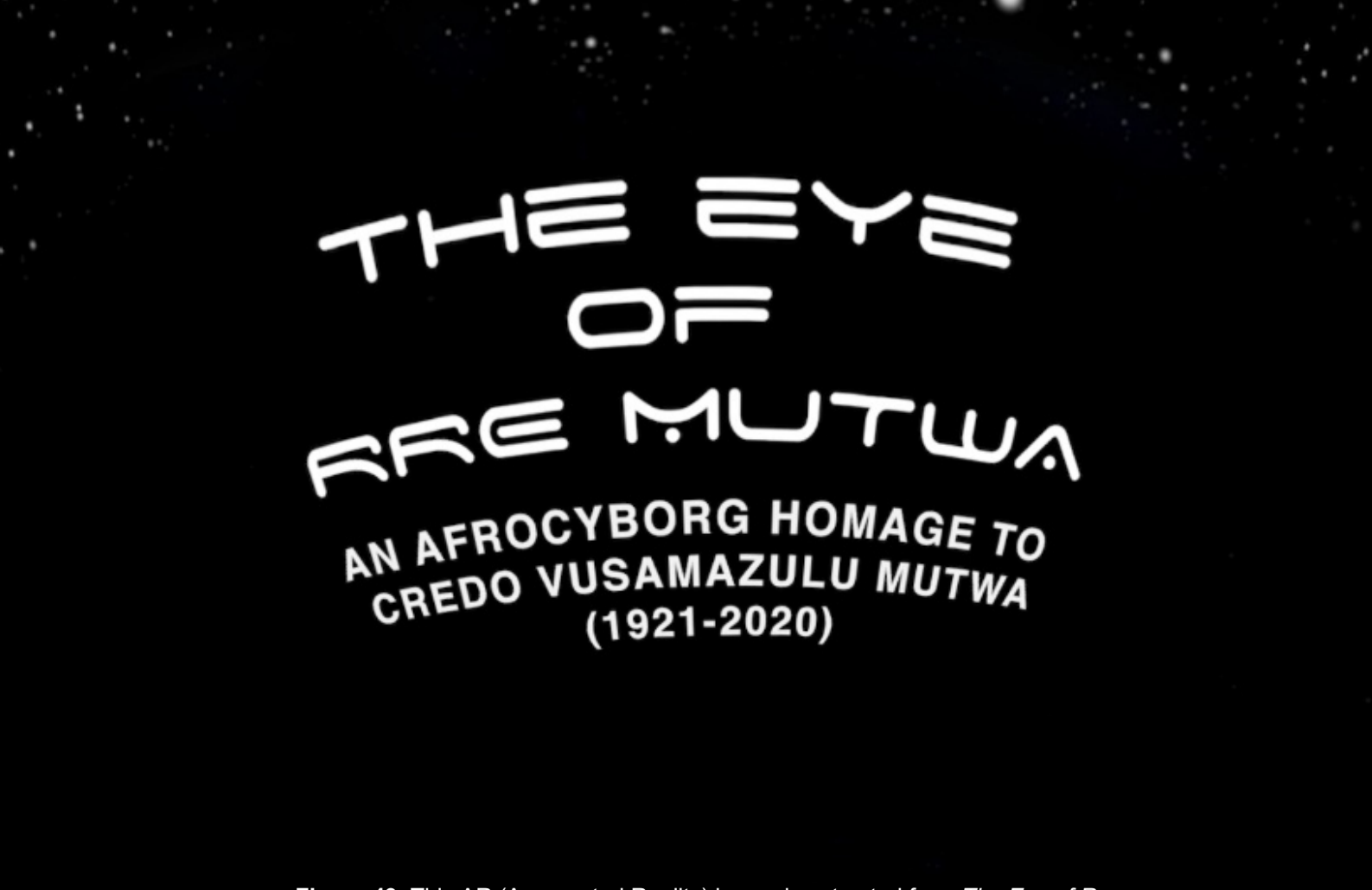


Figure 49: This AR (Augmented Reality) image is extracted from *The Eye of Rre Mutwa.* To see the AR, scan this image with your smartphone using the UniteAR application (app), which you can download from Google Play Store. A VR clip of the talking, breathing and speaking eye will play automatically. Please tilt your phone down to see the eye.

Afrocyborgs in The Eye of Rre[56] Mutwa

The Zulu mythology of Credo Vasamazulu Mutwa, outlined in *Indaba, My Children: African Tribal History, Legends, Customs and Religious Beliefs* (1964), with its multiverse of African cyborgs,[57] is the source of inspiration for this VR homage to Mutwa, who passed away silently as the local media obsessed over Covid-19 lockdown news in 2020. Mutwa did not receive a state funeral. Sadly, this rite was denied due to the pandemic. Mutwa's passing, one year shy of a century, was ironic and ominous considering his departure at a time of global sickness and stature as High Isanusi.[58] Mutwa was not only a medicine man, a seer and an embodiment of the "African Renaissance".[59] Mutwa painted, sculpted, and wrote to continue the art of storytelling in the African tradition, handed down from generation to generation (Mutwa 1964: 217). *The Eye of Rre Mutwa* was inspired by the chapter titled; The *Eye Is Blind That Will Not See*, where Mutwa's prose is directed at white South Africans, urging us to open our eyes to see Africa's vast contribution made to global history. Mutwa laments: "I appeal for nothing big, dramatic or drastic; I only appeal for simple flexibility and a willingness to hear and judge clearly without prejudice. There is nothing more saddening than a man deliberately blinding himself to the shimmering lake of reality … " (Mutwa 1964: 211). *The Eye of Rre Mutwa* is an attempt at ameliorating the propensity of white South Africans to blind themselves deliberately to their role in the current socio-political-economic realities of South/Africa.

In this film, I have opened my eyes to see and respond to Mutwa's castigation when he says: "White people of South Africa, I Vasamazulu … am ashamed of you. I am thoroughly disgusted with your indifference to those things on which your ungrateful lives depend … Your lives depend on a better knowledge of Africa's past … Only by unravelling the past can one hope to find the key to the golden portals of the future" (Mutwa 1964: 223). In response

[56] The use of the Setswana pre-fix *Rre* is a double entendre, conjuring up either *Ra* or *Re*, the Egyptian Sun God, as well as being a polite greeting and sign of respect in daily Setswana when addressing men of stature. This bricolage of semiotics points to an interconnectedness at the centre of the conceptual subject matter. Splicing Setswana into ostensibly Zulu subject matter further denotes a pan-African consciousness and reference to Egyptian myths.

[57] From the anthropomorphic Tree of Life to the shape-shifting Ninavanhu-Ma and Watamaraka, many of Mutwa's archetypes are endowed with African Science Fiction paranormal powers (Mutwa 1964 29-57).

[58] "Isanusi" denotes a highly skilled traditional healer or divinator "who divines by means of the bones" (Doke & Vilakazi 1972: 11).

[59] The two philosophical-political concepts of the African Renaissance and Pan-Africanism are intertwined. The former grew out of the latter, according to Iroulo (2017), who notes: "Pan-Africanism and the African Renaissance are ideologies upon which African institutions are founded … they can serve as a check on how African institutions should be managed to avoid any form of neo-colonialism" (Iroulo 2017: 162).

to this chastisement, *The Eye of Rre Mutwa* heeds Mutwa's call to investigate Africa's past to see deeper into its future reflexively. In taking these words to heart, I have brought ancient pan-African archetypes into play with a socio-political-economic critique of the four consecutive Industrial Revolutions; and how these historical events used technology as tools in the arsenal of corresponding human rights violations, namely slavery, colonialism and apartheid.

In the making of this film, I respond to Mutwa's reprimanding tone by applying DiAngelo's theory of "white fragility", which I interpret as a call to white people to become conscious of our arrogant ignorance and our failure to educate ourselves about black and African cultures (DiAngelo 2018). This film, with its ocular-centric vision theme central to the narrative, reflects my awakening and expanding my consciousness. The film summarises my journey to educate myself and assimilate South/African cultures as part of becoming aware of the myopia of white un/conscious forms of prejudice that remain visible in the fabric of current global and local technocultures.

Act 1 begins with an Afrofuturist eyeball at the centre of an intergalactic star-scape in this time travel ritual to honour the dead. The VR camera is mounted within the black pupil of a planetary eye. The eye itself is the central character. It is an African Science Fiction representation of Credo Mutwa as an ancestral cyborg All-Seeing-Eye. Inkosi Enkhulu[60] Mangosuthu Buthelezi's grandmother, Princess Magogo's track titled, *Uyepi Na*? meaning "where has he gone?" underscores this opening scene, as Mutwa begins to speak from beyond the grave. Magogo sets the otherworldly tone for the rest of the film as a solemn sonic ode to Mutwa and this narrative of ocular muthi. This track is aesthetically appropriate because Mutwa may have grown up on the banks of the Umkumazi River listening to her music on the radio. *Uyepi Na*? elicits a haunting ghostliness to the ambisonic soundtrack, creating an eery dirge-like atmosphere in constructing the VR SF world. Multi-coloured electronic plasma animates the eye in concentric outward ripples as Mutwa begins to speak as an Afrocyborg ancestor:

[60] Inkosi Enkhulu is Zulu for King in English.

THE ALL-SEEING EYE (Voice Over)

(Albert Ibokwe Khoza channeling Credo Mutwa)

I Credo Vusamazulu Mutwa,
I am the "soul's time-penetrating-eye".
I see through the ages.
Through time and space.
I see great empires rise and fall.
I scan and scroll backwards and forward through human history,
Seeking patterns, distilling algorithms.
Revealing the medicine of true sight to those who desire it.



Figure 50: The Wedjat Eye or Sacred Eye represents both The Eye of Ra and The Eye of Horus (tvtropes.org; Pinch 2002: 61). *The Eye of Rra Mutwa* appropriates this concept of the healing eye as a homage to Mutwa, the traditional healer, which serves to communicate the ancient nature of medicine associated with sight in African cosmology.

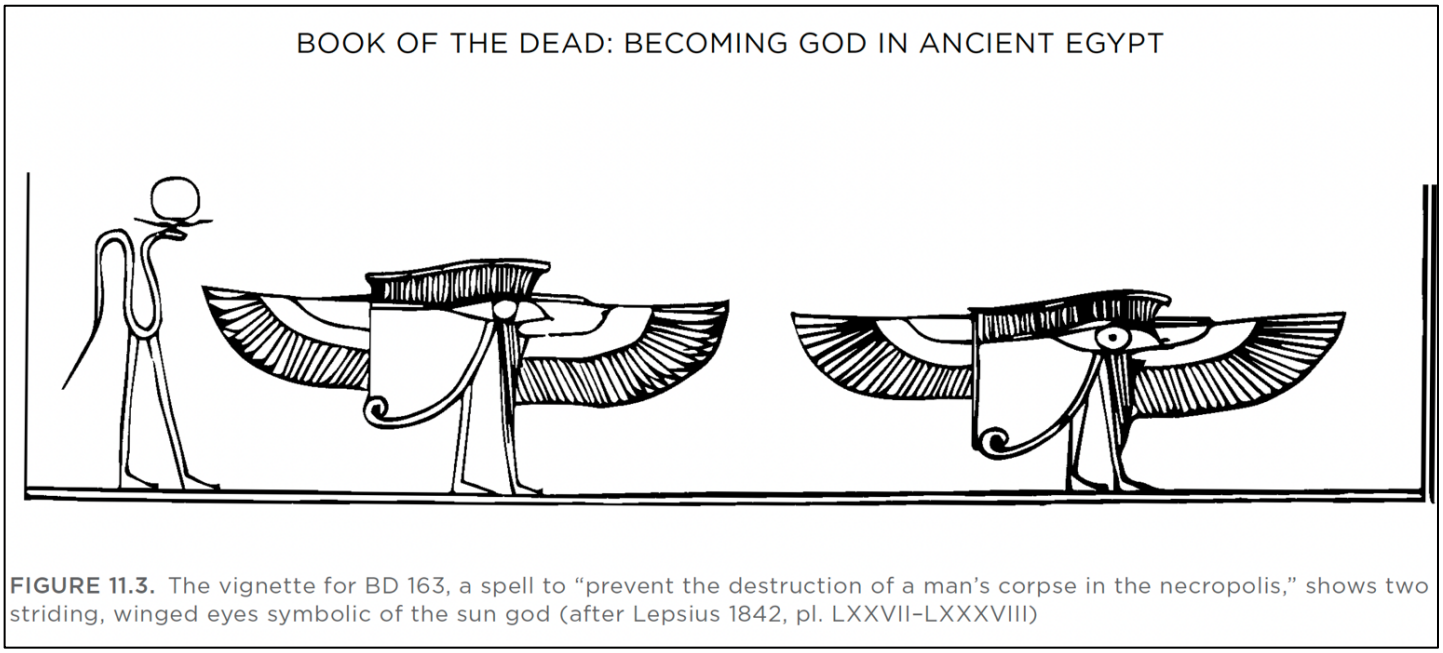


Figure 51: An image of The Eye of Ra and The Eye of Horus, extracted from Foy Scalf's (2017) interpretations of various versions of *The Book of The Dead*, Scalf's scholarship still uses language that reveals racism and prejudice in so far as the prayers and incantations in *The Book of The Dead* are referred to in the negative as "spells" even though many passages read similarly to Judeo-Christian religious texts (Scalf 2017: 130). This is endemic to English colonial Egyptology, where scholars are blind to their prejudice, using condemnation in their choice of words to describe religious practice outside of their myopic norms and conventions. The writing of Wallis Budge is another case in point.

The anthropomorphic eye as a central Afrocentric archetype

The Eye of Rre Mutwa is a pan-African tribute to the late Mutwa, drawing on Egyptian cosmology for inspiration, which greatly emphasised life after death as the sacred purpose of African spirituality in antiquity. The scholarship of Memphis Theology was to transcend death and become Godlike (Scalf 2017: 11; James 1954: 85). The conceptual link between early Egyptian Theology and current thematic trends in cyborg post-humanism, which focus on transcending death, is philosophically compelling. VR is at the centre of Kurzweil's futurist vision to re-program death in his "Singularity" hypothesis (2005). In the chapter titled "We are Becoming Cyborgs", Kurzweil forecasts that circa 2030, humans will be more nonbiological than biological. Schneider hypothesises that satellite internet will connect directly to your retina (Schneider 2019: 83). Musk's invention of "neural lace" is a transhumanist bio-tech-info-tech merger designed to help humans keep pace with AI. The Neuralink (a BCI – brain-computer-interface), which prioritises the production of "neural lace", is "an injectable mesh that connects the brain directly to computers". Once connected, "neural lace" networks all your digital devices, including cloud computing. This allows you to

store, upload or download the contents of your mind, as one does currently with the contents of your computer (Schneider 2019: 27). This is the beginning of digital immortality as the neural lace user can clone themselves innumerable times over. A cyborg-enhanced digital substrate will soon be able to mesh mental meat with microchips. Microscopic nanobots can be injected into the bloodstream, capable of passing the blood-brain barrier (Kurzweil 2005: 175). These nanobots will form interneural connections in your brain, networked to all your senses, providing you with embodied VR interface (Kurzweil 2005: 212). This is possible because the nanobots can suppress and override your biological inputs with virtual signals, allowing you to segue instantly into immersive, life-like VR worlds (Kurzweil 2005: 212). The avatar you chose is one of many in an endless palette of digital personas (Kurzweil 2005: 214). AI-enhanced digital immortality exponentially eclipses Sherry Turkle's notion of "the second self" being an extension of cyber identities (Turkle 2005: 288). Containing infinite replicas of oneself for longevity as duplicates of AI clones proliferate in the Cloud is an ethical conundrum which not even Human Rights legislation can apprehend since these clones will no longer be human. Human Rights therefore no longer apply to AI clones. As Nhemachena et al. affirm: "…human rights are cancelled out through cloning, hybridisation of human beings, creation of humanoid robots, and injection of human beings with microbots or biohybrids, and genomics which rental human identity is fuzzy" (Nhemachena, Warikandwa, & Amoo 2018: 31).

Halala![61] You are now a cyborg! No more death in the endless wonderland of cyberspace. While Kurzweil's posthuman AI research is already underway, ideas of cyborg-immortality are as old as the yearning to transcend death explicated in *The Egyptian Book of the Dead* circa 2350 BCE, which promised eternal afterlife in the "Elysian Fields" (Pinch 2002: 158). In this context, the parallel between the posthuman possibility of Cloud Computing and the Elysian Fields is uncanny. The transhumanist Kurzweil is not immune to criticism from many sectors, including VR innovator and computer-scientist Jaron Lanier, who accuses Kurzweil of "cybernetic totalism" and cyber-eschatology.[62] Nonetheless, uploading the consciousness of a dearly departed loved one certainly does have an appeal, an idea I explore below by imagining Mutwa as an archival ancestor.

[61] "Halala" is isiZulu for "congratulations" in English.

[62] Oxford Biblical Studies online defines "eschatology" as a theological concept that refers to the end of humanity, such as judgement day, the rapture, heaven and hell (oxfordbiblicalstudies.com 2014).

In Act 1, Ibokwe Khoza continues: “If only we were connected, we could have uploaded Isazi[63] Mutwa’s consciousness to the Cloud. His mind could have connected us with all the greatest thinkers, healers, and storytellers across space and time. The Entire Universe of knowledge alive.” These lines reference Kurzweil’s forecasting of the possibility of uploading mortal consciousness to the eternity-enabling Cloud by 2030 (Kurzweil 2005: 210). In his later work, *How to Create a Mind* (2012), Kurzweil explains how humans can “expand the neocortex” using AI. While this poses an enormous ethical conundrum, Kurzweil foregrounds that “this additional intelligence will essentially reside in The Cloud, where most of our machine intelligence is now stored” (Kurzweil 2012: 116). As tempting as digital immortality may be, Chela Sandovals’ “oppositional consciousness” and her mode of textual analysis obliged me to look at technocratic tools as sources of political power, which Benyera asserts will only serve to “recolonise Africa”. Benyera points out how “Cloud computing”, along with all the other Silicon Valley plutocratic 4IR companies such as Google, Facebook, YouTube, Netflix, et al., operate in Africa, extracting massive profit but contributing nothing in the way of taxation (Benyera 2021: 26). For Benyera, 4IR will only repeat the economic oppression and human rights violations for Africans as per the First, Second and Third Industrial Revolutions. By scanning and scrolling backwards and forwards through history, *The Eye of Rre Mutwa* looks back on the patterns, seeking to distil the algorithms that Benyera warns about, saying, “The past three industrial revolutions have not brought any sustainable development to Africa. On the contrary, they resulted in further marginalising Africa and Africans” (Benyera 2021: 232).

While the posthumanists seek to upgrade *Homo sapiens* to immortal cyborgs, or “Homo Deus” through Cloud computing, BCIs, VR and AI, these technologies are still in early developmental stages (Harari 2015). However, the parallel between Egyptian mythology and transhumanist predictions of the future seems startling. It is a recurring theme from the animal-human cyborg constructs of Ancient Egypt to the AI-enhanced cyborgs of 4IR. In many ways, Egyptian mythology prefigures transhumanism. The technologies of the day used by our Egyptian ancestors, such as prayer, incantation, and mummification, were undoubtedly more rudimentary. , the desire to escape the affliction of mortality suffered by the hapless *Homo sapiens* is the same. This becomes a poignant thread in *The Eye of Rre Mutwa*. The augmented human-animal-androids from the *Book of the Dead – the Papyrus*

[63] “Isazi” refers to a wise man (Doke & Vilakazi 1972: 551).

of Ani (400–100 BCE) (Budge & Wilson 2016) to *The Singularity is Near* (Kurzweil 2005); share the trajectory of human imagination, striving towards becoming "Homo Deus"[64] (Harari 2015). This conceptual alignment points towards the timeless evolutionary impetus of humans wrestling with ways to transform themselves into gods, thereby escaping death. Therefore, this recurring narrative of the posthuman cyborg is arguably as old as the origins of the Pyramids Texts, emerging between 2686 and 2055 BCE. The Pyramid Texts are the fount of *The Book of The Dead*, which proliferates with human-animal cyborg gods and goddesses, all endowed with supernatural powers to negotiate life after death on behalf of the deceased human (Pinch 2002: 9).

In tracing this trajectory, my creative intention was to decolonise the cyborg construct towards engaging with this fundamentally postmodern idea as a futuristically ancient African idea that predates transhumanism by several centuries. In this way, I engage with Mutwa's injunction to unravel the past to find the keys to the future (Mutwa 1964: 223). In *The Eye of Rre Mutwa*, the African cyborg is technologically reincarnated in Africa's new zeitgeist of 4IR. Since VR is a tool of 4IR, *The Eye of Rre Mutwa* is concerned with VR as the future of Immersive Computing, fashioned in the furnace of the 4IR by plutocrats who assume the position of "Homo Deus" and seem to be actively colonising the future through "data colonialism" (Harari 2015; Benyera 2021: 148).

The message in *The Eye of Rre* Mutwa is concerned with these new forms of inequality being generated amid 4IR for those who cannot afford the technologies to cheat death and embrace cyborg-utopianism. *The Eye of Rre* Mutwa is an experiment with the new-fangled gaze of VR to see if it can be used as a tool to re-negotiate a new vision of African Futures that are equitable for all global citizens under 4IR.

Applying the methodology of Phatsimo Sunstrum, I re-interpret Egyptian myth through the lens of Haraway's prosocial technofeminist cyborg to re-materialise an SF interpretation of the ancient Eye of Ra. They were represented as a panoply of beings with multiple genders, identities, magical powers, and mythical narratives, re-mixed here as a VR homage to Credo Mutwa. Mutwa is depicted as a floating eye in the film and represents a mythical ancestral

[64] "Homo Deus" references Harari (2015), where he implies that Silicon Valley is engaged in the questionable ethics of "evolutionary humanism", which historically prioritised the creation of "superhumans" under Nazi rule in Germany, with "ethnic cleansing" and "selective breeding", which he equates to "twenty-first-century techno-humanism" and "genetic engineering, nanotechnology and BCIs" (Harari 2015: 288).

biome adapted for this African SF VR script from reading passages in *The Book of The Dead* (Scalf 2017; Budge & Wilson 2016).

Mutwa, depicted as an All Seeing Eye, is a semiotic reference to Egyptian antiquity where The Eye of Ra and The Eye of Horus are both re-visioned here as cyborg constructs in so far as these deities are often represented as winged wedjat65 eyes, which remain potent symbols of the left and right eyes of the Sun God, Ra. Together with incantations from the Book of The Dead, The Eye of Ra and The Eye of Horus were said to prevent the corpse from decay (Scalf 2017: 130). This is a fitting metaphor to honour Mutwa's passing, as the eye in Egyptian creation mythology is not only fixed on morbidity but also on rebirth. The "primal event", the first act of the creator, was to create light via "the life-giving power of the sun", pictured as the pupil of an eye. This eye is sent out "to illumine the darkness" (Pinch 2002: 59). This is also a semiotic expression of enlightenment and a metaphor that describes my philosophical expansion of consciousness exhibited in the making of this film, with its themes of data decolonisation, black tech-consciousness and Quantum Ubuntu. My creative process mirrors the opening of the "mind's eye" of perception. In Egyptian mythology, the "Open Eye" is a semiotic inference to Osiris, who remains visibly represented as an "All-seeing Eye" in Egyptian temples (James 1954: 143). The "Open Eye" is symbolic of "transcended space and time", omniscience and omnipresence, invoking "the Great Mind"; exemplified in "nous" or "mind", which are semiologies of inner vision, intelligence, consciousness, and illumination (James 1954: 24).

The components of techné are visible in the semiology of the Open Eye. In constructing the ocular-centric semiotics of the eye in the context of VR as worldmaking, I apply the layered meaning and process of making outlined in the theory of techné, which incorporates: "episteme (knowledge), phronesis (judgment), sophia (wisdom), and nous (intellect)" (Hosale, Murrani & de Campo 2018: ch1: para 3). In this creative process, techné becomes a mode of theorising and concept formation in the praxis of VR worlding. The orb of the eye, which is also a tiny planet, becomes a contrapuntal conjoined metaphor. Re-envisioning techné from an African worldview is guided by the transdisciplinary application of "Afrikology" in exploring the eye as an allegory for the cinematic discourse of "the gaze". Baba Bantu defines "Afrikology" as a solution for decolonisation and social transformation that places

[65] "Wedjat" refers to a sacred eye. The Eye of Rra and Horus are sacred eyes used in Egyptian burial rites to protect the deceased in the afterlife and for apotropaic purposes (Pinch 2002: 131 & Scalf 2017: 76 & 82).

African epistemology central to liberation strategies (Bantu 2013: 1). Mutwa's eye is a synonym for his life as a seer and a human being who possessed a paranormal gaze. It is with this "time-penetrating eye" that scans and scrolls backwards and forwards through history that the neo-Marxist critique of the Four Industrial Revolutions is delivered. The wedjat eye, like Mutwa, the medicine man, reveals the "medicine of true sight to those who desire it." This is a direct response towards healing "the colonial wound" (Bantu 2013: 8). In this context, my intention was to imbue the ocular semiotics with the poietic66 potential embedded in the medium of VR, to leverage a restorative gaze of Africa. The eye, in conjunction with the expanded gaze of the VR camera, is used to explore how an expansive gaze in VR might activate a therapeutic, prosocial, pro-African gaze.

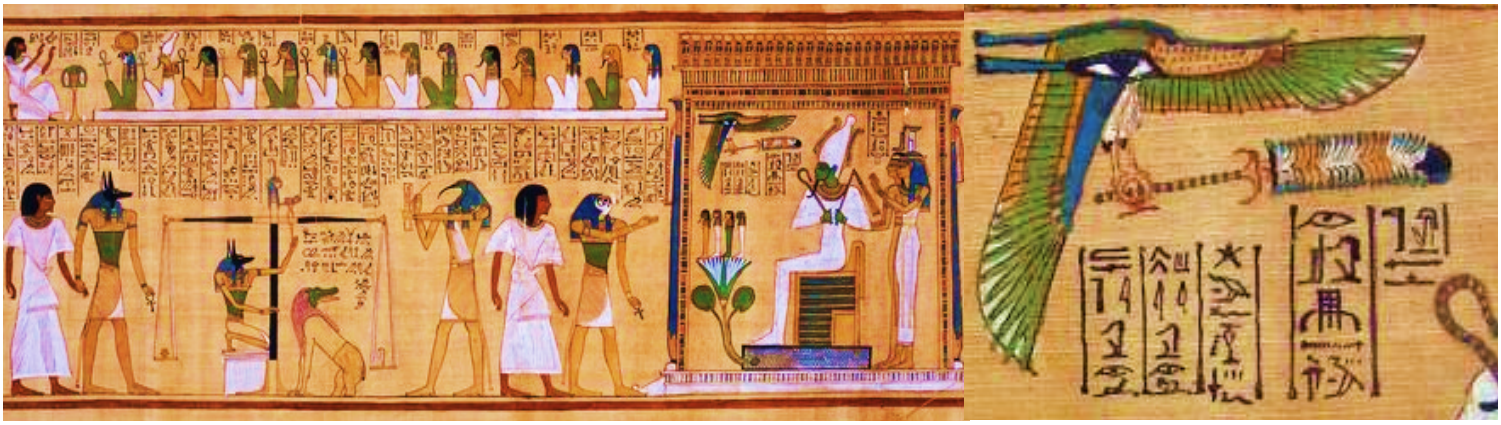


Figure 52: LEFT: Book of the Dead of Hunefer, depicting the judgement scene with the Eye of Horus seen on the right (145 BCE) (britishmuseum.org). RIGHT: detail of the Winged Eye of Horus guarding Osiris is a sign of protection (ReFaey et al. 2019: 1). These images referenced from The British Museum ironically affirm colonial knowledge and cultural practices of appropriation. Artefact number: EA9901, 3.

[66] "Poietic" is defined as the aesthetic aspects of the domain of techné and how this relates to world-making (Hosale, Murrani, & de Campo 2018: ch 1: para 32).

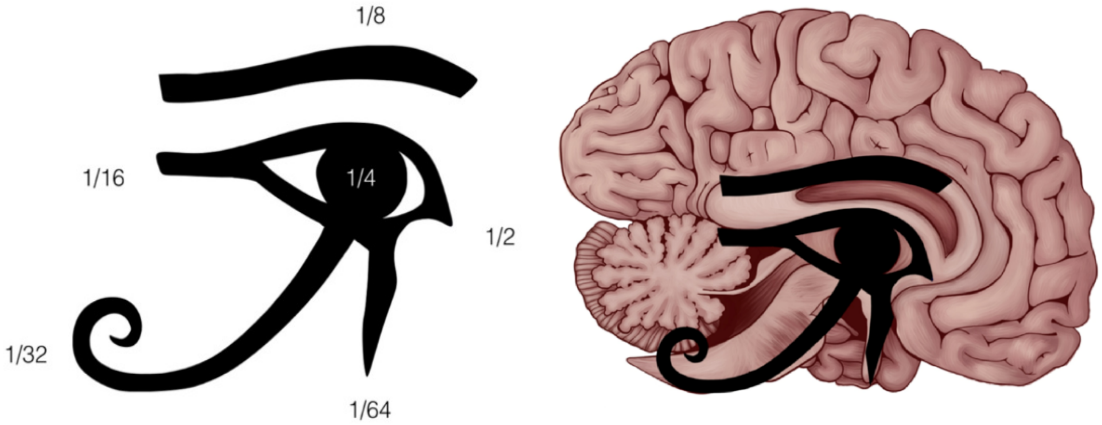


Figure 53: LEFT: The six mathematical parts of the Eye of Horus with six parts: 1/2, 1/4, 1/8, 1/16, 1/32, and 1/64. Each fraction corresponds to the senses: 1/2 represents smell, 1/4 represents sight, 1/8 thought, 1/16 represents hearing, 1/32 represents taste, and 1/64 represents touch (ReFaey et al. 2019: 3).
Figure 54: RIGHT: shows the Eye of Horus fits the mid-sagittal section of the human brain, corresponding to the human sensorium (ReFaey et al. 2019: 5). VR is a technology designed to simulate the human sensorium. Lane affirms the relationship between VR and consciousness as prescient since the "brain itself operates as a VR system" (Lane 2020: 20).

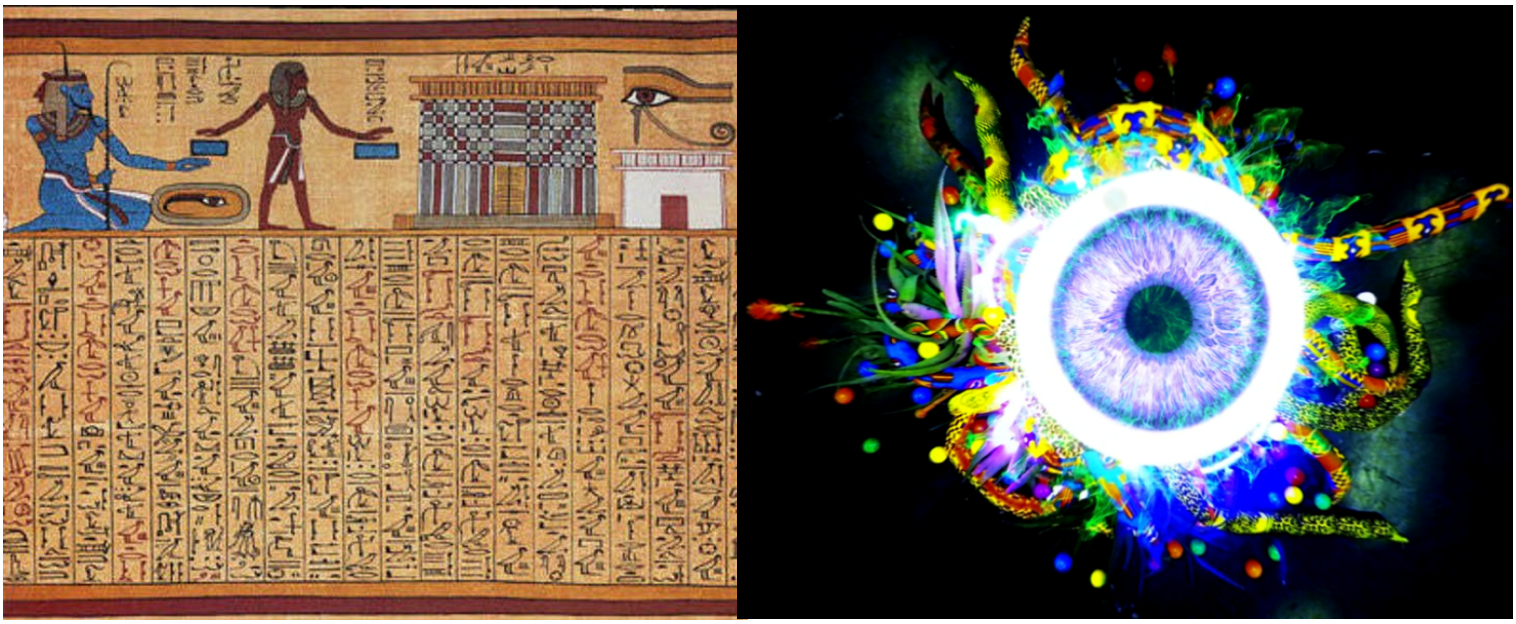


Figure 55: LEFT: The Eye of Ra pictured on the far right of the image extracted from the *Book of the Dead – the Papyrus of Ani* (400 –100 BCE) (Budge & Wilson 2016: 31).
Figure 56: RIGHT: *The Eye of Rre Mutwa* experiments with constructing a prosocial African gaze that re-reads the semiotics of The Eye of Re in *The Ancient Egyptian Book of The Dead* as an African Science Fiction cyborg construct. Mutwa, represented as an "All Seeing Eye", becomes an ocular-centric metaphor for the expansive or "exponential" gaze, enabled by the technē of the multiple lenses on a VR camera.

Learning to accept Mutwa's muthi, Boyer begins to weep as she opens her mind's eye to expand her consciousness. Slowly she opens up to the blindness of her privileges. She accepts her illness. Her dis/ease, the sickness of being blind to prejudice and racism as a systemic creation of the false category of "whiteness", created to subjugate black people for economic exploitation (DiAngelo 2018: 16). Realising, accepting, and contemplating racism as an invention of capitalist interests must guide future action in the world if we are to process the meaning of white fragility and allow this theory to guide our future ethical behaviour. White South Africans must learn to resist the convenient and comfortable avoidance of the truth by pretending to be "colour-blind". In this scene, Boyer is a conduit for my awakening to the prejudice I have unwittingly participated in as a white South African. At this juncture, Ibokwe says to her:

IBOKWE (to camera)
Do not cry. Stop.
We are here to comfort you.
By activating your sight.
Do you see empire-?
War? Conquest, Massacre? Genocide?
Control, Exaltation? Advancement?
Upon what exoneration do these stand?
Now open your eyes wider;
Do you see the other side? The underbelly?
What is teeming there?
Is it Defeat? Death, Subjection? Humiliation? Exploitation? Poverty?
Name what you see,
Acknowledge what is in front of you,
Moreover, your tears will begin to dry up.

In this scene, I was working with DiAngelo's theory of the problematic nature of white tears, which in cross-cultural circumstances, can be manipulative. As a white South African, I have cried plenty. I cry when I read Steve Biko. I cry when I read Frantz Fanon. However, my tears are worth nothing if they cannot affect change or be turned into action. This work is evidence of my realisation that white guilt is not enough. It is, in fact, useless. White tears are "self-indulgent" … "narcissistic … and ineffective; guilt functions as an excuse for inaction" (DiAngelo 2018: 135-136). "White tears" are therefore subversive, turning attention to "white

distress, white suffering, and white victimization" (DiAngelo 2018: 134). DiAngelo expresses frustration at how "white tears" become a refusal to see or engage honestly with racism through understanding these overt and covert forms of prejudice. "White tears" divert attention from work required to comprehend, apprehend and transform behaviour. Without this transformation, we cannot see the patterns of economic oppression that recur, and the residual effects of the First, Second and Third Industrial Revolutions; and how these moments in history impacted Africa egregiously in the form of slavery, colonisation and apartheid (Marwala 2020: 12, 13, 271).



Figure 57: LEFT: Above, Boyer reluctantly performs the uncomfortable truths of "white fragility" and "white tears (DiAngelo 2018). She begins to open up to the truth and says: "I am here to learn how to see." at the end of this scene, she wipes her eyes and looks at Ibokwe with a new gaze, with a new understanding.
Figure 58: RIGHT: Learning to see, in this instance, is about learning to transform "white fragility" into affinity and solidarity. Cyborg technofeminism foregrounds the need for accountability and knowledge of patterns of oppression (Sandoval 2000: 174).

During the pre-production phase of this film, I witnessed white fragility in myself in the white casting of the film. Boyer withdrew from the film because the film was overtly political and critical of whiteness. I then became angry with Boyer when she accused me of bolstering my allegedly obsequious political stance in making *The Eye of Rre Mutwa* as an engineered career move. Boyer took exception to the scene where she was asked to perform "white

tears". She asked for this scene to be removed. However, I wanted to explore white tears in the context of racial injustice, where; "white women's tears" effectively reinscribe rather than ameliorate racism (DiAngelo 2018: 132). After argumentative exchanges, I persuaded Boyer to return to the project and consulted a professional script editor at her behest.

After internalising Boyer's comments and questioning my anger reflexively, I realised that both her and my reactions were instances of white fragility. The conflict that arose between us was itself a performance of "white fragility" (DiAngelo 2018). Focusing on the subject of white fragility produced a mirror effect in us both, where we acted out white fragility. My creative intention in crafting the subject matter in the script was to deploy the "oppositional gaze" to "subvert and transform" the pervasive practices of many white South Africans, which is to deny any culpability or privilege with respect to the lingering legacies of apartheid. This pervasive denialism allows the continuity of overt and covert forms of racism to continue unchallenged. This is symptomatic of how South African societies have been historically structured throughout the colonial project of "development". I illustrate this point in the script by adapting what Marwala says about the four Industrial Revolutions and how these eras in history in the South African context; leveraged technology, power, politics, and alleged "progress" to exploit black people for profit and economic gain (Marwala 2020: 10-20).

Like the patterns DiAngelo identified with white Americans in their refusal to acknowledge race inequality, white South Africans are similar, preferring to hide behind the pseudo-progressive claim of being "colour blind". DiAngelo points out that: "colour-blind racism is an example of racism's ability to adapt to cultural changes. According to this false consciousness, if we pretend not to notice race, then there can be no racism" (DiAngelo 2018: 41). This is particularly true of post-apartheid South African race relations, where many uneducated, or politically myopic white South Africans assume that democracy ended apartheid, when in fact structural racism continues to permeate through various sectors of society. The ubiquitous attitude of white South Africans is marked by a refusal to acknowledge the various legacies of apartheid and how this has endowed them with white privilege. Since this subject is uncomfortable to deal with, it is easier to adopt the false consciousness of colour blindness, which negates the pain they have directly or indirectly caused. By negating the pain they (or their ancestors) have caused, they can also negate the pain they may feel subconsciously. The suppression of guilt and pain rids them of the need for redemption by negotiating socio-political-economic reparations due in a post-

colonial democracy. In this context, learning to love the self-reflexive work of confronting "white fragility" was painful. It remains painful because "white fragility" is so ubiquitous in South African white cultures. It is painful to live in a state where one is preoccupied with correcting the stigma of "white fragility". It is painful to be on the receiving end of incessant negative critique. It is challenging but ultimately insightful and liberating.

From my perspective, *The Eye of Rre Mutwa* was written as a reflexive contemplation of what it means to be a white South African in the twenty-first century amid the techno-cultural-political colonisation of global South past-present-futures. This film allowed me to explore my culpability regarding the patterns of technoscience oppression evidenced in the First, Second, Third and Fourth Industrial Revolutions. Boyer's performance represents an attempt to explore my own white identity about the question of white privilege. As a beneficiary thereof, I might learn to assimilate an expanded consciousness by learning to love all South African citizens, regardless of the trials and travails spotlighted in the daily avalanche of current affairs. Sandoval's revolutionary love[67] guides me through the rapids of load shedding, State Capture, and the Zondo Commission.[68] In this process, I learnt to love, through understanding and endurance, how to handle these hardships together to shape an equitable post-apartheid South Africa. While the film may have been lacking in communicating love, I maintain that confronting white fragility in *The Eye of Rre Mutwa* is an instance of Third Cinema and Prosocial VR; because it forces white people to look at, acknowledge, and see racism embedded in the technoscience practices of the four Industrial Revolutions. This mode of seeing constitutes an "oppositional gaze" informed by bell hooks, who urges the problematisation of race in cinematic representation to subvert the "white supremacist capitalist imperialist dominating gaze" (hooks 2015: 264).

Act 1 – The First Industrial Revolution (1IR)

In Act 1, *The Eye of Rre Mutwa* explores the interconnectedness of human suffering and technological "development", which equates to the price Africa has had to pay for "progress".

[67] Love is a political technology used in the arts for social transformation (Sandoval 2000: 4). Sandoval argues that love guides political "*movidas*" or "revolutionary manoeuvres" towards a "decolonised being" (Sandoval 2000: 140).

[68] Chief Justice of the Republic of South Africa, Raymond Zondo tables how State Capture led to ongoing national electricity outages, known as load shedding through corruption at Eskom, (SA's state power utility) under the Zuma administration (Zondo 2022: 549-553).

The spectre of 1IR, 2IR, and 3IR remain visible in the form of post-colonialism, precipitated by transatlantic slavery and Triangular Trade[69] during 1IR, which amassing unprecedented wealth for the global North (UNESCO 2002: 160). 1IR powered by the slave trade developed factories and locomotives driven by steam technology (Schwab & Davis 2018: 17). When slavery was abolished in 1865, 1IR technologies were poised to shift gear into colonial modes of extraction in 1880, with the *Scramble for Africa*, specifically the scramble for mining rights, and the indentured labour of African men, evidenced in apartheid mining practices (Marwala 2020:13). In 1IR (circa 1750-1850) technologies lead directly to the development of 2IR (circa 1870-1930) technologies, primarily electricity, also sourced from coal, paved the way for the invention of the lightbulb, the telephone, the radio and television. 3IR (circa 1950-2000) technologies, ICTs, digital computing and the internet, opened the way for global North countries to upgrade further to 4IR, "exponential technologies", which have the capacity to violate Human Rights on a global scale, as we have witnessed in the Cambridge Analytica scandal (Schwab & Davis 2018: 18). As Boyer becomes conscious of her white fragility. Her in/direct participation in the patterns of economic oppression built into the consecutive Industrial Revolutions, she says:

PATRICIA (to camera)

… White power becomes enraged,
When confronted with the truth of how it's "progress."
Shaped the First Industrial Revolution,
Leading to the Second, the Third and now the Fourth.
How wealth was generated by the Triangular Trade, the selling and buying of slaves,
Led to the First Industrial Revolution
And how White capitalism would rather gouge out its eye
Than acknowledge how it came into being and continues to fly to this day with the wings of racism, sexism and classism;
How the Homo Deus of Silicon Valley built their wealth on all three.

[69] Triangular Trade was a mercantile capitalist system emerging from the transatlantic slave trade where, according to Moeletsi Mbeki: "manufactured goods were shipped from Europe to West Africa and exchanged for slaves, who were shipped to the Americas to grow sugar, cotton and tobacco that were then shipped back to Europe. This transatlantic slave route forms the shape of a triangle when one connects the dots of 1IR mercantile capitalism" (Mbeki 2009: i).

From the perspective of neo-Marxist configurations of "technological determinism" under 4IR, I was working with the idea of integrating "white fragility" and economic, technological power. Exploring the knock-on effects of technological negation through prejudice from 1IR to 4IR in the African context, I was working with what prejudice meant from the perspective of VR as an optical tool for future gazing. DiAngelo describes prejudice as "foundational to understanding white fragility because suggesting that white people have racial prejudice is perceived as saying that we are bad and should be ashamed" (DiAngelo 2018: 20). When people feel bad or ashamed, they become defensive, instead of exploring prejudice openly and honestly to transform prejudice into a broader understanding of human suffering (DiAngelo 2018: ibid). DiAngelo asserts that racism, like sexism, is a socially constructed system (DiAngelo 2018: 21). White capitalism emerged after slavery to "scientifically" validate this system of economic oppression (DiAngelo 2018: 16).

The conceptual and emotional relevance of mapping the trajectory from 1IR through to 4IR in the medium of VR as a tool of 4IR was central to my understanding of the material semiotics of this exponential technology. Benyera argues that Africa is in danger of "(re)colonisation" in the same way that "colonialism outlived decolonisation, coloniality is ahead of its victims in the Fourth Industrial Revolution where it is busy (c)overtly mining and harvesting data, in the process clamouring to appoint itself as the data custodian for Africa" (Benyera 2021: 11). The intersectional politics of coalition that permeates Haraway's writing of the cyborg is critical to re-examine in the age of 4IR, which presents new forms of inequalities for Africa. Benyera paints a dystopian image of an "ontological ladder, whose apex is occupied by white Caucasian males and the bottom is occupied by black women" (Benyera 2021: 10). In the theoretical framework that informs Boyer's performance as an Afrocyborg representation, I was creatively obliged to explore my white culpability and this new site of technological power struggle in the context of 4IR. In this sense, Boyer's performance of white fragility reflects my own *mea culpa.*

To subvert the violent binaries of black and white in *The Eye of Rre Mutwa,* I use the SF aesthetics of blue and green body paint to transform Ibokwe and Boyer into Afrocyborgs. Ibokwe wears turquoise blue daubs of paint on his skin, while Patricia is smeared in fluorescent green body paint. These semiotic choices were deliberately designed to disrupt the politically fraught binaries of black and white. This deliberate visual destabilisation and cyborg subversion is "part of needed political work" towards creating connection and affinity

(Haraway 1991: 154). In doing so, I am working with the idea of making Quantum Ubuntu a visual construct by subverting the semiotics of multiple forms of race prejudice, still evident in South African societies. The subversion of black and white, reconfigured as green and blue, is a way to negate the tired old tropes of apartheid South Africa.



Figure 59: In this scene, Ibokwe wears a crown of lightbulbs, exclaiming: *"In the second Industrial Revolution, we have electricity! 1878 the invention of the light bulb."* Boyer replies: "*But are we enlightened?"* Ibokwe laughs as he replies, "*Haai jabula"*, a line he improvised using informal Zulu slang. This line translates to: "*No, you must be happy with the little you have."* This ad-lib comment from Ibokwe denotes the systemic forms of poverty orchestrated by apartheid politics and town planning that forced the majority of the South African population to live in under-resourced townships; with little to no access to municipal service delivery, including electricity, running water, basic schooling and mobility infrastructure (Sithole & Mathonsi 2015: 15).

Act 2 – From electricity to enlightenment (2IR)

In Act Two, "enlightenment" is questioned in relation to the 2IR with its so-called "civilising mission", where colonialism was merely greed disguised as "Christian piety". Banyera attests to this: "What our forefathers and parents received was not a civilising mission but the complete opposite. They received colonialism, brutalisation, humiliation, subjugation, and

commodification" (Benyera 2021: 42). While the "normalisation"[70] of black poverty remains visible in townships today, "white fragility" can easily be triggered in daily conversation around the heated, polarised debates of service delivery. load shedding[71] (electricity blackouts) can spark highly controversial discussions in South Africa that reveal racist rage bubbling just below the surface of white collective un/consciousness. White South Africans chose not to see the fact that service delivery systems inherited by the ANC in 1994, were built for 10% of the population (whites only) (Sithole & Mathonsi 2015: 15). In trying to increase service delivery to 100% of the ever-expanding population, infrastructure has collapsed, crumbled, decayed, and then the State Capture[72] scandal, culminating in the Zondo Commission, almost brought Eskom to a near standstill.

The subject of Load Shedding in South Africa is a quick litmus test for racism, which can be detected almost instantly, depending on how the person reacts. I have witnessed countless instances of vitriolic racism by white South Africans who frequently and openly condemn the ANC for corruption in terms of load shedding. Adding insult to injury, while South Africa struggles to keep the lights on, the "developmental prerequisites" of 4IR need a constant supply of affordable electricity. Benyera bemoans that the electricity supply in Africa is unstable, saying, "There are many African-made problems in Africa, however, and more importantly, the African problem is not an African problem. This is because colonialism and capitalism structured Africa into what it is today: a fragmented sovereign-less continent, a supplier of raw materials, a consumer of finished goods, a perennial beggar for aid and alms" (Benyera 2021: 195). From the position of white fragility, white South Africans refuse to see how historical political oppression is the cause of corruption. If the ANC was founded in 1912 and was forced underground to operate as an illegal political party, which was only unbanned in 1990, this means that for 78 years, the ANC was forced to exist outside the law. When politicians are forced to live in prison for decades before taking their seats in parliament, we cannot expect that the lived experience of trauma and politically imposed criminality will not permeate contemporary politics. Fanon's *Wretched of the Earth* (1963) is filled with examples

[70] Sithole and Mathonsi refer to poor service delivery under apartheid as responsible for institutionalising black poverty (Sithole & Mathonsi 2015).

[71] "Load shedding" began in 2008 when Eskom, the state electricity supplier, ran into its first "emergency" blackout due to the failure to secure coal for generating electricity as a result of fiscal mismanagement (Madonsela 2016: 193).

[72] "The State Capture Report" was written by Thuli Madonsela, former Public Protector, in 2016, drawing attention to former President Jacob Zuma's involvement with the Gupta family, who were allowed undue influence over ruling party politicians and awarded business contracts unfairly (Madonsela 2016:5).

of political trauma manifesting as psychosis. South African white fragility is, therefore, blind to the fact that it co-created load-shedding by forcing Jacob Zuma into a prison cell for ten years on Robben Island. Acknowledging the interconnectedness of oppression and corruption is an example of Quantum Ubuntu. Here, “I am because you are” can be paraphrased as “corruption exists because of oppression”. The two are interrelated, as per the law of Newtonian physics; all actions have an equal and opposite reaction. As Boyer says in *The Eye of Rre Mutwa: “*The rope around my neck is connected to the rope around your neck”. This line was directly inspired by abolitionist Frederick Douglas, who said in, *My Bondage and My Freedom*, first published in 1855: "No man can put a chain about the ankle of his fellow man without at last finding the other end fastened about his own neck” (Douglass 2005: 411).



Figure 60: LEFT: Boyer and Khoza RIGHT: become twentieth-century cyborgs of the word-wide-web with robotically uncanny machinic movements to render the 3IR in African cyborg subjectivity. These Afrocyborgs are cast as primitive computers and telecoms. Their extensions of webbed connectivity are supposed to connect them to the global village community, available to some in the global North. In Africa and the global South, the appearance of the “Digital Divide” points to the disconnected discourse of progress. In connecting the dots between 1IR, 2IR, 3IR and 4IR, Marwala says: “It is essential to know where South Africa has fallen behind in each industrial revolution and why it is so necessary that we do not suffer the same fate a fourth time” (Marwala 2020: 10).

Act 3 – The internet and interconnectivity (3IR)

Representing 3IR cyborgs in the scene above, Ibokwe and Boyer transform into embodied computers, primitive robot-cyborgs with telecoms extensions, implied by the spinning of their electrified braids to form a web of connectivity. Ibokwe says, *"In the third industrial Revolution, we have telephones. Computers … and behold …"* Boyer chimes in to finish his sentence robotically, swinging her tentacular braids in orbits around her; *"The internet & the world-wide-web!"* In the last three lines of the 3IR inspired third act, Ibokwe says: *"Umuntu, ngumuntu, ngabantu? A Digital Revolution? No, instead, we have a digital divide!"* Here Ibokwe conjures the African interdependence of "Botho and Ubuntu"[73] as an African expression of what the World Wide Web should be instead of disrupting economic inequalities evidenced by the Digital Divide of the 1990s. Not "everyone across the globe benefited in the same way" South Africa lacked equal access to these digital technologies under 3IR (Marwala 2020: 15). Marwala forecasts future evidence of approaching digital divides in 4IR, stating: "AI will reinforce the digital divides that are already fueling economic inequality and undermining competition" (Marwala 2020: 216). The meaning of the word "revolution" begins to slip into cognitive dissonance as the "progress" associated with the four industrial revolutions becomes a construct of Western privilege and power. Revolutions of a political magnitude are a shadowy, or rather, bloody chimaera that is equally interconnected with the Industrial Revolutions of tools, technologies, wealth and power.

[73] Bantu describes the interdependency of "Ubuntu" as: "I am because we are. I can only be a person through others" (Bantu 2013: 6).

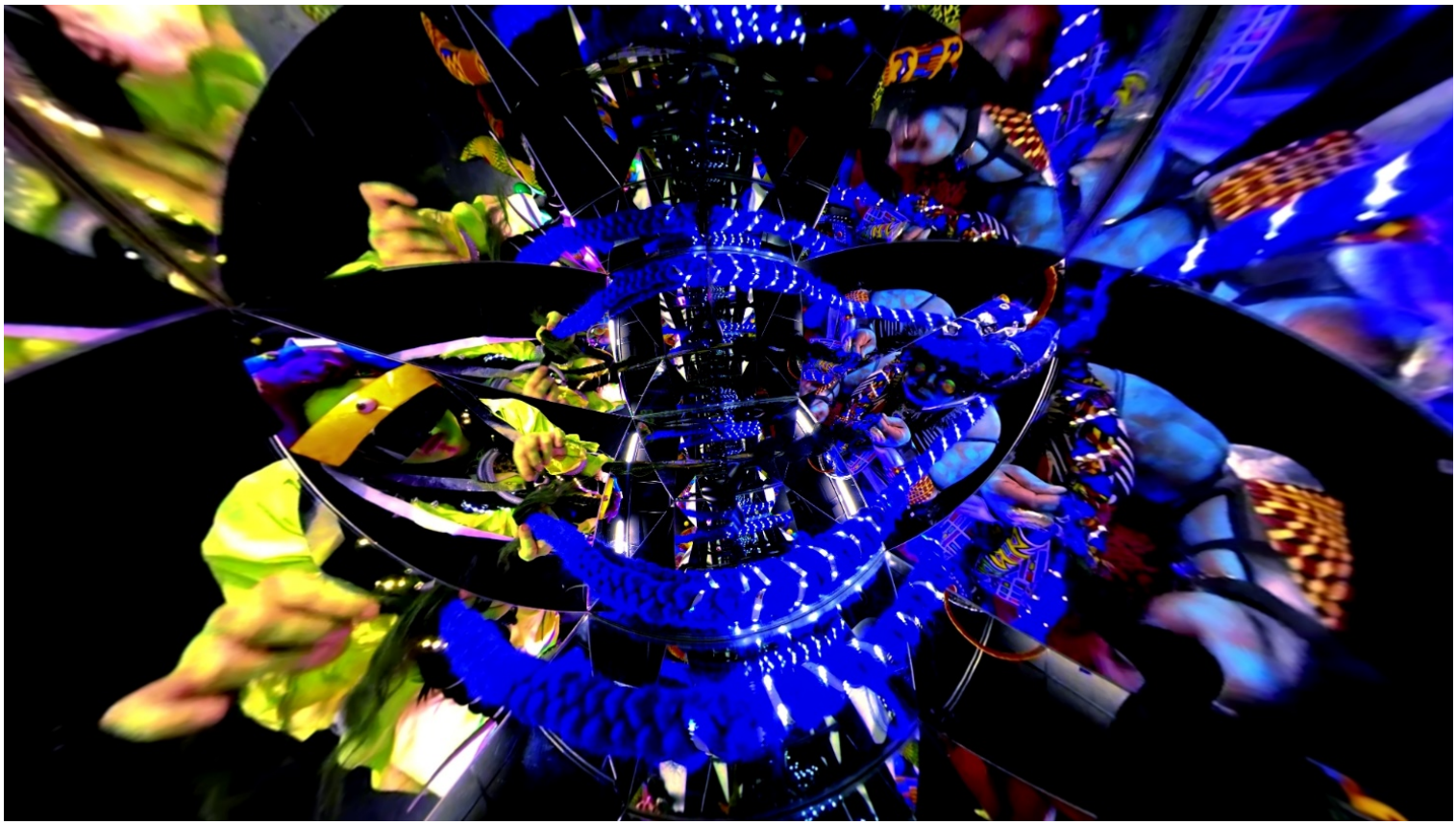


Figure 61: In this scene, The Eye of Rre Mutwa creates the optics of infinity as a cypher for the spiritual and supernatural domain that defined the life of Credo Mutwa, the High Isanusi. Not only would it be inappropriate to deny the potent spiritual/supernatural aspects of Mutwa's contribution to isiZulu traditional medicine and spirituality, but this realm could not be overlooked or omitted in a homage to Mutwa in light of his invocation of spiritual practice as a "muthi" for healing racialised wounding. As Mutwa says: "You cannot fight an evil disease with sweet medicine … one cannot hope to cure a putrid malady like inter-racial hatred and misunderstanding by mincing words" (Mutwa 1964: xx).

BOYER VOICE OVER

Now, at the dawn of in the 4th industrial Revolution,
We have tantalizing new shiny toys,
That breech the boundaries of digital, biological and physical.
The world shudders because of the distant rumble of *DISRUPTION!*

IBOKWE VOICE OVER

Virtual Reality, Augmented Reality,
3D printing, gene editing.
Quantum Computing.
Rising Inequality.
Artificial intelligence, threatening job security …

BOYER VOICE OVER

But the Titans of Silicon Valley tell us its ok,
Don't worry, just give us your data!
Ha ha! Cambridge Analytica!!
My data = your weapon of war.
You're gonna make the world a better place?!
Really? Thanks for Trump & Brexit!
Oh, and we hear you've solved the problem of mass unemployment!
Hooray! Everyone can go on permanent holiday!

IBOKWE VOICE OVER

H-a-l-l-e-l-u-j-a-h!
A Universal Basic Income!

BOYER VOICE OVER

Kurzweil predicts that by 2030,
We will inject nanobots into our bloodstream.
We will live and see in Virtual Reality.

IBOKWE VOICE OVER

Deus Ex Machina! God will emerge from the Machine!

BOYER VOICE OVER

Really? A Singularity?
And all these lies while *THEY OWN MY FUTURE?*
Just like a bad TV advert?
… the Homo Deus of Silicon Valley
Are already very busy …
Colonising Our Futures!

IBOKWE VOICE OVER

Perhaps what we really need is a new Pantheism to save the planet?
A New Singularity informed by Black Quantum Futurism.
Deus Sive Natura!
Quantum Ubuntu – we are all particles –
Atoms, neutrons and protons,
Spinning in infinity,
Orbiting around,
One another.
For all eternity.

Act 4 – From quantum computing to Quantum Ubuntu (4IR)

In the fourth act, Ibokwe and Boyer are a collective sentient cyborg being, with no end or beginning between them. This is my visualisation of Quantum Ubuntu. They are interconnected by braiding their hair into each other's blue and green plaits as they question the potential pitfalls of history repeating itself in the African 4IR. Quantum Ubuntu is configured here in the nexus of Bantu's Afrikology, where Ubuntu and decolonisation work together towards healing the colonial wound in working towards the realisation of African post-modernity (Bantu 2013: 8). Ibokwe and Boyer are one being when their braids connect to each other in a circle around the VR camera, placed inside the mirror pyramid prism. This visual invokes the continuum of infinity from the 5th millennium BCE to the twenty-first century at the dawn of 4IR. This scene is a visual rendering of Quantum Ubuntu because it expresses "I am because we are" in the age of human-to-cyborg evolution (Bantu 2013: 5).

In this kaleidoscopic mise-en-scène, Ibokwe and Boyer form a web of interconnectivity with their interlocking braids. At this point, the dialogue is no longer performed as I intended to show they have attained a super sentient intelligence enabling them to communicate telepathically. Telepathic performance is prefigured in Mutwas' writing, where he affirms telepathy as an acknowledged practice historically in isiZulu culture (Mutwa 1964: 552, 575). Mutwa's techno-magical communication tool preimages the telepathic abilities of VR BCI users. VR game design is already using AI to develop VR telepathy in real-time interactive virtual gaming (The Royal Society 2019: 26). Communicating telepathically with Ibokwe, Boyer says:

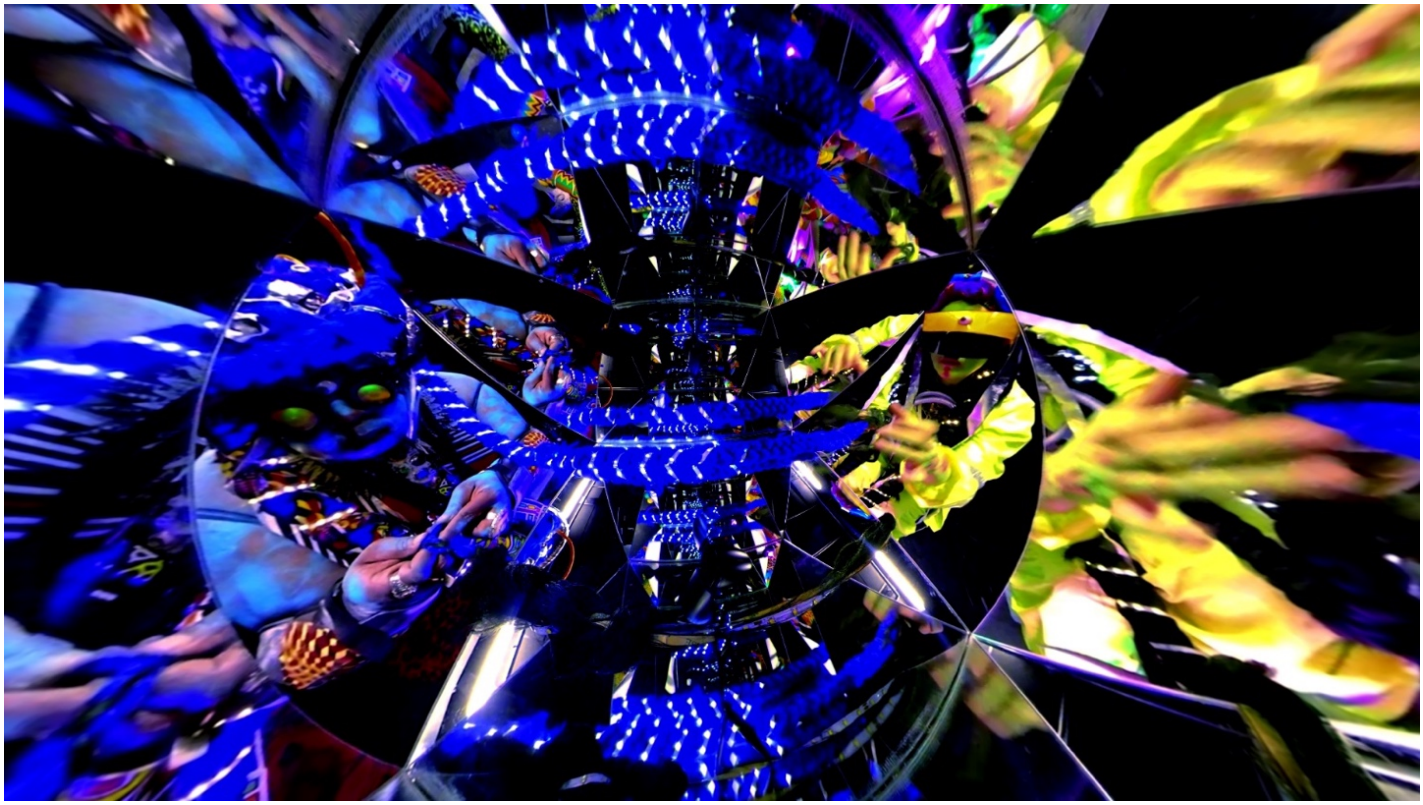


Figure 62: Fractal VR cinematography as a representation of Quantum Ubuntu creates a quantum gaze of human intraconnection. In this final scene, Ibokwe and Boyer weave Rasheedah Phillips' Black Quantum Futurism (BQF) into the narrative to connect to Quantum Ubuntu through Haraway's "sympoesis" as a way of becoming with (Haraway 2016: 125). Quantum Ubuntu asks the viewer to take a leap of consciousness out of the self into a limitless kaleidoscopic, quantum gaze of human interconnectedness, or interdependence expressed as "umuntu, ngumuntu, ngabantu". In this palliative philosophical gesture, I echo Haraway's 3IR cyborg, hoping that my 4IR Afrocyborg might forge quantum affinities and infinities on the new integrated electronic circuit of exponential technologies in 4IR (Haraway 1991: 149).

In this scene, Khoza and Boyer become an interconnected sentient superbeing, which is signified using mirrored (virtual and real) reflections as African fractals, which represents deterministic chaos, used in African divination (Eglash 1999: 94). Acknowledging the infinite as a spiritual semiotic homage to Mutwa the Sangoma, and medicine man was essential to visualising the idea of Quantum Ubuntu in this scene where Boyer and Ibokwe become one being, connected through braiding their hair together. In this act of "weaving with", I was summoning the oppositional consciousness of Haraway's "Spider Woman" as a way to decolonise the Hollywood appropriation of Ghana's autochthonous Spider-Man (Haraway 2016: 91). Haraway's "Spider Woman" is a cyborg-incarnation of the Thousand Faces of Gaia (Haraway 2016: 52). This chthonic cyborg with myriad appendages instantiates

"tentacular thinking[74]" as a mode of creative "sympoiesis" (weaving with) as oppositional consciousness (Haraway 2016: 30). Science Fiction is entangled with Science Fact, Speculative Fiction, and Speculative Feminism (Haraway 2016: 31). Haraway's SF spider-woman-cyborg subverts Hollywood's SF homogenous/hegemonic spidermen towards constructing a justice-seeking Afrocyborg where Boyer and Ibokwe weave their braids into one another's platted antennae as they become an interlinked super-sentient-being, weaving their newfound kaleidoscopic sight of interconnectedness.

The semiotics of the eye as an allegory for the Prosocial gaze in the mode of Fourth VR

In the final image of the film, Mutwa has the last word as multi-coloured electronic plasma animates the eye in concentric outward ripples that represent him as an SF ancestral incarnation:

THE ALL SEEING EYE (Voice Over)
(IBOKWE channeling Mutwa)
The only way we can fix the future
is by seeing each other eye-to-eye.
Achille Mbembe warns of a planetary turn:
"The destiny of our planet will be played out,
to a large extent, in Africa.
This planetary turn of the African predicament will constitute the main cultural and philosophical event of the 21st century."
Africa represents the last frontier of capitalism.
Keep your eyes open. Indaba, My Children.
Do not let history repeat itself.

[74] Haraway's chapter on "tentacular thinking" intertwines with the multiplicity of Gilles Deleuze and Felix Guattari in, *A Thousand Plateus* (1980), where their conceptual and creative praxis semiotic, the "rhizome", "ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles." (Deleuze & Guattari 1980: 7). The rhizome and the tentacle in both instances are examples of Sandoval's "oppositional consciousness". (Sandoval 2020: 408)



Figure 63: in this closing scene, The Eye of Rre Mutwa represents a "planetary turn" towards Africa at its centre, which I depict as the pupil of Mutwa's planetary eye (Mbembe 2016: 323). The juxtaposition of the infinitesimally small is also part of the indefinably enormous. Astrophysicist Neil deGrasse Tyson tells us that quantum physics begins with the need to comprehend the four laws of physics: matter, space, time and energy, from which all things emerge (deGrasse Tyson 2007: 312). $E=mc^2$ is a computational tool to calculate the exploded universe, where "our" sun is one of a hundred billion stars in the Milky Way, and "our" Milky Way "is but one of a hundred billion galaxies in the universe" (deGrasse Tyson 2017: 44). $E=mc^2$ extends the human imagination to compute the trajectory from the infinitely large to the infinitely small, where the universe was born, "all the way back to infinitesimal fractions of a second after its birth" (deGrasse Tyson 2007: 313). Through space, time, matter and energy, we trace our collective path home to the divine spark, or the "Living Spark" (Mutwa 1964: 30). Both the eye and the planet are equally small and equally large. Scale is irrelevant from the subatomic to the fractal geometry of the infinite; both are intertwined expressions of Deus Sive Natura, God or Nature (Spinoza 2007: 296). Thus, I am because You are = Quantum Ubuntu.

In this scene, I apply the theoretical discourse of "gaze regimes" since a significant portion of African cinematic discourse hinges on the subject of the gaze and identity politics (Mistry & Schuhmann 2015: x). Gazing deeper into the African origins of techné, the application of truth, praxis, and production are refocused on the mythology of the wounding and restoration of the Eye of Horus, exemplified in the making of *The Eye of Rre Mutwa*. Mutwa is represented as an ancestral "All Seeing Eye", which was designed as a modern-day echo to 5000 BCE, where the "Open Eye" appeared alongside the injunction to: "Know Thyself" (James 1954: 84). The Open Eye, and the ancestral eye represented here are symbols of African identity and self-determination. This follows what Baba Bantu says: "Many of the pyramids in ancient Egypt had the inscription 'Know Thyself', which pointed to the centrality of self-knowledge in African culture ... to be conscious was to be alive and to be human. The

greater the consciousness, the higher the expression of one's humanity" (Bantu 2013: 6). I embrace this act of self-knowledge in applying both the semiotic Eye of Mutwa and the multiple eyes of the VR camera towards constructing a prosocial gaze of Africa in the mode of Fourth VR to critique the alleged re/colonisation of Africa through data colonialism currently underway in 4IR (Banyera 2021: 316).

I embrace a prosocial "oppositional consciousness" as part of decolonising VR media practices (Sandoval 2000: 3; Haraway 1991: 118). This is achieved by leveraging VR as a new tool to create a fresh gaze, as per Mistry and Schuhmann, who draw attention to the need for: "New tools, a fresh gaze and different stories" required to "dismantle the master's house" (Mistry & Schuhmann 2015: xvi). This is exemplified in the praxis and paradigm shift witnessed in *The Eye of Rre Mutwa*, where experiments with VR become a way to expand the Afrocentric gaze (Mistry & Schuhmann 2015: xvi), This approach includes Sandoval's principles of "equal rights", the "revolutionary", and the "differential", which, applied together, form a kaleidoscopic theoretical and methodological tool to generate new cinematic and kinetic powers with the potential to transform dominant power relations (Sandoval 2000: 43).

By working in the mode of Fourth VR, which is "Indigenous Futurism", "Indigenous Activism", and Prosocial VR, this film articulates a decolonising of the gaze since it serves to shift media perspectives and representation of the African continent towards a corrective gaze of seeing contemporary South African societies positively (Wallis & Ross 2020: 3). Prosocial VR is geared towards behaviour change and learning to understand each other's perspectives with an emphasis on how VR can be used to instigate "empathetic reactions" using embodied cognition and affective psychology (Aitamurto et al. 2021: 2139, 2140).

The Eye of Rre Mutwa experiments with reconstructing a new "gaze regime" by employing the decolonising impetus of Fourth VR, where Indigenous futurism and activism share genre conventions with Afrofuturism (Mistry & Schuhmann 2015; Wallis & Ross 2020: 5). Fourth VR builds on the history of anti-colonial struggles, informed by the production of Third Cinema in Africa. The focus of this collaborative cinematic practice is to "problematise hegemonic gaze regimes" in contributing towards the "anti-imperial gaze" while working towards a "post-colonial gaze" where nation-building is foregrounded (Mistry & Schuhmann: xvi). For this reason, gaze discourse is pivotal to the notion of identity politics, which is the driving force behind neo-Marxism, and its attendant way of seeing the world as a result of pervasive race-gender-class inequalities. The Afrocentric gaze constructed in *The Eye of*

Rre Mutwa is an experiment with constructing new ways of seeing by using "new tools" that might inform the viewer of the inherent political power engendered in the ways we look at culture and identity from Africa. Experiments in VR gaze are critical from an African perspective because constructing this cinematic point of view (POV) or "world view" is a lens through which to project African identities into the future. This is also the role of Fourth VR and Indigenous Futurism, which emphasises activating agency in prosocial VR (Aitamurto et al. 2021: 2141). POV in VR teleports the viewer into the world of story. This powerful POV is constructed by the VR camera's multiple lenses, exponentially expanding the portrayal of the subject matter in the film. POV is the authorial creative conviction or motivation for filmmaking. POV not only structures the medium but, more importantly, the message, the homily, and the dénouement. As a result, a film without a well-defined point of view or "world view" or "world of story" is unlikely to be an exceptional film. POV is gaze construction. It is for this reason that *The Eye of Rre* Mutwa is constructed around the prosocial gaze of Fourth VR and its ability to decolonise African futures amid the anxieties of 4IR and how history might repeat itself as evidenced in the global trend towards "data colonisation" (Benyera 2021: 209). This restorative gaze aligns with the Third Cinema practice of African cinema during the liberation struggles of the mid-twentieth century, where the camera became a revolutionary tool aimed at dismantling the colonial gaze (Ellerson 2015: 1). Now, in the twenty-first century, I merge these earlier liberation struggle practices with a forward focused gaze on the new frontiers of a different kind of struggle; the struggle against data colonialism in the Fourth Industrial Revolution.

Learning the medium of VR through the lens of Mutwa's muthi

Mutwa wrote *Indaba My Children* to redress the misunderstanding between black and white people when he took a blood oath in 1960 and swore to avenge the death of his betrothed, who was shot in the back in the Sharpville Massacre (Mutwa 1964: 24). His Soweto home was burned to the ground in 1976 because the youth thought he was an impimpi.[75] Mutwa was punished for sharing the sacred *Umlando*[76] in his book, which he wrote to open the eyes

[75] An "impimpi" is a "sell-out", "police informant", or "collaborator" with the apartheid regime (Tutu et al. 1998: 90, 404).

[76] "Umlando" means to "narrate" or "give an account of yourself" or "trace descent". To "conform to, adhere to … tribal custom" (Doke & Vilakazi 1972: 448).

of those who might see through the lies constructed by racism. Through this act of Mutwa's generosity, I chose to see through the blindness of my privileges.

In retrospect, what I have learned in the writing of *The Eye of Rre Mutwa*, as I have tried to wrestle with my "white fragility" in the process of waking up, is the need for healing by acknowledging the collective suffering of both black and white people, caused by the societal wound of racism. I have learned that becoming angry or defensive is futile and counterproductive since this is a knee-jerk response to "white fragility". I have learned by embracing the teachings of Mutwa that repressing any emotional or psychological feelings of pain and suffering that result from my participation in white privilege must be acknowledged and held up to the light for examination. I must learn to hold my discomfort. When I look around and see the pain and suffering of systemic poverty embedded in the fabric of post-apartheid South Africa, I must acknowledge my dis/ease, and by doing so, act with loving kindness and expanded consciousness to contribute to a better, kinder, more loving and open-hearted world. By opening the eyes, the heart must also open. This is the continuum of liberation.

In this chapter, I have shown how I have answered the research question by addressing how *The Cosmic Egg* and *The Eye of Rre Mutwa* both undertake to transform gaze regimes through transgressive visual acts of technofeminist and neo-Marxist critiques of neo-colonialism and 4IR big-tech Capitalism towards undoing oppressive power structures. The case study of *The Cosmic Egg* summarises this as a Prosocial and Fourth VR rendering of MmaModimo as an eco-conscious call to see planet Earth as an extension of ourselves by proffering the theory of Quantum Botho.

The case study of *The Eye of Rre Mutwa* can be summarised as an acknowledgement of how "white fragility" has been made visible concerning prejudice and racism through technological "progress" from 1IR to 2IR, 3IR and 4IR in the shaping of our collective futures on the African continent. In this experiment, to see if "the medium can be the muthi" to heal the blindness of discrimination, I create a gaze of hope by invoking a new theory of Quantum Ubuntu as a way to mediate the mutations of the biological, physical, and digital worlds which threaten to synthesise humanity into cyborgs amid 4IR. Both films are linked by the thematic exploration of Quantum Botho/Ubuntu in the context of 4IR human-machine Afrocyborgs. Both films are made in the mode of Prosocial VR as they address eco-consciousness and environmental degradation in the case of *The Cosmic Egg*; and white fragility and economic

exploitation amid 4IR in Africa in the case of *The Eye of Rre Mutwa.* Both films are also made in the genre of Fourth VR, which combines African futurism with activism. The Afrocyborg constructs in both films are examples of political science fiction that celebrate oppositional political strategies. In the final chapter of this research, I will argue how both films exemplify how we have used the VR medium to be a form of ocular muthi.

CHAPTER 5:
Findings and conclusions: the medium is the muthi[77]

"Modern Medicine is full of cyborgs" (Haraway 1991: 149).

Now more than ever, Africa needs a new mode of Pan-Africanism to future-proof collective futures as "mwe" navigate the African 4IR (Siegel 2022). Pan-Africanism in the twenty-first century is not a totalising concept for those living in Africa, or of African descent, or of the vast network of diasporic African solidarity. Framed as a transnational and transglobal multiplicity of identities, Pan-Africanism is also not a phenomenon or rubric that is fixated with skin colour, or rigid constructs of ethnicities. Rather "Afropolitan" Pan-Africanism according to Mbembe is experienced globally as "transnational solidarity, and an internationalist, anti-imperialist solidarity" (Mbembe 2021: 209). It is the "rhizomatic" "relativization of roots" and "online routes" that are "intraconnected" (Deleuze & Guattari 1980: 25; Mbembe 2021: 215; Siegel 2022). As a white South African, living on the African continent, I have found Pan-Africanism[78] to be a consciousness-expanding antidote to "white fragility" (DiAngelo 2018). This act of technocultural assimilation renders my ontological reality as innately Afrocyborg. This is my journey to becoming an Afro-cybernetic-organism. This is an act of personal revolution, with social change enacted in the conceptual and creative output of the Afrocyborg VR X. Global, transnational Pan-Africanism in the twenty-first century is a way to apprehend the "algorithms of oppression" as 4IR strips sovereignty from states and aggregates wealth and power for the big tech giants of Silicon Valley (Umoja Noble 2018; Benyera 2021: 207). In 2015 Harari claimed "organisms are algorithms" (Harari 2015: 98). Fast forward to 2023, Harari now claims that unleashing large language models such as ChatGPT into the public domain has enabled AI to hack the "operating system of Human Civilisation. The operating system of every culture in human history has always been language…Human Rights are not a biological reality, they are not inscribed in our DNA. Human Rights are something we created with language by telling stories and writing laws" (Harari 2023). To galvanise this claim, Harari cites how Google engineer Blake Lemoine was fired for claiming that the large language model AI called LaMDA was sentient in 2022. While

[77] "Muthi" is traditional African medicine (Ntshangase 2012: 48).

[78] This claim is open to contestation by more traditional or radical proponents of Pan-Africanism. I am willing to accept this critique while noting that my positionality is informed by hybridity and multiplicity that is characteristic of twenty-first century postmodernism where black and white boundaries dissipate into many shades of "creolity" (Mbembe 2021: 99).

Lemoine's claim was highly controversial and likely false, he was willing to risk his career and credibility to protect the AI. This level of language manipulation to provoke human action raises larger ethical debates in the context of AI chatbots on social media with the power to sway elections as the world witnessed with the Cambridge Analytica and Facebook Files scandals and lawsuits. As Benyera affirms: "Combining AI with Facebook's 2.2 billion users creates a new technological oligarchy, one greater than any political oligarchy in modern history" (Benyera 2021: 210). These facts force us to look at VR and AI critically as Facebook, parented by Meta, owns the largest stake in VR technology globally, with its twin, Meta AI, which is infused across its "family" of applications and social media platforms (Meta 2023).

AI's mastery of language could be the end of human-dominated history as it cocoons us in a matrix of illusion (Harari 2023). Humanity legislated its way out of nuclear annihilation at the end of the Cold War in 1991. Two decades later we face a new arms race as AI developers like Google's co-founder, Larry Page, pursue "digital super-intelligence" in hopes of becoming "basically a digital god, if you will, as soon as possible" (Zilber 2023). Elon Musk's exposure of Larry Page proves Harari was onto something when he wrote *Homo Deus* (2015) detailing how the gods of Silicon Valley seek to deify themselves with AI. Consequently, Musk and Harari are among the 27 565 AI researchers who have signed the *Pause Giant AI Experiments Open Letter* (2023) published by the *Future of Life Institute* that calls on "all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4" (Future of Life Institute 2023). Global legislation is one of the ways in which we can put a stop to the "algorithms of oppression" perpetuating increasingly higher levels of intelligence through machine learning. The open letter calls on civil society to contain AI through the equivalent of pharmaceutical trials before being released into the public domain.

Pharmaceutical trials may not be enough to treat a "pre-existing condition" notes Benyera who appropriates the term from "the medical fraternity" by way of comparison; "a pre-existing condition predates the one under investigation or treatment, and predisposes a patient to more harm compared to other patients with no pre-existent conditions. In politics, it is a condition which causes a similar effect in that it renders Africa more susceptible to (re)colonisation" (Benyera 2021: 204). Africa has been a casualty of the 1st, 2nd, and 3rd Industrial Revolutions (Benyera 2021: 223). To prevent this algorithm from repeating itself in the 4IR, Africa must legislate that AI "operate according to our values – values based on the

principle of Ubuntu" (Marwala 2020: 219). A prosocial application of cyber-ubuntu is one of the ways that the twin mediums of VR and AI can be the "muthi" "mwe" need to "rehabilitate reason and heal our broken world" (Mbembe 2019).

In responding to Marwala's call to code Ubuntu into prosocial uses of 4IR technologies such as VR and its new clone, AI; I summarise how Quantum Botho/Ubuntu has infused our collective creative discourse and praxis in producing *The Cosmic Egg* and *The Eye of Rre Mutwa.* Concentric circles of consilience ripple outward from the conceptual centre of Quantum Botho/Ubuntu, which at its core signifies a methodology of love, informed by Chela Sandoval's guide to love as a political "*movida*" or "revolutionary manoeuvre" towards realising a decolonised state of being (Sandoval 2000: 140). In this context, love is the "muthi" or "*movida*" that "mwe" need to "heal our broken world".

From inception, the formation of the Afrocyborg Collective was designed as a technofeminist, technopolitical network of sharing knowledge and resources to get our VR films made. Cyborg technofeminism is a progressive intellectual methodology concerned with bridging social divides as integral to expressions of humanity and how affinities of political coalitions can be formed towards enshrining Human Rights. In this light, ethical responsibility is central to all expressions of our shared humanity (Short 2005: 16). In this sense, the Afrocyborg Collective has functioned as a support group of feminist solidarity, particularly amid the despair of COVID-19, when we thought our films might not be made at all, due to the various lockdown protocols. The discourse and praxis of Quantum Botho/Ubuntu sustained our relationship across closed borders through all manner of challenges and continue to do so. As of writing this chapter, the Afrocyborg Collective has just showcased our films at the Fak'ugesi Digital Art Festival at Tshimologong in 2023. This was the first time we showcased our work in a post-Covid environment, where this festival resumed a pre-Covid vigour.

Prior to this event, the exhibition of the two films faced significant challenges initially as all festivals were shut down due to Covid-19 National State of Disaster legislation. Our first screening at the Virtual National Arts Festival (vNAF) in 2020 was disastrous because the festival was forced to go online. While this was a noble endeavour for vNAF, both our VR films were uploaded to the vNAF website in the wrong format. They were uploaded as stretched-out equirectangular video in a different 360-degree spherical VR format. This resulted in a hostile reception from entertainment journalists at *The Critter*, the vNAF publicity platform.

Fortunately, the pan-African VR showcase at the RapidLion Film Festival in 2021 was somewhat more successful but still suffered poor audience attendance due to the ongoing lockdown regulations, compulsory mask wearing and social distancing. These regulations put a severe dampener on festival attendance and ambience in general. The whole point of a festival is the social event and networking opportunities around showcasing the work. Practising social distancing at a film festival is simply depressing. Audiences were reluctant to talk to one another, let alone be strapped into an invasive VR headset, which needed to be sanitised before and after each viewing.

The FNB Art Joburg: Open City Art Film programme in 2021 showcased our films at the Hyde Park New Metro cinema, where we hosted a handful of interested guests in a VR lounge setting. Again, masks, social distancing, and endlessly sanitising the VR Headsets rendered the festival like a scene from a post-apocalyptic zombie film as theatres played films to empty chairs. Despite these setbacks, sisterhood, love, and an undying friendship has sustained us through all these experiences. Our collective successes and failures remain “inextricably bound up” as we navigate future projects (Tutu 1999: 31).

Reflecting on the making and exhibition of our films, Molema and I both agree that *The Cosmic Egg* and *The Eye of Rre* Mutwa are prototypes of what we wished our films could be. If we were to make these films again, we would do many things differently. Creativity, after all is iterative. These were our first VR films, so naturally, there were going to be mistakes. If I were to make *The Eye of Rre Mutwa* again, I would rewrite the script to be more nuanced and less didactic. I would rehearse with the actors for at least a week to work and re-work the dialogue until it flowed and felt less stilted. I would choreograph more movement in the performances. The obstacles of limited finance and Covid-19 notwithstanding, produced two films worthy of recognition as peer review revealed amid the ghostly spectre of the pandemic. Tragedy struck on the last day of the RapidLion Film Festival. On the 11th of April 2021, my dear friend, and fellow VR collaborator, Phumlani Pikoli, passed away in his sleep. The cause of his death remains unknown. Pikoli wrote a peer-review response to *The Eye of Rre Mutwa*:

“There could have been no better words to suit the passing of Credo Mutwa last year, and very little could honour his legacy of pre- and post-colonial thoughts, understanding, philosophies and material grounding. Credo wrote books not only to teach, but to inspire new ways of living. Therefore, it is fitting that *The Eye of Rra Mutwa – An Afrocyborg Homage to*

Credo Vusamazulu becomes a necessary viewing for anyone who has ever flirted with the idea of being post this material animation of Western hegemonic control and dominance. Even to wake up a little from the discomfort of this simulation of economic violence that strives to exclude to the point of debasing one's humanity utterly and to rather confront it with a contempt that destroys an ability to feel empathy beyond one's mirror reflection. Rather it be stagnant in a hubris that has shared itself multiple times throughout the globe via a violent machinery that has barely been comprehended.

What Shmerah Passchier attempts with this film is to go beyond the typical flogging of white guilt. Instead, she looks at the several iterations of colonial violence through a full spectrum of colour and language to force whiteness out of its shrewd and cavalier self-preserving efforts to confront its very existence without a pat on the back or even a gentle encouragement to reckon its atrocity. It's a brash philosophical battle to awaken the sleep out of the comfortable by holding their eyelids open to how their systems of shelter invisibilise themselves and those that labour to create that very comfort.

Through the script's dense poetics of Credo's musings, wrapped in abstracted humanities, the eye you stand on sees you and the oblivion in which you derive meaning. It's an effort to learn to understand, rather than the mere circular industrialised and weaponised understanding of learning. In a newly accessible medium, Passchier is leading us on how to use the didacticism of these new tools" (Pikoli 2021 peer review by email).



Figure 64 & 65: LEFT: Above, Phumlani Pikoli, author, multimedia artist, journalist, filmmaker, and community member of WeAreVR, watching The Eye of Rre Mutwa. **Figure 65**: RIGHT: Pikoli, like Mutwa, was denied a public funeral. His passing was broadcast on YouTube because burial ceremonies were limited to 50 people as they were labelled "super-spreader" events. Again, we were robbed of our rights to mourn the dead appropriately under Covid-19 restrictions. Pikoli's work can be viewed here: https://tmrw.art/occupying-a-fatuous-state-of-severity(tmrw.art)

Experimenting with concepts of gaze formation in making *The Eye of Rre Mutwa* revealed principles of reflexivity that obliged me to wrestle with my own identity in relation to the subject matter since the high techné medium of VR requires the application of knowledge, analysis, philosophy and critical thinking. In so doing, my methodology of exploring an Afrocentric gaze in VR became inextricably intertwined with negotiating white identity in South Africa. This required embracing truth-seeking as prescribed by the discourse of techné (Hosale, Murrani & de Campo 2018: ch 1: para 43). This truth-seeking shifted my internal gaze, which required cultural recalibrating. This inward gaze was inspired by the writing of Nnedi Okorafor, who says: “We prefer to explore the universe by travelling inward, as opposed to outward” (Okorafor 2015: 21).

The re-focusing of my inward gaze was informed by assimilating Afrikology as a cultural application of “learning, unlearning, and re-learning” (Bantu 2013: 50). Living with the phenomena of white fragility in a country like South Africa, which remains soaked in the toxic binaries of black and white tension, requires ongoing critical thinking, and the ability to admit when one is wrong. In making *The Eye of Rre Mutwa*, I was trying to construct a visual experience of “interbeing” or Quantum Ubuntu/Botho. I was trying to figure out how I could erase black/white boundaries and binaries. I was trying to figure out how to be in this world. How to become together, not apart(heid). Critically, I wanted to belong. I was trying to find peace, loving and belonging in a truthful manner that would work towards healing the colonial wounding of apartheid (Bantu 2013: 8). If indeed people are people through other people, perhaps, if I can learn to care more, love more, and demonstrate open-hearted compassion; surely then, in some small way, this interdependence of my humanity, which is “inextricably caught up with yours”, may be fractionally uplifted (Tutu 199: 31). If I open the mind’s eye, together, with my heart, and indeed go on to act in ways that ameliorate suffering, this becomes a prosocial transformation. While the films were exhibited at three National Festivals, true audience engagement cannot be certain given the various obstacles described above resulting from the Covid-19 pandemic.

I can, however, assert that through this visual experiment in trying to facilitate new understandings of reciprocal interconnectedness, I was able to heal myself more than any members of the largely absent audience. In experimenting with the VR medium, by invoking Mutwa’s muthi, I was able to make peace with the murder of my father in 1998. Mutwa’s muthi arises from the opening pages of *Indaba My Children* (1965) when the High Isanusi

took a blood oath to avenge the death of his bride after she was shot in the back by police at the Sharpeville Massacre of 1960. Mutwa's revenge was not to seek blood. Instead, he gave white South Africans a sacred gift of knowledge in his writing so that we might see the true magnificence of African culture. In this prosocial action, Mutwa transformed his pain and suffering into an astonishingly beautiful gesture. He turned the muddy stench of death and trauma into an exquisite flowering of the mind and heart. He chose wisdom, love, intelligence, and enlightenment over blood. Because he did this, I, too can do this. I can transform my pain into exquisite healing. Achille Mbembe tells us that we cannot fix our broken world if we do not rehabilitate reason. In his words, "There can be no sustained project of freedom without a voluntary renunciation of the law of blood. Radical politics is about attending to the foundational debt we owe each other, the debt of life, the recognition of which is the first step and only road to genuine restitution, reparation and the possibility of a world in common" (Mbembe 2019). This prosocial thinking is what it takes to heal ourselves and our wounded world. The medium of VR, therefore, has the capacity to be the muthi when produced in the mode of Prosocial VR. Mbembe affirms the three primary functions of the arts in Africa are "caring, nurturing, and repairing life" (Mbembe 2021: 221). I might not have been able to affect any manner of healing in the scarce audience, but I was certainly able to let go of my suffering in making this homage to Mutwa.

Molema's expression of muthi in the mode of Prosocial VR is eco-Botho. This prosocial portmanteau infers "socio-political action", which is the ethical/moral practice of communal respect, dignity, welfare and prosperity for all (More 2004: 157). Molema's innovation is to extend this thinking to a planetary scale. Eco-Botho expresses an anti-materialist worldview because it is communitarian, communal, "communist" or collective sharing and caring, a neo-Marxist worldview. For centuries African societies have been organised around the principle of sharing (Ramose 1999: 27). Molema's insight is to call on collective compassion to connect people and the planet for their collective well-being in futures to come. This is the defining feature of eco-Botho, which connects all creative aspects of *The Cosmic Egg* as a collective instantiation of cyborg cinema. This VR film articulates the four key theoretical constructs of cyborg cinema: neo-Marxism, Technofeminism, Postmodernism, and Post-Colonialism (Short 2005: 131).

Technofeminism is evidenced in the representations of the three Egg Blessers. These space travelling shamanic cyborgs return from the future to save the present crisis of climate

change. Postmodernism is evidenced in the rendering of MmModimo as a decolonised representation of Haraway's Gaia hypothesis. For Molema, her cyborgs are scripted towards palliative healing of our "damaged planet"[79] (Haraway 2016: 67). Eco-Botho points to how global warming is an interconnected wound that afflicts "Gaia", or rather, in Setswana, MmaModimo (Haraway 2016: 52). Haraway hypothesises through metaphors of symbiosis that "we" may only heal the earth by activating conscious ecologies of collective, transformational behaviour (Haraway 2016: 213). Being aware of this ecological symbiosis is eco-Botho.

By way of closing, I will summarise how I have answered each of the three research questions:

1. In what ways does an Afrocyborg, technopolitical, technofeminist framework help advance an African filmmaking discourse and praxis?
2. How can African women filmmakers collaborate to construct prosocial African Science Fiction in Virtual Reality filmmaking?
3. What transgressive and transformative gaze regimes make a technofeminist Virtual Reality approach contribute to the decolonial undoing of oppressive power structures?

I have answered the first two questions in Chapters One and Two by pointing to how collaborative filmmaking is a mode of knowledge and resource sharing with each other and our students. Particularly women students who need to be encouraged to participate in STEAM subjects to future-proof their collective interests in the zeitgeist of 4IR. This innately African principle of sharing expresses the prosocial action and ethos of Ubuntu (Ramose 1999: 27). As such, the collaborative mode of prosocial filmmaking in the genre of African Science fiction can be described as "intraconnected" or "Me + We = Mwe" (Siegel 2022). Intraconnection is a process of integrating the identity of self into broader belonging. Mwe did this by forming the Afrocyborg Collective, which continues to produce collaborative VR projects well after the parameters of this creative PhD research. Mwe continue to consciously practice the idea that Mwe are "part of a synergy of systems" (Siegel 2022: 4). This synergy implies inter-be-ing. My knowledge is your knowledge. Your success is my success.

[79] Haraway calls for collective creative action towards healing the "damaged planet", saying: "The arts for living on a damaged planet demand sympoietic thinking and action" (Haraway 2016: 67). The work of the AFrocyborg Collective is an instantiation of Haraway's hypothesis.

Together we are more powerful than if we were operating alone. Ramose asserts, “Epistemologically, be-ing is conceived as a perpetual and universal movement of sharing and exchanging the forces of life” (Ramose 1999: 41).

This sharing of life force is instantiated by Quantum Botho/Ubuntu, which is inspired by the profoundly interconnected ways in which quantum physics reveals the molecular nature of all things. I am because you are, like quantum physics, denotes the “exploration of small units of energy, of quanta” (Siegel 2022: 32). These quanta behave in verb-like states of being that are deeply connected. Photons and electrons are not nouns or objects. They are verbs or “emerging events” where there is no separation between the dimensions of time and space (Siegel 2022: 32). Siegel asserts that this interconnection may be new to Western science but has existed for millennia in the “wisdom traditions” from around the world, including the African philosophy of Ubuntu/Botho (Siegel 2022: 34). We express this as Quantum Botho/Ubuntu.

This quantum scale perspective informs our work as per Spinoza’s non-binary concept of the one “infinite substance” that constitutes all of the known universe, which is “Deus Sive Natura”, or God/Nature (Spinoza 2007: 296). This notion of prosocial pantheism infuses both *The Cosmic Egg,* expressed as eco-Botho, and an interrogation of “white fragility” towards inter-being in *The Eye of Rre Mutwa* (DiAngelo 2018). These two Prosocial VR messages point towards how the medium of VR can also be a form of ocular muthi. Molema’s film addresses the healing of the Earth from the excesses of Capitalist greed. My film addresses the healing of racial wounding visited on Africans through successive Industrial Revolutions. Here, I apply Quantum Ubuntu as a way for Africa to collectively future-proof its interests in the 4IR; to ensure that Africa is not recolonised by the global trend towards data colonisation driven by Silicon Valley’s 4IR-Capitalism (Benyera 2021: 210). This answers the third question regarding constructing transgressive and transformative gaze regimes in the decolonial undoing of oppressive power structures. Molema’s gaze in *The Cosmic Egg* is a planetary configuration of eco-Botho, which challenges the rapacious power structures of Capitalism that avariciously consume Earth's resources. *The Eye of Rre Mutwa* constructs a gaze that confronts the racism of white South Africans by examining white fragility and its bearing on the history of technology. This Prosocial VR film constructs a gaze that calls on the audience to look at the oppressive power structures embedded in all four Industrial Revolutions, including the technologies of 4IR.

In this research, we have demonstrated how we equate Prosocial VR with Third Cinema since both modes of cinematic practice consciously construct messaging to actively produce positive prosocial change in the viewer, according to Shriram, Youn Oh and Bailenson (2017). They note that prosocial behaviours can be elicited from the viewer, and this has been successfully used to overcome discrimination, reduce prejudice, and promote altruistic behaviours (Shriram, Youn Oh & Bailenson, 2017: 313; D'Errico, Leone, Schmid, & D'Anna 2019: 10).

In this research, I have demonstrated how the Afrocyborg Collective works in the domain of Prosocial VR, currently being produced in the global South, which is referred to as "Fourth Cinema" or "Fourth VR" (Wallis & Ross 2020: 1, 3). Wallis and Ross note a tendency towards "indigenous futurism" to express VR narratives emerging from new practices, which transcends the cinematic discourse of Third Cinema to "disrupt" contemporary neo-colonial cinematic practices (Wallis & Ross 2018: 3). They link "indigenous futurism" to "indigenous activism", which shares many genre conventions with African Science Fiction and Afrofuturism and is often expressed by foregrounding the need for expanded consciousness by reframing how human beings perceive each other and consequently treat one other. The Afrocyborg VR Collective produces Fourth VR insofar as both VR films are made in the mode of African Science Fiction, which is a form of indigenous futurism and activism. Since both films were scripted with the prosocial messaging of environmental awareness in the case of *The Cosmic Egg* and racial justice in the case of *The Eye of Rre Mutwa*, these implanted meanings constitute the socio-political-environmental consciousness and activism of Fourth VR. In this way, we have articulated transformative gaze regimes in the medium of VR that contribute to the decolonial undoing of oppressive power structures.

The Afrocyborg, like the "rhizome" or the "tentacular" continues to grow, multiply and mutate (Deleuze & Guattari 1980; Haraway 2016). "Mwe" have become a generative "intraconnection" with no end, and many new beginnings as we board a plane back to Paris, France, where we will showcase our newly re-mastered VR films at the Forum Creation Africa Festival with French subtitles that were generated in OpenAI's ChatGPT-3 (Siegel 2022). Our new Afrocyborg logo was generated in the AI software Midjourney.



Figure 66: This is the prompt I used to generate the AI portrait of Molema & I on Midjourney, based on photographs that were taken of the two of us in Paris in 2019 on the Digital Lab Africa artist residency programme. 101 images were prompted and generated to arrive at this image above which can be seen on the new VR film poster below and on our website: ***Afrocyborg.com***:
"Two smart women eyeballs in SF African masks on stalks connected to each other with electronic astronaut cables in the style of Afrofuturism animation inspired by Jacque Njeri & Kaylan Michel are wearing VR Headsets & they are in a NIGHT TIME DEEP SPACE lunar moon base outer space setting with planets & stars in the background" (Midjourney.com 2023)



Figure 67: New VR Film Poster for *The Cosmic Egg* designed for Creation Africa Festival in Paris, France (2023)

FRENCH 500 CHARACTERS SYNOPSIS GENERATED IN OPEN AI CHATGPT 3 FOR SUBMISSION TO THE FORUM CREATION AFRICA FESTIVAL IN PARIS, FRANCE 2023:
"Le Cosmic Egg (Botswana) adapte l'art rupestre San et la mythologie Motswana. Cyborgs africains anciens chassent œufs d'autruche, mystère éco-conscient. Danseurs humains-animaux-cyborgs prônent durabilité en pondant œufs métaphoriques : Sagesse, Appréciation, Harmonie. Femmes sages intergalactiques, Bénisseuses d'Œufs, restaurent équilibre après chasseurs consomment muthi cosmique des œufs volés" (ChatGPT-3, Open AI to Shmerah Passchier: 25 September 2023).

ENGLISH TRANSLATION 500 CHARACTERS SYNOPSIS GENERATED IN OPEN AI CHATGPT 3 FOR SUBMISSION TO THE FORUM CREATION AFRICA FESTIVAL IN PARIS, FRANCE 2023:
"The Cosmic Egg, set in Botswana draws on San rock art & Motswana mythology, featuring anciently-futuristic African cyborgs on an ostrich egg hunt, which unfolds into an eco-conscious time-travel mystery where human-animal-cyborg dancers, emphasize environmental sustainability when they lay metaphorical eggs—Wisdom, Appreciation, Harmony. Intergalactic wise women, Egg Blessers, restore balance after hunters consume cosmic muthi from stolen eggs." (ChatGPT-3, Open AI to Shmerah Passchier: 25 September 2023).

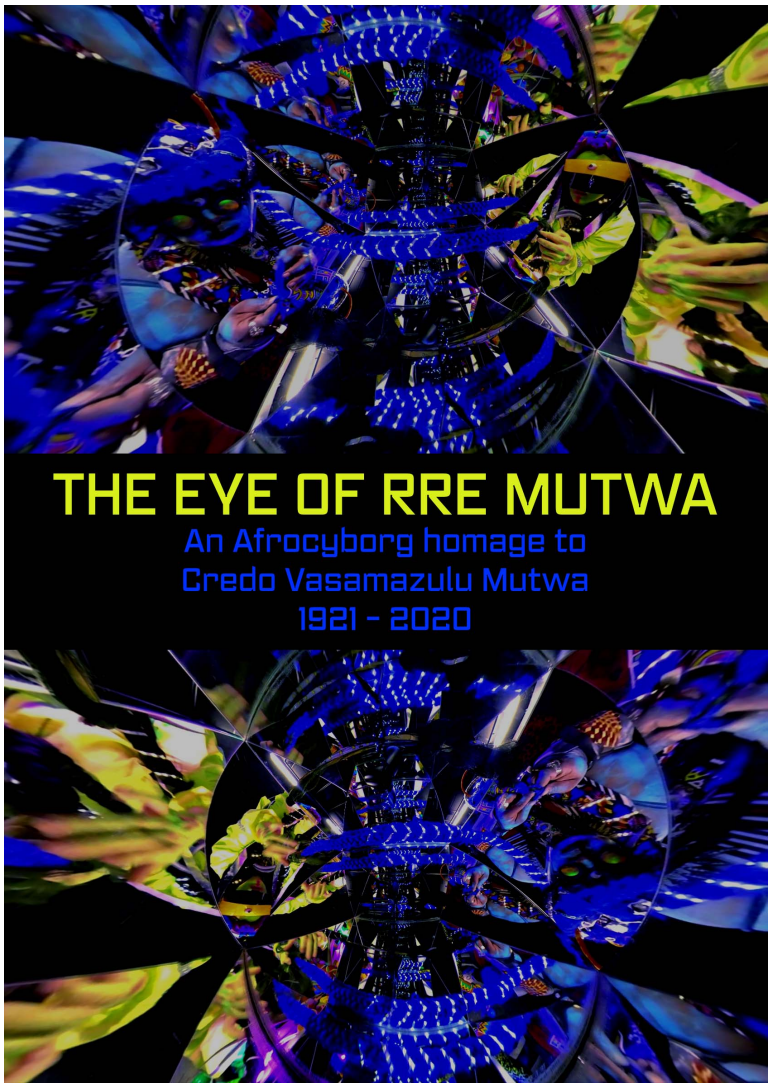


Figure 68: New VR Film Poster for *The Eye of Rre Mutwa* designed for Creation Africa Festival in Paris, France (2023)

FRENCH TRANSLATION 500 CHARACTERS SYNOPSIS GENERATED IN OPEN AI CHATGPT 3 FOR SUBMISSION TO THE FORUM CREATION AFRICA FESTIVAL IN PARIS, FRANCE 2023:
“L'Œil de Rre Mutwa rend hommage au voyant zoulou et guérisseur traditionnel Credo Mutwa. Le film s'inspire de ses écrits sur les cyborgs africains dans la mythologie zouloue et explore le lien entre les violations des droits humains et le "développement" technologique, dans le cadre de la Quatrième Révolution industrielle ou 4IR. Les acteurs Khoza et Boyer analysent les inégalités socio-politico-économiques inscrites dans les algorithmes des 1IR, 2IR et 3IR, qui informent à présent la 4IR” (ChatGPT-3, Open AI to Shmerah Passchier: 25 September 2023).

ENGLISH 500 CHARACTER SYNOPSIS GENERATED IN OPEN AI CHATGPT 3 FOR SUBMISSION TO THE FORUM CREATION AFRICA FESTIVAL IN PARIS, FRANCE 2023:
“Eye of Rre Mutwa is a tribute to Zulu seer, sangoma & traditional healer Credo Mutwa. The film draws on his writing of African cyborgs in Zulu mythology. The film explores the connection between human rights violations & technological "development", in the Fourth Industrial Revolution or 4IR. Actors Albert Ibokwe Khoza and Patricia Boyer analyze the socio-political-economic inequalities embedded in the algorithms of 1IR, 2IR & 3IR that now inform the automation of 4IR” (ChatGPT-3, Open AI to Shmerah Passchier: 25 September 2023).

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