

Blan/ck Screens: Chroma Screens Performing Race

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ABSTRACT

Chroma screens is a term for the green and blue screens used in filmmaking, television, and graphics during image making for the compositing of other images in post-production. Engaging an agential realist framework to deliberate on this mode of screens wherein they are *without images*, I consider chroma screens in and through material-discursive practices to argue that the green and blue colors of chroma screens can be considered a cultural enactment of racialized media practices. I take the image blankness of chroma screens as the condition for a performance of blackness/race. An analysis of Sondra Perry's work, *Graft and Ash for a Three-Monitor Workstation* (2016), opens onto how racial practices and concepts around blackness have functioned in the very blankness of chroma screens. The blan/ckness relationship in Perry's work is leveraged to become generative of a differencing, a performance that not only sustains blackness, a difference in color, but recognizes and animates it in constructive ways. In this paper I show that neither blackness nor whiteness are pre-given but are caught up with a powerful imaging and medial technique, co-constituted in, with, and through chroma screens.

INTRODUCTION

The technique of chroma screens illustrates a unique relationship between images and screens, where images wait to be called onto screens. Chroma screens is a term for the green and blue screens used in filmmaking, television, and graphics during image capture for later compositing during post-production. With the technique of chroma keying, the objects shot in front of the green or blue screens are separated out to be superimposed on another background. Arguably the camera is replaced by the computer, or specifically the lens of the camera is replaced by the screen of the computer. This is not to say that we don't use cameras to record images—the relationship between images and camera of course still exists—but the adjunct relationship between onscreen production and post-production editing of images takes over and becomes more important and, in some cases such as when chroma screens are used, replaces the lens-based camera altogether.

As a post-production technique, chroma screens are hardly seen in their original form—without images, empty with the green and blue color field visible—other than in some behind-the-scenes recordings. However, media artists have utilized some aspects of the color field of chroma screens to suggest alternate ways of conceiving the aesthetics and experiences of chroma screens. The

delay or *absence* of images in chroma screens raises questions around the relationship of screens and images and pertinent concerns around the medial performances of screens. For instance, in *How Not to Be Seen: A Fucking Didactic Educational .MOV File* (2013), Hito Steyerl explores the politics of the visibility of images and proposes that chroma screens can be a way to hide from over-visibility by becoming a part of the image. My concern, however, is with the material-discursive enactments (togetherness of photographic practices and social-racial demarcations) of chroma screens *in* and *through* which, I argue, the green and blue colors of chroma screens can be considered a cultural enactment of racial practices. The image *blankness* of chroma screens as the condition for a performance of *blackness* can be seen in Sondra Perry's work, *Graft and Ash for a Three-Monitor Workstation* (2016), as well as to a lesser extent in Sandra Mujinga's *Throwing Voice* (2016). To be clear, the phrase "without images" in this context does not indicate a complete absence of images but highlights instances where they do not dominate screen space. Images are invisible not only when they are not seen; they can be invisible when they are inactive, inoperative, or non-functioning. In the emptiness of chroma screens I examine the various ways in which images hide and reveal connections and sustain those connections in and through their blankness. It is in the blankness of chroma screens—an entanglement of the blankness of chroma screen with blackness—that racial practices and concepts become in Perry's work generative of a differencing, a performance that not only sustains blackness, a difference in skin color, but recognizes and animates it in constructive ways.

My study of these racialized practices examines Perry's *Graft and Ash for a Three-Monitor Workstation* (2016). The work is comprised of a modified bicycle exercise machine with three screens. A triptych nine-minute video on the screens shows Perry's animated floating head against a chroma blue backdrop intercut with clips from YouTube on deliverance ministries, as well as a highly modified closeup of Perry's skin. The blank blue chroma screen in Perry's work generates blackness entangled with racialized photographic practices. Taking an agential realist framework, I discuss material-discursive practices—such as separation of the foreground and use of blue and green color in chroma screens—that enact racial bias in photography, cinema, and digital technologies, in order to explore the relationship between blankness and blackness. Image-making practices may have changed, but the racial biases have been sustained. In continuing an obfuscation of black bodies, chroma screens provide an understanding of blackness that generates difference where blackness is recognized in its entanglement with whiteness. The material agency of color, discourses on race and racism, and the exclusions that chroma screens enable in relation to cultures *produce* and *are produced* by colonial and racial identities. The blank chroma screens in Perry's work thus highlight blankness as productive at the level of chroma or color itself. In Mujinga's work the blankness in and through chroma screens explores the links between geological race formation and technological surveys of Black bodies. In this way, blackness itself is co-constituted *in*, *with*, and *through* chroma screens to produce a performative understanding of both. Through this analysis I illustrate that entanglements such as that of screens and images, and blackness and whiteness, do not simply mean connection. Rather they are woven together in a way that extends their dependency on each other beyond the mere identification of that connection. The components are co-produced in and through various material-discursive practices.

The color of chroma screens is at once an enactment of the color of certain human skin tones and an enactment of racism. These associations unfold through the relationship between technical use of blue and green color in chroma screens, and the history of racialized photographic and

cinematographic practices. Diffracting the inability of media practices to recognize Black bodies through colonial and racial discourses provides a framework for analyzing how blan/ckness of chroma screens operates, highlighting how racism is enacted at the level of visual media technologies. I propose that some concepts from Karen Barad's agential realism can help us reconfigure relationships between screens and images, and later between blankness and blackness, and blackness and whiteness. A performative understanding of chroma screens will take into account the multiple relations and the position of chroma screens in various assemblages of image-making and display. Barad's posthumanist idea of performativity builds upon Judith Butler's ideas, among others, such as that of Donna Haraway, Bruno Latour, Joseph Rouse, and Andrew Pickering.¹ Such a notion of performativity can tell us something about the formation of various entities—humans and screens, for example—and the conditions of their production. Barad argues that since performativity produces “the matter of bodies,” it is imperative to know about the attributes of this production.² For chroma screens this means having a closer look at the image-making practices that have produced certain kinds of bodies.

CHROMA SCREENS IN AN AGENTIAL REALIST FRAMEWORK

Perry uses digital media in her work to focus on race politics in the American context. The video of *Graft and Ash for a Three-Monitor Workstation* includes a close-up display of her digitally processed skin showing different-colored patches ranging from dark brown to light reddish brown. The close-up is textured and seems to flow like a river. Perry uses this “flesh wall” or “skin wall” (used in other works as well) to question representation of human bodies and the category of being “human.” Since Black people are not regarded as humans, she adds, the representations that recognize and the systems that define “human” have to be questioned.³ This querying of the flesh wall can be considered an enactment of blackness. For Perry, this processed skin forms a transition space between a human and a digital creature, the laboring body and the machine.⁴

Perry's digital avatar in the video provides technical details about the exercise machine in the installation *Graft and Ash for a Three-Monitor Workstation*. The avatar states how the exercise machine keeps a working body fit; not just any body, but particularly the productive and laboring Black body, which is called to our attention in many different ways here. First, the avatar cites a study that shows that high blood pressure ailments were common for Black people who sought equitable social relations but nonetheless faced discrimination. Disregarding systemic inequality, these people blamed themselves, believing they were not good enough. Second, the Black body is addressed in and through audio of deliverance ministries, which consider demonic possessions to produce problems in the life of Black people. In the video a pastor asks, “Who are you?” The question is directed at the evil spirit possessing a woman. The woman replies, “I'm a man like you.... What is the problem?” Following another exchange, a kind of exorcism takes place with screaming and shouting both from the pastor and the woman. As the demons are expelled and the woman is “delivered” from evil, the implication in the video is that the Black body too might be delivered from an unjust system. Third, the Black body is enunciated in its relationship with technology. Referring to itself as an inaccurate version of Perry, the avatar claims, “... but she could not replicate her fatness in the software that was used to make us. Sondra's body type was not an accessible pre-existing template.” This points to the existence of certain body types, primarily thin white women who match Euro-American visual standards of desirability, that are most commonly used for marketing and available via software templates.⁵ Here the video raises

issues of available body types while contemplating how the kinds of filters and pre-given templates that inhabit technologies generate racism.

These connections and conversations have to be examined as intra-actions where both chroma screens and racial practices are being reconfigured. In the triptych display screen, the intra-action of images and screens indicates that their agencies are co-constituted. Intra-action is Barad's key concept for thinking about how relations allow matter and entities to emerge. Barad uses intra-action to signal "mutual constitution of entangled agencies."⁶ "Intra-action," as opposed to "interaction," suggests that entities are not pre-determined but become determined in relations. Importantly, the separation of intra-acting agencies into entities must be constituted through specific material-discursive practices: specific kinds of agential intra-actions—called "agential cuts" by Barad—are marks through which the boundaries and properties of things are determined.⁷ These cuts may be repeated as "boundary drawing practices," and they come to constitute objects in a particular way. The objects are, then, *within* and *part of* the practices.⁸ In other words, objects are "enacted" via these practices.⁹ In the context of this paper, intra-action indicates that chroma screens emerge *in* and *through* cinematic and photographic practices of image-making and their relations with other entities such as light, camera, and software. As such chroma screens are material-discursive practices that can be historically traced to media practices optimized for white bodies. Chroma screens technique separates the foreground and background in order to overlay images on the blank color field. As I will show later, the color of chroma screens was developed with white skin tones in mind, but when used blankly without images, as seen in Perry's work, they enact blackness. In the video, Perry's avatar and the deliverance ministries are placed on top of the blue chroma. The blue chroma screens intra-act with images of the deliverance that show the possession of Black bodies and the continued discrimination of Black bodies in technologies and filming practices. In Perry's work, the intra-actions or entangled agential relations of different parts, such as blue color, images, sound, and screens, articulate Black bodies in specific ways.

Since matter is constantly forming and unforming, Barad clarifies that intra-activity constitutes entities differentially.¹⁰ The cuts or boundaries between entities create agential separability. This does not simply mean that entities have different agencies but that, as Barad suggests, the entities can enact agencies outside their boundaries.¹¹ They face out to other kinds of practices and matter but are still entangled (exteriority-within-phenomena).¹² Practices have to be closely analyzed to trace diverse intra-actions of chroma screens across the technical apparatus, social context, medial history, viewing habits, and image-making practices. While the boundary drawing practices, chroma screens in the context of this paper, enact differential boundaries between blackness and whiteness, the issue is that anti-Black ontology persists with chroma screens. In the last section of the paper, I discuss ways of rethinking that difference through indeterminacy and inseparability.

Racial bias in technologies has been widely discussed in media and film studies scholarship, especially the failure of a range of technology to recognize bodies of color. The famous Shirley cards, introduced by Kodak in the mid-1950s, ensured that a white woman was the norm for adjusting color balance in photography.¹³ The bias against using Brown and Black skin tones as the touchstone for color balance continued in the color balancing techniques of digital cameras. While many digital cameras have dual skin tone color balancing, artificial light sources still make it difficult to photograph darker skin tones.¹⁴ This visual bias against darker skin tones has carried over to artificial intelligence, where algorithms execute selected visibility of Black bodies.¹⁵ This disposition of technology that allows only certain bodies to become visible is termed "algorithmic

visibility” by Daniela Agostinho.¹⁶ Analyzing the visibility and invisibility of algorithmic practices in Perry’s work, Agostinho comments that on a Black person’s body “the flesh is both bearer of subjection and source (code) of freedom.”¹⁷ Perry, remarks Agostinho, uses chroma screens as a space where the requirements and aspects of the visibility of race are re-evaluated.¹⁸ Chroma screens provide that space where relations and conditions of visibility can be renegotiated. This is affirmed in Perry’s work when the blue chroma screens alternate with the “flesh wall,” a highly processed close-up of Perry’s skin, directing us to think about ways of making race visible for surveillance and invisible for civil rights. Chroma screens, then, are not just spaces that mobilize and highlight racial injustices, they also shift our attention to image-making practices that have sustained a racial separation of bodies.

In the entangled relationships that chroma screens are constantly negotiating, they not only connect, relate, and re-organize connections between different parts such as image and software but also produce sensations, affects, transitions, and experiences. In such an arrangement, entities and agencies are constantly being enacted through discursive, material, social, cultural, scientific, and natural practices. Some of these practices, such as the compositing technique and use of specific colors in chroma screens, will be discussed later to demonstrate the sociotechnical entanglement of blackness and chroma screens. It is also important to unpack the material and discursive aspects of practices. Continuing with an agential realist position, discursive practices are also material as they unfold. Barad emphasizes, “In an agential realist account, *discursive practices are material (re)configurings of the world through which the determination of boundaries, properties, and meanings is differentially enacted* (Barad’s italics).”¹⁹ Thus, rather than taking knowing (a discursive activity) to be different from making (creating a material), Barad focuses on practices as being material-discursive.²⁰ Material and discursive are not separate, but in a reciprocal relationship. This is demonstrated in *Graft and Ash for a Three-Monitor Workstation*, when only the audio of the deliverance ministry is heard as we watch a lattice frame with a ball of Perry’s skin animation rotating on top. The construction of a Black human body is referenced by the skin rotating on top of the grid, reminiscent of Cartesian space and producing a powerful visual enactment of color in its contrast with the blue chroma screen. Here the blue chroma screen is not set up blankly to act as an unbiased or receptive field waiting for images, but is acknowledged to be a space entangled with racialized media and cinematographic post-production practices. Perry’s chroma screen calls up the identity politics played out in contemporary America and questions specific acts of violence against the Black community by compositing a false narrative (such as individualized responsibility for racism, religious exorcism) similar to compositing images on chroma screens. Furthermore, Perry’s use of chroma screens is an attempt to think about practices of image post-production. The blank recording of chroma screens on which images created separately are overlaid offers the possibility that images can be produced in a space different from their space of production. However, that possibility was devised for a certain type of images and recognized primarily white American and Europeans as the standard body and color. A discussion later in the paper on the technical process of keying will highlight how the racialization of technology is amplified through the specific practices of filmmaking and chroma keying. Typical methods used in filmmaking for lighting Black and Brown skin in film and television production continue to be problematic, as these bodies are either too dark or over-exposed by the lighting and filmic models of the medial production space.²¹ When thought through in terms of blackness, these practices draw our attention to how Black and Brown

bodies have been photographed in film and video, as well as the persistence of racialized image-making practices. Chroma screens sustain such practices.

Discussing these intra-actions of blue chroma screens and Black bodies explicates that the technological disposition against Black bodies stems from photography and filming practices. While such practices tell us that chroma screens continue racialized practices in various fields, they do not get to how specifically blue and green colors aid these practices and do not address the relation between blackness and blankness, which points to the ontological and semantic boundaries of blackness. By being attentive to material-discursive practices that connect blankness with blackness and the role of color (green and blue) in chroma screens in sustaining blackness, I suggest an understanding of blackness as a productive difference: blackness is not just different from whiteness, but entangled and co-constituted in and through material-discursive practices. Such practices sustain the difference between whiteness and blackness but also provide blackness a potentiality by proposing that the equivalence of blackness with blankness suggests not a void in knowing and understanding blackness, but rather, through Édouard Glissant and Denise Ferreira da Silva, a different kind of blackness.

BLAN/CKNESS

I am concerned primarily with blackness in relation to blankness, the blankness which is also that of the screenspace—that which has not yet been filled with images. But this cannot be divorced from questions of blankness *in* knowing, or indeed *of* knowing, that emerge through practices of seeing, given the occlusion of Black bodies from histories of being and knowing the world. This very lack of knowing, this blankness or ignorance, is articulated by scholars of Afro-pessimism.

The concept of nothingness as posited in relation to Black subjectivities and the delineation of blackness has been discussed in different ways by theorists such as Frank B. Wilderson III, Saidiya Hartman, Fred Moten, Jared Sexton, and Hortense Spillers. Thinking about blackness in relation to blankness raises the question of value. Blankness does not have to indicate that blackness has no value. Wilderson notes that fungibility situates the ontological status of blackness in “noncommunicability”: “Blackness is predicated on modalities of accumulation and fungibility, not exploitation and alienation.”²² In other words, blackness executes blankness. In the affective interpretation of blackness offered by Hartman, the relation of blackness to blankness takes on a different meaning. According to Hartman, the fungibility of Black bodies—their commodity-like “interchangeability and replaceability”—extends from being an exchange commodity to having unlimited abstract and metaphorical value in being easily replaced and rearranged, “an abstract and empty vessel vulnerable to the projection of others’ feelings, ideas, desires, and values.”²³ In this way, Hartman sees a history and a present in which the Black body is made to perform any kind of labor while simultaneously indicating a nothingness, productive of adaptability and malleability. Moten carefully introduces the discussion on Black nothingness to challenge the idea of a “normative personhood.” He says,

Perhaps nothingness insofar as it is irreducible to and not interchangeable with emptiness makes possible a recalibration of (what Wilderson calls “our black capacity” to) desire that is not predicated on the constant oscillation between lack (always headed with a silent “b”) and (whiteness as) normativity.²⁴

Such “normative subjectivity” can be reconfigured in our analysis of how blackness is performed, noticed, and maintained in and through media practices.

In the context of media technologies, Sean Cubitt argues that blackness describes the conditions of invisibility.²⁵ Even though invisibility is not the same as the nothingness discussed above, these two concepts have some historical and cultural equivalence. The color black, Cubitt argues, is considered to be an absence of light.²⁶ Although black absorbs all visible spectrums of light, because it reflects nothing it is still regarded as an absence of color. In the same sense, although white reflects all light, it is still perceived as “presence” in opposition to the “absence” of light in blackness. So “black = absorption of light = nothingness” is the ocular invisibility of anything in blackness, and “white = reflection of light = presence” is the visibility of things. In this triangulation of black, white, and light, blackness is reduced to invisibility: “The history as well as the practice of black—and of light—is full of gaps, of tricks to make us ‘see’ an invisibility that otherwise refuses visibility or attempts to fill light-based media with darkness.”²⁷ These “tricks,” in Cubitt’s assessment, include adjustments in contrast levels during the period of black-and-white television.²⁸ These high contrast images increased the level of blackness as well as whiteness, deepening their difference and suppressing intervening tonalities. Blackness is thus highlighted in relation to whiteness and is contrasted to its surrounding color spectrum. It is the nothingness of blackness that then becomes more visible.

In fact, this relation between blackness and whiteness is one of entanglement. It is not a contrariety reducible to *either* black *or* white; it is not a *separation* of black from white, but an entwinement. How blackness comes to be made visible in this togetherness can be illustrated via Denise Ferreira da Silva’s notion of blacklight. Ultraviolet light, also known as blacklight, is used by Ferreira da Silva to activate a mode of thinking about blackness. Ultraviolet light is not directly visible to humans but is seen as glowing luminosity in objects. Blacklight then reveals constituents of the thing it illuminates, highlighting the entanglement of various compositional elements. But more importantly, blacklight destroys the thing that is exposed to it. For example, it has the potential to alter DNA. For Ferreira da Silva, this means that blacklight activates the process “of separating form (the code, the formula, the algorithm, or the principle) and matter (content, or that of which something is composed)... Once released by blacklight, the matter becomes available for something that can be termed a recoding.”²⁹ Here the entanglement of blackness and whiteness is recognized, while blackness and whiteness can also be recomposed through material-discursive practices, as seen in the continuation of racialized media practices. Blackness can be viewed under certain conditions, as Ferreira da Silva argues, and those conditions are created by chroma screens as Perry deploys them. To be sure, chroma screens in the usual post-production sense offer a separation between the foreground and the background. But when used in the blan/ck relation in *Graft and Ash for a Three-Monitor Workstation*, the blankness of chroma screens itself enacts a productive difference between Black and white bodies. This is prominent in various instances in Perry’s work such as the adverse health effects produced by denying the experiences of discrimination against Black bodies. Because chroma screens are used in material-discursive practices that produce agential cuts—boundary-making practices of intra-active agencies—they separate blackness in the entangled agencies of the media assemblage.

Thus, the blankness of blackness is recognized in the entanglement of blackness with whiteness. Material-discursive media practices enact blackness as blankness simultaneously with its

relationship with whiteness. It is through technical elements such as chroma screens that these processes come to light. To trace blackness in and as chroma screens through blankness gives blankness the function of being a conjunctive hinge in the entangled relations of media practices and color.³⁰ As a hinge, blankness creates an axis for both aligning and misaligning chroma screens and blackness. Chroma screens are entwined with media practices that accommodate a particular kind of body and selectively racially (mis)recognize. These continue to be part of contemporary living conditions. The avatar in the video of *Graft and Ash for a Three-Monitor Workstation* remarks on chroma screens' inability to produce a replication of Perry, due to the limitation of the software; this highlights how image-making practices are aligned to replicate certain racial and physical body types. But how the color of chroma screens (green and blue) contributes to this enactment of blackness still needs to be examined.

CHROMA SCREEN PRACTICES AND GREEN-BLUE MATTERINGS

The technique of chroma keying used in various apparatuses over the years provides a noteworthy way in which the blankness of screens can be observed. Green and blue chroma screens actualize and perform chromatic relations that exist between blackness, blueness, and greenness, and the racialized practices of cinematography and photography. Blackness and chroma screens are entwined sociotechnically in ways that constitute and perform each other. It is important to touch upon the technicalities of chroma screens in order to show the intra-action of matter through which blackness is separated in and through practices.

The history of chroma keying lies in film compositing techniques used at the advent of cinema. Compositing in the simplest terms is the process of combining two or more image sources. Digital compositing is the integration of two or more image sources through digital modification to produce a combined form.³¹ The practice of compositing was widely used in photography and then in motion pictures.³² Digital image mattes or masks are generated for a seamless combination of elements from multiple images. The process of generating a matte for compositing is referred to as matte extraction, pulling a matte, or keying.³³ Chroma keying generally refers to both the generation of a matte and compositing, that is, the separation of the object from a green/blue screen background and inserting a new background.³⁴ Depending on the hardware and software, there are different techniques of keying. For example, in luminance-based keying or luma-keying, the matte extraction of the object depends on the difference in brightness of the background and foreground. Chroma-keying fixes the background pixels on a certain chosen range of colors/hues. In some cases, such as the standard video signals, not only the hue but also the luminance and saturation can be specified.³⁵ The separation of the object in the foreground from the background is critical in chroma keying. Color separation, even lighting and color spilling are among the most common issues in chroma keying. In green/blue chroma keying, the color of the background should not be present in the object in the foreground because this may conflict with the keying.³⁶ Consistent lighting is another challenge, as it effects the intensity of the color in the keying. Flat lighting ensures that the chrominance of the background is regular. Moreover, "spill suppression" has to be taken into account, which happens when the color of chroma screens is reflected by parts of the object in the foreground.³⁷

Compositing through keying is based on the relationship of colors as well as complex algorithmic systems that give better control for managing that relationship. The composite image can be

understood as a combination that adds two images by subtracting them from their original position. The technical process of extracting the foreground from the background in chroma keying (and the color difference method) elucidates the relationship between black and white. To illustrate this, let us go through the process as discussed by Ron Brinkmann.³⁸ In the process of keying an image or an object with a blue chroma screen background, all the blue color will be replaced by green color. This means that pixels where the value of blue is greater than green turn black (green and blue produces black). Due to this, the blue background turns black and other pixels in the image or object where there is more blue than green will also change color.³⁹ Brinkmann clarifies that this step includes a lot of other parameters and depends on how much blue has to be removed, as the substitution of the colors may also cause difference in the intensity of the image or object in the foreground. After this step, the matte image is extracted by subtracting blue from the green pixel. This renders the matte image or object black and the background white (also called an inverted matte). Next, the intended background is placed on the black foreground, re-masking the image or object in the foreground.⁴⁰ Brinkmann warns that this process may seem simple but in practice the colors are never pure. The whites and blacks are usually different shades of grey, which then are adjusted by tweaking the values of the color channels. The process is made easier if the background colors are purer; hence the use of red, blue, or green in chroma keying.⁴¹ This means that chroma keying and/or the color difference method is based on values of color understood through the relations that colors have to each other on a spectrum.⁴² In additive and subtractive relations with other colors, the green or blue background produces a composite image.

This discussion of the technical aspects of chroma screens and color relations lays the groundwork for thinking about how techniques that emerge from technical elements engage with discursive practices in what Barad terms the active matterings of matter.⁴³ Although color is compositional in Perry's *Graft and Ash*, it is also racial and political, all at once. The agentic capacity of chroma screens matter (to) Black bodies. The colors green and blue—the most widely used colors in chroma screens—have a specific mode of gesturing; that is, they perform blackness so that it is maintained in specific ways.

The most important consideration in deciding whether to use green- or blue-colored chroma screens depends on what is being shot and the background that will be composited on the color. For a sharp separation the colors in the background should be distinct from the ones in the foreground. This can be challenging in red colors since red does not present high contrast to the colors of human skin tones in the foreground and, therefore, can interfere with them during keying.⁴⁴ Traditionally blue has been used since the 1920s as the choice of the background color for chroma screens. The rise of green screens is credited to the expanded use of video in the late 1960s and 1970s. Some have argued that green is preferable since blue is more common in clothing and many other common foreground objects.⁴⁵ However, there are additional, technical reasons for the increasing use of green chroma screens for video and digital work. First is the availability of green color. The green chroma screen color is a particular shade of green (354C in Pantone color scheme), a color that became more common only after 1960s developments in paint color technology (day-glo paints).⁴⁶ Second, it is relatively easier to do the lighting setup for green chroma screens. In the color spectrum, green is a color of high luminosity. It requires less light to create an evenly lit chroma screen background. Although less light helps control the color spill on the objects in the foreground, the green spill is also brighter on the object in the foreground, which is difficult to manage. On the other hand, blue is also noisier, that is, grainier than the green

channel.⁴⁷ This is a point to consider in both film stocks and video, as they might already be grainy. The grain of film stock may be enhanced with the use of blue chroma.⁴⁸ In video, increasing the sharpness of the image can make the images grainier with the use of blue chroma background. Thirdly, most video and digital cameras contain the Bayer pattern filters in their image sensors. The Bayer photo mosaic pattern, modelled according to the human eye's sensitivity to colors, has the largest number of green photo sensors, making them more sensitive to green color.⁴⁹

Another way in which green chroma is associated with race is through the association of green with earth and geographies. The relation of green to Black bodies can be understood as a part of extractive colonial practices and histories. In discussing ideas around the relationship between geology and race, Kathryn Yusoff challenges what she calls “the racial blindness of the Anthropocene.”⁵⁰ Her interest lies in an entangled logic and politics of the extraction of bodies and minerals as racialized/fossilized narratives. Yusoff builds on the work of Hartman and others around “fungibility” and specifically focuses on the ways the concept of the Anthropocene has failed to deal with Black bodies in contemporary debates. Yusoff argues that ecological discussions of the Anthropocene do not take into account the violence of imperialism and colonialism, which for centuries was enacted on and through Brown and Black bodies.⁵¹ The literal enslavement of Black bodies and the tearing of resources from their land, upon which colonial trade and empire were forged, has made both land and bodies into properties. Instead of Black bodies being regarded as human, they have become inert matter, devoid of human agency, and instead part of geological matter.⁵²

The obfuscation of Black bodies in extractive geological politics takes a diametrically opposite form in surveillance technologies, where Black bodies are made conspicuous. The linking of geological race formation and technological survey of Black bodies in and through green chroma screens is proposed by Sandra Mujinga. Mujinga works across sound, video, performance, and installation art using green chroma screen in numerous ways to move through questions of representation, surveillance, masking, and obscuring. She employs the green chroma screen in the color of walls in the installation *Nokturnal Kinship* (2018) and the light of the exhibition space in *SONW: Shadows of New Worlds* (2020), as well as in the backgrounds of videos such as *Throwing Voice* (2016) and *Catching Up* (2017). In *Throwing Voice* a video is projected in an installation space through three polycarbonate sheets in an upright position, curling from its sides and held together with wires. In the video, Mujinga herself poses against a green screen. Her face is contorted, and her clothes permeate the green of the chroma screen at places, giving her body the appearance of being “under construction.” The video is accompanied by audio from makeup tutorials by Black females on how to contour and highlight different parts of the face. It seems as though the Black body itself is a work in progress. The makeup technique of contouring requires dark and light shades of makeup products to add depth and dimension to the face or body part. The percolation of the green chroma screen through different parts of Mujinga's body, similar to the makeup technique of contouring, hides some parts and highlights others. Moreover, the overflowing green of the chroma screen not only hides the Black body but holds the promise to make it better by juxtaposing new images, similar to the contouring of makeup to enhance the body part.

Throwing Voice resonates with Steyerl's use of green screens in *How Not to Be Seen: A Fucking Didactic Educational .MOV File* by recognizing the politics of visibility in chroma screens, though Mujinga aligns this technological visibility specifically with the color of Black skin. Considering the "emptiness" of blackness, Mujinga places her work in the duality of (in)visible Black bodies, while also examining what it means to be in darkness.⁵³ Affirming her views on the use of green screens, Mujinga says, "In my videos when you see a black background, it's green screen.... It allows me to host ideas and alternative spaces. Green is ultimately Black."⁵⁴ Here the green chroma screen is equated with Black bodies in their invisible and hidden blankness. They become spaces on which ideas of Black identities are made, similar to the way images are inserted to create new backgrounds on chroma screens. The green chroma screen in *Throwing Voice* embodies the dualities of invisibility-visibility and absence-presence. Even though these dualities are equated with the positioning of Black bodies, Mujinga folds visibility with invisibility and highlights their co-presence.

The blackness executed in the material-discursive practice of green chroma screens in Mujinga's *Throwing Voice* is one specific entanglement of blackness with blankness; the other entanglement of blackness with blankness is carried out in the entwining of the blueness of chroma screens with blackness. One of the reasons for using blue and green for chroma screens is that they are furthest away from human skin tones, but Perry asks the pertinent question, whose skin tone are we talking about here?⁵⁵ Human skin has yellow to red tones that contrast well with blue and green.⁵⁶ Brinkmann notes that the color of hair and skin are a deciding factor in the use of blue or green color screens. He states that some argue that darker skin tones have more blue than whiter ones, but he is quick to brush these arguments aside by stating that such a "theory has never been rigorously tested."⁵⁷ On the other hand, Jeff Foster explains why blonde hair might key better against a blue background since the green background makes blonde hair appear too red.⁵⁸ However, he concedes that it depends on the colors used in the foreground image. Neither of them directly addresses the color of skin in relation to the chroma screen color, but both imply a correlation between the color of skin and chroma screen color. The tendencies toward yellow to red undertones are that of white skin as commonly observed by cinematographers. Black and Brown skin have mostly blue undertones.⁵⁹ A blue background, therefore, absorbs black tones and makes it more difficult to separate out.

Perry, cognizant of all these relational color combinations, actually correlates chroma key blue with blackness.⁶⁰ After all blue is the color of blackness in many ways. From the color of skin to the journey of crossing the blue waters of the Atlantic, blue accompanies black, coalescing and relating with and to it. In spite of these relations, blue chroma screens are not suited to the Black skin tone for image compositing. In a way, blue chroma screens enact a refusal to acknowledge Black bodies as separate since the color blue is more active in Black skin. Drawing a specific connection with the blue color of chroma screens and black, Perry states that the blue chroma key absorbs shadows much better than the green chroma key, and hence "approximate[s] blackness."⁶¹ In this way, Perry positions blue chroma screens in an ambiguous and unstable but active space. The instability of the blue chroma screens is not a representation of blackness but the shifting performance of blackness in and through the material-discursive practices—some of which, such as keying and racialized photographic practices, have been explicated here. The screen is not just hiding and revealing images, but instead intra-acting with history, race, laws, and nation-states as

much as the discursive practices of medial representation and technological development. Blackness engages with and co-constitutes these arrangements in and of the world.

In an agential realist framework, detecting and evaluating blackness is inseparable from the material-discursive phenomena of chroma screens. Since assessments and modes of evaluation are inseparable from what is being evaluated, blackness is co-constitutive of the (green/blue) color of chroma screens. Moreover, matter and meaning exist in the act of evaluating/valuing.⁶² The meaning and productive value of blackness in a dominant post-production practice lies with the performance of chroma screens. The value of blackness and chroma screens is given only in and through their intra-active performances. In Perry's video such intra-action is visible in the background alternating between blue chroma screen and the flesh wall when the avatar comments on the value of Black bodies being measured by the perceived fairness of the system and the world. Barad places importance on the act of measuring as a way of accounting for material-discursive practices, which we can see is also taking place through the technical processes of color-matting. Barad emphasizes the importance of *how* things are measured and the ethics of that process more than simply what a measurement is. The *how* of the measuring constitutes what is revealed.⁶³ The measurement of blackness in chroma practices reveals the continuation of racialized technical practices. Measuring Black bodies in terms of their productivity is affirmed in several ways by Perry's avatar. But the question of *how* that measuring takes place requires the interrogation of ontological frameworks in and through which racialized technical practices such as chroma screens operate. Blackness is compared to whiteness and the difference between them bestowed per white standards. According to Ferreira da Silva, blackness is determinate for the Hegelian and Kantian traditions, as these assume human difference is based on a universal benchmark, which for them is White Europeanness.⁶⁴ But as I have shown, blackness is not pre-given but caught up with—among a range of other relations and things—a powerful imaging and media technique, co-constituted in, with, and through chroma screens.

Might chroma screens then perform an excess of blackness? Such excesses, on the one hand and according to Ferreira da Silva, can legitimize racial violence against Black people.⁶⁵ Yet this excess, which seems to be a “disruptive force,” is simultaneously the creative capacity of blackness. The blankness of chroma screens can in this way be understood as a performance of excess blackness. In the entanglement of blackness and whiteness, blackness is executed as a productive difference that also maintains ontological and semantic shifting boundaries. Does the blankness then make blackness difficult to understand and know? Would transparency and visibility address the blankness of blackness? Ideas positioning openness as a condition of knowing stem from European onto-epistemological ideas of inquiry. This compels us likewise to evaluate why invisibility should, at least to the extent of opacity, be required. As Édouard Glissant has argued, transparency is a grasping at something being brought closer to the self, thus reducing the thing that is being grasped.⁶⁶ Such opacity, however, is not in conflict with visibility but constitutes instead a different kind of comprehension of blackness.

BLAN/CK OPACITY

Glissant's call for a “right to opacity” is a demand to unthink simplifying difference for the sake of transparency. He says:

But difference itself can contrive to reduce things to the Transparent.

If we examine the process of “understanding” people and ideas from the perspective of Western thought, we discover that its basis is this requirement for transparency. In order to understand and thus accept you, I have to measure your solidity with the ideal scale providing me with grounds to make comparisons and, perhaps, judgements.⁶⁷

The above statement calls on blackness to remain unrecognized and opaque. To be clear, Glissant is discussing a particular kind of transparency that is demanded by Western thought. This refers back to the earlier discussion by Ferreira da Silva, who was concerned with how blackness and whiteness are produced according to the standards of White Europeans. Elsewhere Glissant talks about “grasping” and how bringing the thing closer to oneself *does not recognize* the thing. Rather, he explains that “to grasp” means to take the thing closer to oneself which is “a gesture of enclosure if not appropriation.”⁶⁸ Then perhaps to understand something one needs to *get* closer not *bring it* closer. The (in)visibility of blackness can be thought of in terms of Glissant’s right to opacity where blackness is not to be understood or grasped, but to be moved *towards*. Here, in a Baradian sense, the measurement of blackness itself is being challenged. Glissant’s idea of a “right to opacity” is an acknowledgement of not being able to fully know or grasp. Western thought, according to Glissant, insists on transparency and knowing, in other words being able to *separate*, but Glissant says,

Agree not merely to the right to difference but, carrying this further, agree also to the right to opacity that is not enclosure within an impenetrable autarchy but subsistence within an irreducible singularity. Opacities can coexist and converge, weaving fabrics.⁶⁹

For Glissant, opacity is not closing down or separation into *self* and *other*, it is rather being open to divergences of many opacities. He talks about “weaving”—an intertwining without any boundaries. For him, a difference is maintained in multiple opacities.

Although Ferreira da Silva too conceives of this kind of singular multiplicity, she arrives at it in a slightly different way. She insists on thinking about difference in ways that avoid separability, determinacy, and sequentiality, arguing that things should be seen as entangled.⁷⁰ She suggests “nonlocality” for such an imagining, as entanglement does not exist in space and time for her.⁷¹ Ferreira da Silva advocates nonlocalization as having actual and virtual existence. She argues,

What nonlocality exposes is a more complex reality in which everything has both actual (spacetime) and a virtual (nonlocal) existence. If so, then why not conceive of human existence in the same manner? Why not assume that beyond their physical (bodily and geographic) conditions of existence, in their fundamental constitution, at the subatomic level, humans exist entangled with everything else (animate and in-animate) in the universe.⁷²

The nonlocality Ferreira da Silva proposes is a coexistence. Chroma screens in Perry’s *Graft and Ash for a Three-Monitor Workstation* and Mujinga’s *Throwing Voice* are instances where the blankness of chroma screens is a kind of nonlocalization of blackness. In this entanglement of

blan/ckness the actual (spacetime) and virtual (nonlocal) coexist in their differencing in particular ways, some of which are explicated in this paper. In both *Graft and Ash for a Three-Monitor Workstation* and *Throwing Voice*, intra-actions of chroma screens enact blan/ckness in different ways, such as blan/ckness as a background on which other images can be juxtaposed; blan/ckness as a performance of racialized bodies; blan/ckness entwining with whiteness; blan/ckness questioning the productivity of Black bodies; blan/ckness as a work in progress; and blan/ckness whose materiality depends upon extractive racial geopolitics. In this way blan/ckness is not restricted to the installation, the exhibition space, or the space occupied by the exercise machine, but also moves us to feel entangled with it.

ENDNOTES

¹ Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007), 46–50, 59–66.

² Karen Barad, “Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter,” *Signs: Journal of Women in Culture and Society* 28, no. 3 (2003): 808.

³ “Sondra Perry interview with Hans Ulrich Obrist” filmed December 15, 2018 at Luma Westbau, Zurich, video, <https://vimeo.com/307269119>. This flowing movement of skin in the “flesh wall” or “skin wall” can be connected to Perry’s underlying interest in thinking about the Middle Passage in relation to racial capitalism. In another work, *Typhoon Coming On* (2018), Perry uses a purple flowing river along with a digital manipulation of J.M.W. Turner’s *Slave Ship (Slavers Throwing Overboard the Dead and Dying, Typhoon Coming On)* (1840), a painting depicting the practice of throwing enslaved people overboard in the Middle Passage to obtain insurance compensation. See Arabella Stanger, “Bodily Wreckage, Economic Salvage and the Middle Passage,” *Performance Research* 24, no. 5 (2019): 11–20, <https://doi.org/10.1080/13528165.2019.1671710>.

⁴ “Sondra Perry interview with Hans Ulrich Obrist” filmed December 15, 2018 at Luma Westbau, Zurich, video, <https://vimeo.com/307269119>.

⁵ Adwoa A. Afful and Rose Ricciardelli, “Shaping the Online Fat Acceptance Movement: Talking about Body Image and Beauty Standards,” *Journal of Gender Studies* 24, no. 4 (2015): 453–72, <https://doi.org/10.1080/09589236.2015.1028523>; Jane Arthurs, “Sex and the City and Consumer Culture: Remediating Postfeminist Drama,” *Feminist Media Studies* 3, no. 1 (2003): 83–98.

⁶ Barad, *Meeting the Universe*, 33.

⁷ Karen Barad, “Intra-actions. Interview with Karen Barad,” interview by Adam Kleinman, *Mousse*, 34 (2012): 80; Barad, *Meeting the Universe*, 148.

⁸ Barad, *Meeting the Universe*, 208.

⁹ Annemarie Mol, *The Body Multiple: Ontology in Medical Practice* (Durham: Duke University Press, 2002), 5, 33.

¹⁰ Barad, *Meeting the Universe*, 178, 32.

¹¹ Agency is never foreclosed, even while intra-acting. Barad, *Meeting the Universe*, 214.

¹² *Ibid.*, 184.

¹³ Lorna Roth writes that complaints by furniture and chocolate companies induced Kodak to be more sensitive to darker subjects. See Lorna Roth, “Looking at Shirley, the Ultimate Norm:

- Color Balance, Image Technologies, and Cognitive Equity,” *Canadian Journal of Communication* 34, no.1 (2009): 111–36; David Hankerson et al., “Does Technology Have Race?” *alt.chi: Confronting Power in HCI* (2016), <https://doi.org/10.1145/2851581.2892578>.
- For a historical reading of other practices, such as makeup, that contribute to the racial bias in films, see Richard Dyer, *White* (London: Routledge, 2002); Cathy Greenhalgh, “Skin Tone and Faces: Cinematography Pedagogy Which Foregrounds Inclusivity and Diversity in Teaching Lighting,” *Cinematography in Progress*, no. 3 (2020), <https://cinematographyinprogress.com/index.php/cito/article/view/45>.
- ¹⁴ Sarah Lewis, “The Racial Bias Built into Photography,” *The New York Times*, April, 15, 2019.
- ¹⁵ Clemens Apprich et al., *Pattern Discrimination* (Lüneburg: Meson Press, 2018); Kate Crawford, “A.I.’s White Guy Problem,” *The New York Times*, June 25, 2016, <https://www.nytimes.com/2016/06/26/opinion/sunday/artificial-intelligences-white-guy-problem.html>; Julia Angwin et al., “Machine Bias: There’s Software Used across the Country to Predict Future Criminals. And It’s Biased against Blacks,” *ProPublica*, May 23, 2016, <https://www.benton.org/headlines/machine-bias-theres-software-used-across-country-predict-future-criminals-and-its-biased>. Simone Browne shows that contemporary surveillance strategies are born out of slave surveillance practices. Simone Browne, *Dark Matters: On the Surveillance of Blackness* (Durham: Duke University Press, 2015), 16–17, 50.
- ¹⁶ Daniela Agostinho, “Chroma Key Dreams: Algorithmic Visibility, Fleshy Images and Scenes of Recognition,” *Philosophy of Photography* 9, no. 2 (2018): 141, https://doi.org/10.1386/pop.9.2.131_1.
- ¹⁷ *Ibid.*, 148.
- ¹⁸ *Ibid.*, 144.
- ¹⁹ Barad, *Meeting the Universe*, 148.
- ²⁰ Wanda J. Orlikowski and Susan V Scott, “Exploring Material-Discursive Practices,” *Journal of Management Studies* 52, no. 5 (2015): 4.
- ²¹ Only recently have filmmakers and camerapersons started paying attention to appropriate lighting for Black and Brown actors. See Nadia Latif, “It’s Lit! How Film Finally Learned to Light Black Skin,” *The Guardian*, September 22, 2017, <https://www.theguardian.com/film/2017/sep/21/its-lit-how-film-finally-learned-how-to-light-black-skin>. Perry refers to the practice of warming up black and brown skin tones to make them more “palatable” for filming. See “Sondra Perry: Typhoon Coming On,” Serpentine Gallery, London, 2018, YouTube, accessed February 2, 2021, www.youtube.com/watch?v=Qunkb4piXGw.
- ²² Frank B. Wilderson, *Red, White & Black: Cinema and the Structure of U.S. Antagonisms* (Durham: Duke University Press, 2010), 58–59.
- ²³ Saidiya V. Hartman, *Scenes of Subjection: Terror, Slavery, and Self-Making in Nineteenth-Century America* (New York: Oxford University Press, 1997), 21.
- ²⁴ Fred Moten, *A Poetics of the Undercommons* (Butte, MT: Sputnik and Fizzle, 2016), 23.
- ²⁵ Sean Cubitt, *The Practice of Light: A Genealogy of Visual Technologies from Prints to Pixels*, (Cambridge, MA: MIT Press, 2014), 21.
- ²⁶ *Ibid.*, 43.
- ²⁷ *Ibid.*, 41.

²⁸ Ibid., 39.

²⁹ Denise Ferreira da Silva, “In the Raw,” *e-flux Journal*, no. 93 (2018), <https://www.e-flux.com/journal/93/215795/in-the-raw/>.

³⁰ I borrow my understanding of “hinge” from Kathryn Yusoff, who uses it to describe the intersection of matter and race; she calls the “concept of inhuman” a hinge in geology and humanism. She argues, “It is a hinge that establishes an extractive axis in both subjective and geologic (or planetary) life.” See Kathryn Yusoff, *A Billion Black Anthropocenes or None* (Minneapolis: University of Minnesota Press, 2018), 16.

³¹ Ron Brinkmann, *The Art and Science of Digital Compositing* (San Diego: Morgan Kaufmann, 1999), 2.

³² The background of photographs was manipulated by creating “combination prints.” This means different negatives were exposed on the photographic paper, resulting in an image with images in backgrounds different from the ones where it was shot. Optical printers in cinema were invented to allow multiple films to be combined to create one print. Disney’s *The Three Caballeros* (1944) was one of the first films to use a crude form of the optical printer. Special effects inventor and engineer Petro Vlahos patented the sodium vapor compositing process in 1963. The film *Mary Poppins* (1965) notably used the sodium vapor process. This technique used sodium (yellow) light and white background for filming. Vlahos can also be credited with pioneering bluescreen technique, which was derived from his earlier Color Difference Travelling Matte System. Contemporary digital compositing, achieved through computers and software, began as the equivalent of optical compositing in cinema. See Jeff Foster, *The Green Screen Handbook. Real World Production Techniques* (New York: Wiley Publishing, 2010), 6, 12. Ron Brinkmann, *Digital Compositing*, 6.

³³ Brinkmann explains the possible confusion that can arise from the terms “matte” and “mask” because they are used as both nouns and verbs; that is, they refer to both the image that has been matted and the technique. See Brinkmann, *Digital Compositing*, 79. Foster notes that matte difference and chroma keying are different process. Even though chroma keying is generally referred to as the whole process of matte compositing and software, technically it is just the process of switching off certain pixels (green or blue of the background). See Foster, *Green Screen*, 23. However, for this research I am referring to the process of hardware and software, that is, matting and compositing, in the phrase chroma keying. Brinkmann differentiates chroma keying from the color difference method, a method that involves numerous steps of matte extraction, color correction, and image combination. In several other studies, chroma keying subsumes the color difference method. Even the keying/matting machines and software packages Ultimatte and Primatte that employ the color difference methods brand themselves as keying technologies. This can be argued, because in both the chroma-keying and color difference methods, the keying process (through which the mattes are produced) is the same. As a technique of matte extraction both use the same technical principles. See Brinkmann, *Digital Compositing*, 81, 84.

³⁴ Brinkmann, *Digital Compositing*, 79.

³⁵ Ibid., 82.

³⁶ Moshe Ben-Ezra, “Segmentation with Invisible Keying Signal,” *Computer Vision and Pattern Recognition*, IEEE Computer Society Conference, no. 1 (2000): 32.

³⁷ Ibid., 33. Alvy Ray Smith and James F. Blinn introduced a more mathematical solution by adding another background in addition to the blue screen. This “multi-background” technique cannot work for actors but takes care of uneven lighting and color spilling on the object. See Alvy Ray Smith and James F. Blinn, “Blue Screen Matting,” *SIGGRAPH Proceedings of 23rd Annual Conference on Computer Graphics and Interactive Techniques* (1996): 259–68.

³⁸ A more technically detailed version that explains the patents by Vlahos is discussed by Smith and Blinn in “Blue Screen Matting,” 260.

³⁹ Brinkmann, *Digital Compositing*, 84, 237.

⁴⁰ Ibid., 85.

⁴¹ Ibid. However, digital technologies have made compositing with any color much easier. As I later discuss, the importance of green and blue color depends on factors other than technical ones.

⁴² Nevertheless, colors are at any rate relational since, considered as part of a spectrum of light, they cannot be entirely fixed or demarcated. A color is not light reflected at one fixed wavelength but rather a range of wavelengths. Blue that is reddish is different when the same blue is placed alongside a white. A color identified as orange could have more red and less yellow to become coral or more yellow than red to become saffron. As is commonly known, the color of the object is not a property of that object. Color observed by human eyes (which also recognize only a certain part of the electromagnetic spectrum) is color reflected by an object. An object appears red because it absorbs all colors (wavelengths of light) except the wavelengths—640 nm–700 nm—that make the object appear red. This assumes that pure red light is reflected, which is hardly ever the case. Colors inmix; that is, the color red that is seen may not have just a pure red wavelength but may have other colors mixed with it (as, for example, in the mixing of yellow and red discussed above). The brightness of light is another factor in what color is observed. The color of the object is contingent on the source of light, its luminescence as well as the degree of saturation of the color. For an in-depth discussion of this see Stephen Neale, *Cinema and Technology: Sound, Image, Color* (Bloomington, IN: Indiana University Press, 1985), 110. Moreover, the color of the object is conditional upon who is viewing the object, since two humans hardly ever perceive colors in the same way. Charles A. Riley, *Color Codes: Modern Theories of Color in Philosophy, Painting and Architecture, Literature, Music, and Psychology* (Hanover, NH: University Press of New England, 1995), 2.

⁴³ Barad, *Meeting the Universe*, 148

⁴⁴ Red chroma keying is used in very specific shoots, for example when shooting spacecrafts. Brinkmann, *Digital Compositing*, 20.

⁴⁵ This is a popular notion in online discussions. “Green Screens vs Blue Screen: What’s the Difference?,” Camberwell Studios, May 29, 2014, <https://www.camberwellstudios.co.uk/blog/film-production-tips/whats-the-difference-between-green-screen-vs-a-blue-screen.html>; “What’s the Difference between a Green Screen and a Blue Screen?,” Gearshift.tv, <https://www.gearshift.tv/faqs/what-s-the-difference-between-a-green-screen-and-a-blue-screen-.cfm>

⁴⁶ Brinkmann, *Digital Compositing*, 219.

⁴⁷ Ibid., 220.

⁴⁸ Special film stocks are produced only for chroma screen recording, such as Kodak's SFX 200T.

⁴⁹ The Bayer photo mosaic pattern that is widely used in digital camera sensors is modelled on the human eye. Similar to most human eyes, there are more cones that detect green color: 50% green detection sensors and 25% each for blue and red. Human eye receptor rods recognize intensity of light, and cones detect colors. However, human eyes detect red most easily because of its high wavelength.

⁵⁰ Kathryn Yusoff, *A Billion Black Anthropocenes or None* (Minneapolis: University of Minnesota Press, 2018), xiii.

⁵¹ *Ibid.*, xiii.

⁵² *Ibid.*, 4.

⁵³ "Press Release of *SONW – Shadow of New Worlds*, Bergen Kunsthall," *Contemporary Art Daily*, January 14, 2020, <https://contemporaryartdaily.com/2020/01/sandra-mujinga-at-bergen-kunsthall/>

⁵⁴ Sandra Mujinga, "There's Nothing Black about This," interview by Olamiju Fajemisin, *e-flux*, March 7, 2020, <https://www.e-flux.com/announcements/318278/sandra-mujingamidnight/>.

⁵⁵ "Sondra Perry." Interview by Hans Ulrich Obrist, Serpentine Gallery, London, 2018, <https://www.youtube.com/watch?v=Qunkb4piXGw>

⁵⁶ Brinkmann, *Digital Compositing*, 219; Andrey Lebrov, "Greenscreen vs. Bluescreen | When and Why?," *YouTube* video, September 28, 2019, <https://www.youtube.com/watch?v=ava4Z3sJMLk&t=105s>

⁵⁷ Brinkmann, *Digital Compositing*, 220.

⁵⁸ Foster, *Green Screen*, 19.

⁵⁹ While the unique skin tone of every individual interacts differently in various kinds of light conditions, the inclination of blue undertones in Brown and Black skin are kept in mind during lighting. Cinematographers consider the skin color of the actor, along with make-up and costumes for specific outcomes. Dyer, *White*, 82–103; Cybel Martin, "The Art of Lighting Dark Skin for Film and HD," *Shadow and Act*, February 4, 2014, <https://shadowandact.com/the-art-of-lighting-dark-skin-for-film-and-hd>

⁶⁰ "Sondra Perry." Interview by Hans Ulrich Obrist, Serpentine Gallery, London, 2018, <https://www.youtube.com/watch?v=Qunkb4piXGw>

⁶¹ Sondra Perry, "Adrift in the Chroma Key Blues: A Chat with Sondra Perry on Black Radicality + Things That Are Yet to Happen in 'Typhon Coming On,'" Interview by Tamar Clarke-Brown. *AQNB*, May 1, 2018, <https://www.aqnb.com/2018/05/01/adrift-in-the-chroma-key-blues-a-chat-with-sondra-perry-on-black-radicality-things-that-are-yet-to-happen-in-typhoon-coming-on/>

⁶² Barad, *Meeting the Universe*, 37.

⁶³ Barad, *Meeting the Universe*, 197.

⁶⁴ That is why blackness is different. See Denise Ferreira da Silva, "1 (life) ÷ 0 (blackness) = ∞ – ∞ or ∞ / ∞: On Matter Beyond the Equation of Value," *e-flux Journal*, no. 79 (2017), <https://www.e-flux.com/journal/79/94686/1-life-0-blackness-or-on-matter-beyond-the-equation-of-value/>.

⁶⁵ *Ibid.*

⁶⁶ Édouard Glissant, *Poetics of Relation*, trans. Betsy Wing (Ann Arbor: University of Michigan Press, 1990/2010), 191.

⁶⁷ *Ibid.*, 189, 190.

⁶⁸ *Ibid.*, 191, 192.

⁶⁹ *Ibid.*, 190.

⁷⁰ Denise Ferreira da Silva, “On Difference without Separability,” in *Incerteza Viva, 32 Bienal de São Paulo* (São Paulo: Fundacion Bienal de São Paulo, 2016), 63, 64.

⁷¹ *Ibid.*, 64.

⁷² *Ibid.*

ACKNOWLEDGEMENTS

Thank you to Prof. Anna Munster for her guidance and support. Thank you to Dr. Megan Driscoll for her generous feedback and constructive comments. This paper extends, gathers, and shapes arguments that were seeded in a paper presented at Media Art Conference RE:SOUND 2019. See Charu Maithani, “Chroma Screens – Intra-Actions, Connections and Gesturalities,” RE:SOUND 2019, 8th International Conference on Media Art, Science, and Technology, Aalborg, Denmark, August 2019.

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