



Using STS to Bridge Long Histories of Blackness, Specularity, and Rendering

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ABSTRACT

Science and Technology Studies (STS) is an academic interdisciplinary that uses sociological and historical methods to study the interrelations of society and technoscience. This paper uses an STS approach to examine the historical feedback loops between "rendering" the shine and specularity of Black skin—across painting, video, and photography—and how computer graphics programmers and artists should question some of the fundamental assumptions of their rendering workflows to both create more equitable representation of human form, and also to understand how computational renderings influence the real world they represent.

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1 INTRODUCTION

Science and Technology Studies, or STS, is a field of interdisciplinary study that examines the interconnectedness of society and technoscience. Through the use of historical and sociological methodologies, STS has demonstrated that technoscience and society operate as a kind of social feedback loop, where social norms and practices influence the direction and shape of scientific discovery and technical innovation, and technical production influences social, cultural, and political practice and thought.

Recently, STS has begun to study the intersections of society and computer graphics. Part of this study has been how "representation" and "realism" operate within rendering technologies, particularly around the tension of mimesis—or faithful physical recreations of the physical world—versus "social realism"—the recreation of our cultural perceptions of the world.[Galloway 2004] Not only can individual or cultural perceptions of the world be "naturalized" in digital rendering as objective representations of the world, but digital representations can change human behaviors in the physical world, complicating the relationship between primary source and secondary representation. Like all human practices, this social-technical feedback loop is also shot through with political, cultural, and identity dimensions.

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This talk is an attempt to bring STS and social scientific studies of computer graphics to the technical community. To do so, I will trace how the rendering of Black skin—through painting, photography, and videography—presents social realistic elements as mimetic elements, leading to the rendering of Black skin that "looks right" to the white eye, leading to anti-Black biases in visual art. As computer graphics works to more closely replicate the cinematic camera apparatus—particularly though techniques like Physically Based Rendering—digital artists and developers must be cognizant of the biases built into the scientific studies and technological systems new digital rendering systems are based upon in order to foster a more equitably rendered world.

1.1 Shine, Skin, and Specularity

Skin in computer graphics, like photography, has over time come to treat "the body" as "the white body," particularly when it comes to the rendering of skin and hair. [Kim 2020] Among the major technical contributors to this enactment is subsurface scattering—the rendering of diffuse light in skin—which contributes to the translucent quality of certain kinds of skin types. the mathematically difficult, computationally intensive translucency problem "is only the dominating visual feature in young, white skin," and yet has taken up a vast majority of digital skin research over the past 30 years. The legacy of racial bias in computer graphics, however, includes but goes beyond the historically constructed technical limitations of software. Black skin has long been treated as either a derivation or deviation from white skin, and Black bodies as edge cases for photography, film, narrative, and digitization.

The shine of Black skin has long been as a site of contestation and violence in a white world. As art historian Krista Thompson argues, the interaction of video light and Black skin serves as a contemporary central axis for the co-production of twenty-first century ways of seeing and representing, particularly when seeing and representing the African diaspora.[Thompson 2015] Video light for Thompson is doubly deployed. First, it was a technique popularized in 1980s dancehalls by Jamaican videographer Jack Sowah, whose camera was affixed with a bright, unfiltered top-mounted light, creating a style whose "visual texture is harsh and burning white." The proliferation of video light in the Caribbean, Thompson argues, contributed to practices of skin bleaching by dancehall participants in Kingston:

This controversial practice, in which dancehall participants make their faces and other exposed parts of their bodies lighter and light sensitive through chemical means, stems in part from an effort to be more visible in the scope of video light, to be rendered legible

through videographic technologies and technologies of light.[Thompson 2015]

Video light did more than just shine light upon a recording surface. Rather, the videographic apparatus of video light created new material, embodied practices, which changed and diffracted the surfaces represented on video and film. Race simultaneously becomes materialized—and comes to matter—through the entanglements of light and skin. This enacted practice foreshadows for us Thompson’s second deployment of video light: the broader entanglements of visual surface, technological media, skin, and culture that permeate art worlds through their material practices. Here Thompson explores the historical and racial links between the Renaissance painting technique of surfacism and contemporary Black arts practices, ranging from Kehinde Wiley’s illuminated paintings to “bling” fashion. Drawing from art historians John Berger and Svetlana Alpers, Thompson describes surfacism in Dutch and European portraiture as the combination of painting technique and medium that gives painted surfaces and subjects a bright, luminescent quality, which was used to connote wealth, prestige, and commodity status. In addition to the selection of objects painted—which came to include pattered marble floors, furs, and golden and metallic baubles—new attention was paid to sheen, shine, and glisten. Alpers argues that “Dutch painters, for the first time in the history of art, attempted to reproduce the optical effect of rays of light hitting the surfaces of the objects in their paintings.”[Alpers 1976] The refractions of painted light were further augmented on the surface of the painting itself, as artists applied copious amounts of shellac to their canvases to increase their gloss and specularly.

Shine and specularly came to represent commodity status. Notably, Thompson observes, the only surface not commonly painted in the surfacist style was the white skin of the patrons themselves; patrons were represented in a warmer, less harsh, less glossy light, separating their humanity from that of the objects surrounding them. Representations of Black bodies in surfacist painting, on the other hand, were rendered in the same techniques and media of shine and glisten as tradeable commodities, leading to “the bodies of persons defined as black not only literally circulated in a global economy as commodities but also were visually defined as such through the visual logic of surfacism.”[Thompson 2015]

Even pre-film and video, the language and technique of light and specularly have been used to cast political, aesthetic, and ideological desire upon the surface of Black skin. These castings are not just visually representative; they directly impact practices of the body as well—representation both reflects and reflects upon the body represented. As Thompson argues, “The bodies of men and women, manipulated to reflect light, become a new form of photographic surface, absorbing and reflecting light, appearing permanently marked by the light of representation.” Thompson’s articulations of the Blackness of video light were the start of a longer legacy of the interactions of Black skin and the camera lens. Genevieve Yue analyses the “China Girls” film squares, images of upper bodies of white women surrounded by blocks of color. These film squares were attached to the beginning of film projection strips, and were used in aiding projectionists’ calibrations of light and picture.[Yue 2020] Like the famous Kodak “Shirley Cards” used to calibrate photographic printing, these “girl head” images centered

whiteness and white femininity as a universally objective standard of quality measurement. A filmstrip or photo that was “color correct” matched the skin tones and color swatches on the girl head cards. Even films that intentionally adopted alternative or shifted color profiles—grading—were measured by how many degrees of temperature “off center” they were from neutral calibration keys.

Despite being deployed as a universal standard of visual measurement, China Girl “objective” skin color is also culturally manipulated. Yue quotes physicist David MacAdam, who, in his investigations of skin tone in color photography notes that, “optimum reproduction of skin color is not ‘exact’ reproduction, [which] is rejected almost unanimously as ‘beefy’... When the print of the highest acceptance is compared with the original subject, it seems quite pale.”[Yue 2020] Proper white skin in photography, then, needed to appear even whiter than it did on the subject’s flesh in order to appear to a white audience as “natural.” The lighting techniques and film chemistry used to produce this whitening of skin have left lasting impressions on the quality of the “photorealism” of Black skin. In their application towards photorealistic rendering, these abstractions of physics—themselves already entangled with white empiricism—become further entangled with white histories and practices of photography and cinema. Within computer graphics, they enact the phenomena of white photorealism: the interweaving of truth claims with the making-invisible of the photographic apparatus to produce a photoreality that only feels “real” to the white eye.

The “about-rightness” of Black skin in white photorealism still pervades Western visual culture. It was evident in Annie Leibovitz’s controversial 2020 Vogue photoshoot of gymnast Simone Biles, which left Biles underlit and flattened. It could be seen in Australian cosmetic company BECCA’s advertisements of Black skintone-friendly foundation, featuring the hand of a white model digitally manipulated to look Black. Not only did the company choose not to hire Black models for their shoot, they also miscolored the manipulated hand, making the palm and back-of-the-hand skin tone the same color—as it appears for pale white skin—rather than rendering the hand in gradient tones more common to melanated skin. Here again the logics of the appearance of white skin were assumed to be easily portable to other skin tones and skin types.

This treatment of white skin and bodies as central in the cinematographic apparatus contributes to the documented ongoing inherent biases in computational media. It is up to digital artists to recognize the implicit theoretical foundations of our rendering practices, and after so doing to develop new rendering workflows which do not treat melanated skin as a derivation of whiteness.

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