

The Augmented Undercommons and The Path to The Sun: An Exploration of Liberatory  
Technology and other Revolutionary Tools

By

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*This paper represents my own work in accordance with University regulations.*  
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If they ask you, tell them we were flying. Knowledge of freedom is (in) the invention of escape, stealing away in the confines, in the form, of a break. This is held close in the open song of the ones who are supposed to be silent.<sup>1</sup> – Fred Moten and Stefano Harney

It is a lively day in an intimate Black neighborhood. A cooling breeze is felt balancing the sun's intense rays. The community's elders sit calmly on their porches, sharing stories and laughter with all who will listen. Young children play in the grass while their older siblings run about the neighborhood. Somebody somewhere is playing old-school tunes from a large archaic boom box. Another is dancing without a care in the world... That is until the sound of sirens is heard wailing in the distance. The young girl climbing a tree is the first to notice it. But soon, more and more sounds are heard approaching the residents and interrupting their harmony. Mothers usher the children inside. Teens drop their bikes and run out of the streets. But many are trapped outside as the armed officers leap out of their cars and aim their weapons. Their harsh voices violently sparring with the smooth jams blasting from the speakers, the police run between houses, yelling for all to show their hands. The families that made it inside hug their young ones while praying that nobody would get hurt. And as they try to hold back tears, they sit wondering: who called the police? The answer: the microphone in the lamp post.

Since 1996, devices placed on rooftops and street lights have secretly listened in on communities of color and summoned police.<sup>2</sup> This technology, called ShotSpotter, is a “precision policing solution” that allegedly helps “save lives, solve cases and deter crime—making communities safer.”<sup>3</sup> In an effort to efficiently deploy resources and personnel, ShotSpotter listens for gunshots, stores the sound's location, is reviewed by a remote listener,

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<sup>1</sup> Stefano Harney and Fred Moten, *The Undercommons: Fugitive Planning & Black Study* (Wivenhoe New York Port Watson: Minor Compositions, 2013), 51.

<sup>2</sup> “Gunshot-Detecting Tech Is Summoning Armed Police to Black Neighborhoods,” accessed February 21, 2022, <https://www.vice.com/en/article/88nd3z/gunshot-detecting-tech-is-summoning-armed-police-to-black-neighborhoods>.

<sup>3</sup> “Home,” ShotSpotter, accessed April 11, 2022, <https://www.shotspotter.com/>.

and calls the police.<sup>4</sup> The process takes less than 60 seconds and was designed to address the issue of gun violence in residential areas, offices and schools.<sup>5</sup>

A glaring problem with ShotSpotter's disruption of the opening narrative is that no guns were fired that day. Yet the police were still summoned because, even after decades of use, ShotSpotter and its review team have a problem differentiating gunfire from other loud impulsive sounds.<sup>6</sup> It could have been anything from a helicopter to construction noises to the sound of heavy bass that triggered the listening device. But that does not mean the solution is to simply improve the technology, because even with perfect detection, there is still much room for concern. ShotSpotter is an example of *surveillance technology*— a tool designed to track, profile, police and regulate populations.<sup>7</sup> This collection of data can occur in airports, on the streets, by way of social media and more. In her enlightening work *Dark Matters: On the Surveillance of Blackness*, Simone Browne explains that surveillance technology is incredibly invasive for all it captures, but it is especially detrimental to the Black people it targets. For instance, police cameras are disproportionately installed in Black neighborhoods, local departments track the phrase 'Black Lives Matter' on social media and there have even been FBI programs targeting 'Black Identity Extremists.'<sup>8</sup> Browne likens the racialization of surveillance to dark matter, a piece of the universe that cannot be seen, measured or detected but whose gravitational pull can

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<sup>4</sup> "Gunshot Detection," ShotSpotter, accessed April 11, 2022, <https://www.shotspotter.com/law-enforcement/gunshot-detection/>.

<sup>5</sup> "Home."

<sup>6</sup> "ShotSpotter Generated Over 40,000 Dead-End Police Deployments in Chicago in 21 Months, According to New Study," *MacArthur Justice* (blog), May 3, 2021, <https://www.macarthurjustice.org/shotspotter-generated-over-40000-dead-end-police-deployments-in-chicago-in-21-months-according-to-new-study/>.

<sup>7</sup> Simone Browne, *Dark Matters: On the Surveillance of Blackness*, 2015, 13, <https://doi.org/10.1215/9780822375302>.

<sup>8</sup> Kade Crockford, "How Is Face Recognition Surveillance Technology Racist?," *American Civil Liberties Union* (blog), June 16, 2020, <https://www.aclu.org/news/privacy-technology/how-is-face-recognition-surveillance-technology-racist>.

move galaxies.<sup>9</sup> The surveillance of blackness can be difficult to detect beneath the myth of tech’s objectiveness. But like dark matter, Black surveillance is the impactful force that ends lives and polices social order.

But according to Browne, “surveillance is nothing new to black folks.”<sup>10</sup> This type of policing has a long history that dates back to transatlantic slavery.<sup>11</sup> She explains that,

... surveillance technologies installed during slavery to monitor and track blackness as property (for example, branding, the one-drop rule, quantitative plantation records that listed enslaved people alongside livestock and crops, slave passes, slave patrols, and runaway notices) anticipate the contemporary surveillance of racialized subjects.<sup>12</sup>

As Browne explains, antiquated forms of probing and control have been repackaged in shiny new high-tech boxes. In the case of ShotSpotter, slave— and later police— patrol has been automatized by the new detection system, which falsely claims to “minimizes unintended bias.”<sup>13</sup> Furthermore, the ‘new surveillance’ is even more effective than its predecessors because it is often undetected, unimpeded by distance and permanently stored.<sup>14</sup>

And this threat applies to all forms of technology. In *Race After Technology: Abolitionist Tools for the New Jim Code*, scholar and Professor Ruha Benjamin asserts that new systems “reflect and reproduce existing inequities” while cosplaying as “more objective or progressive than the discriminatory systems of a previous era.”<sup>15</sup> These algorithms, which she calls the ‘New

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<sup>9</sup> Browne, *Dark Matters*, 9.

<sup>10</sup> Browne, 10.

<sup>11</sup> Browne, 11.

<sup>12</sup> Browne, 22–23.

<sup>13</sup> ShotSpotter, *ShotSpotter Connect™ - Community First Patrol Management (June, 2021)*, 2021, <https://www.youtube.com/watch?v=VV8bChgtADs>.

<sup>14</sup> Browne, *Dark Matters*, 14–15.

<sup>15</sup> Ruha Benjamin, *Race After Technology: Abolitionist Tools for the New Jim Code* (Medford, MA: Polity, 2019), 5–6.

Jim Code,' amplify racial hierarchies as designers encode their own biases into their projects.<sup>16</sup> Moreover, Benjamin asserts that it is impossible "to create something without some intention and intended user in mind."<sup>17</sup> And it turns out, the U.S. Armed Forces were the intended users of today's most popular devices. From global positioning systems (GPS) to drones to the internet to kites— many of our commonplace tools were invented by and for the military.<sup>18</sup> These systems were originally soldiers at war and assistants in mass destruction. Although later adopted and adapted for civilian use, technology's birthplace was amidst an abundance of pain and violence. Hence, when these machines locate, attack and kill their targets, they function exactly as designed.

Between the invasive ShotSpotter, other rebranded slave patrols and killer drones, it is clear that today's technology and design process must be reconfigured from the ground up. "Will our current or future technological tools ever enable us to outrun white supremacy?" academic Charlton McIlwain asks. The answer is yes, but only if we first acknowledge both the individual and systemic prejudices ingrained in our current devices. In "The 19th-Century Roots of 21st-Century Digital Racism," scholars Jenn Stroud Rossmann and B.R. Cohen liken today's systems to a palimpsest— an antiquated, reusable manuscript that writers used to "erase and write over prior texts on the same page."<sup>19</sup> The material provided a practical method of transcription beneath which old text remained buried and barely visible. Likewise, tech's current design process resembles a palimpsest because it remains in the presence of past work. But we cannot

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<sup>16</sup> Benjamin, 11.

<sup>17</sup> Benjamin, 28.

<sup>18</sup> Austin Choi-Fitzpatrick, *The Good Drone: How Social Movements Democratize Surveillance*, Acting with Technology (Cambridge, Massachusetts: The MIT Press, 2020), 45.

<sup>19</sup> Jenn Stroud Rossmann and B.R. Cohen, "The Internet Is Railroad: The Historical Structure Of Digital Racism" (Monday Lab Meeting, Zoom Lecture at Ida B. Wells Just Data Lab, February 7, 2022).

“only work on the top layer.”<sup>20</sup> We must reveal the hidden history to escape the grooves of conformity.<sup>21</sup> We need also think “beyond the dominant genre,” Benjamin asserts.<sup>22</sup> This involves tearing a new sheet of paper and challenging the settled ways of conformity. It requires us to create systems with liberation in mind and it involves discovering what happens when those who technology targets most choose to close the tab, cover the camera and ultimately go dark.

In this paper, I will explore the many ways targeted communities are designing their own liberation apart from the destruction present in our digital society. Through three distinct case studies, I will uncover what happens when the technical design process is reconstructed, and industry standards are challenged. This analysis will also investigate the flaws that linger even in the systems intended for freedom. As I dissect these faults, I will note how they amplify larger social issues, which often require systemic change. Ultimately, this paper will reveal that the many problems troubling the digital age require a variety of solutions. Yet, it is oh-so-worth the time it will take for users to reclaim their agency and build a better tomorrow.

### *The Augmented Undercommons*

In *The Undercommons: Fugitive Planning & Black Study*, cultural theorists Fred Moten and Stefano Harney advocate for the need to be *in* but not *of* the university.<sup>23</sup> As Black studies intellectuals, the two promote the delegitimization of scholarly institutions while uplifting an alternate place of study that does not adhere to the rules and regulations of the current.<sup>24</sup> The need for this parallel location, which they name *the undercommons*, stems from the belief that

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<sup>20</sup> Stroud Rossmann and Cohen.

<sup>21</sup> Stroud Rossmann and Cohen.

<sup>22</sup> Benjamin, *Race after Technology*, 31.

<sup>23</sup> Harney and Moten, *The Undercommons*.

<sup>24</sup> Harney and Moten.

the university reproduces and reaffirms our culture's most dangerous systems.<sup>25</sup> Rather than encouraging free thought that challenges societal norms and the institution itself, Moten and Harney argue that traditional education further indoctrinates students into the racist, capitalistic notions that plague society. Thus, they advocate for the undercommons, an uninhibited space for the "subversive intellectual" to openly challenge cultural standards and plan for revolution.<sup>26</sup> In "Black Study, Black Struggle," historian Robin D. G. Kelley further describes the undercommons as "a fugitive network where a commitment to abolition and collectivity prevails over a university culture bent on creating socially isolated individuals whose academic skepticism and claims of objectivity leave the world-as-it-is intact."<sup>27</sup> Essentially, the undercommons is a site for unfettered thought that reimagines and pushes for the destruction of the common, the comfortable and the standard.

To better understand this concept, scholar Jack Halberstam likens it to the multidimensional world of Maurice Sendak's book and film *Where the Wild Things Are*. In it, protagonist Max flees the condemnation of his parents and stumbles upon an island where monsters dwell. While there, he plays without care and fearlessly rules over the wild things until this world also disappoints him.<sup>28</sup>

That Max fails to make the wild things happy or to save them or to make a world with them is less important than the fact that he found them and he recognized in them the end of something and potentially the path to an alternative to his world. The wild things were not the utopian creatures of fairy tales, they were the rejected and lost subjects of the world Max had left behind and... he knows the parameters of the real – he sees what is included and what is left out and he is now able to set sail for another place, a place that is neither the home he left nor the home to which he wants to return.<sup>29</sup>

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<sup>25</sup> Harney and Moten.

<sup>26</sup> Harney and Moten.

<sup>27</sup> Robin D. G. Kelley, "Black Study, Black Struggle," *Boston Review* (blog), March 7, 2016, <https://bostonreview.net/forum/robin-kelley-black-struggle-campus-protest/>.

<sup>28</sup> Harney and Moten, *The Undercommons*, 6.

<sup>29</sup> Harney and Moten, 7.

The undercommons is where the wild things are. It is the unregulated and radical temporary housing for people broken by their society. Nevertheless, these digital maroons— escapees of surveillance captivity— find in each other the possibility to change the things they have come to accept. They learn what it means to work in community and think freely without the restraints of ‘reality.’ They also realize that bargaining and repairing what has been damaged is not enough. They must ultimately re-envision everything and build from the ground up. And through this process, they will discover that “new worlds are possible,”<sup>30</sup> as Benjamin often says.

Although Moten and Harney’s detailing of the undercommons remains focused on emancipation from the university, there is room to expand this radical oasis to the realm of surveillance technology. This extension is what I call *the augmented undercommons*— a domain inclusive of, but not limited to, the virtual sphere where all who refuse to submit to technology’s watchful eye may freely reside while reconfiguring the world’s understanding of ‘innovation’ and ‘security.’ My use of the word augmented here refers to the phrase augmented reality (AR)— “an enhanced version of the real physical world... achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology.”<sup>31</sup> Like the undercommons and its augmentation, AR is *in* but not *of* the real world. When looking through a device, the visual and auditory stimulations may dart across the room or interact with tangible objects. Yet, however genuine the 3D graphic may seem, it is not. Its very existence defies the laws of our dimension, reminding all that it is merely a virtual illusion.

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<sup>30</sup> Ruha Benjamin, “Note to Author,” February 15, 2022.

<sup>31</sup> Adam Hayes, “Augmented Reality Definition,” Investopedia, December 2, 2020, <https://www.investopedia.com/terms/a/augmented-reality.asp>.

The term ‘augmented’ also reminds us that the undercommons still has ties to the common world. Unlike virtual reality (VR), which is “a self-contained computer environment,”<sup>32</sup> AR layers itself atop the physical realm. This interaction with reality mirrors the undercommons because it responds to the world’s stimuli before producing its own. Thus, attaching “augmented” to the undercommons shines a spotlight on its most critical shortcoming. That is, because the undercommons is often reactive, it too is flawed by its intertwinement with the structures it seeks to abolish. The need to remain defensive limits its perspective beyond the enemy directly ahead. Critical reactivity and creative productivity are not mutually exclusive. However, the former is often an inhibitor to the latter, making it difficult to reach independent worlds. Therefore, the maroons of the augmented undercommons “are always at war”<sup>33</sup> as they find new and inventive ways to duck and dodge surveillance tech in all its slaughter. Yet, it is all a part of the process. To even access the undercommons, we must first learn to think and think differently than the commons. Hence, we must first *know* the commons. A virtual reality-esq world that allows for full, untainted immersion in liberation may come in time. But at this moment, we are embedded within the flawed land we inhabit now. And this is why the undercommons, augmented or not, is not the final destination. Like the wild place, it is merely a transient place of learning. Halberstam explains,

We cannot say what new structures will replace the ones we live with yet, because once we have torn shit down, we will inevitably see more and see differently and feel a new sense of wanting and being and becoming. What we want after “the break” will be different from what we think we want before the break and both are necessarily different from the desire that issues from being in the break.<sup>34</sup>

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<sup>32</sup> Dave Johnson, “What Is Augmented Reality? Here’s What You Need to Know about the 3D Technology,” Business Insider, accessed February 16, 2022, <https://www.businessinsider.com/what-is-augmented-reality>.

<sup>33</sup> Harney and Moten, *The Undercommons*, 30.

<sup>34</sup> Harney and Moten, 6.

Because we cannot yet imagine the revolution, we must *enter into study*— “a mode of thinking with others separate from the thinking that the institution requires.”<sup>35</sup> Studying both the destruction of the commons and the cracks in the undercommons allows us to prepare for the future’s unknown. And this mode of study is precisely what I will delve into as I search for the augmented undercommons. As I proceed, I will locate and examine technology and other tools created to be transformative and liberatory for all who seek solace apart from the commons. The instruments of the augmented undercommons challenge industry standards by offering new solutions. And they begin with what Moten, Harney and literary theorist Gayatri Spivak call *the first right*, the refusal of an imposed dichotomy.<sup>36</sup> Concerning the undercommons, the first right is rejecting to be either “for or against the university.”<sup>37</sup> And in the augmented undercommons, it is declining the choice to be strictly for or against technology. It is refuting “the artificial/natural dichotomy, which tends to be trapped in either the organicists’ desire for untouched nature, or the techno-optimists’ desire for resource extraction,” as cybernetics scholar Ron Eglash described.<sup>38</sup> Of course, the issues of our digital world are much more nuanced than these proposed yes or no questions. Therefore, the augmented undercommons considers how technological developments may be the key to some problems yet the ignition for others. The maroons then study these contradictions and use their findings to construct another dimension.

The people and tools of the augmented undercommons must also refuse the *call to order*. They deny “the teacher picking up the book, the conductor raising his baton,”<sup>39</sup> the app recording their voice, the government focusing the camera. In the augmented undercommons, it

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<sup>35</sup> Harney and Moten, 11.

<sup>36</sup> Harney and Moten, 8.

<sup>37</sup> Harney and Moten, 9.

<sup>38</sup> Ron Eglash, *African Fractals: Modern Computing and Indigenous Design* (New Brunswick, N.J.: Rutgers University Press, 1999), 228.

<sup>39</sup> Harney and Moten, *The Undercommons*, 8–9.

is known that discrete mobile location tracking and airport biometric scanning are not the most effective ways of ensuring overall security.<sup>40</sup> The current call to order is enforced submission to the surveillance state, but the inhabitants of the undercommons know better than to accept this logic. They understand that is unwise to follow big tech's call to deflect responsibility for the systems they create. This refutation differs from the original undercommons where "the door swings open for refuge even though it may let in police agents and destruction."<sup>41</sup> Members of the augmented undercommons do not share this luxury. Although allowing the 'bad guys' to study liberation is a risk that Moten and Harney are willing to take, responsible creation and use of technology are values on which the augmented undercommons cannot bend. Designers are liable for their liberatory concepts and the ways in which they may become destructive in others' hands. Else, the maroons of the augmented undercommons recreate the destructive processes they sought to delete.

Essentially, the augmented undercommons is a network of maroons who uncover and design their own liberation from our digital society. Their refusal to click, snap and send their data is as much a strategy as their decision to participate in a virtual realm of their own. They silence the sound of the machines to reconsider the need for its presence. They mute their voices and blur their faces searching for their true identities. But most importantly, they dream of their revolutionary future as they create under the commons. And this process of building a rocket beneath ground before sending it flying through the sky reminds us all that we must go low before we can go high.

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<sup>40</sup> Browne, *Dark Matters*.

<sup>41</sup> Harney and Moten, *The Undercommons*, 38.

*Begin Anew: The Search for Liberatory Technology**Biofashion for Black Lives: The Subversive Hoodie*

The summer of 2020 is often referred to as a moment of “racial reckoning.”<sup>42</sup> With constant discussion of George Floyd, Breonna Taylor, Ahmaud Arbery and the murder of countless others, people around the world began protesting the police and their destructive behavior.<sup>43</sup> These demonstrations often led to the emotional and physical distress of those in attendance as law enforcement and white supremacists initiated violence.<sup>44</sup> In response to these incidents and with the hope of locating and aiding people in distress, Spelman College faculty Jaye Nias and Robert Hamilton alongside researchers Mika Campbell, Savannah Adams, Abigail Gordon, Eric Thompson and Grace Burch designed a high-tech ‘subversive’ hoodie that changes colors as the wearer’s anxiety levels increase. The group’s preliminary design, which they may choose to fully develop in the future, finished second against 51 other universities in BioDesign Challenge’s 2021 Summit.<sup>45</sup> Reminiscent of the mood rings of the early 2000s, their design integrates wearable sensors that detect a person’s heart rate, perspiration and blood pressure.<sup>46</sup> Based on the sensor’s retrieved biometric data, the jacket’s armband shifts to yellow, orange or red as indicated in figure 1.<sup>47</sup> The display alerts others of the user’s welfare and promotes

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<sup>42</sup> Ailsa Chang, Rachel Martin, and Eric Marrapodi, “Summer Of Racial Reckoning,” *NPR*, August 16, 2020, <https://www.npr.org/2020/08/16/902179773/summer-of-racial-reckoning-the-match-lit>.

<sup>43</sup> Chang, Martin, and Marrapodi.

<sup>44</sup> “Police Keep Using Force against Peaceful Protesters, Prompting Sustained Criticism about Tactics and Training,” *Washington Post*, accessed April 14, 2022, [http://www.washingtonpost.com/national/police-keep-using-force-against-peaceful-protesters-prompting-sustained-criticism-about-tactics-and-training/2020/06/03/5d2f51d4-a5cf-11ea-bb20-ebf0921f3bbd\\_story.html](http://www.washingtonpost.com/national/police-keep-using-force-against-peaceful-protesters-prompting-sustained-criticism-about-tactics-and-training/2020/06/03/5d2f51d4-a5cf-11ea-bb20-ebf0921f3bbd_story.html).

<sup>45</sup> “Summit 2021,” Biodesign Challenge, accessed April 15, 2022, <https://www.biodesignchallenge.org/summit-2021>.

<sup>46</sup> Jaye Nias et al., “Subversive: BioFashion for Black Lives,” in *Sixteenth International Conference on Tangible, Embedded, and Embodied Interaction*, TEI ’22 (New York, NY, USA: Association for Computing Machinery, 2022), 1, <https://doi.org/10.1145/3490149.3505569>.

<sup>47</sup> Nias et al., 4.

“embodied and communal well-being.”<sup>48</sup> For example, if attending a protest or demonstration, activists can wear this ‘subversive hoodie’ and provide the necessary support to members in distress. Furthermore, this information is shared over a secured network so that others may check in on loved ones or send additional assistance to high-stress areas.<sup>49</sup> Essentially, the researchers’ wearable device was created using various community-led processes that challenge the standard path to technological innovation. Although the ethics of biometric surveillance will not go without critique, there is still much to learn from this early-stage design as we locate the augmented undercommons.

The Spelman team used a hoodie as a tool for collective well-being to reconstruct the garment’s negative connotation. “Through our speculative upcycling of the typical hoodie, we envision an Afrofuturist wearable design to change the narrative of... wearing a hoodie while being Black,” Nias et al. explained.<sup>50</sup> Their use of the term *Afrofuturism* here describes innovative stories that detail “new directions in the study of African diaspora culture that are grounded in the histories of black communities,” as defined by scholar Alondra Nelson in *Social Text*.<sup>51</sup> In this case, the undergraduate researchers’ reconstruction of the hoodie is rooted in the belief that this garment is worn by ‘thugs’ and ‘gangsters.’ And with the murder of hoodie-wearing Trayvon Martin in 2012, cultural studies scholar Mimi Thi Nguyen’s work “The Hoodie as Sign, Screen, Expectation, and Force” explains how the phrase “‘hoodies up’ became not just a rallying cry but also an incitement to create new images.”<sup>52</sup> Thus, like the work of many Afrofuturists, Nias et al. take this context in a different direction by making its owner a target of

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<sup>48</sup> Nias et al., 2.

<sup>49</sup> Nias et al., 1.

<sup>50</sup> Nias et al., 1.

<sup>51</sup> Alondra Nelson, “Introduction: FUTURE TEXTS,” *Social Text* 20, no. 2 (71) (June 1, 2002): 9, [https://doi.org/10.1215/01642472-20-2\\_71-1](https://doi.org/10.1215/01642472-20-2_71-1).

<sup>52</sup> Mimi Thi Nguyen, “The Hoodie as Sign, Screen, Expectation, and Force,” *Signs* 40, no. 4 (2015): 808, <https://doi.org/10.1086/680326>.

care and aid rather than harm. “Clothes are often understood through an indexical relationship to the person who wears them, functioning as clues to a person’s existence in the world,” Nguyen described.<sup>53</sup> And with the integration of this biometric technology, the reimagined hoodie reveals the more intimate state of the wearer beyond the surface level implication provided by their skin color.

As Nias et al. reconstruct the hoodie’s narrative, they are also positioning themselves within the emerging *biofashion* industry— a field characterized by worn technology, virtual outfits and microbe-based fabrics.<sup>54</sup> The field was born when designer Suzanne Lee coined the term *biocouture* in the early 2000s.<sup>55</sup> As she paved the way, Lee used yeast, bacteria, tea and sugar to grow fabrics and explore how designers and scientists are collaborating to create the eco-friendly clothes of the future.<sup>56</sup> Since then, biofashion "has extended beyond the idea of sustainable wearability into designing toward and for human biology."<sup>57</sup> And the Spelman design fully embraces these properties by using green materials that monitor and reveal a person’s biometric data.

In the spirit of biofashion, the subversive hoodie is made with three environmentally conscious materials for each of the jacket’s layers— shown in figure 2. The outer layer is made of silk-based leather from Tufts University’s SilkLab.<sup>58</sup> “This layer is rip, puncture, and water-

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<sup>53</sup> Nguyen, 792.

<sup>54</sup> “The Future Fashion Trends Explained By the Fabricant,” *BioFashionLab* (blog), December 25, 2020, <https://biofashionlab.com/digital-fashion-lets-discover-the-fashion-trends-of-tomorrow-with-the-fabricant/>.

<sup>55</sup> Brooke Roberts-Islam, “The Rise of Biodesign - Growing Our Way To A More Sustainable Future,” *Forbes*, accessed March 19, 2022, <https://www.forbes.com/sites/brookerobertsislam/2019/08/25/the-rise-of-biodesigngrowing-our-way-to-a-more-sustainable-future/>.

<sup>56</sup> Roberts-Islam.

<sup>57</sup> Nias et al., “Subversive,” 1.

<sup>58</sup> Nias et al., 3.

resistant” to provide physical protection to the user.<sup>59</sup> Additionally, this textile may also be 3D printed to increase efficiency and reduce fabric waste to zero.<sup>60</sup> The hoodie’s next layer is constructed with the non-Newtonian D3O®, a unique substance that is soft and flexible when relaxed yet hard and stiff when acted upon by a force.<sup>61</sup> Made from a compressed mixture of starch and water, D3O® resists impact and protects whatever it surrounds without forgoing mobility.<sup>62</sup> Finally, the innermost layer of the jacket is made of a removable and easily washable synthetic mesh. Together, the three layers may supply protection to the wearer while remaining environmentally conscious.

As Nias et al. created their subversive hoodie within the Afrofuturism and biofashion traditions, they also embodied the thoughtful frameworks described in researcher Sasha Costanza-Chock’s *Design Justice: Community-Led Practices to Build the Worlds We Need*. In this work, Costanza-Chock outlines ways of dismantling interconnected modes of oppression through “community-led processes that build shared power.”<sup>63</sup> Of these principles, the Spelman team made sure to:

- Design to sustain, heal and empower our communities
- Prioritize design’s impact on the community
- Work toward non-exploitative solutions that reconnect us to the earth and to each other
- Look for what is already working at the community level
- Work toward sustainable, community-led, and controlled outcomes.<sup>64</sup>

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<sup>59</sup> Nias et al., 3.

<sup>60</sup> Augusta Pownall, “Algorithmic Couture Reduces Fashion Industry Waste with Digital Customisation,” Dezeen, March 27, 2019, <https://www.dezeen.com/2019/03/27/algorithmic-couture-digital-fashion-customisation/>.

<sup>61</sup> “The Right Chemistry: D3O Is a Remarkable Non-Newtonian Fluid,” *montrealgazette*, accessed March 19, 2022, <https://montrealgazette.com/opinion/columnists/the-right-chemistry-d3o-is-a-remarkable-non-newtonian-fluid>.

<sup>62</sup> “The Right Chemistry.”

<sup>63</sup> “Sasha Costanza-Chock, Ph.D.,” accessed March 20, 2022, <https://www.schock.cc/>.

<sup>64</sup> Nias et al., “Subversive,” 3–4.

The group’s focus on environmental impact and collective well-being effectively demonstrates Costanza-Chock’s tenets. Their garment builds on the political history of the hoodie in order to embolden and support Black communities. Additionally, the subversive hoodie takes after the colloquial ‘grapevine’ in enabling “members of the community to share and propagate data that [allows] support networks to engage as needed.”<sup>65</sup> Essentially, this technology is notable because the designers intentionally weaved sustainability, Afrofuturism and design justice structures into each step of the conception process.

By committing to these liberatory practices while creating their device, the Spelman team laudably breaks the tech industry’s ‘make first, think later’ cycle. However, they did adopt tech corporations’ desire to capture and store users’ sensitive information. Nias et al. did this so that Black people “can record their whereabouts for their own safety and actively contribute to the collection of biometric data.”<sup>66</sup> The team explains,

The body camera on a hoodie is meant to protect and give power to the Black lives that wear it. This network system also encourages the possible global collection of data about biometric responses for research purposes where user privacy will be upheld in the process for people of color.<sup>67</sup>

The researchers describe data democratization— universal access to data—<sup>68</sup> but that may not be the best method of returning agency and control to subjected users. Placing personal information in the hands of marginalized groups in no way guarantees it will be well cared for. For example, an insightful article written by Joan Donovan and Chris Gilliard following the January 6 Capitol siege in 2021 found that “many who consider the use of facial recognition technology ethically

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<sup>65</sup> Nias et al., 3.

<sup>66</sup> Nias et al., 4.

<sup>67</sup> Nias et al., 4.

<sup>68</sup> “What Is Data Democratization? Definition and Principles,” *Amplitude* (blog), January 27, 2022, <https://amplitude.com/blog/data-democratization>.

wrong in the context of policing take a different stance when it's in the hands of researchers and journalists.”<sup>69</sup> Yet, this trust is misplaced because, as these systems identify right-wing insurrectionists, they are becoming increasingly better at doing the same for Black and Brown people. “Black people face overwhelming disparities at every single stage of the criminal punishment system, from street-level surveillance and profiling all the way through to sentencing and conditions of confinement,” MIT fellow Kade Crockford wrote in an ACLU article.<sup>70</sup> So, while technologists are steadily improving the weapon's effectiveness when aimed at white supremacists, Black people will soon suffer the consequences of these improvements when placed back in the line of fire. For instance, biometric technology is increasingly being used to predict ‘blue-collar crimes’—aggressive acts often associated with Black people—while giving less attention to equally harmful infractions enacted by their white counterparts.<sup>71</sup> Hence, even when controlled by Black people, data democratization may inadvertently harm their community. And this possibility would undermine the Spelman team's commitment to Costanza-Chock's “non-exploitative solutions” principle.<sup>72</sup>

Additionally, the subversive hoodie's biometric technology likely relies on racialized science. The hoodie detects a wearer's biomarkers—pulse, blood pressure and other indications of increased anxiety—<sup>73</sup> and compares it to the standard output of a relaxed subject. However, the majority of the studies that have determined who or what qualifies as the norm largely

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<sup>69</sup> “The Capitol Siege and Facial Recognition Technology,” accessed February 11, 2022, <https://slate.com/technology/2021/01/facial-recognition-technology-capitol-siege.html>.

<sup>70</sup> Crockford, “How Is Face Recognition Surveillance Technology Racist?”

<sup>71</sup> Hazem Zohny, Thomas Douglas, and Julian Savulescu, “Biomarkers for the Rich and Dangerous: Why We Ought to Extend Bioprediction and Bioprevention to White-Collar Crime,” *Criminal Law and Philosophy* 13, no. 3 (September 1, 2019): 479–97, <https://doi.org/10.1007/s11572-018-9477-6>.

<sup>72</sup> Sasha Costanza-Chock, *Design Justice: Community-Led Practices to Build the Worlds We Need* (The MIT Press, 2020), chap. Introduction, <https://design-justice.pubpub.org/>.

<sup>73</sup> Kyle Strimbu and Jorge A. Tavel, “What Are Biomarkers?,” *Current Opinion in HIV and AIDS* 5, no. 6 (November 2010): 463–66, <https://doi.org/10.1097/COH.0b013e32833ed177>.

focused on middle-class white men.<sup>74</sup> According to a 2019 article in the *Journal of Health and Social Behavior*,

We do not currently have a clear sense of either the determinants of the levels of mental health status for the major racial/ethnic groups in the U.S. or the patterning of the various indicators of mental health status for all of these minority populations.<sup>75</sup>

This is troubling because the Spelman hoodie likely relies on biological cues determined by research that did not consider Black people. Without a thorough investigation into how biomarkers vary with different types of people, the subversive hoodie risks inaccurately portraying its user's emotions.

However, it is important to emphasize that this concern does not arise from the belief that there are inherent biological differences between races. Rather, I believe that the political category of race generates differing environmental conditions that, in turn, affect one's biology. In *Fatal Invention: How Science, Politics, and Big Business Re-Create Race in the Twenty-First Century*, Dorothy Roberts thoroughly describes this distinction. She explains that "genetically identifiable racial groups" do not exist.<sup>76</sup> She clarifies,

...first we are born into a race, and then our society determines the consequences of this natural inheritance. There is, then, no contradiction between seeing race as both biological and socially constructed.<sup>77</sup>

What Roberts describes is the way racial harassment and marginalization have a cumulative impact on one's health.<sup>78</sup> The result is more frequent activation of the brain's 'fight or flight'

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<sup>74</sup> David R. Williams, "Stress and the Mental Health of Populations of Color: Advancing Our Understanding of Race-Related Stressors," *Journal of Health and Social Behavior* 59, no. 4 (December 2018): 466–85, <https://doi.org/10.1177/0022146518814251>.

<sup>75</sup> Williams.

<sup>76</sup> Dorothy Roberts, *Fatal Invention: How Science, Politics, and Big Business Re-Create Race*, 2012, x.

<sup>77</sup> Roberts, 4.

<sup>78</sup> Roberts, 132.

activity in response to increased discrimination.<sup>79</sup> Although it is not apparent which studies the Spelman team plans to base their design on, it is clear that efforts toward more inclusive biological analyses are relatively new and not yet standard practice.<sup>80</sup> Thus, to ensure they are constructing a tool that is truly useful and beneficial to their community, the bio-designers must either seek to locate this improved research or abandon their use of biometric technology altogether.

Nias et al.'s subversive hoodie may collect users' biometric data, display their anxiety levels through color changes and promote communal well-being and support. The tool's commitment to sustainability, Afrofuturism and design justice demonstrates a way of building new systems that does more to support targeted communities than its predecessors. Although, their potentially harmful handling of biometric data may pale compared to more direct communication of one's stress and anxiety.

### *Redirecting the Spotlight: The Fawkes Cloaking System*

The average person holds significant power to undermine the existing surveillance structures in ways that may be both shielding and liberating. This often looks like overtly covering one's appearance with a mask, baseball cap or sunglasses while at a protest. Yet, this resistance may also appear more discreetly, hidden between lines of code and submerged under each bit. That kind of under-the-hood opposition allows individuals to be seen by human perception yet miscategorized and misidentified by the surveillance state's digital eye. An example of this can be found in Fawkes, the artificial intelligence (AI) system developed by

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<sup>79</sup> Uraina S. Clark, Evan R. Miller, and Rachal R. Hegde, "Experiences of Discrimination Are Associated With Greater Resting Amygdala Activity and Functional Connectivity," *Biological Psychiatry. Cognitive Neuroscience and Neuroimaging* 3, no. 4 (April 2018): 367–78, <https://doi.org/10.1016/j.bpsc.2017.11.011>.

<sup>80</sup> Williams, "Stress and the Mental Health of Populations of Color."

University of Chicago computer scientists Shawn Shan, Emily Wenger, Jiayun Zhang, Huiying Li, Haitao Zheng and Ben Y. Zhao. Essentially, users implement Fawkes— which is not yet available for standard download— by feeding the algorithm their photographs prior to posting them online.<sup>81</sup> The system then adds pixel-level changes (cloaks) to these images.<sup>82</sup> These alterations work to confuse existing facial recognition models used by local police, large companies and U.S. Immigration and Customs Enforcement (ICE).<sup>83</sup> In “Fawkes: Protecting Privacy against Unauthorized Deep Learning Models,” Shan et al. explain,

Fawkes, a system that helps individuals to inoculate their images against unauthorized facial recognition models... If collected by a third-party “tracker” and used to train a facial recognition model to recognize the user, these “cloaked” images would produce functional models that consistently misidentify them.<sup>84</sup>

The developers created this technology in direct opposition to Clearview AI— groundbreaking facial recognition software that scraped and stored “more than three billion images and related biometric information” from the web.<sup>85</sup> The cloaks that Fawkes embeds in a user’s image poison Clearview AI and similar system’s training pool, making it difficult for the user to be correctly detected. The pixel-level changes that the software implements make it possible for ordinary people to protect themselves from the dangers of surveillance without physically covering their faces. Thus, they may continue to participate in social media and other aspects of the digital society without inadvertently consenting to their virtual codification. However, it will soon become clear that the ability to hide in plain sight also requires that someone else be pushed into

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<sup>81</sup> Shawn Shan et al., “Fawkes: Protecting Privacy against Unauthorized Deep Learning Models,” *ArXiv:2002.08327 [Cs, Stat]*, June 22, 2020, 1, <http://arxiv.org/abs/2002.08327>.

<sup>82</sup> Shan et al., 1.

<sup>83</sup> Shan et al., 1.

<sup>84</sup> Shan et al., 1.

<sup>85</sup> Emily Cheston et al., “The End of Privacy Clearview AI, Mass Surveillance, & Legal Challenges” (Ida B. Wells Just Data Lab, May 2020), 5, <https://www.thejustdatalab.com/tools-1/clearview-report>.

the spotlight. Thus, this potentially liberatory technology must be investigated thoroughly before encouraging its uptake in the augmented undercommons.

Understanding Fawkes' technology requires a general comprehension of how facial recognition models operate. The goal of these algorithms is to create labels and categories based on patterns found in data. For example, they seek to learn what separates an animal from a building or a bug from a fish or you from your neighbor. To understand this, the machine needs something from which to learn. So, the developer feeds the machine large amounts of data that teach the system the differences between the many categories. Once the computer recognizes the patterns in these differences, it creates a set of instructions— known as a model— to sort the current and future data effectively.<sup>86</sup>

Fawkes undermines the integrity of the machine learning process detailed above by implementing a poisoning attack that taints the training data with minuscule inaccuracies, drastically undermining the model's performance.<sup>87</sup> Shan et al. explain,

Any facial recognition model trained using these images of the user learns an altered set of “features” of what makes them look like them. When presented with a clean, uncloaked image of the user, e.g. photos from a camera phone or streetlight camera, the model finds no labels associated with the user in the feature space.<sup>88</sup>

In this process, the cloaked images that companies like Clearview AI scrape from the internet poison the machine's understanding of the depicted party and their distinguishing characteristics. This subversive attack is quite effective because it clones the underlying “poison” to be virtually identical to the data the facial recognition models expect.<sup>89</sup>

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<sup>86</sup> Cassie Kozyrkov, “Machine Learning — Is the Emperor Wearing Clothes?,” *Medium* (blog), October 3, 2021, <https://kozyrkov.medium.com/machine-learning-is-the-emperor-wearing-clothes-928fe406fe09>.

<sup>87</sup> Shan et al., “Fawkes,” 4.

<sup>88</sup> Shan et al., 1–2.

<sup>89</sup> Shan et al., 2.

Effectively, the trained machine is unaware of the internal damage implemented by Fawkes' cloaked images. Like hidden mold, the attack silently festers and sprouts throughout the system. And this damage is largely successful in the world's most popular models. The cloaking technique successfully outsmarted the *Microsoft Azure Face API*, Microsoft Cognitive Services technology used by Uber and Jet.com and others, *Face++*, an application developed in China widely used by financial service providers and other security-sensitive customers, and *Amazon Rekognition*, Amazon's search service utilized by the NFL, CBS, National Geographic, some state law enforcement agencies, ICE and more. Against these systems, which are three of the most widely used facial recognition services today, the Fawkes robust cloaks offered 100% protection. That level of success proves that Fawkes' attack may realistically and effectively shield those seeking to protect themselves from the pervasive eyes of large corporations and the state. They may post and engage with digital culture while preventing themselves from becoming another face in a database.<sup>90</sup>

Despite the incredibly effective security provided by Fawkes' cloaking technique, there is still much to consider regarding long-term effects. For one, technology is constantly evolving and improving. What works today may be completely ineffective next week. However, while Fawkes' attack is certainly not "future proof,"<sup>91</sup> developers do note their belief in this intervention as "an important and necessary first step in the development of usercentric privacy tools to resist unauthorized machine learning models."<sup>92</sup> Their justification lies in their belief that this system is helping pave the way for a new wave of technology that defends against facial

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<sup>90</sup> Shan et al., 10.

<sup>91</sup> Shan et al., 14.

<sup>92</sup> Shan et al., 14.

recognition. But as Fawkes and other user-based attacks progress, they must be sure to improve and advance one step ahead of the world's top facial recognition systems.

Even while Rekognition, Face++, and Azure remain defenseless against Fawkes' poison, the users themselves may undermine the effectiveness of the technology. Numerous unclocked uploads on a side account, a friend's page or an employer's website all complicate the efficacy of a user's digital invisibility. However, an unmasked image or two is not enough to ultimately compromise Fawkes' attack. It is more realistic to assume that hundreds of thousands of user's pictures are already spread across the internet even when deciding to cloak their future uploads. Shan et al. address this concern by suggesting users execute additional privacy-enhancing practices in conjunction with their program. For example, users can control their online media presence by removing Facebook and Instagram tags.<sup>93</sup> The designers wrote, "the online curation of personal images is a challenging problem, and we leave the study of minimizing online image footprints to future work."<sup>94</sup> Their proposed solution for users is to utilize other privacy tools to increase security and expand the program's effectiveness.

Finally, misidentification is a crucial feature of the Fawkes cloaking technique. When the target's underlying image is confounded, someone else's face, name and identity may be brought into the spotlight. What then? In the system's documentation, the cloak confuses actor Patrick Dempsey with actress Gwyneth Paltrow, a seemingly harmless misdirect, seeing as both celebrities are willing recipients of public perception and visually dissimilar. But it is not clear if things are always this simple because Fawkes does not confuse every user for a celebrity. Rather, it is much more likely that facial recognition software will show another ordinary face to whichever company is on the other end of the computer.

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<sup>93</sup> Shan et al., 4.

<sup>94</sup> Shan et al., 4.

Fawkes' potential for wrongful accusation fits well within AI's troubled history. Facial recognition algorithms have worked relatively well on white men in the more than two decades utilized by police forces. However, the same cannot be said for its use on Black subjects, as evidenced by black and Asian faces being 10 to 100 times more likely to be falsely identified than white counterparts.<sup>95</sup> In what is widely considered the first known American case of technological misidentification, Robert Julian-Borchak Williams was harassed, imprisoned and interrogated due to a blurry photo that was "clearly not Mr. Williams," according to a New York Times article written by Kashmir Hill.<sup>96</sup> The resemblance was so lacking that Williams held the image beside his face and asked the interrogator, "You think all black men look alike?"<sup>97</sup> Here, Williams' features were noticeably distinct from the person police were accusing him of being.<sup>98</sup> Yet, he was still held 30 hours after his arrest with a \$1,000 bond even after the detectives admitted that "the computer got it wrong."<sup>99</sup> Situations like this, and much worse, are at risk when Fawkes' intervention replicates the structure of false identification. Even when the mix-up seems obvious, irreparable damage may still ensue.

To be truly liberatory, the misidentification that is inherent in Fawkes would depend on the flawed police force noticing discrepancies when arresting and charging suspects. As illustrated in the case of Julian-Borchak Williams, that is not reliable. And while the Fawkes developers do not directly address their problem with misidentification, they do once again state that they "leave more detailed exploration of the tradeoff between user privacy and authorized

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<sup>95</sup> Kashmir Hill, "Wrongfully Accused by an Algorithm," *The New York Times*, June 24, 2020, sec. Technology, <https://www.nytimes.com/2020/06/24/technology/facial-recognition-arrest.html>.

<sup>96</sup> Hill.

<sup>97</sup> Hill.

<sup>98</sup> Hill.

<sup>99</sup> Hill.

use to future work.”<sup>100</sup> The notion that ethical qualms may be passed off to others dangerously redirects the weight of responsibility from the system’s developers to whoever lingers behind to clean up their mess. And this is exactly how invasive algorithms like Clearview AI begin to permeate while restorative technology and ethical considerations trail slowly behind. The creators of these tools cannot continue to hand off accountability to politicians and social scientists as if they are not responsible for the harms they may be creating. As design director Mike Monteiro emphasized,

As designers, we need to see ourselves as gatekeepers of what we are bringing into the world, and what we choose not to bring into the world. Design is a craft with responsibility. The responsibility to help create a better world for all.<sup>101</sup>

It should be the job of the designers, programmers and developers to fully consider what it is they are making *prior* to releasing it into the world. Otherwise, what remains are various databases that scrape faces off the internet and return false positives to police. And it is ironic considering the initial intention of the Fawkes tool. Where they sought to provide security from facial recognition technology, they may have unintentionally enacted harm on those misidentified because of their device. Thus, there may need to exist *another* algorithm to rectify Fawkes’ flaw of reinventing the misidentification wheel. And hopefully, this one does not neglect some other ethical dilemma.

Despite Fawkes’ highly effective execution against the world’s most prominent facial recognition technology, the program is nowhere near perfect. The algorithm’s poisoning attack is impressively successful in providing the everyday person the power to opt out of their codification within the digital sphere. Yet, the problem of leaving someone else exposed to recognition systems in place of the Fawkes user needs to be addressed before this solution can be

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<sup>100</sup> Shan et al., “Fawkes,” 14.

<sup>101</sup> “Ruined by Design,” Ruined by Design, accessed April 8, 2022, <https://www.ruinedby.design>.

deemed liberatory. Victims of surveillance must be given the power to push back against these invasive systems, but it is equally vital that they do so without putting others in danger.

Exploring other methods of subversion while seeking a remedy for the one described here is essential in developing an effective toolkit for the hyper-exposed seeking to regain their digital power in ways algorithms cannot see coming.

### *To Sit Amongst the Flowers: Breonna's Garden*

Breonna Taylor was a 26-year-old emergency medical technician (EMT) who spent her time caring for patients and studying to become a nurse.<sup>102</sup> Known as 'Bre' to loved ones; she was somebody who enjoyed "singing, playing games, cooking and checking up on friends."<sup>103</sup> However, shortly after midnight on the evening of March 13, 2020, Taylor was killed by officers Jonathan Mattingly, Brett Hankison, and Myles Cosgrove with the Louisville Metro Police Department.<sup>104</sup> The branch was conducting a raid on her apartment under the false premise that she was in possession of drugs.<sup>105</sup> Finding only Taylor and her boyfriend Kenneth Walker, the plain-clothed officers shot Taylor five times as she lay in bed, and only noticed her injuries after Walker called 911.<sup>106</sup>

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<sup>102</sup> "Breonna's Garden - Apps on Google Play," accessed March 25, 2022, [https://play.google.com/store/apps/details?id=com.eyejackapp.Breonna&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.eyejackapp.Breonna&hl=en_US&gl=US).

<sup>103</sup> Ari Shapiro, Jason Fuller, and Becky Sullivan, "As the Nation Chants Her Name, Breonna Taylor's Family Grieves a Life 'Robbed,'" *NPR*, June 4, 2020, sec. Live Updates: Protests For Racial Justice, <https://www.npr.org/2020/06/04/869930040/as-the-nation-chants-her-name-breonna-taylors-family-grieves-a-life-robbed>.

<sup>104</sup> "Breonna's Garden - Apps on Google Play."

<sup>105</sup> Richard A. Oppel Jr., Derrick Bryson Taylor, and Nicholas Bogel-Burroughs, "What to Know About Breonna Taylor's Death," *The New York Times*, April 26, 2021, sec. U.S., <https://www.nytimes.com/article/breonna-taylor-police.html>.

<sup>106</sup> Oppel, Taylor, and Bogel-Burroughs.

Yet another case of premature Black death at the hands of the American police force, Taylor's story drew national attention in May 2020 alongside the murder of George Floyd.<sup>107</sup> Ordinary citizens, celebrities and athletes began proclaiming "#SayHerName" on social media platforms and at demonstrations in search of justice for the young woman.<sup>108</sup> As this occurred, creative technologist Lady PheØnix noticed that Taylor's sister, Ju'Niyah Palmer, was receiving death threats for posting about her beloved sibling. PheØnix was outraged by this "horrible display of humanity" and sought to create Breonna's Garden—a digital haven for Palmer to grieve her loss.<sup>109</sup> "I thought, 'Well, there should be a place where Ju'Niyah can go and be with her sister whether she wants to mourn, whether she wants to laugh at old memories.' You know, whatever it is, there should be a safe place for people to grieve and mourn their loved ones online," PheØnix stated in a live discussion with the designers and collaborators of Breonna's Garden.<sup>110</sup> Yet prior to this premiere at the 2022 South by Southwest (SXSW) conference and before even beginning the app's design process, PheØnix brought the idea to Palmer, Walker and Taylor's mother to ask for their full approval and obtain their consent for this deeply personal project. And as they collaboratively began the venture in July 2020, PheØnix developed a connection with both Palmer and Walker that informed the care and sensitivity with which she handled the work.<sup>111</sup>

In solidarity with Taylor's family, Breonna's Garden exists as both an AR app and VR experience to "honor Breonna Taylor and celebrate someone you miss." When visiting the app, users view a slideshow celebrating Taylor while finding a quiet, comfortable space. They then

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<sup>107</sup> Opiel, Taylor, and Bogel-Burroughs.

<sup>108</sup> "SAY HER NAME," AAPF, accessed March 26, 2022, <https://www.aapf.org/sayhername>.

<sup>109</sup> Sutu et al., "Featured Session: Breonna's Garden: How We Grow the World We Want" (Austin Convention Center, March 16, 2022), <https://schedule.sxsw.com/2022/events/PP1141471>.

<sup>110</sup> Sutu et al.

<sup>111</sup> Sutu et al.

point their cameras toward the floor and watch as a volumetric (3D) hologram of Taylor and a plethora of flowers grow before them. Soon after, a digitized Palmer appears beside her sister and welcomes everyone to the app while sharing fond memories of her big sister. For the rest of the encounter, participants walk around the garden and listen to the flowers, each holding a message from someone around the world. They can choose to simply listen to those who visited before them or leave a memo of their own.<sup>112</sup>

Similarly, the VR event maintains the general premise of the app while offering a more immersive experience.<sup>113</sup> It begins in ‘the Breonna room’ with keepsakes and portraits of Taylor.<sup>114</sup> Palmer described,

That room is at my mom’s house... that art came from different people from all over the world because we had a PO box at one point, and people were mailing us their artwork... There’s everything in that room. That room is really built around Breonna.<sup>115</sup>

The Breonna Room looks and feels hyper-realistic because it was created using photogrammetry— an emerging method of obtaining 3D information from pictures to create detailed models.<sup>116</sup> Additionally, the project is remarkably one of the first to integrate volumetric holograms into a photogrammetric environment. “Not many people have seen actual humans outside of avatars on this platform,” technical partner and sponsor Chyna McRae remarked, highlighting the app’s technical prowess.<sup>117</sup> Finally, as the user transitions from the sacred room, they are led into the garden— whose function largely resembles that of the app.

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<sup>112</sup> “Breonna’s Garden - Apps on Google Play.”

<sup>113</sup> Sutu et al., “Featured Session.”

<sup>114</sup> Sutu et al.

<sup>115</sup> Sutu et al.

<sup>116</sup> “Photogrammetry Software | Photos to 3D Model | Autodesk,” accessed March 27, 2022, <https://www.autodesk.com/solutions/photogrammetry-software>; Sutu et al., “Featured Session.”

<sup>117</sup> Sutu et al., “Featured Session.”

Uniquely, the VR exhibit exists within an interactive social platform where people are encouraged to connect “consciousness to consciousness.”<sup>118</sup> Big Rock Creative (BRC)—extended reality company and producer of Breonna’s Garden— CEO Athena Demos explains,

For something like Breonna’s Garden, it was super important for us to have hosts and docents in the garden so that after you go through this moving experience of being in the room, you have somebody there to say, “Hi, welcome. We’re here. We can give you a virtual hug.” And we do... It creates connection, it creates engagement, and it makes a compelling experience and room for healing.<sup>119</sup>

The social aspect of the event encourages communal wellness. The designers and contributors of the Garden are striving to design a safe, comfortable environment where participants feel relaxed working through their emotions with others.<sup>120</sup> Yet, this is no easy task. Users may be initially reluctant to share their grief knowing real people stand a few feet away. Thus, the developers’ goal is for the virtual reality portion to be so immersive that a person’s internal barriers dissolve.<sup>121</sup> And equally crucial to the digital realm is the physical. The team recognizes the need to make the world outside the headset as welcoming and safe as the one inside— a sentiment that can easily serve as a metaphor for technology development writ large.

The intention behind the augmented, virtual and real-world experiences with Breonna’s Garden is to find justice for Breonna Taylor, independent of standard legal procedures. “I think culturally we’ve had to depend on our own forms of restorative justice and transformative justice because we haven’t had the privilege of having justice in the judicial system,” PheØnix observed.<sup>122</sup> Therefore, like the maroons of the augmented undercommons, the Garden designers have built beneath a disappointing political structure that “limits our ability to find each other, to

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<sup>118</sup> Sutu et al.

<sup>119</sup> Sutu et al.

<sup>120</sup> Sutu et al.

<sup>121</sup> Sutu et al.

<sup>122</sup> Sutu et al.

see beyond it and to access the places that we know lie outside its walls.”<sup>123</sup> Essentially, PheØnix, Palmer, Walker et al. are forging their own path to the sun and lighting the way for the rest of the world.

According to Lady PheØnix, the primary intention of Breonna’s Garden is to “mend the loop” around Breonna’s purpose.<sup>124</sup> “Her purpose was healing— her purpose *is* healing because culturally we believe that when you go beyond flesh, you still have life,” PheØnix clarified.<sup>125</sup> Whether in the back of an ambulance or on the hospital floor, Taylor helped those who were injured move towards more life.<sup>126</sup> She rehabilitated their bodies or aided in their transition to the afterlife. Thus, the objective is to complete this loop of purpose by placing the VR version of Breonna’s Garden in every major hospital across the US.<sup>127</sup> Hospitals are typically cold with terrible music, “incessant beeping,” and uneasy “fluorescent lights,” according to PheØnix.<sup>128</sup> Yet, Breonna’s Garden would be a comfortable, welcoming, safe space to offset the otherwise uncomfortable environment. As these medical facilities bring life in and out of this world, “Breonna— having been in both realms— is the perfect steward and the perfect nurse” to aid others in these transitions.<sup>129</sup>

To honor the legacy of Breonna Taylor and provide a location for healing and grief, the designers of the Garden partook in numerous collaborations with existing companies. Microsoft, Metastage and Altspace— to name a few— all worked with the creative team and Taylor’s loved ones to make this idea come to fruition. However, Microsoft stands out from the bunch as a large

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<sup>123</sup> Harney and Moten, *The Undercommons*, 6.

<sup>124</sup> Sutu et al., “Featured Session.”

<sup>125</sup> Sutu et al.

<sup>126</sup> Sutu et al.

<sup>127</sup> Sutu et al.

<sup>128</sup> Sutu et al.

<sup>129</sup> Sutu et al.

tech conglomerate with a worrisome history that may present a potential conflict of interest for the Garden. For instance, Microsoft has been involved with the endeavor since its initial AR development phase.<sup>130</sup> They were particularly helpful in building the volumetric capture and providing guidance for the project's policies and moral values.<sup>131</sup> Senior developer Chyna McRae even represented Microsoft at the launch of the VR experience at SXSW. However, as mentioned in the Fawkes case study, Microsoft has developed Azure—a facial recognition algorithm used by “over 95 percent of Fortune 500 companies.”<sup>132</sup> Although they stated in 2020 that the company would not sell Azure to the police,<sup>133</sup> nearly a year later the tech giant announced they would supply facial recognition technology to the US Army through mixed reality headsets that train soldiers for war.<sup>134</sup> Even if Lady PheØnix and the team keeps Microsoft on a short leash, there is still concern that partnering with such a morally dubious business may inadvertently cause harm to users in the future. Because Microsoft has been involved in several antitrust investigations conducted by the Federal Trade Commission and the U.S. Department of Justice, visitors of the Garden may not be sure that their intimate confessions and information will not be abused.

In addition to questionable partnerships, the developers of Breonna's Garden need also be wary of their approach to content constraints on the platform. The team collaborated with XR Safety Initiative (XRSI) to mitigate messages and behavior within the environment. Moderation of some kind often feels necessary for ensuring the overall well-being of the community. And,

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<sup>130</sup> Sutu et al.

<sup>131</sup> Sutu et al.

<sup>132</sup> “Drive Growth with the Most Partner-Focused Business Platform,” accessed March 30, 2022, <https://azure.microsoft.com/en-us/blog/drive-growth-with-the-most-partnerfocused-business-platform/>.

<sup>133</sup> PatrickFarley, “Face Documentation - Quickstarts, Tutorials, API Reference - Azure Cognitive Services,” accessed March 30, 2022, <https://docs.microsoft.com/en-us/azure/cognitive-services/face/>.

<sup>134</sup> “U.S. Army to Use HoloLens Technology in High-Tech Headsets for Soldiers,” Transform, June 8, 2021, <https://news.microsoft.com/transform/u-s-army-to-use-hololens-technology-in-high-tech-headsets-for-soldiers/>.

considering how personal the Garden is, attention needs to be paid to participants who engage in harmful behavior. However, this is a complicated task as carceral logic is often replicated on digital platforms through reinvented forms of policing.<sup>135</sup> Often, with little explanation, users are subject to content removal and deplatforming when conflicting with the program's guidelines. Yet, the moderation process for Breonna's Garden does not appear within the app or on the website. What exactly are the community guidelines? Are participants notified when their content is removed? Is there an appeal process? Will they be banned after repeated offenses? The XRSI framework leaves these answers to each organization they partner with.<sup>136</sup> The Initiative recommends companies maintain a system "that processes reports and notifies impacted individuals" while also cautioning that this may also "undermine anonymity and free expression."<sup>137</sup> XRSI's moderation policies also suggest that organizations implement automated tools to filter content—a process that may not always consider cultural or regional context. Yet, shifting content moderation from computer to man may also run the risk of harming and even traumatizing the worker tasked with listening to offensive messages.<sup>138</sup> It is clear that there is no simple solution here. Tech companies, big and small, are struggling to establish fair and transparent methods of protection and accountability. But, because the team behind Breonna's Garden is particularly attuned to their community, they have a unique opportunity to change how the industry considers safeguarding. Starting with the release of their current guidelines and methods of censorship, the Garden's developers must part ways with the standard

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<sup>135</sup> "The Platform as the City | ACM Interactions," accessed March 30, 2022,

<https://interactions.acm.org/archive/view/november-december-2021/the-platform-as-the-city>.

<sup>136</sup> "The XRSI Privacy and Safety Framework," 21, accessed March 30, 2022, <https://xrsi.org/publication/the-xrsi-privacy-framework>.

<sup>137</sup> "The XRSI Privacy and Safety Framework," 21.

<sup>138</sup> "Content Moderators at YouTube, Facebook and Twitter See the Worst of the Web and Suffer Silently - The Washington Post," accessed March 21, 2022, <https://www.washingtonpost.com/technology/2019/07/25/social-media-companies-are-outsourcing-their-dirty-work-philippines-generation-workers-is-paying-price/>.

police practice of aggressive enforcement of ambiguous rules and move toward a more liberating future.

Due to the delicacy with which a personal project such as this should be approached, Breonna's Garden cannot and should not be replicated for all who have passed. The goal of fulfilling Taylor's purpose is both central to the virtual experience and specific to her alone. Thus, it is one of the only examples of a healing and revitalizing digital space, yet we ought not be so quick to duplicate it. Technology centered around the deceased must integrate their loved ones into the entire process from ideation to creation. It should focus on what makes this person special to their community. These are things that Lady PheØnix and the collaborators of Breonna's Garden do so well. And, with the proper care, others can create equally unique, impactful and welcoming digital locales. These new environments may not resemble Taylor's exactly, but they can have value of their own. Finally, future digital locations and the Garden alike must be wary of who is on their team. Projects as intimate as these must be careful not to leave participants vulnerable to individuals and companies with a history of destruction. Finally, these experiences must enact full transparency of their content moderation process. This will allow all who participate to feel heard and respected while remaining protected from digital abuse.

Breonna's Garden revolutionizes the digital space through its attention to love, grief and healing. The endeavor seeks to "align Breonna with her purpose and not her pain" and centers around Breonna as a hostess of revival and transition.<sup>139</sup> Ultimately, it is the "beginning steps of justice in the form of love."<sup>140</sup>

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<sup>139</sup> Sutu et al., "Featured Session."

<sup>140</sup> Sutu et al.

*To continue supporting Breonna Taylor's pursuit of justice, visit [BreonnaTaylorFoundation.org](https://BreonnaTaylorFoundation.org).*

### *Taking Time to Engender Trust and Enforce Accountability*

The surveillance state is constantly flashing shiny new ways of stealing citizens' information, joy and liberty. Gunshot-detecting microphones,<sup>141</sup> killer drones<sup>142</sup> and baby fingerprint scanners<sup>143</sup> all exist to convince you that they are necessary developments for a safe society. Yet, the maroons of the augmented undercommons refuse to accept it. Instead, they inventively craft devices and spaces that represent the future they wish to see. They invite all to join as they “dismantle the worlds we cannot live within, even as we imagine the worlds we cannot live without,” as Benjamin described.<sup>144</sup> They are subverting invasive algorithms, carving out their own virtual space and prioritizing communal wellness. And they are doing so by forcefully rerouting tech's oppressive history towards liberation. But necessary to this process is a focus on the bugs within the underlying code because society's problems will never be solved solely through technological remedies. Rather, they are merely cosmetic fixes to much deeper troubles. Thus, the transformative technology of the augmented undercommons must ultimately be paired with low-tech interventions that address these challenges.

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<sup>141</sup> “Gunshot-Detecting Tech Is Summoning Armed Police to Black Neighborhoods.”

<sup>142</sup> “Biden Admin Will Provide Ukraine Killer Drones Called Switchblades,” NBC News, accessed March 31, 2022, <https://www.nbcnews.com/politics/national-security/ukraine-asks-biden-admin-armed-drones-jamming-gear-surface-air-missile-rcna20197>.

<sup>143</sup> “Researchers Develop Biometric Tool for Newborn Fingerprinting,” UC Health - UC San Diego, accessed March 5, 2022, <https://health.ucsd.edu/news/releases/Pages/2018-09-12-researchers-develop-biometric-tool-for-newborn-fingerprinting.aspx>.

<sup>144</sup> Sutu et al., “Featured Session.”

### *Engendering Trust*

The tech industry is notoriously bad at generating trust between themselves and consumers. Hiding the who, what, where, when and how of their systems—ordinary citizens find it difficult to have faith in these new developments. And this difficulty only increases as more users discover that technology is not the neutral, unbiased savior their creators advertised. Benjamin, Browne, Stroud Rossmann and other technology scholars have made it abundantly clear that programmers fill digital applications with their own prejudice and follow imperialist legacies as they do so. As Stroud Rossmann put it, “they’re not glitches, they’re natural outcomes of systems that follow these historical patterns.”<sup>145</sup> As a result, technological solutions will always fail until the industry actively works to engender trust within the Black community. And that means acknowledging a long history of surveillance, oppression and devastation that existed long before algorithms arrived on the scene. Consequently, “addressing digital racism requires excavating that past,” Stroud Rossmann and Cohen concluded.<sup>146</sup>

Beyond uncovering the ghosts of tech’s past, the industry needs to be fully transparent about how its creations work. Currently, users are not being made aware of exactly who has what power over their personal information. And this omission is eerily felt as individuals live their lives suspecting that someone or something is watching—and they are right. In his article, “Hi, Alexa. How Do I Stop You from Listening in On Me?” Brian X. Chen explained that “in the tech industry, it’s an open secret that artificial intelligence isn’t all that smart yet. It takes lots of people manually sifting through data to train the computing systems.”<sup>147</sup> This secret, casually

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<sup>145</sup> Stroud Rossmann and Cohen, “The Internet Is Railroad: The Historical Structure Of Digital Racism.”

<sup>146</sup> Jenn Stroud Rossmann and B.R. Cohen, “The 19th-Century Roots of 21st-Century Digital Racism,” October 9, 2021, <https://www.fastcompany.com/90683997/the-roots-of-digital-racism-date-back-to-19th-century-railroads>.

<sup>147</sup> Brian X. Chen, “Hi, Alexa. How Do I Stop You From Listening In On Me?,” *The New York Times*, August 21, 2019, sec. Technology, <https://www.nytimes.com/2019/08/21/technology/personaltech/alexa-siri-google-assistant-listen.html>.

kept amongst an entire field, contradicts the public perception that their devices are much more advanced and self-sufficient. Not only is this conception inaccurate, but the human interference in their data is not entirely professional and reliable. Chen explained that multiple reports detail whistleblowers who listened in on Siri and Alexa recordings.<sup>148</sup> One of these accounts reported how an employee shared and identified individuals in voice assistant records.<sup>149</sup>

Users' ignorance of the number of people interacting with their personal information is due to what Donna Haraway calls the *gaze from nowhere*— an attempt to “distance the knowing subject from everybody and everything in the interests of unfettered power.”<sup>150</sup> The gaze from nowhere— known in science and technology studies as the *black box*—<sup>151</sup> dodges accountability by concealing who possesses the power in these companies. In *The Good Drone: How Social Movements Democratize Surveillance*, scholar Austin Choi-Fitzpatrick rejects this secrecy by using a simple balloon as a lesson in responsibility:

The social impact of the string is profound: it allows anyone who can see the balloon to see the person operating the balloon. It is old-school analog accountability at its best. It is the kind of accountability that drones and satellites elude by design... The string, I want to write in homage, is a metaphor for technological accountability. It embeds seeing within relationship, context, and perhaps even community.<sup>152</sup>

In this analogy, Choi-Fitzpatrick describes the importance of seeing who is in control of the helium-filled plastic flying in the air. That way, when that balloon gets tangled in a tree or crosses a bird's path, anyone can follow the course of the string down to find the person responsible. Essentially, this is a lesson in accountability. We have not reached the point in technological development where devices even have the ability to be completely autonomous. Thus, when a computer enacts harm, there is a whole team of people liable for that behavior.

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<sup>148</sup> Chen.

<sup>149</sup> Chen.

<sup>150</sup> Choi-Fitzpatrick, *The Good Drone*, 83.

<sup>151</sup> Benjamin, *Race after Technology*, 34.

<sup>152</sup> Choi-Fitzpatrick, *The Good Drone*, 82.

This openness is urgently needed in the tech industry. Without it, these companies will always fail to be liberatory and trustworthy.

Ultimately, the tech industry needs to be more transparent about its history and the people involved in its designs. This will help foster trust in users, but it will also allow the trade to create *Consentful Tech*. A concept crafted by Allied Media Projects, consentful tech adapts Planned Parenthood’s definition of sexual consent to “support the self-determination of people who use and are affected by these technologies.” Resultingly, technological consent is Freely given, Reversible, Informed, Enthusiastic and Specific (FRIES).<sup>153</sup> That means applications must use clear and accessible language that allows users to fully understand how *everything* works.<sup>154</sup> These systems may also only use a user’s data in ways they have explicitly agreed to, and the agreement must be revocable if the client chooses.<sup>155</sup> Because consentful tech is not yet an industry standard, users are tasked with seeking and creating outside methods of regaining their agency. For example, the Fawkes algorithm permits people to forcibly withdraw their consent from having their facial information attached to them in an external database. Interventions such as these only feel necessary because companies like Clearview AI, Microsoft and Amazon extract and store biometric data without gaining specific consent from the people in the images. Yet, none of this would be needed were consentful tech common practice in the field. Developers need to acquire specific, reversible approval while unearthing their own history and informing users of all who interact with their data. All of this must be done so that users may trust app developers and freely offer informed and enthusiastic consent.

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<sup>153</sup> “The Consentful Tech Project – The Consentful Tech Project Raises Awareness, Develops Strategies, and Shares Skills to Help People Build and Use Technology Consentfully.,” accessed March 30, 2022, <https://www.consentfultech.io/>.

<sup>154</sup> “The Consentful Tech Project – The Consentful Tech Project Raises Awareness, Develops Strategies, and Shares Skills to Help People Build and Use Technology Consentfully.”

<sup>155</sup> “The Consentful Tech Project – The Consentful Tech Project Raises Awareness, Develops Strategies, and Shares Skills to Help People Build and Use Technology Consentfully.”

### *Taking Time*

The tech industry's Achilles heel is the high-paced speed at which these tools are created, updated and released. Often it is said that technology improves at an unstoppable pace. In *Race After Technology*, Matt Ridley claims that "technology seems to change by a sort of inexorable, evolutionary progress... Increasingly, technology is developing the kind of autonomy that hitherto characterized biological entities."<sup>156</sup> But this assertion gives the inanimate objects entirely too much agency. As mentioned above, we are not so advanced in society that machines can administer their own updates. They still require the invasive intervention of real, human people. The misconception vocalized by Ridley is yet another consequence of secrecy in the technology industry. Yet, once again, there is no black box and no stringless balloon. There is only a view from an office where real people are needlessly racing each other. The faces leading this charge hide in the shadows and leave ethical qualms to future scholars and critics. The need to 'make first think later' is precisely why the technology created is becoming increasingly difficult to keep up with. Ethical considerations take time— time that this industry would rather us believe does not exist.

For example, the creators of Fawkes uplifted the fallacy of limited time when they opted to leave "the tradeoff between user privacy and authorized use to future work."<sup>157</sup> In doing this, they decided that the potentially destructive consequences of their work were not as important as the self-imposed pressure to release it as quickly as possible. Similarly, when justifying their decision to collect and store biometric data, the creators of the subversive hoodie stated that it "is

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<sup>156</sup> Benjamin, *Race after Technology*, 40–41.

<sup>157</sup> Shan et al., "Fawkes," 14.

only a matter of time until our clothing becomes a medium for data collection and sharing."<sup>158</sup>

Yet another example of flawed logic. It may also be true that it is only a matter of time before a nuclear bomb is detonated, but that does not mean we should ignite one now for the sake of being first.

The sense of urgency fabricated by the tech industry makes it so each technological solution is only as good as its last software update. The attacker and the attacked constantly enhance their methods to remain one step ahead of the other. In Fawkes' case, merely four months after its paper was released, the people behind Microsoft Azure's facial recognition platform began improving its software to thwart the attacks.<sup>159</sup> Although Fawkes soon released an update that restored most of its efficacy,<sup>160</sup> the swift response from Microsoft highlights the precarity of transformative technology when the myth of limited time is not abandoned. Essentially, the augmented undercommons needs time to consider ways of engendering trust, consent and other ethical matters. Without it, liberation cannot be achieved.

### *Enforcing Accountability*

The tech industry's reluctance to properly self-govern indicates that political interference may be a useful tool in slowing down the clock long enough to hold people accountable. Laws and policies that restrict individuals from producing, releasing and using a system without it first being reviewed by an ethics committee may decrease the risk associated with technology. Effectively, there needs to be political regulation that returns agency to users by allowing them to opt-out of their digital commodification. This must be done in step with political and tech institutions engendering trust with the groups they have historically hurt. One cannot go without

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<sup>158</sup> Nias et al., "Subversive," 5.

<sup>159</sup> "Fawkes' Webpage," accessed January 3, 2022, <http://sandlab.cs.uchicago.edu/fawkes/>.

<sup>160</sup> "Fawkes' Webpage."

the other. As Kimberlé Williams Crenshaw argues in “Race, Reform, and Retrenchment: Transformation and Legitimation in Antidiscrimination Law,” legal reforms have “transformed the Black experience by lifting formal barriers that had subordinated all Black people.”<sup>161</sup> Through the study of civil rights strategies and outcomes, Crenshaw concluded that political steps integrated within “a powerful combination of direct action, mass protest, and individual acts of resistance” are necessary for Black gain.<sup>162</sup> Therefore, political accountability coupled with social action and change will create a more liberatory future.

Crenshaw’s assertion diverges from the beliefs of Moten and Harney, who assert that policy has no place in the undercommons. As the “general antagonism to politics,”<sup>163</sup> the pair do not think it is the goal of the undercommons to try to intervene in policy and remedy the problems of the commons. Moten and Harney explain that “politics is radioactive... So it matters how long we have to do it, how long we have to be exposed to the lethal effects of its anti-social energy.”<sup>164</sup> They assert that legality is a form of self-defense that forces radical movements to conform and compromise within the restrictive limits of the structures it seeks to attack.

Crenshaw, too, acknowledges this limitation in politics as a tool. She says,

Blacks are ultimately presented with a dilemma: liberal reform both transforms and legitimates. Even though legal ideology absorbs, redefines, and limits the language of protest, African-Americans cannot ignore the power of legal ideology to counter some of the most repressive aspects of racial domination.<sup>165</sup>

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<sup>161</sup> Kimberlé Crenshaw, “Race, Reform, and Retrenchment: Transformation and Legitimation in Antidiscrimination Law,” *Harv. L. Rev.* 101 (January 1, 1988): 1370.

<sup>162</sup> Crenshaw, 1382.

<sup>163</sup> Harney and Moten, *The Undercommons*, 20.

<sup>164</sup> Harney and Moten, 19.

<sup>165</sup> Crenshaw, “Race, Reform, and Retrenchment,” 1370.

At the end of the day, compromise is an integral part of legal reform, but politics is also necessary for maximizing the impact of other methods of liberation. As Crenshaw put it, “in the quest for racial justice, winning and losing have been part of the same experience.”<sup>166</sup>

In terms of the augmented undercommons, political intervention must run parallel to the creation of other transformative tools. From its conception, big tech has failed to implement its own form of checks and balances. And while revolutionary designers such as Lady PheØnix and the Spelman team seek to change the way systems are built and utilized, others in the field cannot be trusted to do the same. A governing body ensuring that technology is consentful and ethically considered can be the difference between life and death for targeted communities. Additionally, since the augmented undercommons already serves as temporary housing while an even more radical future is built, legal barricades will provide interim solutions to the multitude of problems created by the tech industry.

### *To Dance in the Sun*

The digital age is riddled with problems, and it will take an amalgamation of solutions to fix them— but we must persist. The maroons constructing the augmented undercommons challenge tech norms by rooting their creations in love and liberation. They are excavating the industry’s destructive history while building from the Black visionaries that came before. They are taking the time to engender trust and enforce accountability. These designers are doing away with the fictional clock that compels them to ignore the ethics of their work. But, most importantly, they listen to their communities and learn from their mistakes. The augmented undercommons, first and foremost, is a place of study. It is a site for learning. The systems created in this space are inadvertently influenced by the commons and must be examined

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<sup>166</sup> Crenshaw, 1385.

critically as a result. Yet, however taxing this work may be, it is ultimately necessary in giving Black people their moment to finally dance in the sun.

## Appendix

Emotion	Biometric Response	Color
Calm	heart rate 60-80bpm	none
Anxiety	increased heart rate	yellow
High Anxiety	increased heart rate and moisture	orange
Fear/Distress	increased heart rate and blood pressure	red

Figure 1: Table indicating color changes in response to biometric data, provided by Spelman Team.<sup>167</sup>

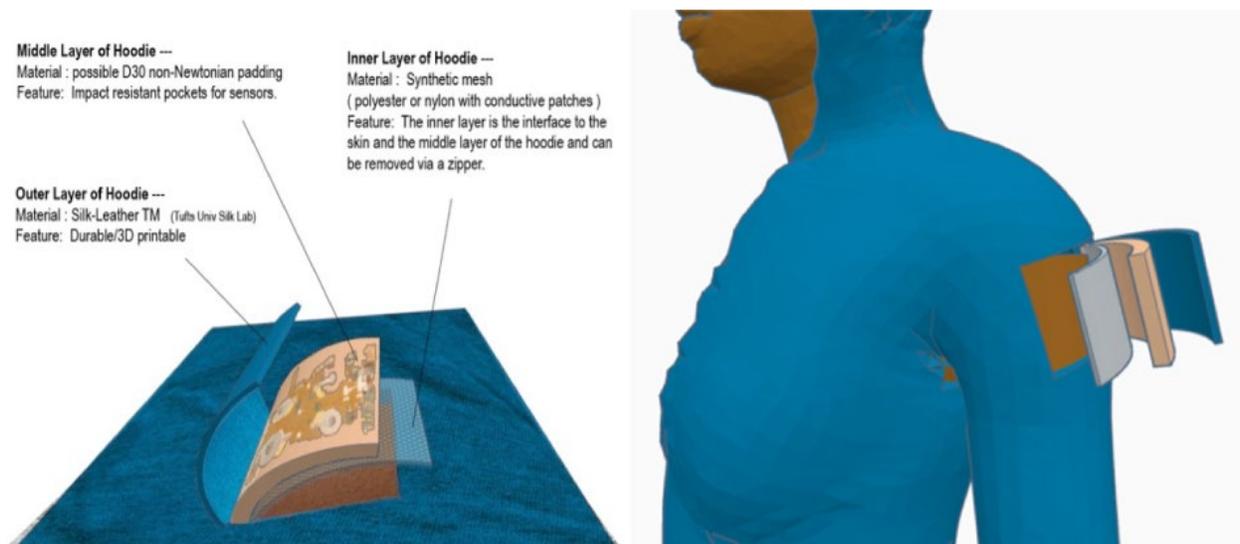


Figure 2: Presentation of Spelman hoodie's multi-layered material.<sup>168</sup>

<sup>167</sup> Nias et al., "Subversive," 4.

<sup>168</sup> Nias et al., 4.

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## Bibliography

- Benjamin, Ruha. "Note to Author," February 15, 2022.
- . *Race After Technology: Abolitionist Tools for the New Jim Code*. Medford, MA: Polity, 2019.
- NBC News. "Biden Admin Will Provide Ukraine Killer Drones Called Switchblades." Accessed March 31, 2022. <https://www.nbcnews.com/politics/national-security/ukraine-asks-biden-admin-armed-drones-jamming-gear-surface-air-missile-rcna20197>.
- "Breonna's Garden - Apps on Google Play." Accessed March 25, 2022. [https://play.google.com/store/apps/details?id=com.eyejackapp.Breonna&hl=en\\_US&gl=US](https://play.google.com/store/apps/details?id=com.eyejackapp.Breonna&hl=en_US&gl=US).
- Browne, Simone. *Dark Matters: On the Surveillance of Blackness*, 2015. <https://doi.org/10.1215/9780822375302>.
- Chang, Ailsa, Rachel Martin, and Eric Mrapodi. "Summer Of Racial Reckoning." *NPR*, August 16, 2020. <https://www.npr.org/2020/08/16/902179773/summer-of-racial-reckoning-the-match-lit>.
- Chen, Brian X. "Hi, Alexa. How Do I Stop You From Listening In On Me?" *The New York Times*, August 21, 2019, sec. Technology. <https://www.nytimes.com/2019/08/21/technology/personaltech/alexa-siri-google-assistant-listen.html>.
- Cheston, Emily, Payton Croskey, Mercedes Davis, Ally McGowen, and Leila Ullmann. "The End of Privacy Clearview AI, Mass Surveillance, & Legal Challenges." *Ida B. Wells Just Data Lab*, May 2020. <https://www.thejustdatalab.com/tools-1/clearview-report>.
- Choi-Fitzpatrick, Austin. *The Good Drone: How Social Movements Democratize Surveillance. Acting with Technology*. Cambridge, Massachusetts: The MIT Press, 2020.
- Clark, Uraina S., Evan R. Miller, and Rachal R. Hegde. "Experiences of Discrimination Are Associated With Greater Resting Amygdala Activity and Functional Connectivity." *Biological Psychiatry. Cognitive Neuroscience and Neuroimaging* 3, no. 4 (April 2018): 367–78. <https://doi.org/10.1016/j.bpsc.2017.11.011>.
- "Content Moderators at YouTube, Facebook and Twitter See the Worst of the Web and Suffer Silently - The Washington Post." Accessed March 21, 2022. <https://www.washingtonpost.com/technology/2019/07/25/social-media-companies-are-outsourcing-their-dirty-work-philippines-generation-workers-is-paying-price/>.
- Costanza-Chock, Sasha. *Design Justice: Community-Led Practices to Build the Worlds We Need*. The MIT Press, 2020. <https://design-justice.pubpub.org/>.
- Crenshaw, Kimberlé. "Race, Reform, and Retrenchment: Transformation and Legitimation in Antidiscrimination Law." *Harv. L. Rev.* 101 (January 1, 1988): 1331.
- Crockford, Kade. "How Is Face Recognition Surveillance Technology Racist?" *American Civil Liberties Union* (blog), June 16, 2020. <https://www.aclu.org/news/privacy-technology/how-is-face-recognition-surveillance-technology-racist>.
- "Drive Growth with the Most Partner-Focused Business Platform." Accessed March 30, 2022. <https://azure.microsoft.com/en-us/blog/drive-growth-with-the-most-partnerfocused-business-platform/>.
- Eglash, Ron. *African Fractals: Modern Computing and Indigenous Design*. New Brunswick, N.J.: Rutgers University Press, 1999.
- "Fawkes' Webpage." Accessed January 3, 2022. <http://sandlab.cs.uchicago.edu/fawkes/>.

- ShotSpotter. "Gunshot Detection." Accessed April 11, 2022. <https://www.shotspotter.com/law-enforcement/gunshot-detection/>.
- "Gunshot-Detecting Tech Is Summoning Armed Police to Black Neighborhoods." Accessed February 21, 2022. <https://www.vice.com/en/article/88nd3z/gunshot-detecting-tech-is-summoning-armed-police-to-black-neighborhoods>.
- Harney, Stefano, and Fred Moten. *The Undercommons: Fugitive Planning & Black Study*. Wivenhoe New York Port Watson: Minor Compositions, 2013.
- Hayes, Adam. "Augmented Reality Definition." Investopedia, December 2, 2020. <https://www.investopedia.com/terms/a/augmented-reality.asp>.
- Hill, Kashmir. "Wrongfully Accused by an Algorithm." *The New York Times*, June 24, 2020, sec. Technology. <https://www.nytimes.com/2020/06/24/technology/facial-recognition-arrest.html>.
- ShotSpotter. "Home." Accessed April 11, 2022. <https://www.shotspotter.com/>.
- Johnson, Dave. "What Is Augmented Reality? Here's What You Need to Know about the 3D Technology." Business Insider. Accessed February 16, 2022. <https://www.businessinsider.com/what-is-augmented-reality>.
- Kelley, Robin D. G. "Black Study, Black Struggle." *Boston Review* (blog), March 7, 2016. <https://bostonreview.net/forum/robin-kelley-black-struggle-campus-protest/>.
- Kozyrkov, Cassie. "Machine Learning — Is the Emperor Wearing Clothes?" *Medium* (blog), October 3, 2021. <https://kozyrkov.medium.com/machine-learning-is-the-emperor-wearing-clothes-928fe406fe09>.
- Nelson, Alondra. "Introduction: FUTURE TEXTS." *Social Text* 20, no. 2 (71) (June 1, 2002): 1–15. [https://doi.org/10.1215/01642472-20-2\\_71-1](https://doi.org/10.1215/01642472-20-2_71-1).
- Nguyen, Mimi Thi. "The Hoodie as Sign, Screen, Expectation, and Force." *Signs* 40, no. 4 (2015): 791–816. <https://doi.org/10.1086/680326>.
- Nias, Jaye, Mika K Campbell, Savannah M Adams, Robert Hamilton, Abigail Gordon, Eric Thompson, and Grace Burch. "Subversive: BioFashion for Black Lives." In *Sixteenth International Conference on Tangible, Embedded, and Embodied Interaction*, 1–5. TEI '22. New York, NY, USA: Association for Computing Machinery, 2022. <https://doi.org/10.1145/3490149.3505569>.
- Oppel, Richard A., Jr., Derrick Bryson Taylor, and Nicholas Bogel-Burroughs. "What to Know About Breonna Taylor's Death." *The New York Times*, April 26, 2021, sec. U.S. <https://www.nytimes.com/article/breonna-taylor-police.html>.
- PatrickFarley. "Face Documentation - Quickstarts, Tutorials, API Reference - Azure Cognitive Services." Accessed March 30, 2022. <https://docs.microsoft.com/en-us/azure/cognitive-services/face/>.
- "Photogrammetry Software | Photos to 3D Model | Autodesk." Accessed March 27, 2022. <https://www.autodesk.com/solutions/photogrammetry-software>.
- Washington Post. "Police Keep Using Force against Peaceful Protesters, Prompting Sustained Criticism about Tactics and Training." Accessed April 14, 2022. [http://www.washingtonpost.com/national/police-keep-using-force-against-peaceful-protesters-prompting-sustained-criticism-about-tactics-and-training/2020/06/03/5d2f51d4-a5cf-11ea-bb20-ebf0921f3bbd\\_story.html](http://www.washingtonpost.com/national/police-keep-using-force-against-peaceful-protesters-prompting-sustained-criticism-about-tactics-and-training/2020/06/03/5d2f51d4-a5cf-11ea-bb20-ebf0921f3bbd_story.html).
- Pownall, Augusta. "Algorithmic Couture Reduces Fashion Industry Waste with Digital Customisation." *Dezeen*, March 27, 2019. <https://www.dezeen.com/2019/03/27/algorithmic-couture-digital-fashion-customisation/>.

- UC Health - UC San Diego. "Researchers Develop Biometric Tool for Newborn Fingerprinting." Accessed March 5, 2022. <https://health.ucsd.edu/news/releases/Pages/2018-09-12-researchers-develop-biometric-tool-for-newborn-fingerprinting.aspx>.
- Roberts, Dorothy. *Fatal Invention: How Science, Politics, and Big Business Re-Create Race*, 2012.
- Roberts-Islam, Brooke. "The Rise of Biodesign - Growing Our Way To A More Sustainable Future." *Forbes*. Accessed March 19, 2022. <https://www.forbes.com/sites/brookeroberthislam/2019/08/25/the-rise-of-biodesigngrowing-our-way-to-a-more-sustainable-future/>.
- Ruined by Design. "Ruined by Design." Accessed April 8, 2022. <https://www.ruinedby.design>.
- "Sasha Costanza-Chock, Ph.D." Accessed March 20, 2022. <https://www.schock.cc/>.
- AAPF. "SAY HER NAME." Accessed March 26, 2022. <https://www.aapf.org/sayhername>.
- Shan, Shawn, Emily Wenger, Jiayun Zhang, Huiying Li, Haitao Zheng, and Ben Y. Zhao. "Fawkes: Protecting Privacy against Unauthorized Deep Learning Models." *ArXiv:2002.08327 [Cs, Stat]*, June 22, 2020. <http://arxiv.org/abs/2002.08327>.
- Shapiro, Ari, Jason Fuller, and Becky Sullivan. "As the Nation Chants Her Name, Breonna Taylor's Family Grieves a Life 'Robbed.'" *NPR*, June 4, 2020, sec. Live Updates: Protests For Racial Justice. <https://www.npr.org/2020/06/04/869930040/as-the-nation-chants-her-name-breonna-taylors-family-grieves-a-life-robbed>.
- ShotSpotter. *ShotSpotter Connect™ - Community First Patrol Management (June, 2021)*, 2021. <https://www.youtube.com/watch?v=VV8bChgtADs>.
- MacArthur Justice. "ShotSpotter Generated Over 40,000 Dead-End Police Deployments in Chicago in 21 Months, According to New Study," May 3, 2021. <https://www.macarthurjustice.org/shotspotter-generated-over-40000-dead-end-police-deployments-in-chicago-in-21-months-according-to-new-study/>.
- Strimbu, Kyle, and Jorge A. Tavel. "What Are Biomarkers?" *Current Opinion in HIV and AIDS* 5, no. 6 (November 2010): 463–66. <https://doi.org/10.1097/COH.0b013e32833ed177>.
- Stroud Rossmann, Jenn, and B.R. Cohen. "The 19th-Century Roots of 21st-Century Digital Racism," October 9, 2021. <https://www.fastcompany.com/90683997/the-roots-of-digital-racism-date-back-to-19th-century-railroads>.
- . "The Internet Is Railroad: The Historical Structure Of Digital Racism." Presented at the Monday Lab Meeting, Zoom Lecture at Ida B. Wells Just Data Lab, February 7, 2022.
- Biodesign Challenge. "Summit 2021." Accessed April 15, 2022. <https://www.biodesignchallenge.org/summit-2021>.
- Sutu, Ruha Benjamin, Chyna McRae, Ju'nyiah Palmer, Lady Pheonix, Joanna Popper, and Kenneth Walker. "Featured Session: Breonna's Garden: How We Grow the World We Want." Austin Convention Center, March 16, 2022. <https://schedule.sxsw.com/2022/events/PP1141471>.
- "The Capitol Siege and Facial Recognition Technology." Accessed February 11, 2022. <https://slate.com/technology/2021/01/facial-recognition-technology-capitol-siege.html>.
- "The Consentful Tech Project – The Consentful Tech Project Raises Awareness, Develops Strategies, and Shares Skills to Help People Build and Use Technology Consentfully." Accessed March 30, 2022. <https://www.consentfultech.io/>.
- BioFashionLab. "The Future Fashion Trends Explained By the Fabricant," December 25, 2020. <https://biofashionlab.com/digital-fashion-lets-discover-the-fashion-trends-of-tomorrow-with-the-fabricant/>.

- “The Platform as the City | ACM Interactions.” Accessed March 30, 2022.  
<https://interactions.acm.org/archive/view/november-december-2021/the-platform-as-the-city>.
- montrealgazette. “The Right Chemistry: D30 Is a Remarkable Non-Newtonian Fluid.” Accessed March 19, 2022. <https://montrealgazette.com/opinion/columnists/the-right-chemistry-d30-is-a-remarkable-non-newtonian-fluid>.
- “The XRSI Privacy and Safety Framework.” Accessed March 30, 2022.  
<https://xrsi.org/publication/the-xrsi-privacy-framework>.
- Transform. “U.S. Army to Use HoloLens Technology in High-Tech Headsets for Soldiers,” June 8, 2021. <https://news.microsoft.com/transform/u-s-army-to-use-hololens-technology-in-high-tech-headsets-for-soldiers/>.
- Amplitude. “What Is Data Democratization? Definition and Principles,” January 27, 2022.  
<https://amplitude.com/blog/data-democratization>.
- Williams, David R. “Stress and the Mental Health of Populations of Color: Advancing Our Understanding of Race-Related Stressors.” *Journal of Health and Social Behavior* 59, no. 4 (December 2018): 466–85. <https://doi.org/10.1177/0022146518814251>.
- Zohny, Hazem, Thomas Douglas, and Julian Savulescu. “Biomarkers for the Rich and Dangerous: Why We Ought to Extend Bioprediction and Bioprevention to White-Collar Crime.” *Criminal Law and Philosophy* 13, no. 3 (September 1, 2019): 479–97.  
<https://doi.org/10.1007/s11572-018-9477-6>.