
Race-positive Design: A Generative Approach to Decolonizing Computing

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Abstract

Removing racial bias from algorithms or social process is necessary, but alone it is insufficient. The “bias” framework tends to treat race as unwanted noise; best when suppressed or eliminated. This attitude extends to classrooms, where an attempt to be “colorblind” leads to what Pollock calls “colormute”; fearful of even mentioning race. Just as feminists developed “sex-positive feminism” in the 1970s, we now need race-positive design. Thinking about race as positive presence—as cultural capital; histories of resistance; bindings between lands and peoples—can be a generative force in computing development. Here we detail the application and assessment of African fractals, Native American bio-computation; urban artisanal cyborgs and other hybrid forms in which race-positive technology design can make important contributions. These include community-based CS education; computational support for sustainable architecture; unalienated labor in human-machine collaboration, and other forms of generative justice.

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CHI 2020 Extended Abstracts, April 25–30, 2020, Honolulu, HI, USA.

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ACM ISBN 978-1-4503-6819-3/20/04.

DOI: <https://doi.org/10.1145/3334480.XXXXXXX>

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Figure 1: Race-positive designs influenced by African fractals: Animated gif by Francois Beaurain and Medina Dugger; Ethiopian architecture by Xavier Vilalta; SciFi novel by Nnedi Okorafor.

Keywords

Decolonization; generative justice; education; ethnocomputing.

CSS Concepts

• **Human-centered computing~Collaborative and Social Computing**

Introduction

Imagine a feminist movement that only focused on the bad things men do. Artists like Frida Kahlo, Judy Chicago, and Lina Iris Viktor would be irrelevant, as would computer scientists like Phoebe Sengers, innovators like Leah Buechley, and entrepreneurs like Limor Fried. These feminists have all worked in domains in which they put out visionary designs, alternative technologies, even new ways of doing business. In short, they were not ignoring critique but realized that feminism also needed to be generative. Perhaps the clearest of such statements occurred when, in reaction to a sweeping declaration against any sexual practices that might be suspected of being patriarchal (including some much beloved in the queer community), activist-scholars such as Gayle Rubin and Mireille Miller-Young invented the term sex-positive feminism. We contend that such an intervention is needed now for race-positive design.

Removing racial bias from algorithms or social processes is necessary, but alone it is insufficient. The U.S. now holds 22% of all prisoners on earth; it is, as Angela Davis puts it, a prison-industrial complex. Removing racial bias from sentencing would barely put a dent in it. The "bias" framework tends to treat race as unwanted noise, a bug to be eliminated, thus

preserving the system containing the bug. This bug-elimination view extends to classrooms, where an attempt to be "colorblind" leads to what Pollock calls "colormute," fearful of even mentioning race. Consider the contrast between "feminist"--a positive statement of female agency--and "anti-racist," which names only what one is against. "Critical Race Theory" similarly places the emphasis on critique. Even our terminology fails to articulate a race-positive vision.

There is a wonderful history of race-positive design movements. The 1960s slogan "Black is Beautiful," a simple but powerful example, gave rise to the Black Arts Movement; AfriCOBRA and other Chicago south side organizations (which included George Lewis's pioneering work on African-influenced computer music); Columbia University's "Urban Center" focused on design justice; and so on. Wired senior editor Jason Parham, drawing mainly from McIlwain's *Black Software*, writes that in the 1990s the proliferation of African American online hubs--NetNoir Online, Melanet, GoAfro, Universal Black Pages (as well as other online ethnic communities such as LatinoLink and CyberPowWow) provided a momentary glimpse of what grassroots platform ownership looked like before "corporate gentrifiers like Google and Facebook moving in and taking over." [16]

Thus, just as sex-positive feminism did not ignore critiques of patriarchy, race-positive design does not ignore critiques of racism. Rather, it enables thinking about race as a positive presence—as cultural capital, histories of resistance, bindings between lands and peoples—and the means by which it can be a generative force in technologies for just and sustainable futures.

For example, figure 1 shows some outcomes of the African fractals project. By documenting the ways that African traditions used recursive scaling in built environments, hairstyles, metal sculpture, textiles, divination codes, and other domains, we were able to make these "heritage algorithms" available for contemporary projects in STEM education, artisanal production, architecture, arts, urban agriculture, science fiction novels, and other design related disciplines. But before we dive into that discussion, we need to ask a more fundamental question: what constitutes race for the framework of race-positive design?

Race is recursive: rethinking the relation of race, genetics, and society

Much of the writing in the racial bias genre is accompanied by the caveat that race does not "really" exist; it is merely a social construction. It is understandable how this confusing stance came about. Social construction has been used effectively to show that categories such as "female hysteria," "health benefits of tobacco," and other once-real phenomena were merely illusionary social inventions. [12] Racist biological theory posited that genetic differences for Black, Native American, and Latinx populations determined innate intelligence; therefore, efforts to create equity in income or academic success were hopelessly contradicted by nature. By attacking race itself as a social construction, one could dismiss this genetic determinism. But it does so by dismissing genetics, creating a forbidden firewall between biological and social domains.

A race-positive perspective, in contrast, need not assert that our current understanding of racial genetics is

correct; but can still engage the utility and flexibility of race and gene relationships. For example, Hubbard and Wald compare screening for Tay-Sachs disease in the Jewish population, which was highly successful, with screening for sickle cell trait in the African American population, which had many negative effects: by the mid-1970s almost all of the major airlines grounded or fired employees who were sickle-cell carriers (even those having only one copy of the gene, thus no anemia). [13] The U.S. Air Force Academy did the same, despite the fact that the claims for oxygen deprivation under physical stress had little scientific support. [2, 3] That a group enjoying greater social privilege can take advantage of a race-gene relationship, while an oppressed population cannot, suggests that we need to demand improving race-gene social justice, not dismiss it as a social illusion.

In studying the "reveal" YouTube videos of African American citizens looking at their DNA ancestry tests, social scientist Alondra Nelson reports:

I've spoken with African Americans who have tried four or five different genetic genealogy companies because they weren't satisfied with the results. They received different results each time and kept going until they got a result they were happy with. [21]

The idea of a flexible "self-fashioning" of racial identity --a process that combines genetic information and personal decisions--may seem counter-intuitive. [17] But it is increasingly common for endeavors such as medical diagnosis, where we take official recommendations regarding genetics, bloodwork, etc. and make our own best guess for diet, treatment, and

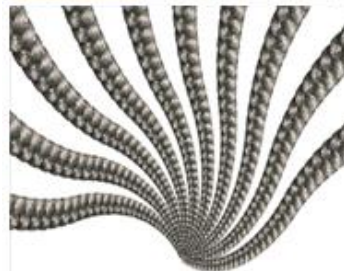


Figure 2: From traditional algorithm in hair to students' algorithm on the screen

so on. If we can democratize health care, why not democratize race? New research in epigenetics shows that our DNA expression, even across several generations, is affected by DNA methylation from diet and other environmental factors. My genetically influenced hair, skin etc. might inspire changes in diet and other behaviors, which creates epigenetic effects modulating gene expression. Why not reconceive race as part of this recursive molecular ecology? We need to move away from the colonial view of race as a means of controlling populations and lands. Exploring its recursive composition across many time scales--a network of factors including genetic, dietary and social effects--we can positively engage the real, rather than endlessly run from an illusion. [4]

Decolonizing Computing: a generative approach

One of the frameworks that allow a more positive role for racial identity is that of decolonization. Tuck and Yang's "Decolonization is not a metaphor" essay illuminated the importance of starting from the view of actual lands and peoples, and the same is true if we are seeking to decolonize computing. [20] We use the metaphor of the internet cloud, but server farms require massive amounts of physical energy, as well as cooling. Facebook, Apple, and Microsoft all have server farms located by Columbia river basin hydroelectric dams, which provide both electricity and cooling. Native communities destroyed or damaged by these "eminent domain" dams include Nez Perce, Umatilla, Warm Springs, Lummi, Slockish, Colville, Nespelem, Sanpoil, Sinixt, Palus, Wenatchi, Entiat, Methow, Sinkaietk, and Yakama to name but a few. Colonization is not a distant historical event; it is an on-going criminal act, and

computing is increasingly taking the role of the mob boss.

The reason why so many native nations have been affected is, in part, the enormous span of the Columbia river basin: 64 dams spread across seven states and parts of Canada. But it is also because Indigenous cultures deliberately focused on water systems to create a *generative economy*. In a generative economy, the value that is generated by humans and non-humans is not extracted. Rather it is circulated and maintained in unalienated forms. Archaeological and ethnographic evidence shows that deliberate enhancement of aquatic habitats, transplantation, predator management and other factors sustained through a complex of spiritual and social dynamics created ecosystems of profound productivity: human populations rose, but food species populations did not decline. [14, 19] Computational models are one way to support decolonization; for example, Lansing's simulations of traditional rice irrigation in Bali were used to defeat forced adoption of pesticides and artificial fertilizers, and gain U.N. status as a world heritage site. [15] But broader application can be achieved if we adopt the generative framework as a generalizable model for contemporary, information-driven systems, from industrial automation to online communities; even including AI. [10]

Industrial processes create destructive effects across the three major domains of life: they alienate ecological value by extracting agricultural products and returning chemicals rather than compost. They alienate labor value by paying workers a fraction of the value they create, and removing creativity and agency from



Figure 3: Generative STEM cycles value back to community sources

work practices. And they alienate semiotic value by colonizing our social networks, privatizing the public sphere. Designing for a transition to a generative economy requires computational innovation in all three domains, replacing one-way extraction with generative cycles, as well as networking between the domains, restoring the links between growing, making and socializing. [10]

A key strategy for race-positive design is to start with systems in which there is already at least some survival of unalienated value generation--traditional agroecology; artisanal labor; grassroots media--and develop technologies that can empower and network those into larger systems. We tend to think of "artisanal" with some skepticism, as corporations and wealth-encrusted specialty shops have appropriated the term. But let us consider the artisanal aspects of Black hair salons and barbershops. They have been wellsprings of unalienated labor and semiotic value since their origin, linking African hair genetics and traditions of combing, braiding, dreadlocking, and shaving with varieties of contemporary cosmetology innovation that cross race and class lines with astonishing power.

Figure 3 shows an example of the heritage algorithms embedded in black cosmetology practices. From interviews with braiders, we gained an understanding of their computational thinking (iterations of geometric transformations). These interviews were a crucial step in documenting internal Black algorithmic traditions, rather than imposing European understandings externally. From there, we developed a blocks-based scripting interface, which allows students to simulate existing cornrow designs, and create new patterns on their own. This interface is the software component of a larger website (csdt.org) that provides cultural

background, lesson plans, and other teaching support, called "Culturally Situated Design Tools" (CSDTs).

CSDT blocks such as "translate by % width" are not part of Western math fundamentals; rather, they portray how practitioners of the tradition conceive it. It creates a minor challenge for teachers, who have to be willing to show students how the concept of calculating percentages, and the concept of geometric translation, can be put together. But it is worth the trouble: studies show statistically significant improvement in STEM skills and interest in comparison to baseline measures using CSDTs for underrepresented students. [6, 9] Likewise, statistically significant improvement has been shown in controlled studies with other CSDTs. [7, 1] Once students have developed their own unique creative design, they can physically render this pattern with digital fabrication into jewelry, textiles, and other forms. Figure 3 shows student projects as 3D printed mannequin heads, which were then passed to braiding shops. As adult cosmetologists became more involved, the race-positive design concept spontaneously emerged in their descriptions of the experience. For example:

I'm excited about what I'm learning today because I realize it wasn't all about slavery, it wasn't all about, you understand, the negative of me having this skin tone. It's more so about that pride and us understanding that we are a people that should be celebrated in a sense.

They also made STEM contributions, suggesting additional research areas: these became digital innovations in pH sensing, hair damage testing, and so on (figure 3). Later work explored potential

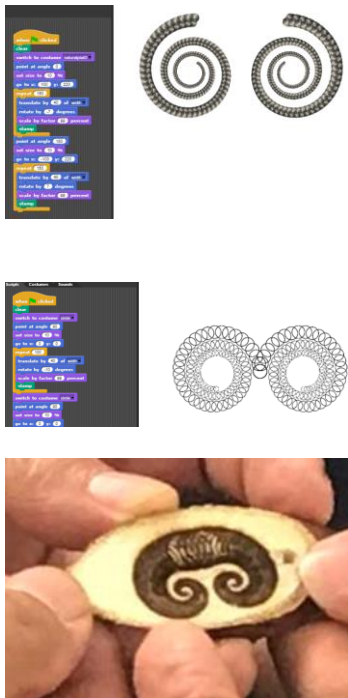


Figure 4: from cornrow simulation to Viking horns

collaborations with digital systems for local food growers, creating ingredients for organic hair products. All of which is not meant to suggest any particular solution, rather it is an illustration of how bottom-up development, starting with beloved culture-based traditions and practices, can be enhanced by computational innovation and networked to form a growing ecosystem of unalienated value circulation.

While the above example focused on African American culture, similar efforts have been made for Latinx, Native American, and African practices. [10, 5] Some of our experiments with these generative computing efforts have looked at white racial identity as well. White males in their teen years are especially vulnerable to the seductions of far-right supremacist groups. One factor appears to be certain strategies of the political left, in cases that emphasize making white youth feel more ashamed of their privilege and ancestors' crimes. [11] As a race-positive counter-strategy, CSDTs have included examples such as the Appalachian quilting CSDT. Here students can see how the "radical rose" (a symbol of the abolitionist movement) was a popular motif in pre-civil war quilting because of solidarity from poor whites, overturning preconceptions of what constitutes white rural heritage.

Another strategy involves CSDTs using Celtic interlace designs. Celtic tribes once spread across Europe from Ireland to Turkey; they were essentially Europe's Indigenous culture. The only difference is that the colonizers--the Roman Empire; and so on--were internal; Europe essentially colonized itself. Our use of heritage algorithms in simulations of contemporary Celtic patterns for leatherwork, textiles etc. is not limited to white youth: it turns out that a Celtic design

imaginary, from Latinx Dungeons and Dragons aficionados to Black Game of Thrones cosplayers, exists across a very multi-ethnic fan base. Figure 4 shows a design created by an African American student who began simulating cornrow braiding, replaced the plaits with circles, and laser-etched a pendant he called "Viking horns." Such cultural hybridity is a common outcome for the generation that taught us how our old categories of race, sex, and class can become a fluid palette for portraits of more just and livable worlds.

Conclusion

One of the most quoted lines from sex-positive feminism was from Wolf: "orgasm is the body's natural call to feminist politics." Race-positive design can also insist on the radical potential of delight. It is a call to playful celebration of old cultural roots and new hybrids that take effective aim against both individual and structural racism. And it is a powerful guard against the tendency of racism to force us into adopting a fearful, paranoid stance, turning colorblind into colormute.

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