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Anti-bias and Pro-transformation: how to merge critique and transformative visions for Artificial Intelligence

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As our keynote speaker Gideon Christian points out, the dangers of bias in AI and other data-intensive information sciences have been well documented (Angwin et al., 2022). They include risk prediction equations used by criminal justice officials to inform their decisions about bail, sentencing and early release; bank loans, medical decisions, and many other aspects of our lives. But an exclusive focus on "bias" is not enough, we need to be both anti-bias and, simultaneously, create transformative change.

What is the difference? If we focus exclusively on eliminating bias, we imply that if only the bias would vanish, we would have a just and equitable system. But that is not at all the case. For example, our current banking algorithms have resulted in higher loan rates for Black home buyers, because of bias in the ways they calculate risk. But that bias does not address the problem that homes and loans are extremely expensive to begin with. For the working class, even in the absence of bias, the dangers of defaulting on loans are significant. They have been a widespread destructive force in working class communities, no matter what color. A system designed to make the rich even richer, at the expense of the working poor, does not need bias to enact forms of oppression. An exclusive focus on eliminating bias can thus become a distraction from the more important project of transformation. Additional examples appear in table 1.

Table 1: the contrast of anti-bias computing and its critique from a transformative perspective

anti-bias computing	**transformative critique**
"We should eliminate racial bias in face recognition systems"	**Yes, but** that just helps "officials to become more adept at criminalizing Black people" (quote from Ruha Benjamin). What we need is restorative justice.
"We should eliminate bias in prison sentencing"	**Yes, but** the US has 20% of all prisoners on earth. Eliminating bias would barely change it. What needs to change is the prison-industrial complex.
"Advertisements targeted to poor people lack opportunities for investment"	**Yes, but** if you do not have money to invest, that is no help to your finances. What needs to change is the economic system of value extraction.

Within STEM education, the same contrast can be applied. It's great to have teachers who are interested in ensuring that instruction is not biased. But for children already challenged by social inequity, merely eliminating bias is not sufficient. And in terms of course content,

introducing subjects like algorithmic bias, or the bias towards military applications, or similar kinds of critiques in computer science classrooms might help alert students to potential problems, but focusing on negative critiques may give the impression that if you do go into computing, you should be expected to set aside social justice issues. Focusing on negative critiques does not engage student's agency and imagination in developing new technologies as a means of social transformation.

In contrast, our research group has been developing three domains in which a more positive approach to computing in the service of social transformation can be achieved, including in STEM education. These are ethnocomputing in Indigenous knowledge; the use of heritage algorithms for low-income community development; and the application of AI in the solidarity economy.

A good "example to think with" as Levi-Strauss would say is African fractals (Eglash 1999). Looking at aerial photos of African villages (figure 1), we can see circles of circles, rectangles of rectangles, rings of rings. A year of fieldwork in west and central Africa showed that the builders were not simply creating unconscious patterns: these were "heritage algorithms" that enacted deeply held beliefs and practices about the spiritual, ecological and social dimensions of the worlds as self-generating. Spiritual concepts such as the ancestors of ancestors, ecological concepts such as the feedback loop between nature and humans, and social concepts such as the iterations of reciprocity between individual and community, are all embedded in these forms.

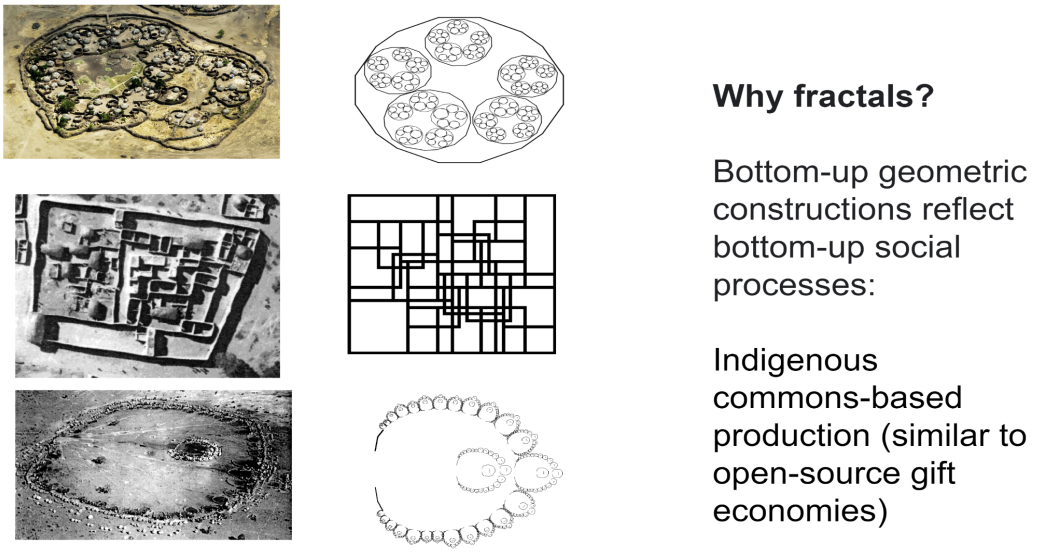

Figure 1: Fractal simulations of traditional African architecture

The computational forms of recursion, central to disciplines such as complexity theory, network evolution studies, models of self-organization in nature, generative AI and similar branches of knowledge are thus equally of central importance in these African traditions, where they represent the circle of life, the spiritual self-emergence of fecundity and the obligations of evolving kinship networks across time, space and species. They are powerful sources of insight into how we might create contemporary forms of circular economies, justice-based societies and ecological balance, if we can learn to "translate" these into technological domains.

Our first step in doing that translation was in STEM education. Readers can go to the Culturally Situated Design Tools website (csdt.org) and explore African fractals, iterative design in cornrow braiding, Native American biocomplexity, Artificial Intelligence for community development and many other frameworks for transforming our classrooms into laboratories in which students explore ethnocomputing and ethnomathematics (figure 2). These practices can show statistically significant improvement in underrepresented student interest and performance (Eglash et al., 2020; 2021; Lachney et al., 2021).

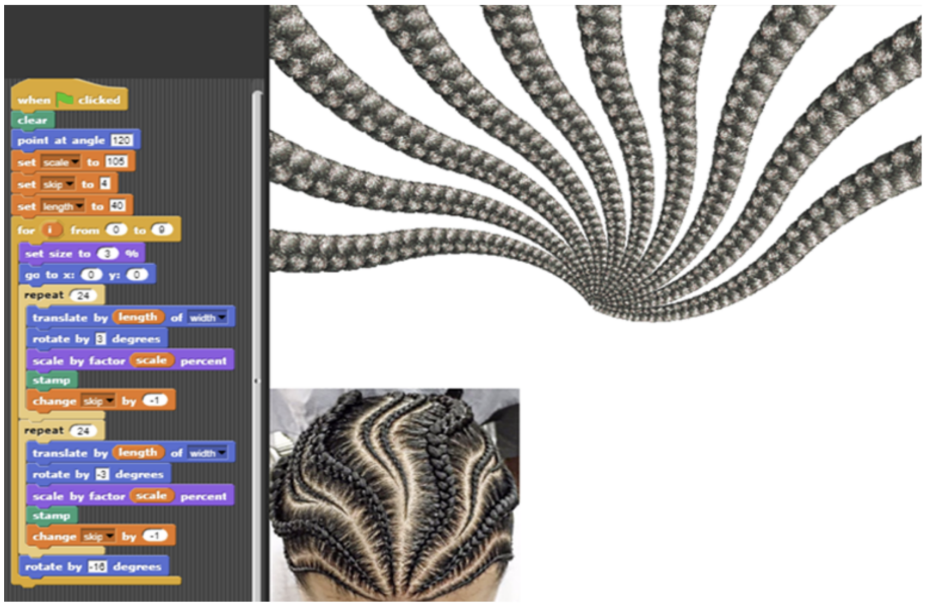

Figure 2: programming interface for CSDT based on cornrow hairstyles

The next step in our exploration was to look at the circular economy offered by those African traditions, and consider how similar kinds of unalienated value flow (ie "generative justice") might be implemented in relation to the adult economy. We brought some professional braiders into conversation with the team, and developed new extensions based on problems they located, such as pH damage to hair and the need to bring in new customers. Out of that came our first investigations into applications for economic value (figure 3).

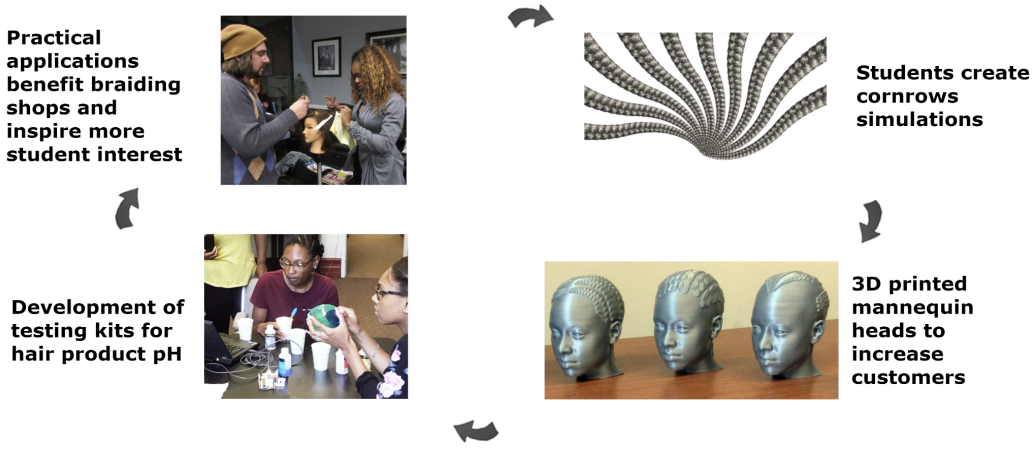

Figure 3: a circular economy connecting STEM and worker-owned braiding shops

More recently, we obtained an NSF grant, "Race, Gender and Class Equity in the Future of Work: Automation for the Artisanal Economy". Here we are applying AI, digital fabrication, and a broad array of other technologies to examine how more extensive networks of low-income community entrepreneurship, urban farming, civic organizations and others might be developed as a community-based economy (figure 4). For example, e-delivery by DoorDash, UberEats or other services charge significant amounts of overhead: much of the profit does not go to the drivers or product providers. So we are working with Detroit's urban farmers to develop an independent system that they can own, control, and co-design with us, so that AI and related algorithmic services can optimize driving routes for their good, not merely the priorities of some distant corporation. AI can similarly be used to help authenticate artisanal work from factory fakes; help consumers find local options to replace industrial farmed produce or overseas products, and many other strategies for keeping value at the grassroots where the actual work is being done, both by humans and our non-human allies in nature. Other work includes automating fabrication for clothing, furniture, and so on, so that local artisans can put more time into their own creative activities, while retaining ownership. Those interested in K-12 education based on such efforts can use the CSDT at https://csdt.org/workbooks/start_aikr_compare. For the adult economy itself, our publications are available at https://generativejustice.org/publications.

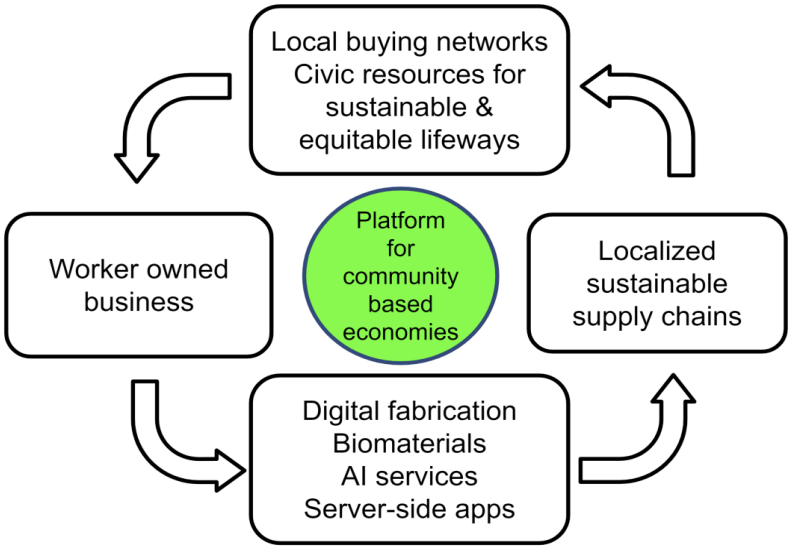

Figure 4: computation for a community-based economy

In conclusion: the elimination of bias is an important part of AI regulation. But alone it is insufficient. We need education, research and policy development that can utilize emerging technologies to offer a transformative move to social, economic and civic systems for generative justice.

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