A Call to Feminism in the Age of Biotechnologies and Bioinformatics

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On the surface, the relationship of feminism to biotechnologies is an easy one. As a cross-disciplinary field with multiple branches, feminism has been utilized to imagine the future of the human body, to consider the way bodies are thought about in terms of their materiality and cultural/historical context, and to critique the way female bodies are represented as metaphorical “figures” and visualized as subjects. But with recent developments in technology, it has become important for feminism to supplement the study of gender as a socially constructed concept and turn “back” to the biological in order to be progressive. As artists and theorists we must look at the representational implications of sciences and technologies that endeavor to enhance biological creatures through prosthetics, create genetically modified and transgenic organisms, and imitate their reproductive processes through cloning and other forms of DNA manipulation. As a method of inquiry and critical intervention into the language, representations, and politics around the notion of “body,” feminism is uniquely equipped to address the overlap between scientists and artists in the new field of biotechnologies by closely examining the way issues of choice, self-determination and agency play out in projects across the disciplines.

Presented almost a decade ago, Eduardo Kac’s Genesis project (1998–99) used Morse code to translate a biblical verse—the so-called “dominion passage”—into a synthetic chromosome, which he then incorporated into DNA of E. coli bacteria using a common laboratory cloning site, “engineered” in the way that genetic material is replicated its genetic material. The verse originally read, “Let man have dominion over the fish of the sea and over the fowl of the air.” (Genesis 1:26) The biblically enhanced bacteria were bred with normal strains under ultraviolet lights in petri dishes at the exhibition. Their progeny’s DNA was decoded on either end of transmission. Mathematical engineer Claude E. Shannon put forward this basic tenet of information theory in the 1940s. By using the Morse system to encode the biblical message before insertion into the biological system, Kac puts the reproductive processes of “wet” (biological) media in parallel with the way electronic circuitry carries information. Using Shannon’s model as a conceptual foundation, Kac suggests that the thermal “noise” that causes errors during communications has a relationship to his bacteria’s reproductive processes and mutational rates.

In the “carnality” of the Petri dish, more than just the bacteria were engaged in the heat of the moment. Virtual participants witnessed and influenced the development of transgenic art, breaking the isolation of the bacteria and virtually bringing them into their homes via the internet. In her seminal book How We Became Posthuman, critical theorist N. Katherine Hayles wrote about cybernetic circuits such as these. The
feedback loop connecting man to machine “splic[es] your will, desire, and perception into a distributed cognitive system.”* In Genesis, human/machine/bacteria all share the interface.

Kac has stated Genesis was about ethics and challenging belief systems. His biologically imitative synthesis of DNA extends this concept into the realm of biotechnologies. The reproductive processes used by Kac present the hierarchies in Western civilization that are handshake down through scripture, but do not critique them. Rather, Kac simply re-inscribes those power structures. It is highly likely that participants within the cybernetic loop of the Genesis project thought about ethical dimensions of manipulating other life forms for their sake. They probably also considered carefully their “God-given” privileges over the bacteria—as suggested not only by the excerpted biblical passage but also by the way they implemented their power remotely through the Internet. How does Kac’s audience interpret his use of the terms “man/machine” to fit within his model of a highly distributed, biotech capitalist system? How might they be “enacting” the very aspects of the Western world’s dominant power structures? To critique whether Kac is blind to present-day implications of the Judeo-Christian faith he quotes is not clear. From a feminist perspective, however, Kac potentially implies a relationship between the bacteria and their human facilitators, which use the same processes of cellular reproduction. In such an expanded reading, Genesis could be considered one dive work at the beginning of an important debate within art communities about the relationship between biotechnologies and all bodies, but particularly the human. Whenever a body “enacts” its experience through a specific circumstance it calls to, signals, or differentiates itself from those bodies around it. Specificities such as race, gender, age, anatomy, and ability are all in play. Within a feminist model, the importance of difference and context is recognized. Also understood are the ways through which power operates in social and representational systems. From this viewpoint, Kac’s audience asserted dominion not just because of his chosen passage, but also because their disembodied state gave them an invisibility and universality to act with impunity.

In Kac’s Genesis, humans become voyeuristic cyborgs who played out their own desires and “spliced” identities. In the guise of a project about transgenics, Kac used the Internet to turn a mirror on virtual subjects who have become instantiated in the flesh. Hayes has reflected upon the manipulative dynamics between the flesh and the virtual in an informative essay on Kac’s project entitled Who’s in Control Here. She cautions about the biosciences, foreshadowing new hierarchies generated from his proposal. “In this fusion of...biology...and...technology...we need to be “brought up to code.” In the cultural narrative of what constitutes a body the normative will begin to list toward those standards. This has implications for natural bodies, especially those that transcend gender and biological women, and even more acutely, those without the means to afford such luxury. Women already invest in normative modifications at alarming rates—breast enlargements, laser treatments, hair removal, Botox injections, etc. The market for “feminization” is booming. But in the end, this is just a pyramid scheme; the commercializing drive of biomedia will undoubtedly keep upping the ante in the beauty and sex industries. But what if women were to use their buying power for other purposes? In a follow-up to Posthuman that appeared in Cultural Critique, Hayes makes reference to Bruce Sterling’s Holy Fire (1995), a science fiction story grappling with the implications of biomedia within the realm of medicine. In this narrative, a ninety-four-year-old woman receives an “extreme” regenerative treatment to restore her body to that of a twenty-year-old. The “incongruities” of this ancient consciousness in the hormonally explosive body of a young woman suggest mind-blowing alternate models of procreation. But Sterling seems to admonish his own character for having her natural desires and, oddly, erases all the common sense and experience of the mature woman in the construction of his narrative. For Hayes, in the Wake of the Computer, the mature woman in the construction of his narrative. For Hayes, in the Wake of the Computer, the mature woman in the construction...
Schneider’s. While evolution is studied on the ostensibly neutral ground of science, it is easily politicized and brought onto the slippery slope of ethical debate. Both Schneider’s computer simulations and Kac’s transgenic projects go beyond bioinformatics in their interpretation of data. In Kac’s case, advances in biotechnologies pervert literal interpretations of religious texts and challenge ethical principals when they are brought into a different medium. In Schneider’s circumstance, his models have been subject to vitriolic rebuffs by creationists and intelligent-design advocates and have required careful point-by-point rebuttals. Such heated debates attest to the challenge bioinformatics can also present to the public, specifically those in his paper “Claude Shannon: Biologist” wherein he postulates “communications systems and molecular biology are headed on a collision course.” Schneider bases his idea on the fact that Shannon, the influential “father” of information theory, developed his foundational channel capacity theory using biology rather than physics or thermodynamic models. Schneider goes one step further: “As electrical circuits approach molecular sizes, the results of molecular biologists can be used to guide designs. We might envision a day when communications and biology are treated as a single field.” If the indeed suggests living cells are destined to become communication instruments, then should we focus our attention again on ethics? This elicited the following response from Hayes: “I think the question we need to ask in this situation is: Whose communication is being privileged?” Such a moment shows how a feminist lens might be usefully applied to biotechnology. By focusing on how biology forms discourse, its real-world effects can be seen and discussed in light of the embedded power relationships of dominant cultures. Eugene Thacker also points out that the instrumental ties of molecular “machines” in nanotechnology emphasizes a Cartesian way of thinking about bodies in the world. 

Hayes’ critical history of information theory, How We Became Posthuman, traces the steady disembodiment of information in culture since the technical innovations of Claude Shannon. In her discussion of Shannon’s early electronic rat experiments, Hayes notes that his binary distinction between “signal” and “noise” has had a ripple effect on the way people think about information. “The structure of [Shannon’s] theory implied that change and innovation is always possible, and that change is not about meaning and content but about the way in which we originally define the signal, we thereby automatically call all of the remainder of the received message the ‘not’ signal or noise.” Indeed, Schneider defines information in terms of what it 


used to construct his theory. As Hayes points out, these ideas trickle into culture through narrative and metaphor.” Hayes asks us to make a linguistic comparison to a competing model of information forwarded at the time by Donald MacCrimmon MacKay, a research professor of communications and neuropsychology. She notes, “MacKay defines information in terms of what it does… Verb-like, it becomes a process someone enact.” “MacKay’s idea, however, ‘requires that psychological states be quantifiable and measurable… something not in reach’ at that time. Hayes proposes that MacKay’s model “implies contest and embodiment.” As a term has been used to suspend long-standing rationalist assumptions that mind and body are distinct entities and that bodies are inherently mechanical and subject to the will of the mind. Within this rubric, the flesh “thinks…” and the body forms the mind. Similarly, embodied information cannot be detached from its material carrier substrate. To give an example, the early wax cylinders used to record music hold important historical information in addition to the music’s pure notes. This information is lost when such recordings are translated to a compact disc as pure data. While MacKay’s model

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allows for these considerations, his relatively unpopular paradigm of embedded information would do little to influence the blooming telecommunications industry where Shannon’s theories were immediately applied. Shannon’s employer, Bell Labs, would depend on the idea of a quantifiable amount of “clarity” (in terms of bits per second at minimal loss) that could be sold as product.31

Hayles seems to play with this idea as the ultimate irony when she notes that MacKay’s obscurity was “the price” he “paid for embodiment.”34

What part does information play in the Information Age, if not within commerce? Can a body exist outside of its communications? And more specifically, can a female body exist outside its commercialized “Siren’s call”? Can it act more like a verb— with agency—than an object through which information is transmitted?

The idea of body-as-information presents new narratives for culture. Increasingly common metaphors such as DNA as the “book of life” signal the paradigm shift. The cybernetic “body-as-machine” handed down through Western culture since the Scientific Revolution in the 17th century is being phased out. To borrow a phrase from Hayles, the “very consequential metaphor” of “code” is the cornerstone of bioinformatics as a field both generated from the noise of difference.31 When she notes that “embodiment is a specific instantiation of noise” and can be many and fruitful.33

In the “Materiality of Informatics,” a central chapter of Posthuman, Hayles lays out the importance of noise to cultural models that are writing over and/or reproduce the data. In issues of sex and reproduction, “agency” is often connected to a specifically phalliccentric idea of desire, but it can also include unquantifiable factors such as how political resistance, religious ideas, cultural moirés, force, or coercion play out in human biological and social systems. From a feminist perspective on bioinformatics, genetic selection that occurs among individuals in the context of these factors may be generative “noise”—a kind of cultural mutation—that cannot be quantified; the path of evolution. Splicing, mutating, and altering genetic code implies making decisions. When debating futures in the new fields of biotechnologies, the need for coherent narratives and careful translations are critical, as is dialogue between artists, scientists and other cultural practitioners. The results of these conversations can be many and fruitful.

To give a personal example, the last time I spoke with Thomas Schneider to go over his results, in some cases, correct the language and scientific concepts in this essay, our conversation inspired an idea for a new experiment in his lab. My immediate proposal here is for art and literature to maintain the health of culture through mutational practices. However, careful understanding of biotech’s principals is required if the alternatives are to be viable. Here I solicit your imaginations to consider how best to apply an invasive feminism to this end, one that permeates science with considerations of life’s many un-measurable factors.

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37. Shannon’s influential paper, “Communication in the Presence of Noise” (1949) helped define what Bell Labs was actually selling—clarity in terms of bits per second at minimal loss. See Schneider, “Glasch Shannon: Biologist.”
39. Hayles interview. 30. Ibid.
40. Hayles, Posthuman, 36.
41. Schneider in email to the author, June 6, 2008.