Art and Culture Paper

The SF of Technoscience: The Politics of Simulation & A Challenge for New Media Art

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"In fact, science fiction...is no longer anywhere, and it is everywhere, in the circulation of models, here and now, in the very principle of the surrounding simulation."

Jean Baudrillard

"Biology is becoming an information science...and it will take increasingly powerful computers and software to gather, store, analyze, model and distribute that information."

Ben Rosen
Chairman, Compaq Computer Corporation

"The best way to predict the future is to invent it."

Richard Feynman

One of the significant characteristics of the last decade, and the new millennium, is the way in which advancements in biotechnology and medicine have come to the attention of the public, through the media, as one of the primary areas in which the future is being vigorously imagined. What distinguishes biotechnology from other sciences is the way in which it is increasingly fusing genetic code with computer code, encapsulated in what Incyte Pharmaceuticals calls "point-and-click biology."

Likewise, the development of the Web, along with parallel advancements in computer graphics and modeling, has made possible a unique domain within the arts that has been variously called "new media" and "net.art." Combining elements of programming, electronic writing, digital imaging and animation, virtual environments, and streaming performances, net.art is rapidly emerging as the cultural vanguard in technologically advanced cultures.

Linking these two trends (contemporary biotechnology and net.art) is thus an array of computer-based technologies of simulation and virtuality. In Jean Baudrillard's famous formulation, the simulacra is the "copy without an original;" that is, the logic of simulation proceeds through a paradoxical circuit in which "the real" is lost at the very moment that it can be perfectly simulated.[1] Both biotechnology and net.art highlight issues concerning the simulation of the real (for instance, in medical imaging and simulation, or in the construction of interactive virtual environments), though in very different ways. Both also are engaged with computer, networking, and simulation technologies which, at the same time, challenge traditional notions of embodiment, presence, and subjectivity.

This paper begins with an exceedingly difficult and complex question: If contemporary "technoscience" (in particular, biotechnology) is one of the most significant domains where issues pertaining to science, technology, and power relationships in society all intersect, what possible spaces are there for critically understanding, analyzing, and contributing to the discussions over the future of medicine, health, and normativity? In a domain where concepts of health, disease, identity, race, gender, and mortality all inform "hard" science research, such a question arises out of a concern for the ways in which a "biopolitics" is currently being formed through developments in the relationship between molecular genetics and computer technologies. The question which this paper asks, and which will remain an open question, is whether the emerging category of net.art can occupy this critical space.

The Biotech Century

Molecular biotechnology is at the forefront of developments in both science and technology, attracting both investment capital as well as government endorsement, the most recent example being President Clinton's inauguration of the new millennium by naming January as "National Biotechnology Month."[2] The President's statement was clear in its vision of a future biotechnology in which medicine is both curative and preventive, in large part due to advances in both molecular science and information technology. Such sentiments were also echoed, at the same time, by a special section presented by Biospace.com, the leading hub for the biotech industry. Entitled "Biotech 2030: Eight Visions of the Future," articles and interviews with leading researchers followed French Anderson's comments concerning gene therapy: "By the year 2030, I think that there will be gene-based medicine for essentially every disease... We will all know our individual genetic weaknesses by then via chip technology... It should be possible to receive a gene or gene-based medicine to alter how important genes are regulated, to prevent disease from occurring in the first place."[3]

What merits our attention here, is that after a stormy decade which saw Dolly the sheep, human embryonic cloning, debates over human stem cell research, the pressure put on the Human Genome Project by privatized genome mapping projects, the boom of the pharmaceutical industry (or "Big Pharma"), the patenting of cell lines from indigenous populations, gene therapy tragedies, and a plethora of new research technologies (including DNA chips, DNA fingerprinting, and DNA profiling), it is becoming clear that a certain type of futurological, forward thinking is a key component to the continued development of the biotech industry and its future applications in medicine and health care.

So then, we might pose our initial question in another way: In a domain in which the science-fictional future of biotechnology has always already arrived, what functions does or can science fiction (SF) have?

SF Mode

In order to approach such a question, it will be helpful for us to first attempt to outline something like a "definition" of contemporary SF. To be sure, histories of SF as a genre refer to as many definitions as there are movements or types of SF.[4] However, for our purposes here, we might begin with the following: SF names a contemporary mode, in which the techniques of extrapolation and speculation are utilized in a narrative form, to construct near-future, far-future, or fantastic worlds, in which science, technology, and society intersect.

This is of course a provisional definition, but in it are three important components that characterize contemporary SF (most often in literature, film, and video games). The first is the distinction between the methodologies of extrapolation and speculation.[5] Generally speaking, extrapolation is defined as an imaginative extension of a present condition, usually into a future world that is "just around the corner" or even indistinguishable from the present ("the future is now"). By contrast, speculation involves a certain imaginative leap, in which a world (either in the distant future or altogether unrelated) markedly different from the present is constructed. As can be imagined, most SF involves some combination of these, culminating in worlds that are at once strange and very familiar.

Secondly, SF's narratological goal is the delineating of a total space in which certain events occur; that is, the construction of entire worlds which operate according to their own distinct set of rules which form their own "reality" (what has been called the "ontological" mode in SF).[6] Finally, more and more genre SF is coming to terms not just with technical concerns, but also with social, cultural, and political concerns. As such, the use of extrapolation or speculation, and the construction of ontological worlds, move SF into a realm that involves thinking about the complex dynamics between technology and globalization, science, gender, race, and related concerns.

Such a complexification of SF has been highlighted by critics such as Fredric Jameson as a critical function. In an article entitled "Progress Versus Utopia" Jameson articulates two critical functions that SF can have.[7] The first is characterized by the development of "future histories," or ways in which SF places itself in relation to history. Discussing SF as the dialectical counterpart to the genre of the historical novel, Jameson suggests that one of the primary roles of SF is not to "keep the future alive" but to demonstrate the ways in which visions of the future are first and foremost a means of understanding a particular historical present.

A second role Jameson ascribes to SF is a more symptomatic one. Referencing the work of the Frankfurt School on the "utopian imagination," SF can form a kind of cultural indicator of a culture's ability or inability to imagine possible futures. For Jameson, writing during the high point of postmodernism, SF was an indicator of a pervasive loss of historicity and the atrophying of the will to critically imagine utopias. Thus, not only is each vision of the future conditioned by a historical moment in which it is imagined, but, increasingly, SF's main concern is with the contingency involved in producing the future, as well as interrogating the constraints and limitations which enable the capacity to imagine the future at all.

The Disappearance of SF

But what happens when the distance that separates the imaged future of SF from the empirical reality of a society is effaced through advanced technologies of simulation? In a text discussing "Simulacra and Science Fiction," Jean Baudrillard outlines a set of analogies between his theories of simulation and three different modes of SF.[8] Corresponding to Baudrillard's first stage (that of "counterfeit" or classical modes of representation) is the category of the utopia, the creation of a wholly different sphere whose primary intention is to stand in contrast to the real world (just as the counterfeit is qualitatively differentiated from the original). To the second stage of simulation (that of industrial "production") is genre SF, especially as characterized during the so-called "Golden Age Here SF operates according to its originary definition given by Hugo Gernsback in the 1930s: as "scientifiction," as the use of the knowledge of science and technology to produce technically plausible (and entertaining) visions of the future.[9] In the same way that industrialism also implied automation, genre SF during the early part of the century became heavily constrained by the limitations of genre writing for pulp magazines (a constraint SF was rarely to break out of until the New Wave).

Finally, corresponding to the third order of simulacra (that of simulation itself, in which the real becomes the hyper-real, and representations become copies-without-originals) is a zone which Baudrillard does not or cannot name: "The most likely answer is that the good old imaginary of science fiction is dead and that something else is in the process of emerging..." The crisis which Baudrillard is isolating here is the gradual effacement of the distance which had traditionally enabled SF to function as a mode of envisioning the future. Without the distance between imagined future and historical present, between virtual realities and real virtualities, between information and the thing-itself, SF begins to lose its own placement in our culture. If the technologies which define the "information society" are predicated on their ability to create virtual spaces and mediated experiences, which attempt to approximate "the real then the need for a separate space of imaginative future world-building begins to disappear; in other words, SF begins to disappear. As Baudrillard comments, "the models no longer constitute either transcendence or projection, they no longer constitute the imaginary in relation to the real, they are themselves an anticipation of the real, and thus leave no room for any sort of fictional anticipation..."[10]

In such a scenario, the imaginative capacity of fiction becomes irrelevant because it is already built into the technologies themselves. To keep with our theme of biotechnology, such a confusion of technology and SF is seen in areas such as genomics and telemedicine, where "the model" is the genetic code of an individual subject, and the SF extrapolation is contained in the technical capacity for "disease profiling" (where susceptibility to genetic disease is read from an individual's genetic code), and a future telesurgery (where surgeons focus on a computer simulation and not the patient they are operating on).

If we take Baudrillard's basic claim here (that, in the contemporary scene of hyper-media and virtuality, SF is always already surpassed by technological advancement) we can begin to locate anew the space left empty by Baudrillard in the third order of simulacra. Put simply, the question is, if SF can no longer play its traditional role of imagining the future (because technological advance has already virtualized the future for us), what happens to SF in the scene of simulation?

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The SF of Technoscience

As a third-order simulacra, SF is not necessarily different from the technologies and the sciences it narrativises, and in fact creates the conditions for their possibility. In fact, SF is necessary in order for biotech and biomedicine to continue constructing their narrative of technological advancement and the increasing sophistication of the biotechnologies of the population.

In other words, the functions and attributes of genre SF (which still exist in genre SF, but which can now only belatedly keep up with developments in science and technology) have been appropriated by the technosciences. As a powerful political tool, SF enables the biotech industry to create a narrative of a bioinformatically based, disease-free, corporate-managed future. In doing so, it is also creating a history, a self-fulfilling narrative of progress.

What is unique about the manifestation of SF at the opening of the biotech century is that SF is no longer the proper domain of culture (that is, of culture's critically commenting upon the intersection of society, science, and technology). Instead, SF has come to be self-consciously embodied as part and parcel of the domains of biotech and biomedicine. To take two examples: researchers at the NASA Ames Center for Virtual Surgery explicitly utilize the rhetoric of SF in a language infused with the giddiness of new technologies. They clearly envision a future of telemedicine which would be at home in the Cyberpunk worlds of Gibson, Sterling, or Cadigan.[11] Their experiment last spring of a three-way, fully simulated, telesurgical collaboration is a concrete manifestation of what the discourse of SF can make possible. Similarly, in a recent article in "Scientific American," researchers reporting on advances in tissue engineering make references to the foundational visions of SF as the model for tissue engineering's ability to grow tissues and organs in the lab:

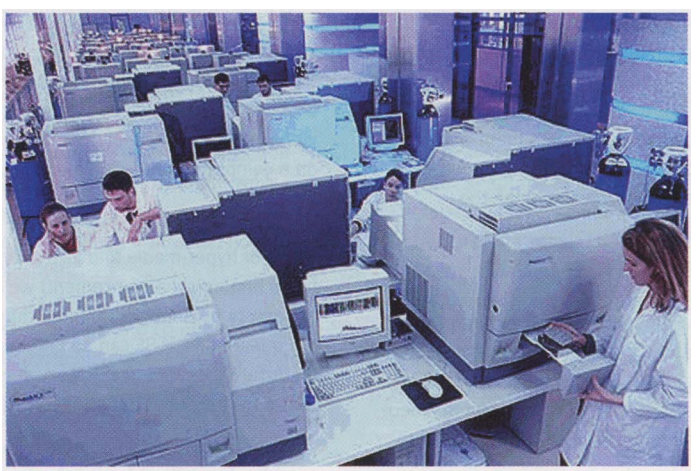
Promoting tissue and organ development via growth factors is obviously a considerable step forward. But it pales in comparison to the ultimate goal of the tissue engineer: the creation from scratch of whole neo-organs. Science fiction's conception of pre-fabricated "spare parts" is slowly taking shape in the efforts to transplant cells directly to the body that will then develop into the proper bodily component.[12]

This is, to be sure, a trend which has been with the science-technology complex for a long time. But instead of functioning as an external promotional tool (that is, as a discursive means of justification), SF now internally conditions and structures biotech research, finding itself in the midst of governmental regulations over the possibility of human cloning, in the new lines of automated software-driven DNA sequencing machines, or in the generation of financial investment for the promises of biotech startups.

Given this formulation, we can currently see SF operating in three main ways with regards to the biotech industry:

First, SF operates as a meta-level discourse for the promotion, justification, potential application, and development of products and services for the biotech industry. This can be readily seen through press releases, strategic corporate mergers, and advertising in specialist and non-specialist media.

Secondly, SF operates in a more constitutive and foundational manner within biotech, actually conditioning the range of what it is possible to do and what kinds of questions it is possible to ask. This is a discourse informed by economic imperative and the traditions of "discovery science," but its mode of operating is that of using extrapolation and speculation to ask research-based questions of the present. The developments of the DNA chip, neurosoftware implants, and tissue engineering are examples of this "precession" of SF.



The biotech lab of the future: automated sequencing computers and high-throughput analysis.

Finally, the ways in which SF is manifested in biotech reveals radical changes which ultimately pose difficult philosophical and bio-ethical questions concerning how "health" and "normativity" will be defined in the future. Already, with the prevalence of genetic science, the notion of the genetic code as both preceding and forming an essential core of the subject is becoming a widespread notion. The distance that separates the introduction of new ways of thinking ("I am my genetic code") with their naturalization (through discourses and concrete practices) is the space of SF.

The SF of Net.Art

This is, certainly, not the most optimistic alliance between computer technology and bio-technology, and it is a complicated field which contains as many promises as it does problems. However, looking at biotech and the ways it incorporates technologies of simulation through the lens of SF reveals some important tendencies.

Clearly, the "SF" in technoscience is not the same "SF" that we are accustomed to in literature and film. The SF in technoscience does strategically utilize extrapolation and speculation. It does create visions of future worlds in which advanced science and medicine have new relations to disease and the body, and in doing so it does make a comment on the ways in which future biotech is largely dependent upon technology development to achieve this future vision. Yet the characteristic which Jameson pointed to earlier, and which was in danger of disappearing in the postmodern (that is, the critical function) is markedly absent from the SF futures imaged by the biotech industry.

One way of discussing this is to mark the difference between SF in technoscience and SF as a cultural and critical activity. Incorporated into technoscience (particularly biotech), SF plays the role of "actualization the role of discursive negotiator, with the main goal being the emphasis on scientific advance and technological progress as the keys to a realization of the future. In this mode, SF's only purpose is to ensure the realization of the future imaged by the biotech industry; SF as a domain of possibility is thus displaced by SF as a pressing concern for making the future a reality.

By contrast, the SF which critics such as Jameson, Donna Haraway, and others discuss is both critical and multi-perspectival. In other words, the critical mode of SF is not about "actualization" but about "potentiality." Here potentiality serves to signify futures that may exist, as well as futures that will not exist (or that should not exist, the critical function of the dystopia). SF as potentiality thus means a certain mobility or autonomy to the category of the potential (as what reserves the right not to exist as well as to exist). Regarded as potentiality, as the work of imagining critical futures, SF is not locked into the narrow path of simply realizing the future or actualizing it. In this sense SF can serve a critical function, and it can do this by creating mobile zones whose primary intention is to comment upon, and intervene in, the "history of the present."

However, this distinction between SF as actualization (SF as it is manifested in technoscience) and SF as potentiality (SF as a critical mode) should not simply mean a return to the kind of literary, dystopian SF works which served an earlier historical moment. In the same way that SF has been embodied in the very techniques and technologies of the biotech industry (especially in its use of computer simulation and the Web), SF can also work from within these technologies to create points of slippage, fissures in the production of homogenous futures. Continuing developments in the areas of computer animation, 3D modeling and the construction of virtual environments, tele-robotics and motion-capture, and an array of technologies for presenting and broadcasting or Web casting innovative work are all becoming available not only to scientists but also to artists, performers, and cultural activists.

The challenge put forth to new media art and net.art is thus to take up this critical function of SF and re-insert it back into the discourse of contemporary technoscience. This has already been happening in the intersections of art and technology for some time, and it is taking new forms with net.art and digital culture, with groups such as Critical Art Ensemble, Mongrel, Fakeshop, and Biotech Hobbyist. Whereas literary SF was limited to describing technologies in extrapolative, near-future scenarios, new media and net.art contain the capacity to actually embody and utilize these "future technologies" in radically new ways. In an important way, then, such projects are SF in as much as they utilize the strategies of SF to ask important questions concerning the future of the human-machine relationship.

Notes

1. Baudrillard J. (1983). *Simulations*. New York: Semiotext(e).
2. O'Brien, S. (2000, January 20). Biotech industry gets Clinton's endorsement. *CBS Marketwatch* (cbs.marketwatch.com). The president's statement can be found at the White House Web site: www.pub.whitehouse.gov.
3. Biospace.com. (2000, January 6). *Biotech 2030: Eight visions of the future*. www.biospace.com.
4. Recent histories of SF include Brian Aldiss's *Trillion Year Spree: A History of Science Fiction* and Edward James's *Science Fiction in the Twentieth Century*. A good reference work is Clute, J. & Nicholls, P. (eds.). (1995) *The Encyclopedia of Science Fiction*. New York: St. Martin's.
5. In his book *Constructing Postmodernism* (New York: Routledge, 1992), Brian McHale discusses the differences between extrapolation and speculation: "Extrapolative SF begins with the current state of the empirical world ... and proceeds ... to construct a world which might be a future extension or consequence of the current state of affairs." (p. 244) "Speculative world-building, by contrast, involves an imaginative leap, positing one or more disjunctions with the empirical world which cannot be linearly extrapolated from the current state of affairs." (p. 244).
6. Ibid., p. 247.
7. Jameson, F. (1982). Progress versus utopia; or, can we imagine the future? *Science Fiction Studies 27*, 147-58.
8. Baudrillard, J. (1997). Simulacra and science fiction. In *Simulacra and Simulation*. Ann Arbor: University of Michigan Press.
9. Hugo Gernsback (1884-1967) is often referred to as the father of genre SF. In the late 1920s, he began publishing a magazine called *Amazing Stories*, which published a number of well-known SF authors of the "Golden Age" of SF. In addition, he formulated a term for a new type of fiction emerging at the turn of the century (as exemplified by Verne and Wells): "scientifiction," in which adventure and romance plots were combined with elements from science and technology (primarily physics, astronomy, engineering).
10. Baudrillard, op.cit., 122.
11. More information on the NASA Ames Virtual Collaborative Clinic can be found at: biocomp.arc.nasa.gov/teleMed/vcc.html.
12. Mooney D. & Mikos, A. (1993, November). Growing new organs. *Scientific American*, 12.