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## The Xenotext Experiment

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### **Abstract**

*The degree to which the biochemistry of living things has become a potential substrate for inscription is increasingly debated. Not simply a code that governs both the development of an organism and the maintenance of its function, the genome can now become a vector for modes of artistic innovation and cultural expression. In the future, genetics might lend a possible, literary dimension to biology, granting every geneticist the power to become a poet in the medium of life. In this spirit, the Xenotext Experiment is a literary exercise that explores the aesthetic potential of genetics in the modern milieu, doing so in order to make literal the renowned aphorism that “the word is now a virus”.*

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\* Author of *Eunoia* (2001), a best-selling work of experimental literature.

## 1. Introduction

Thinkers as diverse as Pak Wong,<sup>1</sup> a cybernetic expert, Eduardo Kac,<sup>2</sup> a multimedia artist, and Paul Davies,<sup>3</sup> an astronomic expert, have begun to speculate that even now scientists might store data by encoding textual information into genetic nucleotides, thereby creating “messages” made from DNA – messages that we can then implant, like genes, inside cells, where such messages persist, undamaged and unaltered, through myriad cycles of mitosis, all the while preserved for later recovery and decoding.

Wong, for example, has enciphered the lyrics to “It’s a Small World After All,” storing this text as a strand of DNA inside *Deinococcus radiodurans* – a bacterium resistant to inhospitable environments. Wong argues that, in a world of fragile media with limited space for storage, DNA might permit us to preserve our cultural heritage against planetary disasters: “organisms...on Earth for hundreds of millions of years represent excellent candidates for protecting critical information for future generations.”<sup>4</sup>

Kac has also used a genetic process of encipherment in his artwork called *Genesis* – a project intended to show that “biological processes are now writerly.”<sup>5</sup> Kac encodes a short verse from the Bible into a strand of DNA, which he then inserts into a microbe, exposing the germ to doses of mutagenic radiation. Kac suggests that, by “editing” such a text through mutation, we can foster an unguided, aleatory message in a more innovative form, rather than accept the dominant, biblical passage in its last inherited form.

Davies has gone so far as to propose an extravagant speculation, suggesting that, instead of sustaining a radio beacon through many millennia, or instead of projecting a large vessel across vast distances, aliens wishing to communicate with us might have already encoded messages in DNA, sending out legions of small, cheap envoys – self-maintaining, self-replicating machines that perpetuate their data over eons in the face of unknown hazards: “fortunately, such machines already exist” – and “they are called living cells.”<sup>6</sup>

These three thinkers have all suggested the degree to which the biochemistry of living things has become a potential substrate for inscription. Not simply a “code” that governs both the development of an organism and the maintenance of its function, the genome can now become a “vector” for heretofore unimagined modes of artistic

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<sup>1</sup> P Wong *et al.*, “Organic Data Memory Using the DNA Approach” (Jan 2003) 46 *Communications of the ACM* 95-98.

<sup>2</sup> E Kac, *Telepresence & Bio Art: Networking Humans, Rabbits, and Robots* (2005), 249-263.

<sup>3</sup> P Davies, “Do We Have to Spell It Out” (2004) 2459 *New Scientist* 30-31.

<sup>4</sup> P Wong, note 1, at 98.

<sup>5</sup> E Kac, note 2, at 254.

<sup>6</sup> P Davies, note 3, at 30.

innovation and cultural expression. In the future, genetics might lend a possible, literary dimension to biology, granting every geneticist the power to become a poet in the medium of life.

## 2. Proposal

In the spirit of these thinkers, I have conceived of *The Xenotext Experiment*, a literary exercise that explores the aesthetic potential of genetics in the modern milieu, doing so in order to make literal the renowned aphorism of William S Burroughs, who declared “the word is now a virus.”<sup>7</sup> In this experiment, I propose to address some of the sociological implications of biotechnology by manufacturing a “xenotext” – a beautiful, anomalous poem, whose “alien words” might subsist, like a harmless parasite, inside the cell of another life-form.

Stuart Kauffman<sup>8</sup> has agreed to lend me the expertise of his lab during its free time so that I might compose an example of such “living poetry.” I propose to encode a short verse into a sequence of DNA in order to implant it into a bacterium, after which I plan to document the progress of this experiment for publication. I also plan to make related artwork for subsequent exhibition.

I plan to compose my own text in such a way that, when translated into a gene and then integrated into the cell, the text nevertheless gets “expressed” by the organism, which, in response to this grafted, genetic sequence, begins to manufacture a viable, benign protein – a protein that, according to the original, chemical alphabet, is itself another text. I hope, in effect, to engineer a primitive bacterium so that it becomes not only a durable archive for storing a poem, but also a useable machine for writing a poem.

I foresee producing a poetic manual that showcases the text of the poem, followed by an artfully designed monograph about the experiment, including, for example, the chemical alphabet for the cipher, the genetic sequence for the poetry, the schematics for the protein, and even a photograph of the microbe, complete with other apparatus, such as charts, graphs, images, and essays, all outlining our results. I also want to include (at the end the book) a slide with a sample of the germ for scientific inspection by the public.

I foresee enlarging charts and photos from this exercise so that I can display them in a gallery, but I also plan to create other works of conceptual art inspired by the structure of the encoded, genetic poem itself. I plan, for example, to submit the gene to DNA 11,<sup>9</sup> a company that makes giclée prints of abstract artworks produced through DNA-fingerprinting, and I also hope to build a colourful sculpture of the gene itself out of dozens of Molymod Molecular Kits.<sup>10</sup>

I expect that the poem is going to be concise, probably about fifty words in length (so that the encoded, genetic text can easily fit into the genome without compromising the

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<sup>7</sup> W Burroughs, *The Ticket That Exploded* (1967), at 49.

<sup>8</sup> A MacArthur Fellow, who is now the iCore Chair for the Institute of Biocomplexity and Informatics at the University of Calgary.

<sup>9</sup> For more on this company, see <http://www.dna11.com>.

<sup>10</sup> See <http://www.molymod.com>.

function of the organism itself). I have yet to determine what the poem might say under the biochemical constraints of this experiment, but I do expect that the work is going to address the relationship between language and genetics, doing so, self-reflexively and self-analytically. I want to convey the beauty of both the poetic text and its biotic form.

### 3. *Rationale*

Kauffman is a renowned theorist, who has argued that the complex, but orderly, structure of every living system arises spontaneously out of underlying principles of self-organization – principles no less important than the laws of selective evolution. First trained as a specialist in the humanities (with the intention of becoming a poet), he has instead gone on to pursue a career in the study of genetics. We believe that our overlapping territories of interest make us ideally matched to undertake this project.

My own artistic activity testifies to the fact that I have always regarded my poetry as a “conceptual experiment,” reminiscent of work done in think tanks, where scientists might indulge in hypothetical speculations, putting into play the propriety of reasoning itself. Just as the “pataphysics” of Alfred Jarry, for example might intermix technical concepts with aesthetic conceits so as to create an archive of “imaginary solutions,”<sup>11</sup> so also does my own artwork strive to create such a hybrid fusion of science and poetics.

We hope that our unorthodox experiment might serve to integrate two mutually isolated domains of research – domains that might not have, otherwise, had any reason to interact, except under the innovative conditions of this artistic exercise. Our collaboration allows us to explore the aesthetic potential of a “literary genetics,” even as the project affords us an opportunity to refine methods for the biological encryption of data – methods that might be applied to domains as varied as cryptography, epidemiology, and agro-business.

We foresee that, if science can perfect the process for implanting lengthy, textual information into a germ, we might not only provide a secure method for transmitting secretive documents, but we might also “watermark” cells so as to track the movement of either microbial diseases or botanical products. We believe that, with such a burgeoning technology, books of the future may no longer take on the form of codices, scrolls, or tablets, but instead they may become integrated into the very life of their readers.

### 4. *Conclusion*

*The Xenotext Experiment* strives to “infect” the language of genetics with the “poetic vectors” of its own discourse, doing so in order to extend poetry itself beyond the formal limits of the book. I foresee that, as poetry adapts to the millennial condition of such innovative technology, a poem might soon resemble a weird genre of science fiction, and a poet might become a breed of technician working in a linguistic

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<sup>11</sup> A Jarry (translated by S Taylor), *Exploits and Opinions of Doctor Faustroll, Pataphysician* (1996), at 22.

laboratory. I hope that my project might, in fact, provoke debates about the future of science and poetics.

Even though this whimsical, aesthetic endeavour might accent some of the ironies in the ominous conceit of the poet, Christopher Dewdney, who has argued that “language may be regarded as a psychic parasite which has genetically earmarked a section of the cortex for its own accommodation,”<sup>12</sup> my attempt to build a literary parasite in the form of a “word-germ” has only the most miniscule, most negligible, chance whatsoever of producing any dangerous contagion (despite the alarmism of critics outside of biology).

My project merely highlights the degree to which the modern, social milieu has now taken for granted that the discursive structures of epidemiology (as seen, for example, in such notions as “viral marketing” or “viral computing”) might apply to the transmission of ideas throughout our culture. If the poet plays “host” to the “germ” of the word, then the poet may have to invent a more innovative vocabulary to describe this “epidemic” called language. I feel that my project goes some way toward fulfilling this function.

I also believe, moreover, that such a poem might begin to demonstrate that, through the use of nanoscopic, biological emissaries, we might begin to transmit messages across stellar distances or even epochal intervals so that, unlike any other cultural artefact so far produced (except perhaps for the Pioneer probes or the Voyager probes), such a poem, stored inside the genome of a bacterium, might conceivably outlast terrestrial civilization itself, persisting like a secret message in a bottle flung at random into a giant ocean.

In the end, my own project draws concerted attention to the sublimity of language itself, teaching us about the wonders of science in a manner that might seem more engaging to a layperson untrained in biochemistry. I hope that my poem might urge readers to reconsider the aesthetic potential of science, causing them to recognize that, buried within the building blocks of life, there really does exist an innate beauty, if not a hidden poetry – a literal message that we might read, if only we deign to look for it.

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<sup>12</sup> C Dewdney, *The Immaculate Perception* (1986), at 59.