

**Evolution, Mutation and Hybridity:
Audio Arts and Live Biotechnology Recordings**
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In this paper, I discuss the creation of hybrid audio works that include “field” recordings of biotechnology practices in laboratory situations, archival radio sound and contemporary performance texts. I will also respond to the hybridising of forms in contemporary audio arts.

As a part of my Doctorate of Creative Arts at the University of Wollongong, I have created a number of new media performance texts, including radio works, based on a series of bioethical fables. These fables respond to the “miraculous futures” promised by contemporary biotechnologies.

These works include a radio play, *The Woman Who Knitted Herself a Child*, presented by ABC Radio National “Airplay” in December 2004,¹ *Chromosome Knitting*, an installation based performance which incorporates live biotechnology and sound, and *Dr Egg and The Man with No Ear*, a puppetry and animation performance which has been commissioned by the Sydney Opera House “Kids in the House” program, for young adult audiences. Finally a more documentary style piece, *Recipe for Life* is in development stage with producer Jane Ulman at the ABC. All these works will include sound recordings and from a biotechnology workshop I undertook at “SymbioticA”, the science/art laboratory that is incorporated in the School of Anatomy and Human Biology at the University of Western Australia.² This took place during the Biennale of Electronic Arts Perth 2004. I will write about this process later.

For the purposes of this paper I will focus on the works produced or in development for radio, as well as a brief discussion of *Chromosome Knitting* installation, as an “extreme mutation” of sound and live science. Some of the questions I am asking for the purposes of this paper include:

- How can concepts of evolution, hybridity, cloning and mutation inform current audio arts practices?
- How does the medium of radio lend itself to the areas of live microbiology recordings? Can we hear the sound of one cell dividing?
- Does the medium need to respond to the message? And vice versa - should new technologies inform the creative practices?
- How does “presentation” of “live” biotech science, rather than “representation” allow audiences to grapple with the ethics of biotechnologies?

- How can concepts of evolution, hybridity, cloning and mutation inform current audio arts practices?

I have used “New Nature” as the inspiration for a series of four contemporary fables or morality tales exploring bio-ethics, which are being “mutated” to form the basis of a number of scripted works. I am defining “New Nature”, as a human or natural environment, which incorporates the “life sciences”, that is, “genetic technologies”, “recombinant DNA technologies” and “bio-technologies”, which mould and create futures that radically alter our patterns of reproduction, food production and health management. Some of these futures, where incorporation of new technologies is involved, have been dubbed “Post-human”, by cyber-theorists.³

I have been exploring how evolution, mutation and transformation within the natural and technological realm inform my arts practice in performance and audio areas. The notion of “hybridity” in new media arts practice encourages cross-form collaboration between traditional forms such as theatre and visual arts with new technologies, critical theory, non arts sector players including science and industry, as well as encouraging the evaluation documentation and presentation of results from these cross form-fertilisations.

Audio arts represents an obvious site for intersections of many of these areas, being a fertile ground for the hybridising of text, archival and recorded sound, digital manipulation, composed music, and the many combinations which exist.

In *Theory and History of Folklore* Russian structuralist Vladimir Propp suggests that hybridity is part of the evolution of any form; for instance, folktales mutate and change through storytelling style, region, historical period and migration.⁴ As a result of his observations on the changes in content which occur to similar folktales throughout the regions in the Soviet Union due to changes in environment or politics, he said, “the old and the new can exist not only in a state of unresolved contradictions, they may also enter into hybrid formations”.⁵

Charles Darwin explored mutation and hybridity in his work *The Origin of Species*.⁶ He saw that a successful mutation or monstrous adaptation might become selected by a species as a strategy for survival, leading to new variations, and potentially new species, and that daily transformations are part of evolution and reproduction. According to Darwin, who observed the extraordinary variations in species and varieties of plants and animals during his five year term as a botanist on The HMS Beagle,⁷ “It may be said that natural selection is daily and hourly scrutinizing, throughout the world, every variation, even the slightest; rejecting that which is bad, preserving and adding up that which is good; silently and insensibly working, whenever and wherever the opportunity offers, at the improvement of each organic being in relation to the organic and inorganic conditions of life”.⁸

Obviously at the moment there is a slow, or fast in biological terms, evolution taking place, to replace analogue with digital technologies. Digital forms allow communication and cross-fertilisation between radio and web based formats, computers, radio, mobile phones, televisions, even your kitchen fridge. This will result in many mutations of traditional forms, some of which will become hardy enough to survive and possibly form new variations, or where highly successful, new species of program formats, et cetera. Just crossing your GE fridge list with any one of these other digital formats will inevitably lead to the question, “Do we have to have radio for dinner again, Dad?” It is easy to see how this metaphor of evolution can work. Creative forms, like any part of nature, are highly adaptable. This will eventuate in the digitisation of many audio, broadcast and recording technologies. Some examples already mentioned have been the digital broadcast of *Checklist for An Armed Robber* by Sydney writer Vanessa Bates and new media artist Norrie Neumark.⁹

I believe that, as with any type of evolutionary process, new technologies will inform creative practices and similarly creative practices will inform the use of new technologies. The medium and the message are both open to hybridity, mutation and evolution.

Hybrids 1-3. Three audio/performance works based on the fable *The Woman Who Knitted Herself a Child*.

The bioethical fable that has “mutated” the most in form during this process has been my fable *The Woman Who Knitted Herself a Child*. This has transformed from a short story to a radio play and finally to an installation performance text.

Historically, fables have explored human and animals place in nature and how life’s difficulties may be met with cunning, ingenuity, invention, transformation, mutation and sometimes magic or luck. Many of the contemporary scientific promises that we are being offered also fall into these categories. Scientists and corporations are making promises for remarkable futures and present day miracles. For the childless couple, there are now scientific possibilities for a new child, or even new body parts grown from stem cells. Such is the “magic” or “fabulous nature” of the twenty-first century.

The post-human fable *The Woman Who Knitted Herself a Child* explores the story of a female scientist who wishes for a child and in fact “knits” a being from the DNA she is working with. This fable has become three scripts, each mutating, transforming, giving birth to new forms of the other. Each informs the other, is built on the other, taking small pieces of form or content with it, but at the same time it abandoning its old form and becoming something new altogether. At each stage it has also responded to the medium, and used the forms that the medium has to offer.

The seeds of this creative and theoretical work were germinated during the “Motherload” research and development period, which was funded by the New Media Arts Board of the Australia Council for the Arts in 2002. This funding provided for a small

development project to be undertaken by three collaborating artists, Maude Davey, Heather Grace Jones and myself, all of us performers, audio or video artists, writers and mothers. We aimed to interrogate the female body as host to the parasitic implantation of another body, as well as exploring the ethical and scientific impacts of recent developments in reproductive technologies. We worked with a research geneticist at Westmead Children's Hospital in Sydney, Dr Tony Roscioli, who assisted our research into the ethical questions surrounding reproductive technology and cloning. One interesting piece of information he gave us, concerning chromosomes "unravelling" or "fraying" towards the end of their life, gave rise to the knitting metaphor, and further hybridisation of that idea evolved to concepts of "knitting data" and "knitting sound" during performance. We also worked with new media artist Sarah Waterson, who explored knitting of computer program data to create a human body, and has recently explored knitting sounds using blue tooth wireless mobile phone technology.¹⁰

Hybrid #1: the radio play

The form of the radio play: I began with the idea of a woman actually knitting chromosomes to create a "wished for child". I decided on a monologue, both external voice and internal reveries; the memories that come up for a woman who is trying to knit a child from DNA, and who is imagining the conception process.

As I talked the idea through with Jane Ulman at ABC radio, she encouraged me to know who was talking, what the "voice" would be. As a result of an interview I undertook with Dr Meri Menidis, a female transgenic scientist who was also a mother, I decided to make this "everywoman" character a scientist working in the field of transgenics. This influenced the fable, the radio piece, and the performance installation.

It was also Jane who encouraged me, when she heard that I was going to the SymbioticA workshop at BEAP to take recording equipment and make recordings of all the sounds I encountered in the lab. As a field nature recorder, she was aware of the value of this sort of footage. While I was at SymbioticA I was also able to do a series of interviews with participating scientists and artists about their ethical positions and some of this verbatim footage will be included in the radio documentary piece, *Recipe for Life*. While they hit the cutting room floor for "Airplay", these recordings were funded and supported by the ABC in the form of equipment loans and some travel allowances.

As I mentioned earlier, my continued exploration of this subject led me to attend the "Wet Biology Workshop" at SymbioticA. Here I was able to experience hands-on biotechnology practice: extracting DNA from pea seedlings, creating a genetically modified "glow in the dark" bacteria, culturing live cells from a pig's hock, and dealing with the issues of contamination, mutagens, and responsibility towards partially living objects first hand: how do we keep them alive? When do we let them die? I was at the "coal face" of the science we are debating at a public level, and it was both exciting, an ethical mine field, and confronting

at a deep level, the very reasons I had started to explore these issues in the first place. Most exciting was the discovery that I could in fact knit DNA in its dried form.

SymbioticA is a unique space in Australia and internationally, where artists are encouraged to do hands on exploration of biological technologies and issues stemming from their use. SymbioticA seeks to take science beyond the laboratory and help the public develop a critical awareness of science and new biological technologies. The workshop introduced me to issues, concepts and techniques relating to the manipulation of life. Emphasis was placed on developing critical thought, ethical issues and cross-disciplinary experimentation in art. The tools of modern biology were demonstrated, which in turn opened discussion about the broader philosophical and ethical implications into the extent of human intervention with other living things.

How does presentation of “live science” rather than representation allow audiences to grapple with biotechnology?

As a result of this research and development, I realised the importance of presenting this science live, rather than merely “representing” it through a mediated form. I was inspired to take the representational aspects of science further by presenting the biotechnologies within performance, allowing the audience to interact with the science that the work is critiquing, so that ethical questions can arise from the variety of meanings that are created. Previously these technologies have mainly been used by visual and installation artists, but rarely presented in a performance context.

Obviously the presentation of “live biotech science” is not possible on radio, but what is possible instead? As a medium that can cope with a large amount of detailed sound and text, radio lends itself to the inclusion of field, or in this case laboratory, recordings and authentic ethical discussions through the inclusion of verbatim interviews with scientists, ethicists, artists in this area. The sound that accompanies a play like *Woman Who Knitted*, while composed using some digitised and treated sounds and voices, also incorporated these field recordings and interviews. Radio allows experimentation with a range of points of view and structural experimentation, allowing multi-voice tracking and therefore allowing many subjectivities and interior as well as exterior worlds. All this allows a fine exploration of a micro field like biology and human interaction with it.

The process for the radio play

Starting points for sound: For the radio play, I started off with a range of sounds and voices that were inspired by knitting/ DNA sequencing and reproduction and popular genetic science.

Sounds List:

- Needle/ knitting needles/ syringe;
- Puncture of skin/flesh;
- Blood flow: liquid sounds;
- Scientific/medical machines: ultrasound/epidural.

By the third draft of the play the sounds had developed to include:

- Laboratory sounds: centrifuges, autoclaves, pipettes, mortar and pestle;
- Mitochondrial waters: the sound-scape of the amniotic space: liquid, teeming life;
- Sounds the baby would hear in vivo: heartbeat, lungs, gurgling body sounds;
- Underwater sounds: a woman swimming underwater, fish, teeming life, snorkelling sounds, breathing underwater. Heartbeat;
- The sound of a crow: a menacing sound brought in around memories of the baby she has lost;
- Playground sounds and the sounds of a small child rocking on a chair and knitting, playing with balls of wool and patterns;
- The sounds of a leafy suburban place circa 1970s. Pop music of the time including Queen and David Essex;
- The radio playing in the laboratory, which the woman scientist listens to. Sound bites concerning Dolly the sheep/transgenics/cloning futures/Madge: mothers protesting against genetically modified milk.

As I mentioned in my introduction, a further two pieces have been created from the initial recordings which I undertook at SymbioticA, funded by ABC Radio National Audio Arts. The first of these is a proposed documentary for radio, entitled *Recipe for Life* and the second is an installation based performance work, with a strong sound component, *Chromosome Knitting*. Both pieces represent mutations or hybrids of the earlier piece, and have evolved in form and content as a result of the earlier processes in the radio medium.

Hybrid/Mutation #2: the sound documentary

Recipe for Life aims to cut together contemporary bio-ethics discussions between practicing artists, agricultural scientists, doctors and anatomists, with live sound recordings from my tissue cell culturing experiment in the SymbioticA laboratory. These recordings will

accompany a step-by-step recipe for creating new life, from animal tissue, as well as a range of discussions that took place during the workshop, and some recorded interviews.

Hybrid/Mutation #3: the performance/sound installation

My New Media performance piece, *Chromosome Knitting* represents the most “extreme mutation” in form from the original fable *The Woman Who Knitted Herself a Child*. This piece explores the hybridisation of the age-old technology of knitting with the infinite variety of combinations of DNA sequences to create human forms.

By giving audience members the opportunity to encounter live biotechnology presentations in a Biotech Household space, incorporating live cold blood cell cultures and plant DNA extractions in everyday environments, as well as presenting fibrous DNA which can be knitted, I hope to challenge audience members to investigate and interrogate their understanding of new biotechnologies and their impacts on human, social and environmental futures.

As well as biotech science, the interactive installation incorporates sound recordings from SymbioticA workshop and the composed score from my radio play. The sound element specifically uses the bioethical interviews with scientists and artists undertaken during that workshop. Performance and narrative texts from the fable *The Woman Who Knitted Herself a Child* will also be included.

Conclusion

It is clear that the creative process, as well as the content and form of audio arts programs, can all respond to the notion of evolution, hybridity and even cloning. The starting point for many of the projects is identical, but in different creative environments, depending on the “nature” or “nurture” in those environments, they have a different life. This is a fluid process and can respond to many stimuli, including sound, image, text, body movement, research material and technology.

Similarly the new media that are becoming available for digital recording and broadcasts, including MP3 downloads, podcasting, webstreaming of audio and other digital forms, as well as interactions between written, recorded and broadcast texts, are creating many potential spaces for new hybrids to develop. As technology, biotech science, writing and performance, sound recording and broadcasting continue to find immediate and necessary connections, new varieties may emerge, and who knows which ones will survive to become the strong contenders in future battles for survival in the audio arts and programming arena?

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¹ During the paper, a range of audio tracks were played, including excerpts from *The Woman Who Knitted Herself a Child*, ABC Radio National Airplay 2004. Producer Jane Ulman, sound engineer Russell Stapleton, writer Catherine Fargher, composer Matthew Fargher. <http://www.abc.net.au/rn/airplay> (19 December 2004).

² <http://www.symbiotica.uwa.edu.au/> Excerpts of live sound recordings from the SymbioticA workshop, Biennale of Electronic Arts, Perth, Sept 2004 were played during the presentation at the conference.

³ These terms have been explored in N Katherine Hayles, *How We Became Post Human: Virtual Bodies in Cybernetics, Literature and Informatics* (Chicago: University of Chicago Press, 1999).

⁴ Vladimmmir Propp, *Theory and History of Folklore*, trans. Ariadna Y. Martin and Richard P. Martin; edited, with an introduction and notes, by Anatoly Liberman (Manchester: Manchester University Press, c1984)

⁵ *Ibid.*, 11, 12.

⁶ Charles Darwin, *The Origin of Species*, ed. J.W. Burrow (London, Penguin Books, 1985)

⁷ *Ibid.*, 1. Darwin embarked on his five-year voyage as a naturalist on HMS Beagle in 1831.

⁸ *Ibid.*, 133.

⁹ Vanessa Bates, *Checklist for an Armed Robber*. Broadcast on Radio National Airplay with a cross platform digital broadcast component developed by Norrie Neumark, featured scroll over texts and images, delivering specific sound bites and audio recordings. <http://www.abc.net.au/checklist/>

¹⁰ “Boxed Set: Sound Knitting with Blue Tooth Mobile Phone Technology”. Performance by Jodi Rose and Sarah Waterson as part of e)scapes. Performed at Medium Rare Gallery, Redfern, NSW, 1 September 2005. <http://www.mediumrare.net.au>