

# BIOTEKNICA:

## Soft Experiments from the Laboratory

*Jennifer Willet and Shawn Bailey*

### ABSTRACT

This paper focuses principally on notions of legitimacy (and *illegitimacy*) as critical tropes in the production of BIOTEKNICA, an art/science project. We will investigate the deterioration of legitimacy in instances of interdisciplinary production with an emphasis on our experience as non-scientists working in the SymbioticA laboratories, and our status as pseudo-specialists in peer based ethics review procedures for scientific research involving the use of animal and human research subjects. We will explore models of 'soft experimentation' that highlight our liminal status as critic/practitioners working in contemporary biological art practices and the realm of scientific technologies and discourses – and the methodological foundation of BIOTEKNICA.

### INTRODUCTION

BIOTEKNICA is an interdisciplinary art/research project established in 2000 by Montreal-based artist/researchers Jennifer Willet and Shawn Bailey. BIOTEKNICA functions as a critical framework within which we produce a variety of art actions, interventionist media works, critical writings, and theoretical analysis of evolving biotechnologies. We present BIOTEKNICA as a fictitious biotech corporation in which designer organisms are generated to meet consumer demand. The organisms produced by our company are modelled on the teratoma, an unusual cancerous growth containing multiple tissues like hair, skin, and vascular systems. Monstrous and grotesque, the teratoma is at the centre of current key ethical debates surrounding foetal stem cell research. Scientists today see the teratoma as an instance of spontaneous cloning in nature, and are conducting research on the teratoma with the goal of developing future therapeutic technologies [1]. Additionally, Christian right fundamentalist advisors in the United States have postulated farming teratoma *in-vitro* as a viable human stem cell source that would not necessitate the termination of foetuses that arguably possess developmental human potential [2]. BIOTEKNICA both embraces and critiques these evolving technologies—presenting the teratoma as a privileged commodity, considering the contradictions and deep underlying complexities that biological technologies offer. BIOTEKNICA intentionally avoids prescriptive mantras; instead the viewer is encouraged to come to his or her own conclusions about the efficacy and underlying meaning of the technologies, procedures and protocols presented.

We deploy BIOTEKNICA in general, and the teratoma specifically, as a critical point of intersection between reality and fiction towards the propagation of meaningful and imaginative critical thinking about biotechnology. This work erupts from a variety of positions and intentionalities—from the contemporary art scene with a focus on the intersection between art and science—from video, installation, and performance concerns—from philosophy of science—media studies—programming—social and political activism—and most recently applied scientific laboratory protocols. With the addition of applied scientific techniques in the propagation of our project, BIOTEKNICA enters a new sphere where liminal (semi)living systems are instrumentalized in the production of artworks in the public sphere. With this work we trespass into specialized territories—where we engage directly with the tools of science—but actively contradict prescribed scientific methodologies and 'good' scientific techniques in our research. We understand this action as contributing to a larger trajectory of 'soft experimentation' in BIOTEKNICA. Here, experimental strategies are deployed in constructing actions, installations and protocols without predetermined outcomes in the 'production of knowledge'. The results of this process are documented, re-presented and theorized in terms of their subjective, aesthetic, and critical vectors. With *soft experiments* objectivity, standardization and reproducibility are not a high priority—and though *soft experimentation* sometimes deploys the tools and models established by the hard sciences, this line of research is by no means scientific (though possibly pseudo-scientific) in its categorization. We take *soft experimentation* to best describe our position as engaged amateurs working in a specific (bio)technological sphere. We conduct standardized protocols, well established as integral processes in the biological sciences, with entirely different expectations and directions as artistic researchers then the purposes these processes were originally designed for. The principle of 'soft

experimentation’ best encapsulates our dual roles as students or devotees of “hard” science, and the liquid, subjective, and expressive potential of scientific investigation as artistic media. A major difference is the objective of deploying all the necessary failures from our immersive laboratory practice into (hopefully) triggering an engaging reflexive critical moment for the viewers of our artworks.

In other words, BIOTEKNICA embraces an experimental interdisciplinary model, intellectually and as applied practical methodology. This paper will focus primarily on the interdisciplinary nature of our project, and the perceptions of legitimacy and illegitimacy that accompany such an endeavour within the institutional context in which we practice, and the heightened enforcement of those disciplinary boundaries in the almost sacred spheres of science, biomedicine and biotechnology. Here, BIOTEKNICA will serve as a case study of the intricacies of working at the intersection in the scientific laboratory and arts and humanities based research. Through anecdotal representations of our experiences we wish to foster an emergent theoretical and experiential discussion of these—rather than merely present discrete conclusions (doubtful and incomplete) about the potentialities of radically interdisciplinary research in academic and institutional circles.

## SOFT EXPERIMENTATION

In the past, BIOTEKNICA has manifest as purely multimedia production. We produced a series of written and visual documents perpetuating our hoax corporate presence in the public sphere. We developed a flashy website, a corporate video and a promotional brochure. In 2004, we developed (with the assistance of artist/programmers David Bouchard and David JHAVE Johnston) the first functional interface for the BIOTEKNICA Virtual Laboratory. In the virtual laboratory (available on our website at: [www.bioteknica.org](http://www.bioteknica.org)) users are provided with a laboratory interface (mixing zone) consisting of a series of empty vials that can be filled with varying amounts of ‘bodily’ fluids in concocting a unique teratoma. Each vial is identified by invented scientific (*sounding*) terminology—osteogenicphysis, histiopiocesis, dermaplasm, megalytrichoma, scaroadipocyte. To any specialist, the language is clearly fraudulently confused—but in the public sphere, the user only interprets the interface as interactive, but inaccessible in its scientific content. This body of work was intentionally presented in an ambiguous fashion (sometimes in the context of art—and other times as factual representation of a growing biotech firm), to illicit a response in the viewer based on their perceptions of BIOTEKNICA in a variety of different situations.

As we began to receive and interpret the viewer response, we looked to develop new—more *visceral* corporeal models for our teratoma product line, in order to shift the project towards a directly bodily engagement that necessitate participation with the viewer. The clean cool design and the confident corporate voice had a serializing effect on the otherwise grotesque content in the work. All sense of visceralness—unruly technologies— unruly art actions—and the very real instrumentalization of the biological in biotechnology—was compartmentalized and diluted by the overt corporate mantra. Arguably, our corporate presence (even with the inclusion of monstrous teratoma images) was too successful—too convincing—contributing further to the prescribed reification of corporate goals as an established value set in evaluating evolving biotechnologies. This reaction was counter productive to our stated objectives of encouraging the viewer to come to their own conclusions about the efficacy of the technologies, procedures and protocols presented, and to demystify our presence as artists working in parallel with scientific modalities.

To remedy this perceived problem of reception, we decided to reintegrate the viewer’s body with the biotechnological body in a very real critical phenomenological feedback loop. With the assistance of artist/designer Kevin Finlayison, we developed a series of *meat sculpture product lines* utilizing store bought animal products, synthetic wigs, and needle and thread, to mimic the appearance of the teratoma. We designed the sculptures (with attention paid to cinematic special effect technologies) with numerous parts of various animals that can be purchased at the butcher or grocery store. These fist-sized sculptural chimeras—containing a chunk of beef tripe, a lamb’s kidney, some unshaven pork-belly, and a bisected chicken heart turned inside out—all contribute to modelling a very ‘real’ teratoma. The inclusion of organic materials derived from food sources in the construction of artistic objects was necessary to the product line, in questioning the ways in which the animal body (as opposed to the human body) is continuously instrumentalized in so many underlying facets of human existence. Presented life-sized, frozen in sterile bags, freeze-dried on a silica bed, or refrigerated in laboratory glassware containing suspensions of formalin—the work mobilizes a visceral and corporeal reaction (often somewhere between fascination and disgust) for the viewer. In conjunction with the meat sculptures, we designed a performance called *BIOTEKNICA Public Autopsy*—where we performed public dissections of the specimens in the tradition of Rembrandt’s *The Anatomy Lesson of Dr. Tulp* (1632)—and Dr Gunter Von Haugen’s public autopsy in London’s Atlantis Gallery (2002). This strategy proved quite successful—in that the performed surgeries were convincing in their appearance, but destabilized by the context in which they were being performed (galleries, public venues, raves, university art laboratories) and the content conveyed verbally and through costume, performance, and an amplified simultaneous media representation. These events provoked more questions than answers in their propagation, something that we found to be inherently necessary in their presentation/performance/production.

In addition to the representational strategies deployed by the meat sculptures, we sought a ‘real’ and actualized participatory relationship with the very technologies we were representing and theorizing. In 2003, we met Oron Catts and Ionat Zurr of the

Tissue Culture and Art Project (TC&A) [3] at the European Media Arts Festival in Ösnabruck, Germany. They invited us to submit an application for a residency at SymbioticA: The Art and Science Collaborative Research Laboratory [4], in the School of Anatomy and Human Biology at The University of Western Australia. Catts and Zurr pioneered the use of tissue culture (TC) and tissue engineering (TE) in the production of contemporary art. With our proposed residency at SymbioticA we wished to build on their expertise by developing TE sculptures of our BIOTEKNICA teratomas, thus bringing our theoretical specimens out of their virtual environment and into the laboratory in a critical/participatory manner. In our initial proposal we postulated a series of three-dimensional tissue prototypes modelled on the Teratoma containing human tissue extracted from Shawn Bailey's body though later expanded our plans to include the use of animal cell lines in the production of this work.

In 2004, we began working with pre-existing cell lines 3T3 (mouse fibroblast) and P19 (mouse teratoma) towards training in tissue culture techniques. Cell lines are isolated cells developed for research purposes and are able to divide indefinitely given an appropriate physiological/nutritive/atmospheric environment in a laboratory. The 3T3 cell line, for instance, is derived from fibroblast cells established by Todaro and Green in 1962 from a disaggregated Swiss mouse embryo [5]. Fibroblast tissue (scar tissue) is made up of extremely hardy cells and is excellent for basic training in tissue culture protocols because of its relative vitality and tolerance for a range of conditions (and abuses). Though still subject to contamination, other cell lines and primary living or recently deceased sources can prove dishearteningly difficult for practicing amateurs to cultivate. Interestingly, the 3T3 line has achieved a sort of immortality, as now—forty years after its host donor's death—scientists and students all over the world continue to conduct research with generation after generation of a miniscule portion of the body of this long-deceased embryonic life form. At SymbioticA we learned tissue culture cultivation, observation and documentation techniques, and at the end of our residency we begun experiments grafting cells into three-dimensional structural matrixes.

In January 2006 we returned to SymbioticA to complete our Tissue Prototypes, this time in collaboration with Zurr and Catts from TC&A. Together we are exploring dynamic and alternative uses of advanced imaging technologies, 3D rapid prototyping, and tissue engineering technologies in the production of biological artwork. First, we will compile three-dimensional scans of both of our bodies (Willet and Bailey). These scans will be manipulated and mutated in three-dimensional imaging software to create the structural dimensions for the final sculptures. These structures will then be outsourced as three-dimensional rapid prototypes in P4HB bioabsorbable material. This will serve as the inner structure of our prototypes. At this stage a licensed plastic surgeon will perform a minor skin shave biopsy on Bailey's upper thigh or buttocks obtaining living cells to be utilized in the artwork. The biopsy of human dermis will contain fibroblasts, viable keratinocytes and perhaps a few stem cells. It will serve as a primary cell source to be grown and proliferated in vitro. Once sufficient healthy cells have been cultivated, we will place the scaffolds one at a time in a micro-gravity bioreactor that will in turn be placed in a water-jacketed incubation chamber. As the bioreactor turns, cells are persuaded to attach themselves to the scaffolds rather than the interior walls of the bioreactor chamber. The medium will be replaced two to three times weekly with fresh nutrient serum to allow substantial development to occur. Assuming we are successful, we plan on exhibiting the completed prototypes for the first time as an integral aspect of our new installation: *BIOTEKNICA LABORATORY REMIX: with Organic Tissue Prototypes in Collaboration with TC&A* at the 2006 ISEA exhibition in San Jose.

## INTERDISCIPLINARY PRACTICE AND LEGITIMACY

With this shift in BIOTEKNICA—from the performed or virtual laboratory—into the very real biological safety level 2 research facilities—came a shift in the criteria by which BIOTEKNICA is evaluated both within the artistic community and external disciplinary communities. In particular, there is a crisis of legitimacy that occurred for us (as artists), when we engaged with specialized infrastructures and the technological processes of TC & TE in our practice. Are we functioning as amateur science students? Technological fetishists with elite access to otherwise inaccessible realms of experience? Or perhaps non-specialists who will prove to be ultimately impotent in utilizing artificial constructs in creating living systems that we categorize as simultaneous art objects and performances? There is, nevertheless, a refreshing degree of risk in decentralizing familiar patterns of production in the arts to the laboratory space, and forcing ourselves to function in these new roles. We experienced a crisis of legitimacy, yet found tremendous motivation and productive energy in our experience with the biological sciences, and remain convinced of the valuable potential that trans-disciplinary practice contains. There is definite blurring of the borders, and a disruption of traditional, deeply ingrained disciplinary beliefs that has fallen by the wayside in our practice.

In "Opponents, Audiences, Constituencies" Edward Said argues [6] that universities

"... appear to exercise an almost totally unrestrained influence: [in] the principle that knowledge ought to exist, be sought after and disseminated in a very divided form."

Within this framework,

"You cannot simply choose to be a sociologist or a psychoanalyst; you cannot simply make statements that what you say as a historian (however well it may have been researched) enters historical discourse. You have to pass through certain rules of accreditation, you must learn the rules, you must speak the language, you must master the idioms and

you must accept the authorities of the field—determined in many of the same ways—to which you want to contribute.” [7]

With this perpetual division of knowledge into smaller and smaller discrete groups of specialization—and with long chains of prescribed ‘rights of passage’ into each field—interdisciplinarity (though touted as the primary innovative goal of most contemporary universities, and museums, and research centres) has little legitimacy in the back rooms—and *boardrooms*—of institutional culture. Often individuals working in this manner are perceived of as ‘jacks of all trades, but master of none.’ And researchers with interdisciplinary concerns often complain of having to achieve ‘expert’ status in multiple fields to be taken seriously in any domain. In other words, if an individual or research trajectory cannot be discreetly categorized in its meaning, historical evolution, and often rigid standards of evaluation for funding, exhibition, and publication purposes, it can prove cumbersome and unruly, or even illegitimate, in the institutional setting.

In the same article Said argues that we need to collapse the borders between areas of specialization to make critical inroads on exclusionary forms of power that stem from the discipline-based system of knowledge production and exchange. He states:

“Instead of *noninterference* and specialization, there must be *interference*, a crossing of borders and obstacles, and a determined attempt to generalize exactly at those points where generalizations seem impossible to make.” [8]

At the time, Said’s interest was in motivating theorists and critics to expand their audiences and participate in journalism as a means of exposing more generalized audiences to the evolving post-colonial, feminist, post-Marxist and queer theories, etc. However, what we are asserting (in this particular paper and with BIOTEKNICA in general) is an exaggerated form of interference through more desperate forms of interdisciplinarity. Instead of academic writers participating in mass print media publication—we argue from our experience for a participatory vision of interdisciplinary as *necessary* critical methodology. Our principle interest may lie somewhere between the intersection of art and science, but we are not certain that this strategy can be deployed in any number of fields to the same effect. In our understanding radical interdisciplinarity is inherently political—counteracting established hierarchies and divisions of power in the institutional setting, in knowledge production, and in the public sphere in general.

SymbioticA, in this instance, is a special case—in that it contradicts Said’s thesis of a rigid discipline-based model of university-based research. This unique centre combines the specializations of Professor Miranda Grounds (SymbioticA Co-Founder and Co-Director, and founder of TERC—the Tissue Engineering Research Centre—and active research scientist), Professor Stuart Bunt (SymbioticA Co-Founder and Co-Director, and CEO and Research Director of Paradigm Diagnostics Ltd), and Oron Catts (SymbioticA Co-Founder and Co-Director, and co-founder of Tissue Culture and Art Project). Located in the School of Anatomy and Human Biology at The University of Western Australia, we have traveled to the opposite end of the earth to experience the transformative interdisciplinary environment that SymbioticA offers its residents. SymbioticA has a long-standing tradition of providing access for artists to the School of Human Anatomy and Biology’s substantial resources that include human anatomy training, anatomical preservation facilities, tissue culture and engineering labs, microscopy research, among many other valuable resources. The cross-contamination of the biological sciences with artists in residence at the UWA goes back the mid 60’s with the inclusion of artist Hans Arkeveld (ongoing to the present time) as an outstanding anatomical drawer and sculptor and valued member of the School of Anatomy and Human Biology. SymbioticA itself has emerged as a cutting edge residency programme that seeks to align scientific and artistic researchers on art projects and provide the necessary access, training, and ongoing intellectual climate from between the discrete disciplinary spheres. It is interesting to note that similar institutional structures are beginning to appear in various configurations in Holland, Portugal, USA and Canada, largely from artist-researchers who has been inspired by the model of bioart practice that has emerged from Perth, Australia, over the past decade. In a very real sense, SymbioticA has clearly indicated that in spite of the regulatory complexities, divergent models of practice, and inherent ideological differences, a collaborative and participatory institutional system is possible, desirable and capable of important contributions to our understanding of the intersection between art and science. However, in our home country of Canada (and internationally), the truly interdisciplinary precedent set at SymbioticA has not yet been achieved.

## **ARTISTIC AND ETHICALLY SANCTIONED USE OF HUMAN RESEARCH SUBJECTS**

With this shift in our practice, from critical arts and humanities-based investigation to a proposed practical exploration of scientific protocols utilizing living tissues (not to mention human research subjects) BIOTEKNICA was propelled into a new set of disciplinary rules, standards, and concerns established by government, university and scientific communities. Our legitimacy as valid and valuable researchers in this new context was in question. Here, we became subject to a level of scrutiny we had previously never encountered as artists—ethics review at the university level. Our decision to work with primary human cell sources instigated an important and established set of institutional protocols for ethics approval concerning research utilizing human subjects. Because Bailey is an Associate Professor at Concordia University—and our project has been funded as both arts- and humanities-based research by several government agencies in Canada—we are subject to the Tri-Council Policy Statement “Ethical Conduct for Research Involving Humans” [9] and we are not able to commence tissue culture experiments utilizing

primary human cell sources without approval from the Concordia ethics review committee. Additionally, as we wished to undertake this research at another institution, The University of Western Australia, we were subject to their ethics review board as well. In other words, we required administrative approval from two institutional committees if we were going to subject Bailey, as a research subject, to a small skin biopsy from his body.

This donation, on Bailey's part, thrusts BIOTEKNICA into the complex (and historically often profoundly unethical) history of scientific innovation from the use of human beings as research subjects. We see this aspect of our exploration as necessary in establishing direct parallels in the exhibition space with the research that is conducted (often) behind the closed doors of the academic and business world, in order to raise and deploy critical issues in contemporary biotechnologies. It was absolutely essential that our proposed research programme be scrutinized and found to be consistent with standardized research approaches, and contributing to the emerging definition and debate concerning art-science research in Canada and abroad. Most importantly, we feel that this procurement of ethical approval sets an important artistic precedent regarding the use and representation of instrumentalized disaggregated human body parts in the production of this artwork. We find it necessary as artistic researchers to work directly with our own flesh, as a constant reminder of the subjective nature of the scientific protocols we deploy, lest we lose sight of the inherent nature of the processes themselves.

We based our ethics test case for the artistic utilization of tissue donation from a consenting human subject upon the successful ethics application to the UWA ethics committee of Kira O'Reilly (with Oron Catts as principal investigator) for the 2004 project *Marsyus—Running out of Skin*. O'Reilly is a UK-based performance artist who has long experience with public performance and exploration of the body as a site for powerful and explicit interventionist performances utilizing medical and surgical techniques. This project received ethics approval from the UWA in 2004, and has since served as an umbrella application to host other SymbioticA artists interested in working with human primary cell lines. In August 2005, BIOTEKNICA researchers received final ethics approval from the UWA human ethics review board to proceed with this research one month after we submitted our application for review. In comparison, we received a final affirmative response from the HREC (human research ethics committee) at Concordia University after 14 months of ongoing discussions about the legitimacy of tissue culture and research involving the use of human subjects as a significant means of artistic production in September of 2005. A more average application—within established parameters of 'good science'—is more likely to pass in two to three months time. This is the first application of its kind to be passed by Concordia University—and understandably received a rigorous level of scrutiny in the process. We consider this process a great accomplishment in interdisciplinary interference tactics.

Though the emphasis for evaluating our project by the university ethics committees is placed on the harm that might come to human subjects involved in making or (presumably) viewing this work—gallery goers are generally more concerned about the ethical implications of utilizing animal cells and serums in the production of artwork. If our project required the sacrifice of a living animal (within the university context) this would necessitate animal ethics approval—but with cell lines, and primary nutrient sources produced for the biotech industry—no such review is necessary. Nevertheless the use of animal cell lines and animal derived nutrient sources has remained a challenging issue for us in the artwork. The organic structures that we create lack a functional nervous and immune system. They are not cognitive or aware on any level. The structures that we grow in the laboratory are less complex on a structural level than simple plant or fungal life forms. They are self-contained, and removal from the very specialized environment they are grown in results in immediate destruction of the fragile artwork. They can only be exhibited in an environment which is completely sterile and where temperature, atmospheric and nutrient levels are carefully regulated. Still, the questions of efficacy in the arts and biotechnological fields persist—and we assert that this is exactly why artists should be involved in these practices—to mobilize questions.

## CONCLUSION

The final sculptures (BIOTEKNICA: Organic Tissue Prototypes) will be little larger than a toe—and extraordinary fragile, dependent on a sterile environment, complex infrastructure and artists/technicians for continued existence. These living fragments of the dissected whole—computationally generated and created in our own mutated image, will be recognizable as little more than miniscule chimera. As with all life, the cells constituting this work will eventually die, or be sacrificed, at which point remaining tissues will be preserved as sculptural documentation—preserved chemically or cryogenically in perpetuity. There are myriad considerations that emerge in consideration of our postulated tissue-cultured art objects. What is their ontological status? What rights and responsibilities do their creators have over their existence for the duration of their life span? What does it mean to have a specimen of one's own body cut free, manipulated, cultured, cryogenically preserved, plastinated and exhibited for public consumption? Eventually, perhaps, the cells live, and the artist does not.

We return to the notion of *soft experimentation* in describing our practice—performances—sculptures—critical production—media design—ethics approval—laboratory work. Arguing for legitimacy in interdisciplinary practices has become an integral component of BIOTEKNICA. Said has provided the language to describe these research goals as an experimental trajectories towards interference.

## Acknowledgements

We wish to thank numerous individuals who have contributed to BIOTEKNICA: Ionat Zurr, Oron Catts, Guy Ben-Ary, David JHAVE Johnston, David Bouchard, Tagny Duff, James McDougall, Anil Ragubance, Kevin Finlayson, Christian Kuras, Maïke Bollen, Gary Cass, Dr. Stuart Hodgetts, Dr. Stuart Bunt, Jane Coakley.

We wish to thank our supporters: SymbioticA, School of Anatomy and Human Biology at The University of Western Australia, The Social Science and Humanities Research Council of Canada, HEXAGRAM, Conseil des arts et des lettres du Québec, Programme Québec Multimédia Jeunesse, The Canada Council for The Arts, Concordia Part-Time Faculty Union, The Banff Centre for the Arts, and Article Artist Run Centre.

## References and Notes

1. Advanced Cell Technology corporate website <<http://www.advancedcell.com/>> (1 January 2005).
2. Clive Thompson, "How to Farm Stem Cells Without Loosing Your Soul," *Wired e-zine* <<http://www.wired.com/wired/archive/13.06/stemcells.html>> (1 January 2005).
3. Oron Catts & Ionat Zurr, "The Tissue Culture and Art Project," <<http://www.tca.uwa.edu.au>> (1 January 2006).
4. "SymbioticA: The Art and Science Collaborative Research Laboratory," <<http://www.symbiotica.uwa.edu.au>> (1 January 2006).
5. ATCC is a global non-profit bioresource center that provides biological products, technical services, and educational programs to private industry, government, and academic organizations around the world. ATCC is a biological library, which develops, stores, and distributes biological materials for use in the pursuit of scientific knowledge. See <<http://www.atcc.org>>.
6. Edward Said, "Opponents, Audiences, Constituencies, and Community," in Hal Foster, ed., *The Anti-Aesthetic: Essays on Postmodern Culture* (New York: The New Press, 1998), p. 62.
7. Said [6].
8. Edward Said, "Opponents, Audiences, Constituencies, and Community," in W.J.T. Mitchell, ed., *The Politics of Interpretation* (London: Oxford University Press, 1983), p. 11.
9. Tri-Council Policy Statement: "Ethical Conduct for Research Involving Humans," <[http://www.ncehr-cnerh.org/english/code\\_2/](http://www.ncehr-cnerh.org/english/code_2/)> (1 January 2005). The Tri-Council statement is part of an ongoing attempt to create guidelines for the assessment of ethical conduct in human research in academia. This effort is rendered very complex due to the widely divergent standards of practice that typify research in discrete disciplines. Humanities-based research will be very different from medical, legal, and of course artistic practices and dissemination.

## General Bibliography

- Brodwin, Paul E. (ed) *Biotechnology and Culture: Bodies, Anxieties, Ethics*, (Bloomington and Indianapolis: Indiana University Press, 2000).
- Catts, Oron, and Ionat Zurr "Growing Semi-Living Sculptures" from *\*Leonardo Magazine\**, MIT Press, Issue 35:4, August 2002.
- Catts, Oron ed. *The Aesthetics of Care?* (Nedlands, Australia: School of Anatomy and Human Biology, University of Western Australia, 2002.) Proceedings of the first international symposium on ethical issues involved in BioArt.
- Critical Art Ensemble. *The Molecular Invasion*. (Brooklyn: Autonomedia, 2002).
- Gessert, George. "Notes sur l'art de la selection végétale" in *L'art biotech'*, Jens Hauser, ed. (Nantes, France : Le Lieu Unique, 2003), p. 47 Catalogue from the exhibition *L'art biotech'* (authors' translation).
- Latour, Bruno and Steve Woolgar, *Laboratory Life: the construction of scientific facts*. (second edition, enlarged) (Princeton: Princeton University Press, 1986).
- Lewontin, Richard. *Biology as Ideology: The Doctrine of DNA*, (Concord: House of Anansi Press, as part of the Canadian Broadcasting Corporation Massey Lecture Series, 1991).
- O'Reilly, Kira. "Marsyas – running out of skin" presented at the Bio Difference conference, *\*Biennial of Electronic Arts Perth\**, Sept. 11, 2004.
- Rifkin, Jeremy. *The Biotech Century: Harnessing the Gene and Remaking the World*. (New York: Tharcher/Putnam, 1998).
- Said, Edward. "Opponents, Audiences, Constituencies, and Community" from *The Politics of Interpretation*. W.J.T.Mitchell ed. (London: Oxford University Press, 1983). p. 11.
- Stacey, Jackie. *Teratologies: A Cultural Study of Cancer*. (New York: Routledge, 1997).
- Thacker, Eugene. *Biomedica*. (Minneapolis: University of Minnesota Press, 2004).

## Author Biographies

**Jennifer Willet** | Jennifer Willet is an artist, a part-time faculty member in Studio Arts at Concordia University (Montreal, Canada), and a PhD candidate in the Interdisciplinary Humanities program at the same institution. Her work explores notions of self and subjectivity in relation to biomedical, bioinformatics, and digital technologies with an emphasis on social and political criticism. She has exhibited, and presented her research extensively across Canada and internationally. Since 2002, Willet and Shawn Bailey have collaborated on an innovative computational, biological, artistic, project called BIOTEKNICA. BIOTEKNICA has been exhibited in various forms including an upcoming exhibition at the ISEA San Jose, USA (2006), *Biennial Electronic Arts Perth* Perth, Australia (2004), *The European Media Arts Festival* Osnabrück , Germany (2003), *La Société des arts et technologiques (SAT)* Montreal, Canada (2005), and *The Forest City Gallery* London, Canada (2004), amongst others. In addition BIOTEKNICA has been presented in interviews and conferences at multiple venues across Canada, and in France, Australia, Scotland, Germany, and Spain. BIOTEKNICA research has been conducted during residencies at *The Banff Centre for the Arts* Banff, Canada (2002), and *SymbioticA*, The University of Western Australia, Perth, Australia (2004, 2006). [www.bioteknica.org](http://www.bioteknica.org)

**Shawn Bailey** | Shawn Bailey is a practicing artist working with digital print media, video and installation. His current research explores notions of authority, control structures, media and international biotech and pharmaceutical policies. He is an Associate Professor at Concordia University (Montreal, Canada) in Studio Arts (Print Media) and an artist-researcher with the Hexagram Institute. Since 2002, Bailey and Jennifer Willet have collaborated on an innovative computational, biological, artistic, project called BIOTEKNICA. BIOTEKNICA has been exhibited in various forms including an upcoming exhibition at the ISEA San Jose, USA (2006), *Biennial Electronic Arts Perth* Perth, Australia (2004), *The European Media Arts Festival* Osnabrück , Germany (2003), *La Société des arts et technologiques (SAT)* Montreal, Canada (2005), and *The Forest City Gallery* London, Canada (2004), amongst others. In addition BIOTEKNICA has been presented in interviews and conferences at multiple venues across Canada, and in France, Australia, Scotland, Germany, and Spain. BIOTEKNICA research has been conducted during residencies at *The Banff Centre for the Arts* Banff, Canada (2002), and *SymbioticA*, The University of Western Australia, Perth, Australia (2004, 2006). [www.bioteknica.org](http://www.bioteknica.org)

## Author Email and Postal Addresses

Jennifer Willet (Part-Time Professor)

Email: <[jswillet@gmail.com](mailto:jswillet@gmail.com)>

Concordia University  
1455 de Maisonneuve Blvd. W.  
Montreal, Quebec  
H3G 1M8  
Canada

Shawn Bailey (Associate Professor)

Email: <[sabailey@sympatico.ca](mailto:sabailey@sympatico.ca)>

Concordia University  
1455 de Maisonneuve Blvd. W.  
Montreal, Quebec  
H3G 1M8  
Canada