Oron Catts/Dr. Stuart Bunt

SymbioticA, The Art and Science Collaborative Research Laboratory

What is SymbioticA?

SymbioticA is a research laboratory dedicated to the exploration of scientific knowledge in general, and biological technologies in particular, from an artistic and humanistic perspective. It is located in The Department of Anatomy & Human Biology at The University of Western Australia. SymbioticA is the first research laboratory of its kind, in that it enables artists to engage in wet biology practices in a biological science department. Developments in science and technology, in particular in the life sciences, are having a profound effect on society, its values, belief systems and treatment of individuals, groups and the environment. The interaction of art, science, industry and society is recognized internationally as an essential avenue for innovation and invention, and as a way to explore, envision and critique possible futures. Science and Art both attempt to explain the world around us in ways that can be complementary to each other. Artists can act as important catalysts for creative and innovative processes and outcomes. There is a need for artists and other professionals in the humanities actively to participate in research into possible and contestable futures arising from these developments.

SymbioticA provides such an opportunity, in which interdisciplinary research and other knowledge and concept-generating activities can take place. It provides an opportunity for researchers to pursue curiosity-based explorations free of the demands and constraints associated with the current culture of scientific research. SymbioticA also offers a new means of artistic inquiry, one in which artists actively use the tools and technologies of science, not just to comment about them, but also to explore their possibilities.

SymbioticA welcomes undergraduate and postgraduate students from all disciplines—artists and scholars to work in interdisciplinary research teams exploring new directions for new technologies and the effects on society that they might have. It enables artists to access and explore a wide range of scientific materials and processes. SymbioticA is designed as an evolving place of artistic investigation that is accessible to people throughout Western Australia and beyond. It aims to become a resource centre of investigation and research in the field of art and (mainly biological) science collaborations. It is a base for both short and long-term residencies. The residency programs will give priorities to artists who engage in wet biology practices.

SymbioticA's Position in The University of Western Australia

The Department of Anatomy and Human Biology is quite unique in the scope and variety of the research interests of its staff. The present holistic approach to humanity of the department was founded by a human geneticist Len Freedman, who insisted that the department focus on the whole of human biology, all aspects of what makes us human, going far beyond simple anatomy to look at human relations, evolution, race and gender issues, as well as researching the human body from gross mechanics to the finest molecular biology. Central to this humanist approach, and shared with many anatomy departments, is a long tradition of working with artists. The departmental corridors are lined with art works. Hans Arkveld, a sculptor and painter, has been working with the depart-

ment for the last three decades, and other artists have come and gone on an ad hoc basis, but although many observed and gained inspiration there, none actually used the laboratories to produce their art work.
SymbioticA is now a research lab like any other in the department, or is it? The tension of the ambiguous position of SymbioticA in relation to the academic disciplines is generating collaborations that have no other place to evolve. With SymbioticA, artists can now work in the different laboratories in the department, such as the molecular biology, tissue culture, neuroscience, biomechanics laboratories and a biological imaging facility (IAAF). Artists will also have access to CTEC - the state of the art training facility for surgeons, including The Hill International Surgical & Medical Workshops, and a VR haptics room.
The West Australian Lotteries Commission and The University of Western Australia (UWA) jointly funded the set-up for SymbioticA. The Lotteries Commission's main charter is to provide funds "for the benefit of Western Australians". This allows the fund to be used for art works, social projects and scientific/medical research. This enables great flexibility and the funding of projects like SymbioticA that fall between traditional funding agencies but which are clearly for the good of WA. UWA sees itself very much as a part of the community in Western Australia and as owing its existence to their support and tax dollars. The university has three missions: to foster world-class research, education and social outreach. SymbioticA provides a unique facility for Western Australia and enhances the area's international positioning as a place that fosters innovations.
SymbioticA is a non-for profit organization, and as such, is free to explore different modes of operation. However, in order to survive in the harsh reality of the capitalist environment it operates in, while maintaining its integrity and artistic freedom, it has to adapt some of the prevailing rhetoric and practices while maintaining a critical outlook and insisting on a model of cooperation and collaboration rather than one of competition. SymbioticA is currently working with the university and an external business consultancy firm (Mainsheet Corporate) on a feasibility study to try and identify possible benefactors and a mode of sustainable operation. This endeavour draws on the strong academic experience of the university and the business analysis skills of Mainsheet in order to secure SymbioticA's existence as an evolving symbiotic hybrid of many, sometimes conflicting, worldviews.

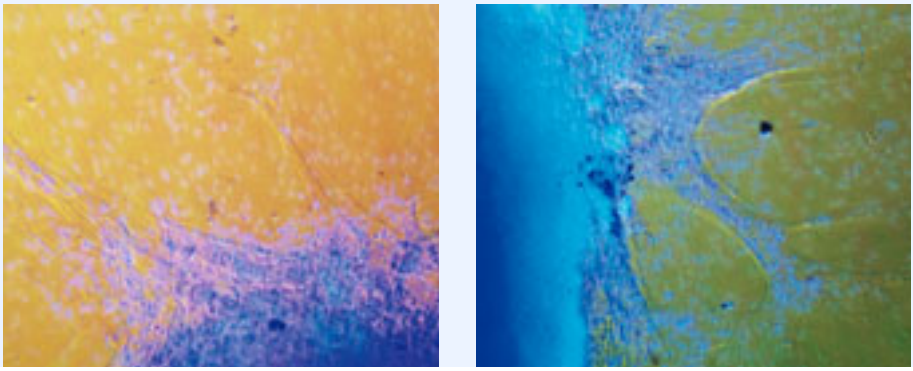
Current Projects

SymbioticA Research Group

The group includes artists, scientists, programmers and engineers. The group is researching projects linking art to tissue engineering, neuroscience, biomechanics, physics, and robotics, and is collaborating with other research groups. It is currently researching "Fish & Chips" (more information about the project can be found in the paper The Current Status of the Research into Fish & Chips, under the installations heading).

"Fish & Chips" and ethical concerns

"Fish & chips" is the first biological art project to be conceived and developed in SymbioticA. It is a pioneering interdisciplinary research project, and as such, has generated issues that never existed before within the university research system. These issues go beyond SymbioticA and will confront any organizations or individuals carrying out wet biology art practice. Historically the use of biological materials in art has always been very common but rarely acknowledged (hair for brushes, canvas, dyes, wood), and aesthetic decisions were made in the breeding of mutant plants and animals such as Koi carp



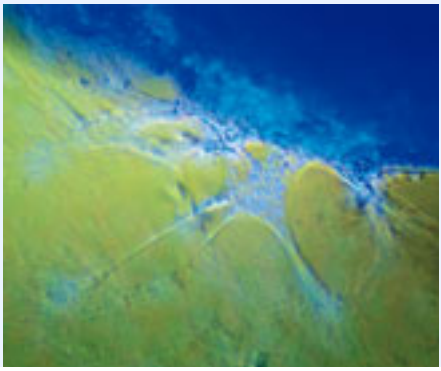
Hieke Wiess

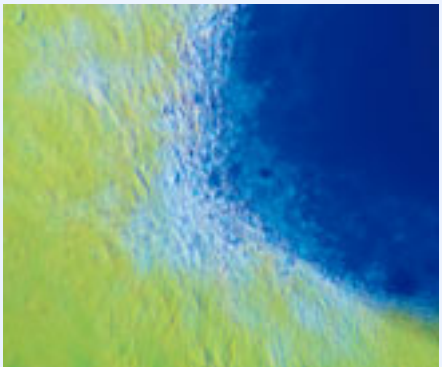
Outgrowth of cells from an isolated graft from the central nervous system of a gold fish

and orchids. The use of biological materials by artists in the context of the new biomedical research intensifies the dilemmas that we as a society face. One of them is the use of animals; part of the *Fish & Chips'* experiments involves the use of goldfish.
Electrophysiological recordings have been performed on some fish brains, and some of the fish's central nervous system has been used for tissue culturing. Some fish had to die in order to increase our knowledge and improve our understanding of how to achieve the goals of *Fish & Chips* Some of the results of the experiments have scientific importance, but the project was conceived as a cybernetic art piece. Before we could carry out any of this work we had to apply to the animal ethics committee in the university for permission to perform these experiments as an artistic project. This caused some consternation within the university, as it was a new situation the university had not directly faced before. The animal ethics committee was set up to decide on the validity of the use of animals for scientific, not artistic, research. To this end its members were drawn from the scientific, veterinary and medical world balanced with members from animal rights organisations such as the RSPCA. The committee did not feel it was qualified to decide upon this matter. In the end an executive decision was made to assess the scientific merits of the work initially and then to sponsor and initiate debate on the use of animals for artistic reasons. The aim, after vigorous public debate, was to convene a representative committee that would be able to assess the application as a work of art and science. This process continues today and highlights the way in which this type of work pushes the boundaries of contemporary thought and challenges society to address some of the ethical dilemmas that the future widespread use of biotechnology may bring.
Fish & Chips' research will continue, but the ethical concerns for SymbioticA are not resolved. One of SymbioticA's missions is to organise ongoing forums to try and develop guidelines and mechanisms to evaluate the use of animals in wet biology art practice. It also aims to tackle other safety, ethical and any additional issues that will certainly arise, as new projects develop. Such issues may be, for example, the use of human tissue and other human or animal remains, the extent of manipulating genetic material, the consequences of developing and controlling sentient beings, the treatment of semi-living objects, the use of hazardous and pathogenic agents, and much more. The level of training and the definitions of responsible practice that will be needed in order to work in the tissue culture, molecular biology and other laboratories, will have to be agreed upon.

The Tissue Culture & Art Project (TC&A)

The Tissue Culture and Art Project (initiated in 1996), is an on-going artistic research and development project into the use of tissue technologies as a medium for artistic expression. TC&A have grown tissue sculptures, "semi-living" objects, by culturing cells on arti-





ficial scaffolds in bioreactors. Ultimately, the goal of this work is to culture and sustain, for long periods, tissue constructs of varying geometrical complexity and size, and thus originating a new artistic palette. This is being done in order to create a contestable vision of futuristic objects that are partly artificially constructed and partly grown/born. These semi-living objects consist of both synthetic materials and living biological matter from complex organisms. These entities (sculptures) blur the boundaries between what is born/manufactured, or animate/inanimate, and further challenge our perceptions and our relations toward our bodies and constructed environment.
The TC&A model of collaboration with The Department of Anatomy and Human Biology has a significant role in the establishment of SymbioticA. By employing wet biology techniques and opening a new paradigm for the field of tissue engineering, TC&A supplied the proof of concept needed for the initiation of SymbioticA. TC&A uses SymbioticA as a base to continue its research and creation of semi-living sculptures. TC&A is developing in SymbioticA an artistic tool kit based on tissue engineering concepts. This kit includes: Artistic cell lines—cells that will be chosen and described based on their artistic qualities; Bioreactors—the environment needed for cells and tissues growth is provided by a bioreactor, that will be designed and constructed to meet artistic and educational needs; Imaging and monitoring systems, and three-dimensional design and construction of polymer scaffolds.

Crossing the Boundaries: Artistic Explorations of Structure and Growth through Visions from Science

Phil Gamblen & Mark Gray-Smith, Phil and Mark were the first residents in SymbioticA, receiving a one-year research and development grant from The New Media Arts Fund of The Australia Council. Their project instigated an artistic involvement with complex and innovative scientific observational techniques and technologies with a view to mapping and displaying a range of structures in these areas. Their research and development focused on the visualization and depiction of three and four-dimensional structures.

SymbioticA is an anomaly, however the dissemination of scientific knowledge through technology is intensifying and so is the need to explore the implications of the new forms of manipulation and the directions they will take. SymbioticA offers a platform for such exploration that focuses mainly on possible presents and futures that the life-sciences/technology confront us with. It is done by forming a symbiotic relationship between the “two cultures,” in the hope that the emergent behaviour will make us more aware of the world and the consequences of our actions while maintaining the sense of play and wonder.