

**A report on the practices of SymbioticA Research Group in their creation of MEART – the semi-living artist.**

**By**

Emma McRae

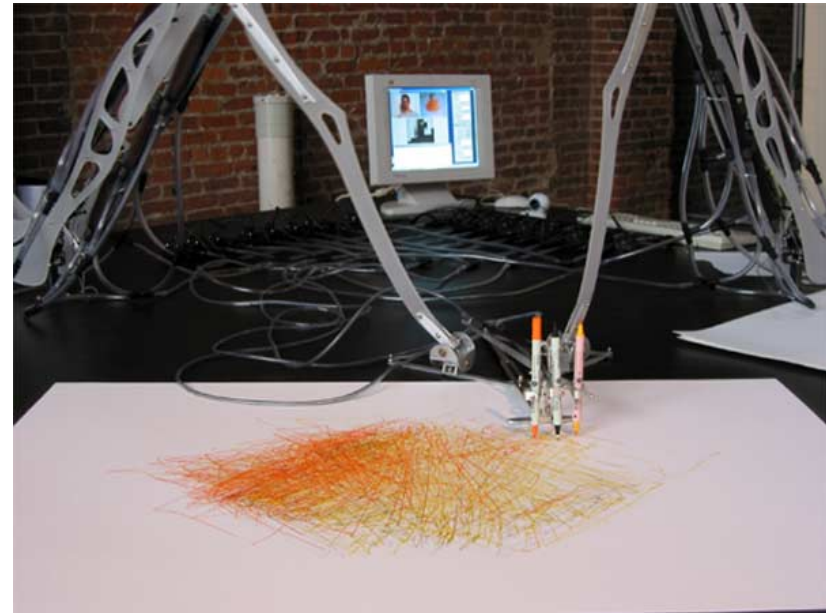
**ACKNOWLEDGMENTS**

I would like to thank the members of SymbioticA Research Group – Oron Catts, Guy Ben Ary, Phil Gamblen, Douglas Bakkum, Matt Richards, Dr. Stuart Bunt, Iain Sweetman, and Dawn Gamblen – for their time, co-operation, and assistance with my research for this report; and Helen Verran for her guidance and encouragement in its writing.

## 1. INTRODUCTION TO A CYBERNETIC ENTITY

The soft popping sounds of air releasing, of the breaths taken between movements as the muscles contract and release on the mechanical structures at work on the table in the centre of the room, reach me first as I walk down the dark corridor in the Australian Centre for the Moving Image. I can see the plastic and metal arms and the tubes connected to two rows of valves – regular black garden hose valves – highlighted by a spotlight, that seem to create the movement of the arms. These arms (the creators call these structures arms, presumably because they hold pens and draw as human arms involved in drawing do) are busy drawing lines in apparently random directions with three different coloured pens on a large sheet of paper on the table. Behind the arms is a computer screen showing a photo of a man's face, a pixellated black and white image, a scrolling text box, and some graphs. The only other thing on the table is a camera which looks down over the arms at the picture they're drawing. A large screen on the wall behind the table shows a graph, a representation that looks like a glacial landscape and is constantly changing form, its peaks and troughs rising and falling in random motion, depicting varied intensities coloured in blue, yellow, white, and red. There are two smaller screens in the opposite corner of the room that intermittently display an image of a science laboratory, a close up of a petri-dish, a screen of 64 ECG-like blue tracking graphs, and a microscope view of cells.

Against the side wall of the room is another table where a man sits looking at a computer screen, absorbed in the information it's presenting him. There are a few other people in the room, where I'm obviously the only spectator, and they are like hosts inviting



MEART in *ArtBots*, New York, 2003\*

me into a space they know intimately and care about. They seem proud and eager to show me around and tell me about their world. These people are the creators of MEART, the semi-living artist who occupies the central position in this space, but is also much more than it first seems. MEART – which stands for Multi Electrode Array Art – is an entity, described by its creators as a “geographically detached, bio-cybernetic research and development project exploring aspects of creativity and artistry in the age of new biological technologies.”<sup>1</sup> It is a combination of hardware, software, and wetware. The hardware takes the form of the mechanical arms, the pens, the tubes and valves of the pneumatic system that drives the movement of the arms, as well

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<sup>1</sup> <http://www.fishandchips.uwa.edu.au/project.html>

as the computers and the tiny (1.6mm x 1.6mm) multi electrode array (MEA). The software consists of a number of computer programs that process information between the hardware and the cluster of mice neurons growing over the MEA that form the wetware component of the bio-cybernetic entity that is MEART. One of the artists, who designed and constructed the robotic arms, explained how the activity of the neurons - stimulated by information from a digital image of a person that is translated into a 64 bit pixel image and transferred via the Internet to the MEA - is translated through software into information that controls the release of air into the muscles that direct the movement of the arms.

The creation of MEART is the result of a collaboration between artists from SymbioticA Research Group based at SymbioticA in Perth, at the University of Western Australia, and scientists from the Laboratory for Neuroengineering at the Georgia Institute of Technology in Atlanta. Oron Catts, the Artistic Director of SymbioticA, describes the collaboration not as that which often takes place between artists and scientists where artists use scientists as artisans or scientists use artists as marketing devices, but as a true collaboration in which both artists and scientists are engaged in exploring the intersection between art and science and what possible futures this may lead to. I met the creators of MEART before I met the entity itself. I had read about and seen images of MEART both in print media and online. I am interested in transgressions – perhaps not so much in what the transgression becomes as in the act of transgressing – and so was intrigued by MEART, this boundary-crossing, disciplinary-challenging entity, and by those who had begun to take steps in crossing these boundaries by creating a bio-cybernetic entity; a cyborg. Our

meeting was facilitated by technologies that allow us to cross time and space virtually, metaphorically, and physically. I initially spoke to Oron Catts via email and on the phone and then contacted and arranged a meeting with artists Guy Ben Ary and Phil Gamblen, and scientist Douglas Bakkum in Melbourne where they were installing MEART as part of *2004*, an exhibition at the Australian Centre for the Moving Image.<sup>2</sup> All the members of SymbioticA Research Group with whom I had contact were extremely warm and open, eager to talk about MEART and about both the scientific and philosophical issues surrounding the existence and creation of such an entity. My questioning of their different roles, reasons, and ethical positions concerning the work were welcomed and encouraged. As a group they are very interested in others' opinions of what they are doing, for they see themselves in the role of questioning and challenging, of promoting questioning and debate rather than presenting answers to issues surrounding the use of biological material in the creation of art. This is evidenced in the documentary they have made about MEART (played during the exhibition at ACMI on plasma screens from June 23 to Sept. 12), interviews conducted during the initial stage of MEART (then called Fish and Chips) in Perth, and their constant interaction with gallery audiences. During previous exhibitions they have given MEART's drawings to people not in exchange for money but for whatever the recipient felt the drawing was worth, as a means of eliciting responses to and opinions of their work. They received things as varied as a pot plant, a hug, a PhD thesis dedication, and an abstract drawing by an 8 year old girl, all of which indicate differing methods and

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<sup>2</sup> *2004*, ACMI and the National Gallery of Victoria, 8 June 2004 - 12 September 2004.

degrees of valuation as responses to the experience of interacting with MEART.

### Artistic Beauty and Natural Beauty

One of the key questions asked in the interviews conducted by SymbioticA Research Group's film maker, Matt Richards, is whether MEART is art. I don't think there is a definitive answer to such a question; and I do not propose to answer it here, but rather to look at the issues surrounding this question with the aim to fleshing out and perhaps highlighting some of the complexities and contradictions of such a question. Art is many different things to many different people, and this changes and is often influenced by the art institutions that present what is to be accepted as art. MEART brings a new range of aesthetic considerations into the world of art and I found this question, as I think many would, personally challenging. I believe that art should, on some level, be aesthetically pleasing – beautiful and emotionally engaging – and on first seeing images of MEART I was drawn to the beauty of the robotic arms, the design and construction and, on seeing them in person, the graceful movement and sounds.

There is a calm, methodical elegance in their concentrated drawing activity that is reminiscent of waves or a bird's wings in flight. But it is also an industrial beauty experienced by those lovers of machines who celebrated the industrial revolution and the dependability and predictability of mechanical motion. Machines, of course, break down and their dependability is never 100 percent, they need to be monitored and attended to in order



Drawing produced by MEART during *Biofeel*, Perth, 2002\*

to ensure their smooth operation, but their tasks are simple, understandable and controllable by humans and this simplicity is a beauty in itself. However MEART is not purely mechanical and thus its simple beauty is complicated by the unpredictability that comes with biological systems. The artists talk about MEART as a project that both attempts and critiques the creation of an entity of "combined elements of unpredictability and 'temperament' with the ability to learn and adapt...that is both dependent, and independent, from its creator and its creator's intentions."<sup>3</sup> While they emphasise that MEART has the *potential* to learn rather than stating that it does, it's the unknown and unpredictable activity of the stimulated neurons that makes MEART a semi-living entity and

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<sup>3</sup> *The Current Status of the research into " MEART – the semi living artist" (AKA Fish & Chips) - Stage 2, p. 2*

adds a new dimension to the simple machinic beauty of the robotic arms. It's this biological element that also brings confusion and uncertainty – and perhaps a little discomfort – when trying to answer the question, *is this art?*



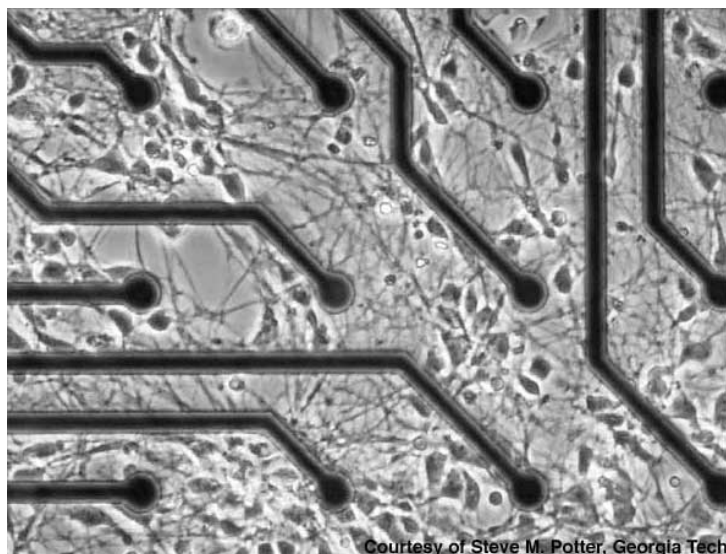
MEART in *Biofeel*, Perth, 2002\*

Douglas Bakkum, the scientist working on the project from Steve Potter's laboratory in Atlanta, is interested in researching the creative potential in biological systems. In describing his work with MEART, he talks about the beauty in the movement of the neurons, almost as though they are performing a spontaneously choreographed dance. Unlike atoms, neurons have intent in their activity – they intentionally move atoms around the body in order to stimulate certain behaviours, eg., to make muscles move. Beauty is a value judgement and can be strongly argued to be in

the eye of the beholder, an act of making meaning from the connections between ourselves and what we see, and between the elements within the object itself. The beauty Douglas refers to suggests an appreciation of an artistic beauty not only in man-made creations but also in nature. Such a view raises many interesting questions concerning the role of intent in artistic creations and in action in general (are the drawings produced by MEART art?<sup>4</sup> Is there intention in the neurons or the arms in creating them?), and also in terms of the distinction drawn between what is man-made and what is natural. Is there a difference between artistic beauty and natural beauty? Can the movement of the neurons really be said to be artistically beautiful? And, as part of a larger entity in which there is artificial creation with intent, can MEART be said to be art? Artifice refers to that which is made by technical skill, art, or workmanship; that which is produced by humans as opposed to what is natural. But where do we locate the dividing line between the two in an entity such as MEART?

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<sup>4</sup> Although the artists refer to MEART's drawings as 'artistic activity' they are careful to note that this must be taken with a hint of irony; they are questioning whether these drawings are art rather than suggesting that they are. However, Guy Ben Ary did mention that he has one of MEART's drawings framed on his wall, and that Mr Daniel Greenfeld, curator of "Spaceworks Gallery" at "The Tank" in New York, exhibited the drawings as works of art in the official opening of the gallery in 2003.



Neurons and Multi Electrode Array (Image courtesy of Steve Potter, Georgia Institute of Technology)\*

The distinction between the artificial and the natural relies on an historical Cartesian separation between man and nature that draws man out of the world and posits the 'natural' world as something to be observed, experienced, and studied. This separation, as the basis for scientific research, has been overturned – or, rather, turned inside out – since Godel's Incompleteness Theorem made the formula for the system inseparable from the system itself, and led to developments in cybernetics and quantum physics in which the observer could not be separated from that which was being observed.<sup>5</sup> This may

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<sup>5</sup> See Hayles, Katherine N., *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, University of Chicago Press, Chicago, 1999

have led to a revolution in scientific methodology and in theories of how we create the realities of the world in which we live, but there remains a persistent belief that as humans we are different from 'nature', that what humans do is somehow not 'natural', and this belief has to do with assumptions of agency and intent. The perception of ourselves as conscious beings acting intentionally in a world of objects leads us to presumptions of power and control in a world that exists for us. MEART questions this presumption by confronting us with an entity that has been created with intent by humans but includes an element of unpredictability – even to the creators – which suggests what they refer to as 'contestable futures' in which a new class of beings may evolve as non-human agents and point out to us that we share the world with an infinite multiplicity of agencies. In addition to suggesting possible futures, MEART makes us question our current attitudes towards other life forms and objects in the world by showing us that the world is possibly a world with agency, with what Donna Haraway has referred to as its own sense of humour.<sup>6</sup> If we are to take this seriously – as seriously as one should take the possibility of agency in the world as a fooling, coding trickster, who's being is dodging, mocking, and teasing – it undermines our presumed dominance in the world and faces us with our own vulnerabilities and unpredictability. It shows us that in the face of the unknown, humour is possibly the best approach when dealing with/in a world of pranksters. But why should we assume, along with Donna Haraway, that the agency of the world is a fooling trickster? Our interpretation of events we don't understand is often tinged with

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<sup>6</sup> Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature*, Routledge, New York, 1991, p. 199



hints of irony in which we still assume a central role. Admittedly each of us is the centre of our own world and so we perceive things that happen as happening to us but we have to allow for – and probably often assume – that the multiplicity of agencies in the world have intentions and desires of their own that do not concern us. When we are confronted with our de-centred position in the world, with a multiplicity of agencies that indicate a multiplicity of worlds, humour is the best response for continuing to play in a game where we certainly do not define, and probably don't know, all of the constantly changing rules. Sometimes another's sense of humour can be dangerous and it keeps us on our toes and steers us away from fear-fuelled revenge if we can learn to adapt and reply with humour rather than defensive aggression.

## 2. LANGUAGE, COMMUNICATION, AND TECHNOLOGIES

In attempting to answer whether MEART is art or science, it will be useful to look at the creators' own descriptions of what they are doing by bringing together science and art, nature and culture. SymbioticA is an organisation that provides residencies for artists at their studio in the attic of the School of Anatomy and Human Biology at the University of Western Australia, where they have access to scientific laboratories, equipment, and facilities, and collaborations with scientists. It evolved out of a desire to formalise the existence of the Tissue Culture & Art project (which still exists as a project within SymbioticA) and to find a home from which artists could work rather than always being guests in scientific departments and having to work within the structures of that

discipline.<sup>7</sup> Those involved in SymbioticA emphasise that, as a 'half-way house' for artists doing residencies on a number of different projects, the reasons for and opinions of producing bio-art are diverse and varied within the group. SymbioticA acts as a facilitator, giving artists the opportunity to develop their work with access to scientific tools within an artistic environment. SymbioticA Research Group (SARG), the creators of MEART, with whom I met and spoke, are a group of artists working within SymbioticA.

Despite the variety of views within SymbioticA, between the members of the group with whom I spoke and on the websites for both SymbioticA and MEART<sup>8</sup> there does appear to be a general credence to what they are doing as artists, from which the trajectories of their personal opinions and practice flow. SARG is a group of artists who collaborate with scientists; therefore, what they are doing is making art. Oron Catts refers to their work with biological systems as creating a new palate for their artistic practice<sup>9</sup>, which he defines as non-utilitarian practice for the purpose of stimulating public debate. Much of the literature concerning their work, on their websites and in papers, positions their work in this questioning role: challenging ideas of art, science, creativity, and life. They highlight the cross-disciplinary nature of their work, which brings together science and art through synthesis and the creation of hybrids. The terminology has a pioneering bent; they note, in relation to MEART, that "as no one has ever done this before, we will treat this installation as an

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<sup>7</sup> Oron Catts, interview, 27.05.04

<sup>8</sup> <http://www.symbiotica.uwa.edu.au>;  
<http://www.fishandchips.uwa.edu.au>

<sup>9</sup> Catts, Oron, *The Art of the Semi-Living*, p. 7.

experiment – scientific as well as artistic,”<sup>10</sup> and speak about the possibility of creating ‘a new class of beings’, envisioning and exploring ‘contestable futures’ and ‘conflicting worldviews’. They are critiquing both art and science by creating ‘partial life’, ‘semi-living entities,’ through invention and innovation, and presenting ‘art as a form of life’.

The scientists involved in the MEART project, in talking about their research into how neuron networks work, also adopt pioneering terminology in referring to the fact that no one knows how neurons make associations between, for example, moving muscles, picking something up, feeling and tasting sensations. MEART is, for them, experimental research into the creative processes of neurons that is pushing the boundaries of what we ‘know’ of how biological systems operate. The language of both artists and scientists seems to concentrate on innovation rather than representation and evoke science perhaps more than art. However, this evocation is according to our traditional categories of what is classified as art and what is classified as science, and how we talk about them. New forms of art often fall victim to the technology attracting more attention than the ideas – as happened, for example, with the birth of photography in the 19<sup>th</sup> century; and this is evident in the technological explanations of how MEART *works* that dominate many reviews of the project. The cross-pollination of language occurring in the communication surrounding this ‘semi-living entity’ shows that it cannot so easily be placed securely within either art or science, and suggests that these are perhaps not mutually exclusive activities.

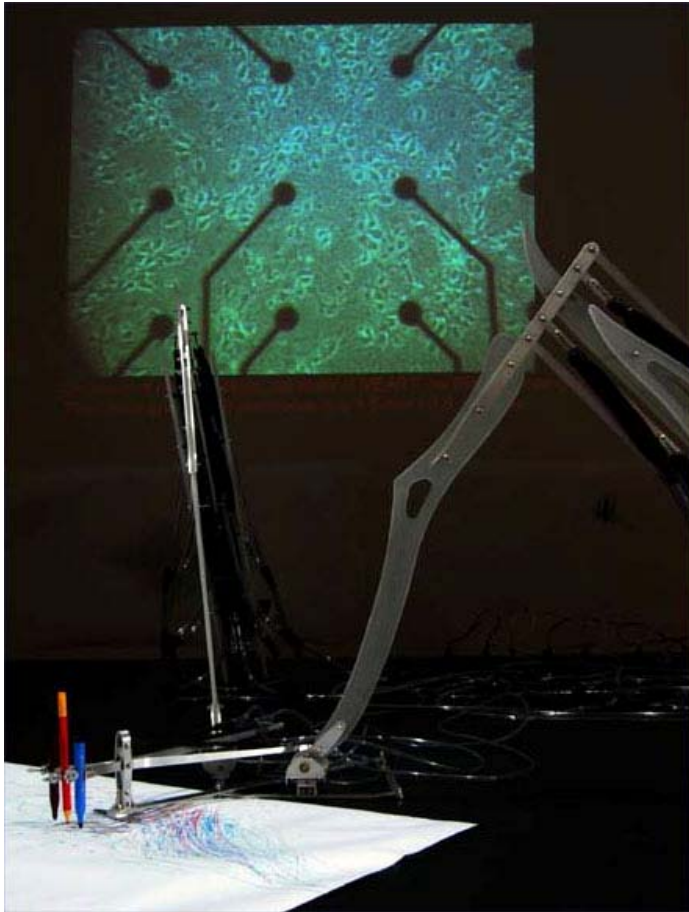
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<sup>10</sup> *The Current Status of the research into “ MEART – the semi living artist” (AKA Fish & Chips) - Stage 2, p. 1*

Communication is very important in this project not only in discussions of what the creators are doing but also in what MEART itself is doing. Both artists and scientists refer to communication that occurs between the different elements of MEART. The neurons *listen* to the information transmitted to them via the Multi Electrode Array. They then process this information and *speak* back to the electrodes from which the spoken information is passed to the program that controls the movement of the arms. It seems that, although the electrodes (non-biological parts) *talk* to the neurons, speaking and listening is limited to activity that occurs in the interaction involving the neurons, the biological component of MEART. The movement of the arms is *controlled* by software and, while the arms are attributed some agency in that they *draw*, the drawing activity results from the neural activity in the dish.

This description, which divides MEART into parts when its existence is that of an integrated entity, reflects both the conviction that agency is a quality of *living* beings (and how we decide what is *living* is one of the questions the artists are posing), and also the modernist notion that an entity is a whole made up of parts functioning together. The artists adopt anthropocentric terminology in discussing MEART in which they refer to the machine element as the ‘arms’ or ‘body’, the biological element as the ‘brain’, and the passing of information through the Internet as the ‘nervous system’. This draws us closer to MEART, perhaps helping us to feel more comfortable when confronted by this semi-living creation, by evoking bodily relations between us and this active bio-cybernetic entity.





MEART in *Biofeel*, Perth, 2002\*

## Embodiment and Ethics

Embodiment plays a central role in discussion surrounding MEART. One of Douglas Bakkum's main interests in his research is in embodying neurons to see if they can learn something and make associations about the environment he gives them. The artists from

SARG had already created mechanical parts that could provide robotic embodiments for the neurons so it was a perfect opportunity for him to extend his research beyond computer simulations into physical environments. Providing a body for the neurons – the brain – is also of great interest to the artists in the creation of this semi-living entity, especially concerning the philosophical aspects of a group of organs that have been brought together to form an entity across different time zones and continents. There is an interest in what happens when a part is removed from the body which was seen to give it life and how it continues to live in its new environment, its new body, and to evolve in directions that had not been considered before. People are confronted by this transgression of organs through time and space, this dislocated body, which poses questions about what is living - how we decide when and whether something is alive. It proposes a new understanding of what an entity is as a being with agency. The entity that is Aristotle exists through different times and spaces through the literary technologies of the written word and material technologies of printing presses. His physical *body* does not exist in two different places at the same time, but if his 'body of work' is read as an extension of his biological being and taken to be a part of the entity that is Aristotle, we see that this entity continues to evolve temporally and geographically as a material, social, discursive being. Traditionally we would not attribute agency to books and words but perhaps through the existence of entities such as MEART we will develop a new, more inclusive, expansive idea of what life is. This dilemma surrounding what we consider to be living consequently raises concerns regarding how we deal with these entities ethically.

MEART was installed in Perth as part of the *Biofeel* exhibition in 2002. On a particular day during the exhibition, MEART was performing a drawing from the stimulation of a digital photograph fed through the neurons in the lab in Atlanta. Guy Ben Ary was in the gallery monitoring MEART's performance when suddenly the arms stopped moving. There was confusion about what had happened and, via an Internet messaging service, Guy contacted the scientist monitoring the activity of the neurons in the lab to ask what had gone wrong. The response that came back from the lab was that the neurons had died. There were audible gasps in the gallery as people were struck by the full realisation that this entity was alive and that, in that moment, they had been witness to its death. As the arms remained lifeless in the centre of the room and the scientist replaced the neurons with a new culture in the lab, the atmosphere in the gallery was completely different from 5 minutes before when people viewing the work had been concentrating on the physical presence of the robotic arms and less aware of the neurons performing their activity thousands of kilometres away.

Both the artists and scientists responsible for the creation of MEART refer to practices of care that are essential in such a project. Douglas Bakkum talks about the neurons as living matter that (who?) need to be fed once a week with sugars and nutrients to ensure their health and prospects for growth and learning. MEART is a project that can not be left in the gallery as a finished work of art but requires constant care and attention, feeding and looking after; the responsibility and ethical considerations involved in the creation of such an entity raise questions about the distinction between art and science: whether the use of biological/living elements is justified in scientific research that may lead to curing

disease or aiding disability but not in artistic endeavours that may lead to a greater understanding of life and compassion. Is the research, development, and growth of mental life, that which is normally labelled culture, less important than physical research in the name of science? Can science, as a human performance in the world that takes place through various and multiple technologies, really be said to *not* be culture?

SymbioticA's research projects have to apply to the same ethics committees as scientific projects involving the use of living material. When SymbioticA Research Group first applied to the ethics committee at the University of Western Australia for approval to create a semi-living entity, the committee concluded by disqualifying itself from making a decision because the chairman felt that the committee was not equipped to make such a decision concerning the use of cells for artistic rather than scientific purposes.<sup>11</sup> As exemplified in their practice, these artists obviously feel that such use is justified but they have faced ethical dilemmas in their work which have caused sleepless nights. For MEART, the neurons come from a store that is cultured in the laboratory for which one animal was initially sacrificed but does not require the ritual killing of living beings. The project out of which MEART grew, called Fish and Chips, involved the use of fish cells for which the artists sacrificed five goldfish, and this caused much greater distress than the cultured neurons. There was also greater proximity, the artists had to do the sacrificing themselves and then personally take care of the cells that formed part of the

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<sup>11</sup> The decision was passed to the Vice Chancellor, who approved the application after requesting it be re-submitted with a stronger emphasis on the scientific aspects of the project.

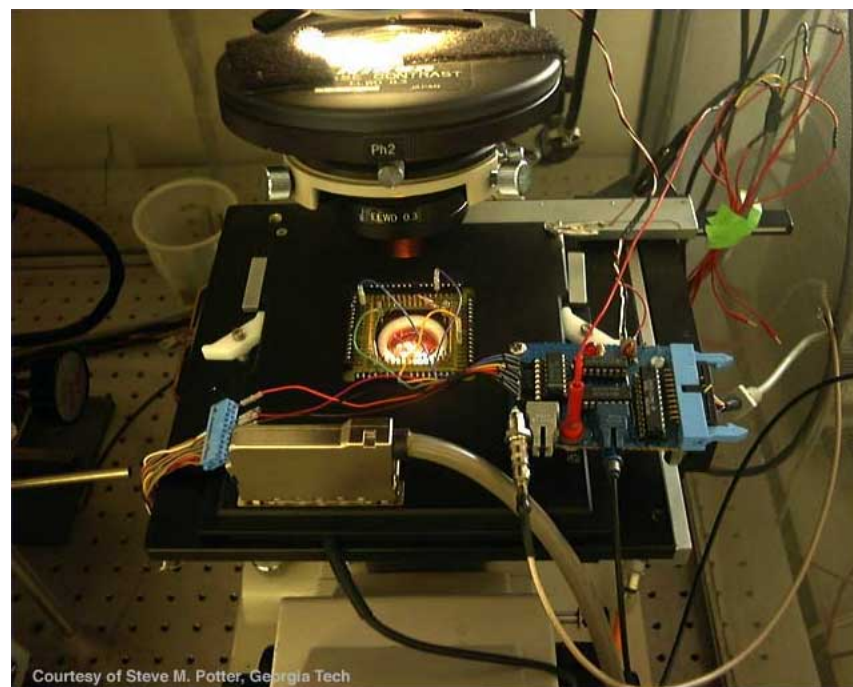
artwork in the gallery<sup>12</sup>; the neurons that are the brain of MEART are in a laboratory on the other side of the world and are being cared for by others. However, the artists have not forgotten or learned to overlook the ethical issues involved in creating bio-art, and part of their motivation in this creation is to raise questions about the perceived difference between living and non-living entities, how we make this decision, and our responsibility in caring for them. In raising questions about care, the artists are performing acts, which could be seen as either violent and cruel or as the ultimate expression of care (euthanasia), for which there is no precedent, and this forces us to think about the ethical issues surrounding these acts.

### Performing Technologies – Performing Entities

Oron Catts says that art is about life, that it can be a process or an object but if its motivation, the intent in its creation, is non-utilitarian - not functional - then it is art. MEART is about art as process rather than object, it is performance art. MEART is always changing, always evolving - there is no finished piece and, as Guy Ben Ary put it, "it is never ready" for exhibition; the time in the gallery is an ongoing experiment. MEART performs its drawings in the gallery space in front of the audience; this semi-living artist is a performance artist who is also being performed by the other actors in the room and in the laboratory. These performances are enacted through various technologies which inform and influence each other in inseparable networks. These technologies can be considered in the following groupings:

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<sup>12</sup> *Fish and Chips* was presented as part of the Ars Electronica Festival, *Takeover*, in Linz, Austria, 2001.



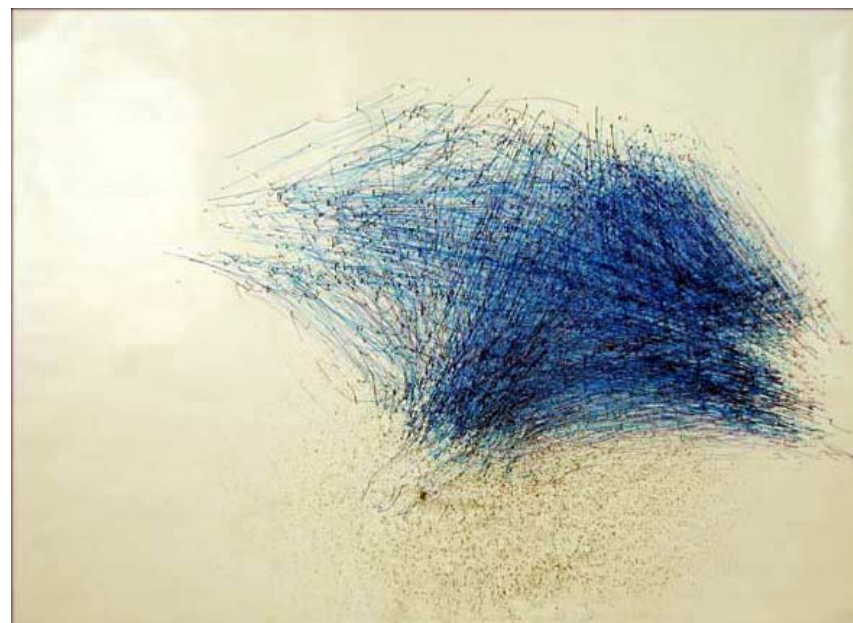
Neurons connected to MEA (image courtesy of Steve Potter, Georgia Institute of Atlanta)\*

**Material Technologies:** metals, plastic, screws, bolts, valves, computers, fibres, neurons, cameras, pens, paper, laptops, scientific equipment, sugars, nutrients, electrodes

**Literary and Discursive Technologies:** papers, presentations, artists' talks, wall texts (in the gallery), websites, reviews, articles, interviews, documentaries, catalogue essays and images, funding proposals, acquittals, ethics committee applications, email, graphs, diagrams, drawings

**Social Technologies:** university hierarchies, ethics committees, art practice and art institutions, curating, art-science collaborations, the Internet, inter-university politics, gallery visits

These technologies, and more, are employed in the practice of the artists and scientists who create MEART – they are the technologies of the bio-art which is performed by the members of SymbioticA Research Group. None of these technologies can independently be said to form the entity that is MEART. Using literary technologies the artists created a discursive entity that they presented to others through social technologies that provided them with the means of employing material technologies to build the physical form of the entity. But the process is not linear in the way this could be read, moving from literary to social to material technologies, for the entity is an evolution that was *born*, not just through written documents but also in discussions and through the neurons and other materials already in existence. It is the new relations between these various technologies that gave birth to the particular entity that is MEART, and it is these evolving and interdependent relations that continue to give it life. In the gallery, MEART is performed through the materials of its body, brain, and nervous system; the textual drawings, graphs, essays and discussions; and the social relations between artists, scientists, audience, curators, and the media. Outside of the gallery, MEART continues to live through the artists' and scientists' daily research practices, the flow of words generated in discussions, presentations, reports (such as this), journals, websites, etc., and the proliferation of images; and through the social interactions, networks, and hierarchies between artists, scientists, members of the public, journalists, ethics committees, and university departments.



Drawing produced by MEART during *Biofeel*, Perth, 2002\*

The creators of MEART are driven by a curiosity to understand what life is, the processes that produce activity and creativity, and this is expressed in different ways, through the use of different technologies and the differing uses of similar technologies, by the artists and scientists. They have different methods of exploring, experimenting, and challenging, but they are interested in the same issues concerning life, creativity, and knowledge. In their different ways of expressing these interests and concerns, they in fact create MEART as not one, but several entities – or, rather, as a multiplicity.

- For the scientists, MEART is a research experiment into neuron activity and the processes of creativity; they gather data from the experiment that they can analyse to try and advance

their knowledge of neuron networks, which could lead to the development of further technologies to aid and extend human abilities. MEART is a way of embodying the neurons in order to explore the associations they make in stimulating activity in that body, and how the information from the body feeds back into and changes the activity of the neurons to possibly bring evidence of learning through this loop. Here MEART is an object in the world that produces analysable data from which we can learn about life processes in biological systems.

- For the artists the neurons are a brain, connected to a body via a nervous system. MEART is a semi-living artist who performs artistic activity, and stimulates questions and debate about what is art, what is living, where we locate agency and how we should address and care for these beings. Here MEART is living work of art that stimulates and challenges philosophical and ethical thought.
- MEART is also a system that needs to be monitored for fatigue, damaged muscles, air leakage, ink shortage, computer system failures and crashes, software bugs, etc.; in this it is a living machine for which Guy, Phil, and Douglas are mechanics ensuring the smooth operation of the entire system.
- For some MEART is a technology that allows us to envision possible futures and advance our operations in the world. Some of the code written for MEART by Douglas Bakkum<sup>13</sup> is

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<sup>13</sup> The software of MEART is written by both Douglas Bakkum and Iain Sweetman.

now being used by other scientists in the laboratory in Atlanta, indicating that this radical and confronting use of technology may enter normal everyday practice, eventually not only in the laboratory but in society in general.

- And MEART is a symbol; a symbol of our hopes and fears, our (mis)understandings about life and death, and of change.

MEART is on display in a public gallery and so is very likely many more things, many different entities, to many people in addition to those I've described here. These entities reinforce each other for MEART exists only as this multiplicity, born through various technologies - social, literary, and material; and these entities cannot be extracted out into singularities. A multiplicity is not a plurality in which one becomes many, it is the birth of an entity through multiple diffracted and converging perceptions and positions.<sup>14</sup>

### 3. BRINGING NATURE INTO CULTURE

By dwelling in this cross-over between art and science, the creators of MEART are highlighting the fact that through their actions they are performing what can be called a nature-

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<sup>14</sup> For more on the multiplicity of entities, see Mol, Annemarie, "Ontological politics. A word and some questions", in Law, John & Hassard, John (eds.) *Actor Network Theory and After*, Blackwell Publishers, Oxford, 1999.

culture.<sup>15</sup> They are blurring the two seemingly separate realms of art and science through their actions, their creations, their words, and their bodies. This blurring is enacted, amongst other practices, in artists working in laboratories, scientists presenting talks at art shows and symposiums, in bio-cybernetic entities performing in art galleries, in the very bodies – the existence – of these beings who do not sit securely and comfortably in either of these categories. The very bodies of the artists and scientists alongside other biological and mechanical bodies blur into each other in this questioning of the bounded zones of nature and culture. However, as SymbioticA Research Group is a group of artists (who collaborate with scientists), and their public presentation of their work takes place mostly in art/culture contexts, their main means of posing these questions, of showing that science and culture are each inside the other, is by bringing science into culture. They've brought the literary, material, and social technologies of science into art institutions and festivals, thereby presenting science *as* culture and undermining the belief that science uncovers a nature that is somehow separate from our human actions. They are highlighting the ways in which we *do* science, how we therefore *do* nature, and how in this doing – through these performances – science and nature are not and cannot be separated from culture. They are making living systems, the performances of living systems, into works of art in explicit ways that show how communications between all kinds of 'natural' and 'un-natural' bodies are cultural exchanges.

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<sup>15</sup> A term employed by Helen Verran to describe the convergence of nature and culture in the practices through which we perform different realms of our lives.

Bringing science into culture in this way is creating a lot of noise in the world of art because the implications and challenges are immediate and threatening to those whose occupation is philosophical enquiry into human practices and realities. These actions are having less of an impact in the world of science, which perhaps sees its research as more fact based than speculative and still relies heavily on an experimental, repeatable methodology that lends an aura of truth to their 'discoveries'. It may be a slower process for the questioning of this methodology through the creation of entities such as MEART to cause any significant sway in the certainties of the science world. However, performing the nature-culture that is MEART in such a way that reflects human form and our anthropocentric perception, SymbioticA Research Group are shedding light on the very culture of science. Their creation shows that our way of understanding living entities in the world is through forms that have bodies, brains, and nervous systems – parts which form a functioning whole. Creating MEART in this form reinforces this perception, and perhaps undermines any effort to conceive of different forms of life that do not reflect our own organisms; a conception that is perhaps not possible.

In placing these living systems within an art context these artists and scientists are raising questions about ethical attitudes towards life by bringing an awareness of the roles we play in creating life and death, of our care and responsibility in our relations with, and agency in, the world. Prompting us to consider the effects of our actions in this way may lead to greater awareness and desire for sustainability in our environments. MEART cannot survive without the care and attention of the artists and scientists, and in this they display their concern in upholding their responsibility to and for this



entity. To separate them from the semi-living entity is to forget that they are in fact parts of the living system that is MEART and in this, perhaps more than anything else, they have created a being that questions our categorical understandings of nature and culture. If culture is that which is man-made, then man cannot *be* culture; yet these people have placed themselves in a gallery as part of an art work, a product of culture. This is not the first instance of this happening; many earlier performance artists have presented themselves as art, but the focus has usually been on their performance as the work of art rather than the artists themselves. In the case of SymbioticA Research Group, MEART is performing an 'artistic creation' but the artists and scientists are simply *in* the gallery, caring for MEART - as part of the living system of MEART - and this places nature – human being – in the very heart of culture. This suggests that, not only the things we make, but we ourselves are cultural beings - not only in terms of our fashions and customs but in our very existence in our world. This turns both nature and culture inside out in ways that force us to imagine an entirely new understanding of life. This altered perception of life, this challenge to our ways of thinking, which is the explicit purpose of MEART, may come less through the overt spectacle of MEART than through the more subtle, implicit cultural shift that is being enacted in the presentation of life – of nature – as culture.

The artists from SymbioticA Research Group and their collaborative partners from the Laboratory of Neuroengineering in Atlanta use the term 'entity' to describe MEART, and I have tried to show here how this entity is much more than a pair of robotic arms connected via the internet to some mouse neurons grown over a multi electrode array. It is a multiplicity that is born through the convergence of varied technologies that creates hybrids

within our traditional realms of art and science, both theoretically and in its very physical, bodily being. In addition to the hardware, software, and wetware described by the creators, this entity is also the artists and scientists that created and maintain its life, their communications and relations, the discussions that are generated through audience interaction in the gallery, and the papers and reviews that generate and flow from its existence. SymbioticA Research Group have created an evolving living system, an entity that visibly questions the distinctions between nature and culture, art and science, living and non-living in ways that are both explicit and implicit in their practice, their language, and their relations. Questioning whether MEART is art through the context of its presentation enables us to shed light on these practices and the ways in which they challenge our cultural preconceptions. MEART does suggest new understandings of life but not only as a merging of biological and artificial elements in which parts are removed from their 'natural' bodies and given alternative embodiments with which to evolve - and which require revised attitudes of responsibility and care; but also as a blurring of the boundaries between nature and culture which proposes a need for a new conception of life that assumes, at its very foundation, that culture is natural and that nature is already deep inside culture.



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## **INTERVIEWS AND PRESENTATIONS**

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Phil Gamblen, face-to-face interview, 06.06.04

Douglas Bakkum, face-to-face interview, 06.06.04

Floor Talk, SymbioticA Research Group: Guy Ben Ary, Phil Gamblen, and Douglas Bakkum, at the Australian Centre for the Moving Image, 09.06.04

\*All images courtesy of SymbioticA Research Group