

# Interview with Stelarc

*This is a text of an interview Oron Catts conducted with Stelarc.*

*The interview took place on Sunday 6th of October, 1996 at Cafe 130 in Oxford St. Leederville, Western Australia. This text is reformatted from the original Tissue Culture and Art Website (<http://www.tca.uwa.edu.au/project/interviews/stelarc.html> )*

## **Oron**

I have seen your performance last night (at Boans Warehouse) and was really impressed by both the performance and your third arm. When I saw its acrylic cover I thought about the possibility of covering it with your own skin, leave the hand mechanical and just cover the rest with your skin.

## **Stelarc**

Well of course, this project isn't the beginning and end of these things, the idea would be to create a new project with that sort of an idea in mind. So then you could plan how you will do this. No, that is very very fascinating, I am most certainly interested in that kind of idea, I... you know about the work in MIT, growing an ear and a nose and those kind of things?

## **Oron**

Yes, I have tried to contact them but I did not get an response from them, yet.

## **Stelarc**

Those people are getting so many requests and they can deal just with either established research or with people who they know directly.

## **Oron**

I am trying to avoid dealing with medical or agricultural uses, so the ethical problems are not so big. That is part of my philosophy, I am trying to find different ways in which I can

appropriate the use of biotechnology, I am looking at environmental views showing the ways we can use biotechnology to generate renewable resources...

**Stelarc**

I will talk to you about an idea that I had, which I still thinking about the best way of implementing it, but it was this idea of how you would, kind of, disperse your genetic matter or your nervous system in to the internet, and the idea was... I mean, well I am still not really satisfied with this idea, but the idea was, maybe to sort of like, at certain global sites, maybe with CUSeeMe or something like that. You would watch through a microscope a sample of your tissue growing , maybe a culture of your skin growing. And just this idea that you will have global sites that you can inspect, via the internet, those tissues which will grow and grow.

**Oron**

Do you mean cyber tissues or virtual tissues?

**Stelarc**

No, we're talking about real tissue, but scanned and looked at through the Internet. You know, obviously there are some sets of ideas there that might be very interesting together.

**Oron**

I just came up with the idea of using tissue engineering which will enable us, in the future, to use biopolymers scaffolding to produce layers of cells, to grow surfaces on man made structures (I showed him the article from Scientific American which deals with bioengineering).

**Stelarc**

I often look at Scientific American, but I haven't seen this issue.

**Oron**

This is another article about the way they are grafting skin in separate layers in which it is combined just before the treatment in patients.

**Stelarc**

But actually this would be interesting information just for this present project of mine, if it will go under way. I would really like to get a copy of this article. Is this interest of yours is purely theoretical, or you in fact growing tissue yourself?

**Oron**

No, unfortunately I don't have the facilities at the moment, but I am experimenting with moss and lichen. I am planning to do my Phd, and by then I am trying to get the background information.

**Stelarc**

We should keep in touch.

**Oron**

I am 'using' you as an example for a post human perception of the future...

**Stelarc**

I think maybe some of the ideas that comes with this remote stimulation ideas- with the present system it is possible that you here in Perth could remotely activate my body in Melbourne. What that is effectively means is that you are extruding your awareness and actions into another body at another place. This body becomes a host, for your remote agent. So, at the moment it is purely a muscular kind of transparent or displacement of motion from one body to another body. But, one can conjure up also optical and acoustical transfer. Something that you see here, I see over there, or we have a kind of telemathic vision which is the result of a topological mapping by search engines scanning the Internet creating kind of a new visual maps of bits of visual information. There are some really exiting possibilities, but then if you can some how engineer a direct connection, or the idea of having..

**Oron**

Your skin spread all over the world.

**Stelarc**

Yeah (laughing). I will show you another idea which is an extenuation of the one I am currently working on. In this idea what I am interested is a kind of seamless interface between people. So here, if you are monitoring the EMG signals from a hand, for example, and you are mapping the finger's movements to someone else's body movements. So, this kind of fractal changes of scale, a finger is like an arm, three segments, three joints. So, like bending my finger like this might bend your arm like that. Or, moving these two fingers would move your legs.

**Oron**

Then you can have like an orchestra of people moving according to your finger's movements.

**Stelarc**

Yeah. But the idea of doing it this way is that you are picking up electrical signals within the body, that electrical flow goes into the computer linked to a modem over the Internet to another modem to another computer into another body. Now, of course there isn't really a flow of electricity but it is a subjective and seamless interface between one body and another body. And then this change of scale, sort of makes it slightly different with adjustment or awareness of this other thing.

I was always interested in Biotechnology but it is one of these areas where I haven't got any expertise myself. All this space I haven't really exploited, except in this kind of simple, naive idea. I'm just simply distributing tissue cultures that would be nurtured and watched as it grows depending on Internet involvement.

**Oron**

That is a beginning, but then you have to talk to researchers and scientists, who sometimes are so fixed in their ways of thinking, and many times you find it hard to bridge the gaps in perceptions. There is a kind of barrier that you have to break. We need the scientists to provide us with their knowledge...

**Stelarc**

But that is what's interesting, if you're getting artists and designers who are really asking the difficult questions about biotechnology or about post human bodies, or what it means to have a self that seems to be fluid and disperse over special distances, that really what it is all about.

**Oron**

I am doing it in a smaller scale, I am trying to reduce the problem, leave the human body out of it for a while, but for the meanwhile lets start with incorporating living matter with man-made structures. What is your perception of this concept?

**Stelarc**

I do know that there are experiments now and partially successful ones about fusing a neuron cell with silicon chips circuitry, and although this neuron cell is functioning at the moment is only acting as a single sensor and nothing else. I mean in a sense, it becomes proven that this is plausible and that living tissue could be fused or interfaced with other forms of technology. So I am very excited about this kind of hybridisation, of living cells with other intelligent structures, whether they will be machines or circuitry or even the notion of trans-species configurations. I think that what needs to be explored is the different structures and dynamic operations of, on the one hand, living cells and tissues, on the other hand, that of the silicon chip circuitry. Problems of heat, problems of electrical flow, and since the body is producing its own electrical activity, in a sense, there is real possibility to create a seamless connections between the body and its technologies.

**Oron**

You can take it even one step further when you will not need electrical circuits, if you can engineer organic matter to do whatever you want it to do. So you can just go away from the mechanical phase of human existence.

**Stelarc**

I think the notion of remaining (organic), certainly the ideas of creating organic computers or creating organic structures that perform other operations is possible and must be explored. My feeling that although there are advantages with soft tissue, there also are disadvantages; the vulnerability, the longevity, those sorts of problems need to be addressed, and my feeling is

that simply working within genetic and natural coding ultimately it is not enough, even though it will make steps towards developing bio-computers. I think it will have to be some kind of an hybridising process where bio-computers will generate other technological configurations, structures and designs. I also have the feeling that what is interesting is neither purely in the biological, nor purely in technological but in the operational space between, because it is more ambiguous, ambivalent space that of slippage and uncertainties especially in the realm of art and also in the realm of design. Those kinds of ambiguities and uncertainties generate new possibilities, new creative potential that does not exist anywhere else. So I think, in a sense we are short of either focus, depending on our current paradigms, either on the anatomical and the biological, or now on the technological and the machine-like. But it is going to be advances in both those and in fact the notion of nanotechnology, or the further engineering of nanomechines will increasingly blur the distinction between bacterial, viral, and machine structures.

**Oron**

You can say the same thing about biotechnology. That it is there to blur the differences between what is living or not, between what is inanimate and what is animate.

**Stelarc**

Yes, and of course you need some instruments and technologies that would function in this cellular level, or the DNA coding level that splicing and modifying, and nurturing and replicating living tissue. This is going to occur.

**Oron**

Like the technique of the PCR that is like copying segments of the DNA and by that amplifying segments of the desired DNA using enzymes.

**Stelarc**

They also developed artificial polymers that are conductive so they twitch to electrical stimulation and produce, at the moment, very small poling forces. But, there is the notion of an artificial muscle, or an artificial membrane that is responsive to electrical flow, or that can be seamlessly interfaced to a living tissue. Those sorts of things are happening. I think that

this is a simultaneous exploration of both of these, which will develop new interfaces and seamless connections.

**Oron**

I think that not enough is been done in biotechnology, it has to be explored by other means.

**Stelarc**

I was very fascinated with the MIT approach, do you know in principle what happens?

**Oron**

Yes, basically what they did was to use this mouse that is genetically stripped of his immune system, so they can implant foreign bodies and tissues without them been rejected. Then they grafted a piece of the kid's skin and built a scaffolding out of biopolymers, bit by bit. Once it was completed they cut it off and transplanted it to a boy. Researchers are now looking at ways to grow tissue cultures inside eggs. Apparently it provide one of the best environments for culturing tissue.

**Stelarc**

I would love to have an artificial ear implanted on the side of my face as an extra ear. Even if was just visually done, if it can be done and the graft took. That will be really interesting. Well if you find out anyone who is willing to do that to me as patient - I will take it. I made a third arm, now having a third ear would be very nice. Even though it doesn't work.

**Oron**

So what about starting by growing skin to cover your third arm?

**Stelarc**

Of course, I would design it differently, at the moment it is a very combatant thing. But in the way that this thing (the third arm) was thought about, that did not matter. And also you had to specially separate it. So, because of the difficulties in attaching it to a whole arm, Where do you attach it? It is a real difficult design problem. would you attach it from behind? Then it will be difficult for the arm to come around the front. If you attach it here (points to below his armpit) then (pulls a face)... You now, it is not an easy design problem.

**Oron**

So I wonder how the multiple armed Indian gods solved it?

**Stelarc**

I don't think they did. You realise that the design problems are very particular and peculiar ones, and it is not easy to solve. Especially with the overall structure of the organism's body.

**Oron**

Yes, bodies had evolved with the principal of less effort, so it is sometimes hard to find a good place to attach things to it.

**Stelarc**

That would be great if you can come up with a mechanism that only part of it will be covered with living tissue. So you can see both the inside and the outside.

**Oron**

Yes, this is how I imagined your third arm, that the hand will stay mechanical, but the attachment part would be covered with living skin.

**Stelarc**

Ho, yes.

**Oron**

Do you think that those kind of developments will contribute to your philosophy of post-human?

**Stelarc**

Yes, I think so because when I thought of making a third hand this was state of the art. This was a way of creating a kind of a mechanical structure that could be interfaced to the body. The hand would be activated by internal muscle signals. So this was a kind of symbiotic connection to the body. The only interface there was of the electrodes stuck to the skin or little needle electrodes inserted into the muscle tissue itself. But here there is a possibility



where you can actually extend tissue growth beyond the surface of your body to envelope and to connect bits of technology or other interesting appendixes. So I think it is very important. This idea of developing strategies both from the biotechnological and the totally silicon chip circuitry side, how can those areas can be seamlessly connected, how can they be structurally interfaced? So, this is a really exciting area, and I think it is necessary to continue with both approaches.

**Oron**

Using tissue engineering it will be possible to graft a piece of his skin and grow it to cover his third arm, during performance blood supply would be able to be taken from the artist. Between performances the skin will be either kept in suspended animation, or kept in a tissue culture state. Or an art gallery with glass cases hanging from the walls in which there are grafted skins from different organisms living as colonies. What do you think about those scenarios?

**Stelarc**

So it is feasible that you can grow them together or glow them together?

**Oron**

Researchers already found the chemical that adheres mammalian cells. So different cells without an immune mechanism can be integrated with other cells from other organisms. But still, much more research has to be done.

**Stelarc**

It seems I am going to ask you more questions than what you are asking me. But do you know the rate of growth of skin in culture for burns injuries?

**Oron**

I don't have the exact data but I know that they are using growth factor to increase growth and sustain the culture. And in a matter of days they have enough to cover the wounds. An interesting point is that researchers are now using foreskin of babies because there are limited cycles of cell replication.

**Stelarc**

So I am in trouble then.(laughs). It might be really interesting to think about it in a sculptural way. Like to come up with an object that lives in a nurturing environment of hormones and neutrinos and growing skin over an armature, like that.

**Oron**

Yes, that's what I was thinking about, and in the long run I am looking at furniture and walls. It is still very much theoretical. But using the concept of covering low tech object will help to communicate my ideas. With the wall covering, you can than look at a house as a closed ecological system, where your waste feeds the wells. While some of the wells will produce nutrients through photosynthesis. Again it is very theoretical, in this stage, more than anything else I would like to analyse different reactions to my ideas.

**Stelarc**

I agree, as a practicing artist what is important for me and what authenticates the ideas is the practice of the performance and the actual experience of the interface and the structural interconnections that are possible. So of course, we all get through a learning and theoretical grounding. But then to get into the actual procedures would be important. Because then you would really begin to discover the limitations and possibilities. I think the idea that we are going to do with extending the nerves system over the internet initially would be more of a visual and symbolic kind of thing, but if you can create electrical flows or electrical connections between computers and growing tissue than it would be pretty interesting. Imagine the conceptual interest of growing living tissue over a computer circuitry.

**Oron**

Yes, what both of us are trying to do is to produce a suggestion for the future. And we have to try and make, as much as possible, those kinds of suggestions in order to increase public awareness of those issues.

**Stelarc**

Imagine a chip or a little circuit with an LED display that counts the number of new cells growing as it happening. That would be fantastic, and imagine that as a site on the internet.

And maybe, you have got a dozen sites on the internet where this is happening, this would be an existing conceptual thing.

**Oron**

Yes, if those cell lines are originated from the same source, so you grow in different places in the world.

**Stelarc**

Yes, that is the basic idea. Although at the moment there is no real strategy, this is the idea that ... There are people in Sydney in a software company call Merlin, we are planning to do this together. We are already thinking about the best way of doing it, some of the suggestions at the moment are too crude or naive, any input from you would be fantastic.

**Oron**

I will try to contact the people that are dealing with tissue engineering, and if I could use your name the may help me with those contacts.

**Stelarc**

I am quite happy to credit anyone who is a part of a project, who is helping. Sometimes an art performance or an art piece provides the kind of visual and conceptual grounding for something that might create attention and create interest in someone else's work. So, why not, that would be great. I would be quite happy to be taken advantage of that way.

**Oron**

To conclude this interview I just want to know if you have been approached or if you know about anyone who is doing something similar to what I presented to you?

**Stelarc**

No. No one.