

Speaker	Dr Ionat Zurr & Mr Oron Catts
Talk title	Subverting Regenerative Medicine - how Art and Design use living tissues
Venue	PICA Bar
Time	Tuesday 29 October 2019, 5:30pm

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### **Kate Wright**

Good Evening Everyone and welcome to PICA Bar on this beautiful spring day, the end of the day.

I hope have all managed to get a drink and relax now

Welcome to Raising the Bar.

Tonight there are twenty-two academics from UWA speaking across ten bars in Perth. This is the second year that we have done that and it went so well last year, we decided to do it again this year.

At UWA we are very excited to make education part of our cities popular culture through transforming local city bars into a place you can enjoy a drink while learning the impact that some of our research has on your community

But before we start, I would like to acknowledge the traditional owners of the land, the Whadjuk Noongar people and thank them for their continued guardianship of the land and pay my respects to the elders, past, present, and emerging.

If you are sharing Raising the Bar on social media, please tag, @UWAresearch or #rtbperth19. So we can share your posts.

Tonight's talks are all going to be recorded and they will be published as podcasts on our social media channel.

Our first cab off the rank tonight is Oron Catts and Ionat Zurr.

They are award-winning artists, researchers, and curators, who in 1996 formed the internationally renowned Tissue Culture and Art Project.

Catts is the Co-Founder and Director of SymbioticA the Centre of Excellence in Biological Arts at UWA and Ionat Zurr is a researcher and lecturer at the School of Art and Design UWA. She is also SymbioticA's academic co-ordinator.

These guys have an international reputation as evidenced by the fact that they have been visiting scholars at places like Harvard, Stanford and also at the University of Aalto in Finland.

So they are going to talk to you tonight about subverting regenerative medicine, how art and design use living tissue.

So, here we go.

[clapping]

**Mr Oron Catts**

Before we start, we want to know a little bit about you, so a series of questions.

How many of you self-identify as artists?

How many of you self-identify as scientists?

How many of you self-identify as marketing people, advertising an all of the above? Right.

Yes, we will have to be worried about you.

How of you grew up on farms?

Only one?

How many of you have killed an animal? And used it?

To eat it? To do stuff with it?

Alright, good.

Hopefully, as we continue, you will understand why I asked those questions but tonight we will start by introducing our project a bit and then we can talk about two very specific projects that might be of interest, we are very happy for you to jump in, we are going to be provocative, we going to try and push things, so if you disagree with us, if you ... you know, feel free to heckle, basically!

**Dr Ionat Zurr**

My name is Ionat Zurr and I have ... I am a hybrid. I have a cross position and I am also part of SymbioticA which is laboratory for artists and people from the humanities, mainly in the School of Human Sciences, so in the Science Faculty but I am also the Chair for the Fine Arts Beauty Plan at the School of Design, both in the University of Western Australia.

I am touching on those two if you want, fields.

Also, I want to say that this kind of position that I have is very fortunate, because what we enable now, through the School of Design and through SymbioticA is to enable artists to go into, say, a typical laboratories, mainly biological laboratories and look at life and living materials as a medium,



as a very problematic medium, an exciting medium for artistic expression and for cultural expression.

This is a very unique position that I think wonderfully, happening here in Perth, so keep that in mind.

I finished my push in the University thing.

Maybe I will start by saying that both Oron and myself started a project, our artistic project in Perth, it's under the umbrella of Beauty Culture and Arts Projects and we thought we were very lucky to get some funding from the Australian Council to look at the use of living cells, living cells from animals as a medium to grow culture.

Oron has studied design before and I was a photographer and we both, together, welcome into a scientific laboratory and together with the doctor and people over there, we learned the skills of how do you take cells and you grow them over if you want couples to create 3D sculptures.

I can tell you this is something that anyone can learn.

It is a technique that, if you do put a bit of effort in understanding into it, you can do that.

That's how this whole idea started and led us to where we are today. Do you want to continue?

### **Mr Oron Catts**

Okay.

Yes, so as Ionat mentioned, I started design and I got really interested in this idea of designing with living, biological materials and the idea was that we are starting to see biology becoming more and more as an engineering pursuit and life becomes a raw material and what I kind of speculated back in the 90s was that one day designers would be called upon to design living biological products.

I found this prospect both really exciting but also very disturbing and just to put into context, I just came back from a, round the world trip, including spending a few days in Eindhoven in the Netherlands where the Netherlands or the Dutch Design Week is happening as we speak to have a stream which is called Biodesign now, so twenty five years after I wrote my Thesis, those kind of things are happening and might admit, now I am even more disturbed than what I was twenty-five years ago because I am not really sure it's going in the right direction and in a sense the rest of the talk would be trying to unpack it, especially through two very particular projects that we developed while we were Research Fellows in Harvard Medical School. The first one was there.

We became really interested in what does it mean to use living biological materials for artistic and design ends.

We became more and more interested in what does it mean to our understanding of the concept of life.

Yes, so, regardless of what we are going to do with it, how it's going change the relationship with the idea of life if life becomes this raw material us to engage with and manipulate in such a matter.

So, it kind of made sense that as one of our projects, because we did quite a few, but one project, in particular, we got interested in the idea of food because you can't get more intimate with another life form than consuming it and incorporating it into your body, yes, so, this is kind of the most intimate relationship you can ever have with another life form, way more than sex, it's part of you.

So, food became something important and the question we raised was, what would it mean to eat meat that had never been into a body?

How many of you have heard about this whole idea of growing meat in the lab?

It's huge now.

But when we were looking at it, back in the year 2000, actually the people that work with us were amused by the idea that we would take something, a technology that was designed to grow body spare parts and that is a technology which is called Tissue Engineering and try to think about it in terms of how we can use this technology for other purposes and what does it mean to make something that was supposed to be used for growing organs into meat that we would eat and ....

#### **Dr Ionat Zurr**

I just want to just keep in context to tell you how it started.

We were artists in ... Artist Research ... Fellow Artists in Harvard Medical School in a laboratory by the Professor ... how many of you have seen the image of the mouth with the ear on his back?

Yes. So, which is kind of, disturbing and beautiful if you want socialist sculpture.

Anyway, we were invited to this person's lab and we went over there to learn some of the techniques, I guess the most advanced techniques at the time in Tissue Engineering and Organ Fabrication.

One of the scientists that worked with us, she was looking at doing a Tissue Engineering procedure in utero.

If you can actually maybe fix some problem in the embryo while it's in this mother's womb. They were looking at sheep and the Tissue Engineering fixing of the lambs, if you want, of all lamb foetuses of sheep and whilst they were doing this, of course, she ended up with some of the embryonic stem cells that came from this procedure and those embryonic cells are muscle embryonic cells, they grow like crazy, so in a few days, their whole lab, their whole incubators were filled up with those cells and she just couldn't throw them away and she said, "Could you please do something with those cells?" and one of the things that came to our mind, of course, you know, starving artists in Boston, hungry, we have muscle cells, we can actually make it into food and we told her, "Yes, we will use them to actually make food."



What was in our mind was, wasn't about, you know we created new technology that we can make food that will fix some of the problems we are facing today, it was a sociological problem.

Can we eat an animal that is yet to be born?

What does it mean to eat an animal that wasn't born yet?

That was ... of course it was a bit uneasy and that's why we were very excited about it and we actually, literally went there... and what's called a "sterile hood" and started to grow those cells into small, if you want, steak-like patties.

### **Mr Oron Catts**

So, we did grow something like between five and ten grams of that meat. That was way back in the year 2000. Unfortunately, we couldn't eat it, even though it looked really juicy, because it was a biomedical research lab.

You didn't get a licence to grow food, some of the other researchers were doing some genetically engineered engineering experiments, there were viruses, it wasn't really a place where you wanted to put anything in your mouth.

So, we were frustrated, we had this piece of meat but we couldn't eat it and we tried to figure out a way to actually do it.

In the year 2003, we were invited to a show in France, an exhibition in France. The people there had enough money, enough courage and maybe they were stupid enough to allow us to do what we wanted to do and that was to set up a fully functioning lab in the gallery space, where we could grow our meat. We included also a dining room there and we decided, because it was in France and we knew that French people don't like the idea of eating engineered food very much, and most other cultures don't like the idea of eating frogs very much, so we combined those two things together and we Tissue Engineered frog meat.

We also went and rescued two frogs from the animal frog distributor in town and the frogs were living alongside their muscle tissue from frogs that we were culturing and every day we would go to the gallery, we would feed the frogs, we feed our steaks and at the very last day of the exhibition we had this ultimate novel cuisine dinner. We were able to grow about seven grams of that meat then, between five and seven grams of the meat and we decided to share it among six people. Each one got, basically a sliver and it was kind of, the first at least, as far as we know, the first documented event where anyone had put into their mouth, a piece of meat that wasn't grown in the animal's body. The taste was quite nice, in the sense that ... we were very concerned about health and safety issues so we asked the chef that cooked it for us, to cook it in a garlic and honey sauce which are well known anti-bacterial agents, but the texture was horrendous. We grew it on a scaffold, that we did not mention before and because of the constraints were the duration of the exhibition, it didn't break down completely. The muscle cells from the frogs, we didn't exercise them, so they were not

aligned in any way, so the texture was very much like eating jelly on fabric. It was very chewy, the polymer was very chewy and the cells were kind of slimy.

**Dr Ionat Zurr**

Just to say, that out of the six people that ate this in-vitro meat, if you want, or in-vitro steaks, four people?...

**Mr Oron Catts**

Three people.

**Dr Ionat Zurr**

Three people? I thought ... okay, three people which is 50% spat it out, okay, and you know what we did when they spat it out, as artists, we immediately went, retrieved it and collected all the spat out parts of the steak and of course, we used it for another exhibition called, "The remains of this embodied cuisine." But more than that, the idea was we ... most of our, if you want, exhibition performances project are kind of failures and we love that. For that, it was also a time to say, "Hey people, don't swallow any new technology that is put into your plate. Think about it, understand, learn about it and then decide whether to swallow or spit out.

**Mr Oron Catts**

Yes, that's correct and then [laughing] ... so, one thing you want to remember as well, when you grow cells in culture you still use quite a lot of animal-derived materials. The fact that they grow outside of the body of the animals, doesn't mean that you don't use animal products and in order to grow fast metabolising cells like muscles, you usually use 20% of the nutrients so you need to feed those cells and in a sense, you need to outsource the body of the animal to technology.

So, you need to find a technological solution to trick the cells into feeling as if they are inside a body. You need to keep them in the right temperature, you give them the right conditions and you need to feed them hyper-purified food. Basically, you outsource the digestive system of the animal to a technology called "apparatus", if you like and then use that in order to feed the cells.

Its hyper-pure nutrients that include also 20% of what is called fetal carciarone and this is the blood plasma of an unborn cow.

So, when anyone sells you the idea of victimless meat or meats without murder, in the shape of meat that's grown in the lab, you have to be sceptical about it and I wonder if we should jump to the victim's murder and then come back to what's happening now with the whole field.

**Dr Ionat Zurr**

So the victim that lay there was a piece we developed together again, following the same idea. What other product do we use, if we use an animal for it and of course that's leather material?

So, we said we can use the same technique to grow leather and we were very fortunate to be invited to a show at MoMA in New York where they were celebrating their ....

**Mr Oron Catts**

We should say, the first time we showed it, was here in Perth in 2004.

**Dr Ionat Zurr**

Yes, true. The first time, we are very proud of it, your home, Perth.

**Mr Oron Catts**

Perth, Homa!

**Dr Ionat Zurr**

Yes and MoMA ... sorry, my shoe just fell off ... When MoMA heard that we showed it in Perth, they were saying we want it too and they contacted us because the curator of the show was interested in doing a show to see how we can create a better future, more sustainable future, through design and art.

And, of course, the idea of actually creating in-vitro leather or victimless leather was very appealing at the time, and she invited us and invited us to do the exhibition and when we go to an exhibit in another country, of course, we cannot travel with living cells, so we make contact with the local laboratory at the place and start and grow the construct over there, using the cells that they have over there.

We worked with a laboratory in Columbia University, New York and they had some bionic mouse cells and we know that when we want to show an artwork that is grown with [inaudible 24:25] we put the cells, the living elements, probably a day or two days before the opening, because then we know if we look at its best and that's what we did and it took probably a few weeks for the actual change to happen.

After a weeks of showing at the MoMA we get a phone call, we are back in Australia, and we get a phone call from the curator at the MoMA and she says, "Oh no, we have a problem, not only the artworks looks different, but also the whole victim[25:01] where the artwork is growing, the victimless leather is clogged because parts ... because we grew cells that are in bionic, they grew faster than what we anticipated and they created what's called the "little embryonic body" which is a cluster of cells but those cells fell into the system and clogged it and the system with the [inaudible 25:22] media was actually, getting clogged up.

And she said, "What do I do with the artwork?" And we said, "What can you do? Switch it off!"



The curator was very, actually ... developed this whole idea conceptually in a really interesting way because she went out to the marketing people around ... [inaudible 25:50] to the journalist and said, "I had to literally kill an artwork!"

Following that, after she did that there were all sorts of headlines going about America as the MoMA, you know, issues about pro-life but this can't because of the killing of this victimless leather that was on show at the MoMA.

Just to put things in perspective, probably when you brush your teeth every morning, you kill more cells than the cells that were killed as part of our show at the MoMA.

But again, this is the power of art.

It's the symbolic things that happen and it's their ideal of ... How, you know, what kind of responsibility or what kind of feelings are we going to have when we start and work with living ... or what we refer to as semi-living art?

We are responsible for its life but also in many places ... on all occasions, the life is uncontrollable so it will change and most probably will die and who takes the responsibility for that and how do we feel about that?

**Mr Oron Catts**

Alright to go?

**Dr Ionat Zurr**

Thank you!

**Mr Oron Catts**

So, fast forward quite a few years and in 2008 we were invited to show our lab-grown meat for a documentary that was produced by the Discovery Channel and the BBC that was talking about how we can use extreme technology called solutions to climate change.

How we can find technological solutions to solve problems that technology brought about in the first place.

They invited me, the BBC flew me over to London, we grew a small piece of meat another like, five grams of meat that we were able to grow from lamb again and the flew me over to meet Heston Blumenthal and he was sniffing the meat, he wasn't allowed to cook it because he had a contract with Channel 4, so his producer was sitting there and stopping him from doing anything that might breach his Channel 4 contract but he was sniffing it and we had this whole discussion and that was in the documentary, so that was about 2009 and then in 2011 a Dutch scientist turns up in a Press Conference in Toronto and says, "I am going to be the first person who is going to grow meat in the

lab, I am going to get Heston Blumenthal to cook it for me and serve it to a celebrity.” And we said, “Wow, this is an amazing point where science imitates art.”

Usually, people think about it differently but here is a case where this guy has basically a leaf from our book and he is running with it.

I was lucky enough to be invited to the Dutch Electronic Arts Festival the year after in 2012 and they gave me some funding to produce an evening, an event and I decided to produce a “cook-off” where I put this guy against a philosopher to talk about the future of protein production with the ... and it was basically a MasterChef style.

I was the MC and the secret ingredient was fetal calf serum.

Now, this guy was game enough to do it, so it was like a full production with a TV crew and we had two screens and this guy was cooking with fetal calf serum and the philosopher ....

### **Dr Ionat Zurr**

Just to explain, so people who don't know, fetal calf serum is basically blood that is taken from calves and is centrifuged in order to take the liquid in between the cells and ingredients that you need to feed the tissue culture in order to grow the cells.

### **Mr Oron Catts**

Thank you. Correct again!

So, we did this, he performed immaculately the philosopher was like a militant vegan and actually, I hooked him up with other artists, so there was the artist that worked with the Dutch scientist who was like, very much also into the future of food and pushing that ahead.

The other artist that I hooked up with the philosopher was a really interesting artist that was trying to, at the time, to get a Private Member Bill through the British Parliament to basically pass a law that in order to eat meat, you need to have a licence and in order to get a licence to eat meat, have to kill an animal and if you killed an animal and you ate the animal that you killed, then you have a licence for life to eat meat and that was debated in the British Parliament through the Private Members Bill which was quite an amazing moment.

Anyway, that cooking show was so successful that since we have been running them all over Europe and that became quite a stressful thing but obviously that original Dutch scientist came to me, or emailed me a couple of weeks later and said, “You know my secret back here, which you didn't want to tell me at the time, who he was” informed me that I should never ever work with you again and then in 2013 he had his big reveal of his own, “first lab born burger”. He did it as a TV show, he a celebrity chef, he didn't Heston Blumenthal but he got a celebrity chef. He cooked it for two judges in a very similar fashion to the cooking show that we had with him the year earlier and he revealed his secret sponsor, who was Sergey Brin from Google.



And that was the moment where we said, “Are we going for a fight, is it a really worth it to fight with Google?” Just the idea of them, Sergey Brin being able to wipe us from existence in a second was something which was a bit daunting but we got into a Twitter conversation with them and here is how interesting the media is.

Even though we are on records, even this scientist, Mark Post recognises the first people to grow and eat meat in his scientific papers from ... basically from all of the media because that was a media circus when he unveiled his burger.

From all of the media outlets in the world, only two approached us. One of them was regional ABC Radio Station from Queensland, a tiny radio station and the other one was Time Magazine.

[inaudible 32:34] it’s obviously none of the other journalists were ordered to do any research or figure out what happened before.

We spent about two with the Time Magazine reporter, telling her the story, telling her some of the issues we have with that thing because, hopefully in question and answers we can tell why we don’t think it’s a good solution but when the Time Magazine story came out, there was only time quote and the journalist actually then contacted me and said, “I am really sorry, but your approach didn’t meet our editorial line because in-vitro meat is considered to be a “good news story” about saving the world and what you are doing is “f\*cking us over” in a sense.

Maybe we should open it to questions now and then we can tell you some of the hidden, ugly truths behind the way in which Silicon Valley took over food industries.

**Dr Ionat Zurr**

I have something profound to say but I see you probably have a question.

**Audience**

I have two questions.

**Dr Ionat Zurr**

Yes.

**Audience**

[inaudible 33:30]

**Mr Oron Catts**

With everything we do is cleared an Ethics Committees and Health and Safety Committees [asidetalk][crosstalk][audience] at the University, so we run SymbioticA and actually let me also

preface that by saying that what we do in SymbioticA is much broader than what we just told you now.

We host residents, we run academic programs and we not prescriptive in regards to their approach but we were able to get UWA to create quite a few international precedents in regards to what artists are allowed to do and how Ethics Committees are actually engaging with us because one of the major issues we have, is that within the whole systems of ethics, its [inaudible 34:10] it's basically a totalitarian ethic approach and it's based on a cost-benefit analysis which means that as an artist, what I say and it's something I constantly say that, "Art ... the most powerful thing about art is that's useless." It has a function but it doesn't bring utility to the world. We are not solving problems in the world because that not our job.

Trying to convince Ethics Committees that actually there is a benefit which is beyond the totalitarian benefit, it is always a really interesting challenge for us.

The approach that we took in regards to Ethics Committees is that we see them as our enablers, they allow us to do things that otherwise might be illegal for us to do it with.

If I come to you and take a biopsy from you, that will be an assault. I will come with a scalpel and try to cut you, but if I get an Ethics approval to do it and I get you to sign a consent, I am allowed to do it.

### **Audience**

[inaudible 35:13]

### **Dr Ionat Zurr**

Okay.

You are asking what is art?

I am avoiding this question.

What I am saying, ethics is very fundamental to what we are doing.

Again, the case of the ... for example the Tissue Engineer things that we are doing, we are taking a low cell line and cell lines are those kinds of commercially available cells. There is a cell bank, you put in your money, you get shipped to you, cells and you can grow whatever you want.

In this case, the ethical question is a bit different.

It is more about the ethics. For me, it is not, because we are not harming, directly, an animal, in that regard, its more about what function this has and for me, if this technology I promoted to save the world to create a more ecological sound world, it's really what claim to be.



Does that make sense?

**Mr Oron Catts**

No, not really and I don't think it would make sense to you, sorry.

Because I think, the question is really the intention of the creator, so I would say a three-headed giraffe might be art, I don't know if it is going to be good art but if the intention of the creator is to generate an object for cultural discussion in order to challenge our perceptions, I would call it art.

If it doesn't do a job, well that's another question but we are not doing those kinds of things, we obviously, we make our choice ... I would give you another example and actually I give a lot of talks around the collapse of social contracts and one of the really interesting things about art is that as artists we never signed the dotted line that we have to tell you truth.

There is a lot of fabricators out there. There are lots of artists that are claiming that they are doing ... artists and authors and musicians, they are being held for making things look and feel like something they are not.

This is kind of the basics of what good art in a sense is which is not something a scientist can get away with, it's not something an engineer can get away with. Designers are a different breed and we can deal with them a bit later.

We decided at SymbioticA that because we are based in the Biological Science Department, we are not going to come up exaggerated claims in regard to what we are doing and we see within our field, we have seen our work being presented alongside, folks art where people claim to grow full bodies and people tend to believe them because of their hyperrealistic silicone sculptures more than seeing the very humble three-gram pieces of meat that are growing in solution groups like snot, that we are able to do with the best technology that was available.

So, our work with ... in a sense we joked and say that we are the last modernist in the sense that we are honest about the material we are working with, but saying that, I would recommend, don't trust anyone and if you want to go into the story about Silicon Valley taking over a food production, maybe that's a good point, because the stories around lab-grown meats are the most amazing kind of narrative that is ... one of the most amazing narratives that are spreading around in regards to trying to find a solution to a problem that can be easily solved in a different way.

**Audience**

[inaudible 38:53]

**Mr Oron Catts**

No, no, now I am moving to a different world.

So, we have been in the last five years, we have been invited to many of those meetings where those companies are now trying to teach to investors to sell the story or the fantasy of a victims existence through lab growing everything.

We have been wheeled out because they have us to credit us, they have to bring us over as those “misguided visionaries” that did things more than a decade before anyone else was thinking about it and the reason for that is because our concern was never commercial our concerns were much more conceptual and in a sense what we were able to do was to liberate this technology from the hands of the biomedical fraternity and put it in a different context which was an artistic context that we were investigating the conceptual issues around what does it mean to do those kinds of things to life, only for that to give a licence ten years later to companies to see if they can commercialise it.

What has come up with those fantastical narratives that are extremely seductive, there are billions of dollars now being invested into this field of what is now being called “cell [inaudible 40:13] culture” and bi-fabrication.

Actually last year I was in a meeting in New York, one of those people who are paying \$1,500 for a one-day meeting where companies are pitching their ideas to investors. They have done a timeline of this whole field, starting with our work which was both very humbling but also quite disturbing in the sense of that wasn't our intention, we didn't want to usher in this kind of, “fake it till you make it” attitude of Silicon Valley, we were much more critical in our approach, but it's being used and this is the question that as artists we constantly need to ask ourselves, “Are artists by definition, gentrifiers?”

If someone offers you a cheap studio in a run-down neighbourhood you are going to take it, knowing all too well that you are being, kind of, an instrument of the developer to raise the value of those properties. It's a very safe way that we realise that we were gentrifiers of knowledge, so we took the knowledge from the very esoteric and closed world of the biomedical research and by just opening it up, we are now, in a sense, unintentionally opened up the flood gates towards those new narratives of being able to grow everything in a lab and that will solve all the problems that we are facing.

**Dr Ionat Zurr**

Correct.

**Mr Oron Catts**

Thank you.

[laughing]

**Dr Ionat Zurr**

Let's have more questions.

**Dr Ionat Zurr**

Any more questions.

**Audience**

[inaudible 41:54]

**Mr Oron Catts**

That's a great question.

First of all, when we did ... it was quite interesting when we did our first “frog steak” one of the first that happened to us was to ... we got an email from this guy and he said, “Can you give me a breakdown of that?” and we realised we used about 500 ml of the fetal calf serum which is basically the equivalent of one dead calf to grow five grams of the frog meat, but we then calculated that if we could try and upscale what we have done to a kilo, it would cost us about €650,000. We were in front at the time so we calculated in Euros, it will cost us €650,000 to grow a kilo.

When Mark Post grew his first burger he said that it cost him €350,000 to grow the half-pounder which is basically a quarter of a kilo which means it actually cost him even more than what it cost us.

Companies now claim it is going to cost them about ten to twenty dollars to grow a pound, which I don't believe.

Even if they are able to get away from using the fetal calf serum and find other substitutes, it is still extremely expensive to grow it, to do with the nutrients, to do with basically, as I said, outsourcing the animal to technology, so you need an incubator. If you are really looking at that, those companies are quoting a paper that was published in 2011 by two economists from Oxford, so they are very respected.

The paper looks on its face to be an amazing, well-researched paper around both the environmental footprint and of course it's associated with growing meat in the lab. It's one of the most floored papers I ever read.

They say twice in this paper that we don't need incubators to grow cells because cells generate your own heat, they just keep on coming with fantasy figures but this is the benchmark document has been used to calculate ... to claim the footprint and the economic cost.

Let me put it this way, I think lab-grown meat is amazing ... it's like molecular gastronomy, it's an amazingly interesting technological novelty for the rich but as a solution to world hunger or as a solution to grow meat, even in general, it doesn't make sense because even from a pure engineering perspective you engage in overshoot engineering. You take your nutrients, you make them hyper-

pure, you purify them to such an extent that the cells can absorb them and then the animal cells that are grown in culture are actually degrading the highly refined nutrients that you provide them.

So, it doesn't make any engineering sense.

**Dr Ionat Zurr**

If you want to be more ecological, eat less meat.

I know it's not a good business model but that's an easier solution.

**Mr Oron Catts**

Sergey Brin wouldn't give us money to try and convince you to eat less meat and this is the problem of the neo-liberal system that tries to find new ways for you to be able to consume without feeling guilty by removing or not removing, by hiding the victims of your consumption without ... beyond the capacity of technology to such an extent that you don't really feel guilty consuming the world.

**Audience**

Thank you.

I just saw two weeks ago related to the new hype on lab-grown meat. There is a company in the US that is actually selling the idea of you to grow your own meat at home.

So, having like a bioreactor which I was astonished because still, we scientists cannot control how we can grow it specifically the features that we want.

Imagining this is incredible and especially as what you mentioned, how can we go beyond the fact that we are still using product that is derived from animals and I want to push a little bit further, because I have also been interested and I know that something that is what you are interested in is about the concept of life itself and I just thought there was a book released by MIT, it's called "Being Material" and it also goes on creating bio-incubators for human life and I know that in this Eindhoven Exhibition that were at, they have one of the pieces is a bio-reactor for human life, so would like to comment on that?

**Dr Ionat Zurr**

Oh my, lovely women around here. We are bio-reactors for new lives, aren't we?

But I won't go into gender critique here because then we talk about what is the whole idea of bio-reactors is, to start human life, to start with.

I want to say that in UWA, I think and other universities, the reason research into the artificial womb which I find extremely, extremely interesting and disturbing at the same time and again, it depends what spins you give it.



But, I think again, if we are going back to art and our changing relation to life, it the creation of what do we want from those kinds of technologies. Who is running those technologies and for what purpose?

I think that's one of the convictions that I have working as an artist in biological laboratories and now I work in the School in Design and Fine Arts is to get more people from the arts. Not to come, you know usually, it's about if it does create it will give new ideas, etc. or will accountability, that's the other things that people think about a lot.

For me, it's more about thinking down to logical questions that we can get out ... take this kind of knowledge, victimological knowledge as a big discipline and constraints that we have and stop and think about what does it mean to us as beings and whether we want to take it as a society into the future.

**Mr Oron Catts**

Yes, and I think it is more than that.

So you know what, I think we all have to take a pause and read this brave new world again just to put in context because ...

**Dr Ionat Zurr**

Aldous Huxley - all of you to read.

**Mr Oron Catts**

The thing is Aldous Huxley was actually hanging out with a guy called Alexis Carrel who was the guy who really perfected the whole field of tissue culture.

He is the one who figured out how to take parts of bodies or complex organisms and keep them alive outside of the original body and that's the first tissue culture. He also developed together with Charles Lindbergh, the first Organ Fusion Farm so he was able to keep living organs alive for a fairly long duration of time as a way of ... it basically opened up the whole field of transportation but from his perspective, it was about trying to look for the keys for immortality and Carrel and Lindbergh, actually story goes that when they developed it, there was a story in Time Magazine again about the fact that Carrel is developing an artificial heart to Lindbergh and you can imagine that actually the basis of Iron Man was based on this relationship between Lindbergh and Carrel.

Popular culture was really infused those ideas through the work of those people, in the early 20<sup>th</sup> Century and one of the things we are really interested in is what we referred to as this acute cultural amnesia, a lot of conversations we have now, because even then, even when Carrel was doing his work, people, one of the very first ideas that people had was, "how can we grow it into meat?"

He was growing chicken cells and embryonic chicken cells and people were ready.



There was a radio show in 1929 about those chicken cells going to grow into a blob and taking over New York but with people harvesting it as food.

We are going through those narratives over and over again but I can also tell you that Carrel wrote a book in 1935 where he recommended the use of Gas Chambers to eliminate undesirable elements in human society.

This is one of the reasons we don't remember him, he was wiped out of our history.

We had those conversations, it didn't really end very well in the 1930s and 1940s and we go through very similar conversations now without recollection of where it took us the first time.

As artists, we are really interested in some of those questions as well because the idea of growing an organ in a glass tube led them to also think about and Huxley to think about the incubators in "Brave New World."

### **Dr Ionat Zurr**

And they should be mortality and we see a lot ... transhumanism which is something that happens a lot at the moment and it's not new.

Again when Carrel started with his experiments and managed to create a culture of chicken embryo cells for more than a year there was a real, real belief that we can actually wipe out death from human life and live forever.

We are facing ... we are using this same discourses and arguments today and there is a question again about being a bit more humble and reflective of human abilities and our control of those technologies and the next question is, "Do we really want to live forever?" if this is possible and what does that mean towards the future?

### **Kate Wright**

Do we have some more questions?

No? Well yes, we do.

### **Audience**

The second question is on the ethical nature of this technology that you talked about and you mentioned that it's more ethical to go for vegetables rather than meat. I want you to touch on that and see from where the moral code whereby we judge where it is moral or not?

From which perspective are you looking at that?

Is it from a naturalistic perspective or by the norms of society or is there a codified objective way that you look at this?

**Mr Oron Catts**

That's a good question. It's a really interesting one, so, let's put ... let's try and break it down.

So, first of all, one of the interests that we have ... so we talk about Symbiotic as a research laboratory that deals with life from sub-molecular to the ecological, from an artistic perspective. So the idea is to explore how the relationship to life is shifting and changing.

Personally, I have a very mechanistic view of life. I am a materialist, but I still that life is special and basically what I have been doing for the last twenty-five years is to reconcile this dissonance between being realistic about it then considering something about the idea of life and the existence of life which I believe can be summarised and will still ... kind of, its work in progress as this idea of secular vitalism and the idea that even though, or from a mechanistic perspective we can think about life as merely a series of reactions material relationships. I just feel something very special about the emergence of the phenomena that we refer to as life and we need to figure out if the shift in our relationship to it as raw material was to engineer and engage within ... like any other material to be exploited and extracted, is that really the right approach that we have and again, if there is anything from this to read, it teaches us, like the case of Carrel is the very same guy that figured out how to break down bodies in order to grow parts of them outside of the body was also the guy recommended the use of Gas Chambers to eliminate undesirable elements in human society.

Even without needing to be overly anthropocentric, it's obvious that what we choose to do to living systems and the mechanistic view that we have towards living systems would come back to bite us in relation to how we treat each other as humans.

We need to, at this ... think about it in those terms.

Do you want to...?

**Dr Ionat Zurr**

Alright.

I just want to say that we are living in very interesting times that knowledge in the sciences and the applied knowledge through technology even puts a strain of what we call a human.

I don't know how many of you know, but actually probably, no probably about 50% of your own cells are non-human, so we are already more than human.

Who knows what kind, maybe we have ... we, whatever that causes this is a vessel for the non-human bacteria and other fungi that is actually part of our body, that moves us around and makes constructive view and the human, but still, I love life and I love humans, but some of them and we do need to have this concept of human in order to ... if we are agreeing that we want to continue with human as species into the future. So for me, this is such an interesting life science, this is such an interesting area at the moment because it raises all the kinds of fundamental questions of what



is life and what is human and also of the relationship we have with something non-human, I would like to say more than human and how do we ... you know ... what would we do with this kind of knowledge and understanding into the future but also, realising that this kind of condescending still from a very kind of human body and perception that is very anthropocentric and very limited?

**Mr Oron Catts**

If I may, we talked about going to meet in the lab and we talked about growing leather in the lab but this was part of a series of three works, the last work that we did in, was this we have done in Sirius, was a Province in Spain because what happened, when we were travelling, we were travelling to Spain quite a lot in the early 2000s and we realised something which was quite strange and this is ... its merely a casual kind of thing, relationships but we realised that the resistance to bullfight was increasing in Spain and at the very same time that the amount of MacDonald's in Spain was increasing. This idea of replacing the very small scale, highly ritualistic, highly respectful relationship with the bull of the bullfight, is extremely violent but is ritualistic violence of this relationship with the bull was replaced with this implicit large scale and way more violent form of industrial farming in [inaudible 58:40]

When we say that it's maybe an ethical problem with eating meat that is grown in the lab, a lot of it is to do also with the loss of the contract that we have with other lifeforms.

We have a contract with cows, they might not like that contract but we do have a contract with cows.

Most kids steal to some extent, nowhere that the meat that they are eating comes from and when a kid realised that at the age of 6 or 7 it feels like a crises that they need to deal with which is a really important crisis of what makes us human and what makes us alive, if we removed that contract, what kind of society are we going to be in.

What kind of a relationship are we going to have with the concept of life if life is obstructed and so decontextualised?

**Kate Wright**

Wow, thank you so much for that amazing talk.

Really raised some very tricky and thorny and philosophical issues here about the food we eat, life and what it means to be human or not human, as the case may be.

I hope you have all enjoyed this and I would like you to perhaps just give a round of applause to our two speakers.

[clapping]

Are you going to be around for a little while?



They will be around for a little while over in the other main part of the bar if you would like to talk to them one to one and discuss any of these issues that have been raised.

I found it really fascinating.

Thank you.

Our next talk will begin at 7:00 pm so I would ask everyone to move through the main part of the bar so that we can prepare for the next talk.

If you do have a ticket for the next talk which is on Space Architecture, please see people there and give them your name and they will scan you in.

The next talk is actually sold out but if you would like to come along you can put your name down on a waitlist.

We will be emailing everyone who registered, details of where you can access the podcasts.

So thanks again for coming, that was fantastic.