TECHNOCULTURE

Exploring the limits of knowing: Technoscientifically motivated art

Episode 20

Full transcript

Guest: Chris Salter [Chris]
Host: Federica Bressan [Federica]

[Federica]: Welcome to a new episode of Technoculture. I'm your host Federica Bressan and today my guest is Chris Salter, an artist and professor for computation art and research chair in 'New Media Technology and the Senses' at Concordia University in Montral. Chris's work explores the borders between the senses, art, design and new technologies through large-scale installations, as well as books and lectures all over the world. He is the author of two books for MIT Press: 'Entangled. Technology and the Transformation of Performance' and 'Alien Agency. Experimental Encounters with Art in the Making'. Welcome to Technoculture Chris! I would like to start by asking you something that has to do with art and science. So, for the podcast, but also for my research work, I speak to many artists as well as scientists and researchers, as well as people who are used to transitioning from one domain to the other, or work at the edge of these two. And I'm supposed to be 'a hybrid profile' myself, so I think about art and science and how all of this is either different or comes together. I'm involved in the current discourse of art and science. When I first learned about you, I saw keywords that I was familiar with attributed to you and your work, but there seemed to be something very unique in the way you embodied them and I got very interested in your work and especially your intellectual work. So that's why I invited you on the podcast and I would like to have your take on art and science and more precisely the encounter of these two which sometimes is portrayed today like something new - and yet we all know it's not new - but what is new about it, because other conditions in the environment have changed, so is there something new? Can you help me separate 'the wheat from the chaff' and see what is good or probably useful in this concept and what is void, what is just rhetoric, so what we can leave behind? But I wouldn't dismiss the whole thing, I feel that there's something about it, so please, what is your take on

this new couple; art and science?

[Chris]: So, I guess there's all sorts of reasons, there's all sorts of historical reasons, as you say, art and science is not a new thing. In fact, it goes way, way back, it's just the understanding, actually what's radically changed is not only the understanding of science from the Renaissance onwards, but also the understanding of art. The concept of art we have now has really nothing to do with the concept of art that emerges from the Greeks, of course which is usually called Techne, or the Romans which is called Ars. The idea we have of the arts now, is a romantic idea from the mid 19th century or late 19th century, about individual aesthetic expression embodied in a person. That was not the case within the so called liberal arts the 'artes liberales' in the Middle Ages or, all the way up until the post-Renaissance, nor was it part of the so called 'artes mechanicae', which were basically the mechanical arts. So the 'artes liberales' of course were kind of part of the quadrivium which was; geometry, music, astronomy and mathematics. And then, the so called mechanical arts were things like cooking and architecture, that couldn't be practical arts. So this debate about art and science is a long ranging one. In fact, art and science were much closer as forms of speculation in the post Renaissance period of the 17th century, for instance with Diderot and d'Alembert's Ecyclopedia, they tried to kind of bring these things together. Our understanding of art though, really derives from, as I said the 19th century, when basically the fine arts developed and there was a split between the fine arts and what we called 'science', which basically became the predominant field of knowledge making and at the same time the fields of what we called 'applied science', which eventually in the 1920s or 1930s became attached with the term 'technology', actually it's a very recent term as well. One of the long-running debates, even though people think it as 'new art science', the 'newness' of it comes from basically the institutionalisation of those terms within, for loss of a better word 'neo-liberal' construction of institutions, like universities and research contexts that have been going on now since the 1980's, but of course, already now have the roots in earlier periods. So, the thing about when we talk about art and science, is that there is 'no art' and there is 'no science', there are only arts and sciences. And what the arts and sciences assumes is an old paradigm which has been critiqued by sociologists of science and philosophers of science for quite some time - for actually the last 40 years - which is the idea of 'unity'. That there is a unified notion of a discipline, that the sciences are 'unified' based on some concept of scientific method which has been disproven again and again and again. Usually, scientific method is this idea of 'deduction', that you have a theory and then you do experiments to prove the theory, or a hypothesis and you use those experiments to kind of prove or disprove your hypothesis. But that's been countlessly debated from Paul Feyerabend and Michael Polanyi and Thomas Kuhn and all these classic historians of science and philosophers of science. So the unity of the arts and the unity of science don't exist, those are fictions that have been brought about by institutional prerogatives, by debates that go back to questions of 'objectivism' and the sciences. The other thing you have to understand too is that, this interdisciplinary connection between arts and the university or the research context,

is something which has all sorts of different historical trajectories. In Europe for instance, there is still a strong separation, in France and also in Germany, between the beaux arts model and and the universities or between the 'hochschule' - which it is no longer called the 'hochschuler', its called 'universitt' in Germany - but the art of design schools in the university. So the tradition that university was a place of knowledge making, which was 'textual knowledge' so that the sciences existed in universities not just that the natural sciences but also the human and the social sciences so whereas, 'practice' happened in the art and design schools and that was never seen as science. That was seen as practical knowledge and so that discussion already is set up by institutional structures that emerge in Europe when the research university emerges, which is again at the University of Berlin in the 19th century. In North America, post 1960's university arts programs had traditionally already been embedded within universities within so-called 'liberal arts universities', because art was seen as part of the liberal arts, was seen as a kind of branch of the humanities and so this debate already has a different valence in North America than it does in Europe. And for instance in Qubec where I'm based, it goes even further back and it's tied to a really specific set of political social circumstances, which is, the development of the so-called 'Quiet Revolution' in the 1960s; where the Province of Qubec tried to - and the Francophone population of Qubec tried to - reassert its presence against the authority of the Catholic Church and at that time basically they tried to build a new kind of civil society based on this francophone context. And what happened there was, there were big debates about the position of the art schools in relationship to the universities, eventually those art schools were embedded into universities. But not because of some kind of model like in Europe, like the Bologna Process, but simply because as part of this social revolution and democratic transformation in Qubec, the artists and actually the government saw the necessity of creating a continuous education of the populace from kindergarten to the university in the arts, because they felt that was part of a democratic - as a modernist concept of course - fundamental part of democratic, secular society. So in fact, already in the late 1960s, when, for instance, the University of Qubec at Montral (UQAM), had one of the first graduate programs in 'ars practique' which was in a university, as in the French university system, already the debate started about the nature of artistic practice within a knowledge producing context, which is the university itself. And so it's very interesting because those debates were not tied to bureaucratic initiatives like the Bologna Process of trying to standardise universities across, for instance, Europe and so university art and design schools would have to become research institutes, because they would have to be equivalent across each country. It was actually based on more fundamental social political questions about what constitutes a democratic society and what role the arts play in that. So already the debates we're going on about what is the role of practice in everyday life, that it emerges from artistic context and what actually is the role of practice within the knowledge construction framework? And so now, it took 50 years before formalised funding programs were set up in Qubec, the so-called, what we call research creation or 'recherche creation' , it took until the beginnings of the 2000s to actually implement funding for artists who were working as university researchers and that has its own trajectory.

It basically had a lot to do with the fact that even though artists were in universities they were not able to get the same funding possibilities that their colleagues in the social science, humanities, natural sciences were receiving. So, in fact there were many commissions - as Qubec has this tradition of setting up commissions - to study the problem and then to provide recommendations to the government. And one of the early Commissions that happened in the 1990s was very much about trying to right the wrongs [done to] these university artists, creators who were, unfortunately, not receiving funding even though they were seen as providing the same kinds of, so-called services, that their colleagues were; training of students, creating new knowledge, creating new research and putting that out into either peer-reviewed publics or the general public. So, the thing is, these are all really specific historical contextual discussions and it doesn't help to create this general concept that there's art and science and there's research creation, they all come from highly specific social, political and economic contexts.

[Federica]: Is epistemology a good access key to this problem, to ask, does research produce knowledge, does arts only produce pretty things, or does art produce knowledge too and if so what kind? So is epistemology a good angle to look at the question and build a discussion over whether art and science are different, or why they should be together?

[Chris]: Well the debates about epistemology only happened in the universities, they don't happen with artists. I don't know of any artist who thinks about their work creating knowledge in the sense of how universities see knowledge, which is, durable, repeatable circulate-able knowledge. And in fact, I just had a discussion with my Methods class yesterday about this very fact. And it's really interesting because if you're creating art within a research context, it's not enough to create the object. What's demanded is not only object, but a discursive apparatus that is entangled with the object and the broader questions. So there's long debates, James Elkins for instance brings this up a lot of times about where does the knowledge lie; does it lie in the object, in the experience of the artwork, does it lie in the writing about the artwork, does it lie in a triangulation between discourse audience and public and object? These are all long, long debates, it's really interesting because in the 'social study of science and technology' or 'STS', the early debates were about the 'sociology of scientific knowledge' how science produces knowledge and what forms of knowledge does it produce; is that knowledge tacit, is it inductive, is it deductive or all of these classic questions? Well, but then of course in the 1980s and 1990s, after people like Bruno Latour, Andrew Pickering and Sharon Travik (?) and Joan Fujimura and Karin Knorr-Cetina, all did studies in the laboratories. They started to be asked a different kind of question; well not necessarily is knowledge human knowledge, but what is the relationship between forms of material knowing a material practice, in which theories and concepts were somehow put more in their place? In fact the study became about instruments, about infrastructures, about conditions and in laboratories and how those aided in the so-called production of knowledge or facts of scientific concepts. You have a very similar thing that happens in the arts where you have the same kinds of apparatuses, infrastructures,

instruments and but they have a very different purpose. And I think one of the things about epistemology is that it's tied to the concept of 'truth construction', that knowledge, scientific facts, if they're validated by numbers and researchers and they, in a sense, become a fact, that they then attend to a notion of 'truth making'. The arts are not about the 'production of truth', they're about the production of perhaps, as Felix Guattari says, 'de-centering the real' or breaking off a part of the real. And so that, what is as a subject or an experience is brought into another kind of relationship with the world. Now I think that, in a university kind of context, it's like when you're creating artistic work, the need to do that is to contextualise that work. In the art world, contextualisation happens also, but it happens in different ways, it may happens 'curatorially', so the curator takes the voice of the artist, it may happen when artists actually write artist statements, but those artist statements are more about how the work came into the world based on that artists personal experience. And of course, that personal experience is filtered by all sorts of interests in aesthetic, cultural questions, but there's not a need to demonstrate that the work is situated within either a cannon of existing works, or existing knowledge, there's no need to cite it, you don't see exhibitions in which the works are footnoted to other works. So the whole process of knowledge validation is very, very, very different. And so, epistemology may be useful in trying to understand how a work is situated within a certain domain of practices or histories or theoretical concepts or literature or whatever you want to say, that doesn't necessarily guarantee the success of the artwork nor does it guarantee the material conditions that may make the artwork possible; it just asserts that one understands the works' relationship to a broader context. Another interesting thing - I just talked about this yesterday too - is a well-known book in the history of science by Steve Shapin and Simon Schaeffer called 'Leviathan and the Air Pump', they talk about, where does this idea of [objectivity] - this is a book about the relationship between Thomas Hobbes and Robert Boyle, both scientists, both with different ways of trying to construct apparatuses to either justify the existence of scientific knowledge or scientific facts - and what's interesting in the 18th century, they give a reason why we have this notion of 'objectivity'. Again, its this assumption, that science is objective and the arts are subjective, well that's been critiqued as well, that kind of dichotomy for many, many years. And one of the reasons that the question; why does this objectivity thing come, is it somehow given in the sciences - don't forget the sciences up until the bureaucratisation of research with the University of Berlin - the sciences were individual practices, people had individual labs, they were not institutional contexts like we have now which are supported by government, so supported by forms of bureaucratic financialisation. And so what they basically say is that, when Robert Boyle was doing an experiment, building an air pump, a vacuum to demonstrate certain scientific principles about the existence of a vacuum, that he engaged in three different kinds of technologies; one of them he engaged with technical instruments, so he had to build an apparatus to demonstrate his concept. But the second thing is that when his apparatus was built it was then shown in the Royal Society. But not everyone could travel to London, to the Royal Society, to see the demonstration. So what does Boyle do? Well he needs to create so-called reports, so he has literary technology, the technology of writing and so in the

report the idea is that you want to be as impartial as an observer as you can and to describe basically what you observe, so you can't embellish that observation with fact, with opinions, or biases, or this kind of thing. So in fact the report becomes the durable knowledge for those who cannot be present, it becomes a kind of 'de-facto witness'. Whereas then, you also have to have physical witnesses so this is a 'social technology', which is what they argue and the social technology is that impartial social scientists should be present. But ones who can be present to witness the experiment and then to report it to others, well, again what you want is somebody - peers - whose biases will not necessarily change the course of the research, but in fact those peers can say to other peers, well, I saw this, this is what happened, this proves this, serves this, proves that and so you don't want the 'social bias' of the observer to enter into the picture. For instance, you know, you want to make sure they're impartial, that they're so-called at arm's length, all the things we try to subscribe about peers. So what's really interesting is that objectivity is again, a social, technical, literary phenomenon, according to them, in the sciences. It's not some given thing that science is somehow 'privileged' to have objective knowledge that is provable, while we say the arts are subjective. And of course, Feyerabend in "Against Method. Outline of an Anarchistic Theory of Knowledge" (1975) says the same thing, he says; there is no scientific method, the most innovative science is that which grabs on to whatever it can, be it other disciplines or even other kinds of social means. Like when Feyerabend talks about Galileo's use of the telescope, he didn't just discover the heliocentric vision of the world, he actually had to work with a telescope. He didn't understand it, t produced all sorts of false images and false information, so he had to persuade people, he had to use rhetoric. So all of these things play into the scientific worldview, it's not simply that facts emerge out of nature and then they're simply [a] given. All of these social and political and technical forces are operating together and, of course, that's very, very similar to how the arts worked as well.

[Federica]: I like that you're exposing some of the preconceptions I might have, partially that I'm aware of, but that I cannot break free from by myself, so I'm liking this - I will keep asking you about this for a moment, if you bear with me - I think that my ideas, my definitions of research, art, science, knowledge are pretty conventional because I'm a product of this academic system. Even if my personality or my interest, my instinct, call for a broader vision. So when I'm asked to make a case for art and science, I know that I'm not very good at it, I know that I oppose some resistance still, something does not convince me and I will try to give you two simple images and ask you to put them together for me. So these two images are that of a scientist and that of an artist and they are extremely clich, symptomatic of some unsophisticated thinking I'm having here, but nonetheless I think compatible with at least 'a' definition of science and 'a' definition of art. The scientist is somebody who is writing a bunch of numbers down, because he or she is a good figure, I imagine the scientist is a 'he', just to complete the clich, okay, measurements concerning something like a physical phenomenon, so it's important that when we think of science in this context we understand 'exact science' -

[Chris]: Natural sciences.

[Federica]: Yes, natural sciences, so even I am labelled as a researcher but I really think it's inaccurate I think that what I do is 'intellectual work' and that doesn't mean that it doesn't have rigour, but when we oppose art and science, I think it's important to be clear about the fact that we mean natural sciences. So measurements, some phenomenon, we want to find out how something works, how something is and then when that's done, we derive an 'abstract conclusion'. The process seems pretty impersonal, not necessarily - I don't want to say objective - but 'true' it aims to be, but impersonal because what the scientist thinks in that moment is not really relevant; it's numbers you measure, write it down and then when you have your conclusion, you write a scientific paper and that is knowledge. On the other side, you have an artist, somebody painting, or repainting, for example, it can even be a piece of furniture, some historical wooden cabinet decorated and so it takes skills to do it and there is an aesthetic element to it, it's a very practical type of activity, that person is not looking for anything, it's just a doing. So provided these two clich images are very clich, I think that they are compatible with at least 'a definition' of scientists and artists. So I fail to see how one of the two would benefit from talking to the other about what they're doing, or how we would benefit from bringing the activities they do closer together, if not merging them - depends what people mean by art science - so since you are a scientist, a scholar and you're also an artist, can you bring these two images together in a way that makes sense to me, please?

[Chris]: Again the term 'scientist' is a European use of the term, so I actually never call myself 'a scientist'. Labels are always tricky, so the interesting thing about 'researcher creator', which is the term - it depends on what context I'm in actually - is very interesting because it doesn't necessarily imply you're making art. Now the assumption is usually the artists are the 'researcher creators', it doesn't have to be, what it does mean in the Qubec context, is that there is actually an ongoing sustained investigation, creatively, of a particular question, or issue, or 'problematisation' is the term that Fond de Recherche du Qubec uses, which is a very interesting term, because of course for Foucault, problematisation is 'a concept' by which one understands the kind of epistemic frameworks of which certain forms of knowledge emerge and others don't. So I first and always say, I'm an artist and I'm a scholar. Scholarship is of course also, you may tie under research, but of course it's a more human and humanities based understanding, means there's a kind of written frame of how you passed that knowledge around. I would say that for me, the relationship between writing, making and thinking about things are all entangled together and I do all three things because they somehow inform each other. And that may be different than other people, so I'm making work and my work is complex in the sense that it involves many different practices and disciplines and techniques and contexts and demands different sites by which it takes place. It moves between the university milieu and which I'm based, it then goes into the cultural sector, it then moves in, sometimes,

it moves in policy context, sometimes it moves in commercial context, it moves in in cultural institutions. It's shifting all the time and I don't mean just like an artwork gets shown in those places, but the concepts of the knowing, or the ideas, or the techniques, or the instruments that emerge from those projects have their own lives that are not necessarily tied to the individual artwork. So, to me they are all part of one larger kind of picture, which is how making something shifts the the balance of experience and knowing one's position in the world and one's position in relationship to other positions. So, because I come from the theatre, artistically and from music, the theatre is a social thing anyway, it's a social context. I don't come from the training in the visual arts, of being in an atelier and working alone and going in the studio each day. I come from a model in which a group of people come together, that have different practices and different disciplines and they work together to make something that's greater than any one person in that team. And so, it's natural that I can just understand the context by which I can go back and forth between a group, bringing of a group of people together from different disciplines and practices, working on a kind of boundary object together, making it work, touring that work, talking about it, spinning off a technology, putting that into other kinds of contexts; its something I just am used to doing and I've done it for a long, long, long time, being both inside the university but also being trained outside and the professional performance world. It's just somehow, something I'm used to. It's not necessarily a model that everyone can follow, because I have a kind of strange background and I think also part of it comes from the fact that I'm actually trained in four things; I'm trained in the humanities, the social sciences, the arts and technology. So, I understand colleagues on the other side of the fence who don't want to compare their books to someone making a sculpture because they think, those are totally like apples and oranges. I understand the question of why methods have to be justified. At the same time, I understand the kind of anarchy, like Feyerabend says, that kind of 'epistemological anarchy' that artists bring, which is forms of resistance and forms of not wanting to buy into standards and forms of measurement and norms, basically. So I guess, my training is really kind of weird and hybrid from the start and I think also I'm very curious about many different fields and how those fields can intersect both in discursive ways, but also in experiential ways.

[Federica]: You know, I think that I shouldn't share these thoughts if I wanted to come across like super progressive, but I admit that I find some resistance for the image you just proposed of equating the book and the sculpture at some level, because I feel that there's a difference, even when I do my research work - especially in collaboration with chemists for my magnetic tapes and that type of work or this podcast - there is that element of 'subjectivity' to me and I wish that I told you that I understand everything you say and your ideas are so ahead and I'm on board - but I didn't think this through by the way - I'm just saying I find myself in favour of the book, I don't know why, maybe I could change my mind very easily?

[Chris]: Yes, I just don't find the discussion between 'subjectivity' and 'objectivity' very

useful, because as I said, those are 'highly historically contingent concepts'. Because as a scientist, I'm sorry as a natural scientist, as a social scientist, you are already setting up the conditions of the experiment in ways to try to prove, or to get what you want, to get out of it, you're already setting up the frame of the context that you are trying to prove or disprove. And of course, the debate about falsification in sciences has now been critiqued endlessly, that in fact, you can't prove it's true, but you can't prove it's false. But as I said, the arts discussion is not about subjectivity because the science is, my colleagues who work in cultural studies or philosophy, that's just as subjective as artistic practice. Believing in affect, the models of affect against hermeneutics, for instance, is a very subjective process. How does the philosopher prove the objectivity of their theories? They don't! So, do you say philosophy, which is seen as the pre-eminent love of wisdom from the Greek, how is philosophy a more objective than say political science? So objectivity, of course comes from when we start to bring in standards of measurement into processes, when we start to say; alright, we're going to use this tool which will guarantee these kinds of results and we're going to use this tool to measure these phenomena and then we're going to be able to measure those phenomena in a different lab and a different setting. And then we start to look at these things, so in terms of quantitative and qualitative ways of knowing things, that's perhaps more, you might say, yes the sciences may be more predominantly driven by quantitative forms of knowing, because many natural scientific phenomena have to be measured in that way in order to compare them. So, the ideas of comparison and measurement come hand in hand, whereas qualitative ways of knowing things, from everything from Ethnography, which is a highly subjective process, even though people like Malinowski tried to claim that it has a kind of scientific basis because the anthropologist who goes in the field, has knowledge that others don't have; in terms of being able to schematise concepts, being able to speak certain native languages and so on, that's also been highly critiqued, that the anthropologist brings, of course, their own biases into the field with them, they don't eliminate them by doing the fieldwork. The arts, again what arts are we talking about? For instance, there are projects I've done that have resulted in installations like 'Haptic Field', in which we started out by doing quantitative research on measuring adjustables with differences of lab subjects being able to perceive 'touch' and someone wrote about that and - not I, not me - but one of the artists, one of the music technologist students who are working on the project. And so, that was actually quite important, to be able to analyse those different J and D's and to say; Oh, actually you don't need a hundred tactile transducers on the body because the skin interpolates between this and this. So now, that fed a different process that was not the work, that was only a part of the work, whereas in the sciences, that becomes the work. If I can prove in a research paper that we can interpolate between point numbers of differences of points on the skin, in terms of haptic information, then we try to compare what people have done before and address the gap of 'ba, ba, ba' a classic research thing. So there's no reason why, in an artistic process the kind of rigour of quantification and also qualification, cannot be played together hand-in-hand. There's an assumption, the problem comes in the assumption and it's not just in the sciences, also highly,

in fact, I think the sciences, many times are more friendly with the arts than the social science and humanities are, because they're competing for the same amounts of money within the university ecology of funding. This idea that the artwork is a subjective thing which comes from the artist's own experience and has no durable connection to anything, is also a very romantic idea of art that is carried on by the social sciences and the humanities. If, as some colleagues of mine start seeing, especially those in science and technology study they start to see that, in fact, the production of artistic works within techno-scientific context is as rigorous and as complex as the production of scientific knowledge in the natural sciences. They see that in fact these old ideas about 'art is subjective' and the 'science is objective' fall apart very quickly.

[Federica]: So when you make an installation, are you trying to convey a message, are you trying to say something? So is art a language, a form of communication? Where I'm going with this is that, I would say, the scientist is not trying to 'say' anything, so the 'subject', the person doesn't have a voice. And I'm so sorry to keep defending this subjectivity thing, but I want to get it out of myself and I keep finding objections, so I just show them to you so you can actually help me move forward.

[Chris]: Well again, like as Latour says 'the scientists takes all of the messiness of the laboratory and converts it into inscriptions'. So in fact, the graph, the number, the text stands as the witness for the science, its own 'subjective sense' of the experiment. And of course, it depends on what we talk about - communication - I don't see art as, yes you want to communicate in terms of you want people to - this is very different again - depends on the artist you're talking about, some artists could not care less about their audiences, other artists whose work is dependent on the audience are highly interested in making sure that audiences are compelled, are caught, or communicated to. I'm talking about art is not communicating a message, this is not information theory, it's not a sender and receiver model of the aesthetic. So, I don't think art has a message.

[Federica]: Please, tell me more: what does it do, then? How? What is it about? What?

[Chris]: Well again, this is a highly contextual question. Which artists are we talking about? This is what's interesting to me and why I've done so much research in 'sociology of science' is that no sociologists or anthropologists would make a general claim about, for instance, 'science' without actually seeing the particularity of practices operating. So when Karin Knorr-Cetina in her work on 'epistemic cultures' says, let's look at the physics, at the particle physics culture, the so-called epistemic culture, the knowledge culture and then let's look at the molecular biology culture, in for instance, the Max Planck Institute in Germany, very specific, also research context. And she says these are very different cultures, the collaboration of the physicists who are only using forms of representation like screens and computers to tell them something about phenomena they cannot even imagine or experience, write papers that have thousands

of authors. And so, in fact the notion of collaboration is completely different whereas in microbiology, she claims that; scientists are caring for things like gardening, so they're caring for their specimens and they're carrying them from one thing to another and they're changing context all the time. And that's work at the bench which is highly tactile, for instance, that's a very, very specific thing. So even if we say, but 'digital arts', which I hate as a term, the way in which I make things and the way in which an artist not in the university, or an artist even in the university makes things are completely different because; the way you set up a laboratory, the way you hire students, or collaborators, what you look for. All of these things have a much closer relationship to the sciences than people imagine they have to the arts, it has to do with this romantic idea of what art is from the sciences and vice-versa this romantic idea what science is from the arts. If artists ever went into scientific laboratories, they would see lots of similarities to what they do and lots of discrepancies and it's the same with the scientists, they go into the artist's studio and, of course, the studio and the lab is always mixed together but they're actually quite different environments depending again on where you are contextually. They would also be surprised if an engineer came into my - of course engineering is a bit complicated, because engineering is a practical art, in some ways it's a technical art, it has a strange relationship to research in universities, anyway, but if computer scientists who was interested in for instance artificial intelligence and different applications that might - come into my lab and see us in our discussions about how to use Machine Learning to affect people's perception of time, or to think about how Machine Learning could be staged so one sees the trial and error of a neural network doing gradient descent and that's displayed in some kind of perceptually perceivable thing like light, or sound, or something. I'm sure they would find a lot of similarities to what they do, it's just the outcome is different and the means and the objectives are different. So you might say that laboratories and studios have similarities and they're set up and their frameworks and all of this, but in fact, the means and the ends are really different. So I guess you would say that, what is the artist trying to do, artists are trying to produce forms of experience or knowing which actually don't operate within normative contexts or normative frameworks and I mean normative in a sense of perceptual, social, political, economic or so and so. So they can operate in many different ways, they operate as forms of communication, they operator as forms of de-familiarisation, they operate as forms of debate, they operate as concepts, there are many, many, many different ways in which artistic works are produced and in the kinds of 'attractors of reception' that they invite. In my own work, I'm interested in constructing apparatus' in which certain types or forms of experience may be catalysed by those and are really specific to things like sensory experiences, like how do we shift away from thinking about, for instance, vision being the dominant sense, which of course it's not, but our culture tells us many times otherwise. How do we relate to forms of different parts of time that emerge in experience? What is the relationship to an apparatus and our self and our notions of self, is that a fixed concept? And in fact, you find lots of neuroscientists talking about the same thing, 'the self', there is no defined point of self in the brain. If we believe in the connectionist model, if we believe in emergent frameworks of ensembles of

complex groupings of neurones that come together and form synchrony patterns for cognitive acts and then kind of dissipate back into noise, there is no position, where is the self there? So in fact, the question that motivates some cognitive scientists or some neuro-scientists - not all, but small and growing fraction of them - is a very similar question to why an artistic work might provoke that. But ultimately, an artistic work is an experience and I think it's defined differently than, for instance, reading something. Because by going into something with your body, you encounter a different worldview, than simply standing back and looking, or reading, you are in a different register of perception and making sense in many ways. And that's why the material aspects of creation are so important, because it's one thing to have a debate about artificial intelligence, it's another thing to walk into something and encounter it directly, either at your own body scale or at scale that's (force?) you and then you suddenly go, Hm, well what's that? Is this the future, am I suddenly in the future, is my body in the future? So it suddenly creates a kind of debate which is, I think, only possible in that kind of direct sensory motor encounter.

[Federica]: I would like to ask you something about your artistic work - not because I ran out of questions on the topics we just discussed, I could 'literally' listen to you all day - but I want to make sure before the time is up that I get to ask you something about your installations, which are the reason why I got in touch with you last year in 2017 and the reason why I travelled to Berlin and then to Montreal to see some of these works. Immersive and multi-sensory installations, they challenged human perception by merging haptic - this would be touch - visual, acoustic and other sensory phenomena. So it is about the human senses and computing, but on the other hand, you also experiment with the non-human, you collaborate with biologists and basically experiment with life engineering, living cells, there's this concept of the living machine and ecosystems, so basically life but non-human. How does that end up in an artistic installation and also what ties together working with the human and the non-human in the light of this concept of agency which you explore in your book from 2015, 'Alien Agency', what has agency here and how is that agency exercised?

[Chris]: Well its carbon things that have agency, but also non carbon things also, the word 'agency' is so messy, there's different types of energies or forces in all sorts of stuff and so, yes the senses are human because I'm still actually making art for human beings. I know artists want to make art for animals and insects and things like that, but I think there's a certain presumption about, I think is a bit too much of a presumption about taking theoretical ideas of Donna Haraway and trying to apply them to everything you do. So the sensory versus the kind of non-human...

[Federica]: And what ties these two things together or are they two different focuses of your work now, or there is a common denominator; is it life, but how?

[Chris]: Sure, the thing is that life forms have been... Stphane Leduc in the end of the 19th century talks about what hew calls 'synthetic biology', it's not what we understand as synthetic biology now, BioBricks and engineering, but he says; I can demonstrate life, the emergence of life not from carbon-based things but from chemicals moving around in Petri dishes and so there's arguments about - and my friend Takashi Ikegami at University of Tokyo, physicist and who's also an artist, he's interested in the question of life and he says life is artificial - life is not how we understand it. Historically as computational simulations, like Chris Langton and Santa Fe complexity thinking, but in fact artificial life is, he says; what are the maximum conditions of life, what are living technologies? And so, there's all sorts of things that might be qualified as living systems and there's certain... Aristotle says the fundamental concept is motion and self-preservation and all of these concepts but it's been demonstrated that emergent systems of either chemical, or biological, or mathematical demonstrate some of those kind of core principles of what living systems are, ones that are able to self organise, that they are able to achieve a certain degree of complexity based on simple parts that produce indeterminants.

[Federica]: Can you give an example of one of your works, present or past or future, that embodies these concepts?

[Chris]: Yes, so for instance, I'm working on a project with artificial intelligence for the Barbican Centre and we're having these debates, so basically the project is a light sculpture called 'Totem', its 14 meters tall, its very, very big and it has, I don't know, 4,000 LEDs on both sides, 8,000 LEDs - so it's a matrix basically - but it's covered and has a lens on the front of it and on this kind of column and so its light does it look like pixels, it kind of distorts into strange shapes, it looks like it has intense, lots of depth in it and it's a very strange kind of visual distortion. And what we're doing now is we're starting to think about a kind of very fundamental question, which is; What are the different timescales of experience people will have when they this thing? And, that's kind of influenced by the late work of Francisco Varela, who talks about different time scales of cognition. So the brain is not working at one time scale, its working in many many different time scales, ones that are not as perceivable to us, so we basically said 'hmm' let's see, this will be in a public space and in the Barbican, not in the gallery and it's a space in which a hundred thousand people walk through a month. And so we're trying to figure out, well what are the different time scales of... that could grab people's attention? And we watch and this is on a ramp in the middle of the Barbican that connects two major streets in the City of London to next to each other. Some people walk through the Barbican to get from one street to another, some people come in the Barbican to eat lunch, some people are coming in for concerts or performances in the evening, so this kind of constant flow of traffic. So we said, oh, what's this? So we were there, we observed, we watched people just like scientists doing the experiment, so we made lots of detailed notes and we thought 'hmmm' this is interesting there seems to be different timescales. So our interest is how could we use new kinds of learning systems like unsupervised machine learning, or neural

models, or different things? How can we use them to shape a different sense of time for people, a kind of time which is self-organised by the machine, so you might say that the machine itself has a kind of time perception that meets human time perception. So what we talked about, we haven't done it yet but we're exploring, how do I make different time scales that work for different types of people? So one timescale is like a minute time scale, it takes one minute for someone to walk from one end of this ramp where this work will be suspended to another end, that's if someone's not looking at the thing, that they just ignore it, they're looking at their phone or they're trying to go to a lunch appointment or whatever so like the work has to work at a 1-minute scale, you have to be able to perceive somehow a structure and this is a very tall thing, so in fact it's not intimate, it feels like a beacon in a very busy space, but how could you perceive this one minute experience of time that might force you into a second time scale like five or six minutes, like that it works at different times, that's like if you catch somebody and they become entrained or curious or mesmerised temporarily by it; then they stay a bit longer, they're standing, they're not sitting, they're looking, they're trying to perceive, discover a pattern, so and so. And then there's a much longer time scale which is people, they're sitting upstairs at the Martini Bar or are sitting at a table working and then they're looking at this thing and they're there for one hour, two hours, whatever, so then suddenly at that one or two hours scale, this thing has to work to reveal a pattern over a long period of time. So one of the debates we're having is, does this thing sense the environment? Is it self-organising in the sense it just sees itself, it sees the amplitude, or the flicker rate, or the frequency of the light and then starts to run that through an algorithm and starts to try to perceive rhythm, or frequency, or synchrony, or different features - basically? Or is it open to the environment that says the environment gives it some information about... and it doesn't know what the environment is, obviously a machine knows nothing about anything, but can it detect a certain rhythmicity, or pattern of people walking toward this thing, or walking away from it and and so, how open then is the system to the environment? So, we're having a lot of interesting debates; where's the border of the sensing is it at the work itself, is it five meters away, is it the whole in space and it's in all of these kinds of things. So, but of course, what we were aiming is that people kind of sense that their own scale of perception comes into alignment, or becomes entrained with this alien type of time, which is made possible by the kind of machine time. That's a very interesting question, this is something that people in neuroscience are trying to figure out, like 'time coding', Peter Cariani is working on time codes of the brain; how do we synchronise certain formations and neurones and the firing rates of those neurones to actually external clocks. But they're not central clocks that are distributed, for instance, music, like lots of experiments with EEG [Electroencephalography] with event potentials looking at the spike, not just the spiking rate, but also the synchrony between different events, exterior to one's perception and then the way the brain interprets or synchronises with those signals. And so it's like, we're moving from the lowest level, which is the temporal level with the level of neurones, all the way up to the highest level which is; what happens to your perception of time if you encounter this thing? And that's qualitative, so we're going to do interviews with people and ask in the

lab, we're going to start doing studies where we set up different types of rhythms and we ask people to try to describe them, to try to graph them, to try to say do you see a pattern, do you not see a pattern? And this aligns with the philosophical question, which is the relationship between order and disorder - something I'm really interested in - which is demonstrated all the time by scientific research and scientific phenomena. That order and disorder are not given in systems, those things emerge temporally, perceptually based on forms of interaction that we don't necessarily perceive and so on. So, I think that's where you can describe an artistic work that actually asks - it doesn't do science - but it asks scientific questions that are actually interesting, that scientists themselves, I should say natural scientists or neuroscientists are also interested in. And that's where I see a really productive discussion and connection between an artistic work, which has its own aims and scientific inquiry, which has its own aims as well, but in fact the set of questions that emerges between the two might actually align.

[Federica]: I feel we've just scratched the surface of about two-thirds of the things that I would like to discuss with you. I'm sure it's clear by now to our audience that you're someone who brings together different domains of knowledge and practice in one vision, in one body and, at least for me, I can say in a way that I had never encountered before. I really encourage the listeners to check you out online, the incredible books you've written and all the material that you have available if it's videos and if it's articles you've written or that have been written about your work. I will sure keep following you and hopefully we can one day resume this discussion. Thank you so much Chris for being on Technoculture.

[Chris]: Sure, talk to you soon.

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