

## 2016 Conference Transcription

Date	Friday 1 April, 2016
Session Title	Life
Session Time	10:15 - 12:15
Moderator	Matthew Cobb
Speakers	Andy Miah
Notes	n/a

Intro	<p>Hello and welcome to FutureEverything's 2016 festival podcast series. Over two days, in Manchester's iconic Town Hall, we tasked designers, artists, scientists, and many more, to rethink our resources. From life, earth, and intelligence, to community and uncertainty, our speakers ask what we might need less, and more of, in our near future.</p> <p>What is the future of human enhancement? Speaking in this session on life we heard from Andy Miah, Chair of Science Communication and Future Media in the School of Environment and Life Sciences at the University of Salford. His work explores new forms of human enhancement, ethics, and the values we hold around them. He examines who the pioneers of human enhancement are, and where does doping in sport come into the conversation?</p>
Andy Miah	<p>Thanks very much Mathew, and I saw something that made me hungry. I don't know what Drew has cooked up for us for lunch, but some kind of in vitro hangover solution seems like the course for the day. So it's a real treat to be here, this is my first FutureEverything. I've been working at Salford University now for a year and a half and this feels now like home turf, and it's a pleasure to be here. Not least because so many people I work with, or know, are involved with FutureEverything, or have come through FutureEverything over the years, and it's nice in particular to have this topic.</p> <p>I wanted to do something completely new for this topic. So yesterday, I started a new banking that I called Life 2.0, and over the course of it, I wanted to take you through ways of thinking about life, our relationship to ourselves, our own biology, but also the wider ecosystem in which we live and how our approach to technology and manipulation of life may need to look to broader horizons to really get to grips with the problems we face.</p> <p>So about eight years ago James Lovelock, interviewed by The Guardian, about how he saw the world today, in his usual sort of irreverent style, warned us that we should start to enjoy our lives pretty quickly because we have about twenty</p>

years of that before things get pretty terrible. Almost ten years on, he is a bit more moderate with his prediction, but he also claimed that by 2100, about eighty percent of the world's population would be wiped out, which is about eighty four years, just for information. The question is, what number will that population be when it starts to diminish? We heard one prediction, by 2050, around ten billion people will be on the planet. So eighty percent of that, still quite a lot, still about one billion more than Lovelock wants us to have on this earth in order to be able to flourish and to allow other species to flourish. But unlike other species, we are incredibly inefficient when it comes to our utilisation of resources, and this inefficiency has grown over time as our society has become ever-more complex. We eat more than we need, we exercise less than we should, we waste more materials, particularly food, than ever before.

National Geographic last month published an article that detailed how we waste fifty three percent of fruit and veg that we cultivate; either in transit, point of origin, or in just daily home consumption. And the accumulation of these systemic imbalances, means that identifying points where efficiencies could be made becomes incredibly complicated.

Consider our movement around the planet, which relies heavily on the availability of fuels for our vehicles. We could do less of this. We could share our cars more, we could use video conferencing much more, we could stop going on holiday, or at least holiday closer. We could send things by a slower means and wait more patiently for them to arrive. But instead, we find ourselves in a situation where we are developing things like drone delivery systems, again for Amazon, or their push buttons, which allow things to get to us super speedy. In any case, these are all social solutions to the problem of how to get more out of our resources, to reduce the pace at which we use them and buy ourselves more time to find alternative sources to keep this planet going, but especially to keep us going within it. But there are also technological solutions, and seen in the way that I'd like to propose, the behavioural fix to diminish our exploitation of natural resources by being less wasteful is a stopgap towards a more long-term solution. And we've heard of a few already. This is actually James King's work from about eight years ago now. So we can grow in vitro meat, we can staple our stomachs to make us less needy of food, or at least more moderate in our consumption of it. We can take all kinds of initiative to diminish that impact that we have. We can use [inaudible 05:27] genetic diagnosis to help us mitigate certain biological sufferings that we may encounter as a result of just being ill-equipped to deal with this increasingly toxic environment. We can modify crops and seeds to ensure their yield is greater. And so whilst our inefficiency is supreme in this natural world, our capacity to think of solutions is perhaps greater than any other species as well.

We can transform our environment if we want to, we can control water flows and generate power with hydroelectric dams or by creating wind turbines or solar cells which draw from our renewable sources of energy. However, the worry of those who criticise this technological solution is that technology has a habit of fighting back. We don't trust the technological solution very much. In fact, I think that mistrust of this technological fix, and for the people that advocate the social solution in particular, is because we have a tendency to continue on with our

consumption and utilisation of resources despite these solutions. We may staple our stomachs, but we'll continue to stretch them ever more, because hunger is no longer simply a biological necessity, it's become a social, cultural ritual. So we may find more ways of generating energy from to be sources, but our species will continue to escalate the number of things it seeks to power, the more rockets to fuel, more discoveries to be made, more artefacts to consume, more devices to connect, fifty billion by 2020, if the prediction about the [inaudible 07:10] of things is accurate. We also worry that environmental interventions may have unforeseen consequences, which could be even more catastrophic than if we just left things alone.

Eric [Hastings Centre? 07:25] paraphrased Milan Kundera's quote, 'human kind's longing for paradise is human kind's longing not to be human'. It's the pursuit of being other, of being something more than we are, may indeed be our downfall.

In actual fact, many of the things we aspire to do are quite palatable. We want to live healthier, longer lives, we want our time on this earth to be as rich and rewarding as possible, we want both the purpose and pleasure that life can bring us. So our pursuit of excess is almost as central to our DNA as our exploitation of natural resources to get what we want. But let's be honest, it's not working for everybody.

In any case, take a look at your own life and consider where you could make efficiencies from today, and going on, I'm sure many of you do already. Write down three things that could make a difference to this problem of resources, bearing in mind Lovelock's twenty year prediction that the time to act is now. I will reduce the amount of food waste in my home, I will ensure I recycle more of what I use, I'll use public transport more frequently, I'll get off my bus one stop before I usually do in order to walk that distance. These are really simple goals. You can do this really easily. If fifty percent of you leave today and make even one of those changes, I would be surprised. It's also about institutions. This isn't just about you, and the more sophisticated critique of this capitalist consumerist culture is to recognise that a lot of the work needs to be done at institutional and organisational levels.

So you might focus your effort at that point and try to change the way in which institutions work. But the last thing I wanted to tell you is to curtail your ambitions, to transcend, to be, and enjoy life more fully, to have experiences that we think enrich our lives and make existence worthwhile, or at least responds to that desire we have to go beyond.

I've got another proposal for FutureEverything today. This is really the heart of what I'd like to talk about. When we think of this idea of Life 2.0 of course it's a kind of device through which to think about change. Life has evolved for many, many years, and so to propose that we are simply at 2.0 is ludicrous. But the point is that we are at a point in our history, in the history of life, where we can change it on a fundamental scale. And that science has been growing for quite some time.

The question I want to ask, the strategy I want to take, is to consider whether we can think about technological change, biotechnological change, modifications of biology, in a way that responds to a deeper interest in insuring environmental flourishing. I have, for fifteen years, worked around technologies that allow us to modify and enhance our capacities. Most of my work has been focused on this area.

Back in 1998, I started here by reading an article in New Scientist that purported to identify performance genes; genes that could be isolated and potentially optimised to allow us to have stronger, fitter, physiologies. Now I'm not sure that many people have asked this question, I'm not sure anyone's asked this question; whether we could modify ourselves to be more environmentally friendly. It's not a very palatable scenario for environmentalists; the idea of disturbing nature is inherently problematic for many people that hold such beliefs. So the idea that we change ourselves using technology to hopefully address this catastrophic imbalance within our society, maybe completely antithetical to what we should be doing. But within those discussions about human enhancement, which I have been part of for many years, the focus of the conversation is always very similar; how can we modify ourselves to get more of the pleasure or the purpose in our lives that we seek? How can technology work for us? How can it respond to this kind of runaway individualism that seems to pervade our lives and govern, not just the way in which we think about ourselves as mostly atomistic individuals, and also responds to the kinds of things we want to do in our life, the way in which we want to choose our futures. So could this be different?

Now, a few years ago I was shown this by a Professor in America. I've not shown it publicly, although it is publicly available. This is actually a photocopy of the print that I was handed, which said classified government violation of ethics. The document outlines a series of projects that were conceived to tamper with technology with a view to bringing about greater complicity with certain ideas that would be inherently controversial. There were desires to modify life, and the end goals of those desires, as this document revealed, were difficult to see, but they were underpinned by the broader governmental interest, that national interest in producing the perfect soldier or the perfect astronaut. Things they talked about in the document were how we can exploit the slippage between therapy and enhancement. We were entering a world where medicine was making, not just well, but as a patient in Peter Kramer's Listening to Prozac book articulated; making us better than well. And this pursuit of that slippage, making people feel that enhancement is part of what medicine should be doing, it's not sufficient just to make us fit for purpose, in fact the purposes is to which we want to be put are much broader and much more beyond just simply being well. And we want to be well for something, capable of enjoying life to its full, and our biology may not be equipped to do that.

So this blurry distinction which underpins the medicalisation of thesis that we see around us, within medical practice today, is part of this project. The role of [BioE Thesis? 14:07], of which I've been a part for many years, was seen as vehicles through which these kinds of experimental procedures could be advanced. BioE Thesis provided the ethical reasoning that allowed science to

continue without much limitation. In fact, about ten years ago, I was involved in some research with a Newcastle lab which was looking at trying to utilise mitochondrial DNA transfer to bring about a child that was not suffering from the dysfunctional consequences of genes that are going to lead ultimately to some significant harms in their lives. And back then, ten years ago, the science was very much experimental. We're just trying this out, we're not going to create a person that has three genetic parents. Ten years later, we see the license being awarded to do precisely that.

The argument is that science has utilised the media, utilised government, in order to bring about these enthusiasms among their public. It talked also about a magic pill, and again, about fifteen years ago when I started here, I met a few people who were working in this area of life extension, and within this document it talks about the pursuit of life extension as a human desire, that aging should not be thought about as an inevitability, but actually as a disease that we should correct. And you hear this language within people working in this field. And arguably, the pursuit of a greater quality of life, a longer life, leads inevitably to a commitment towards life extension, at which point, if you have the possibility of immortality, then when do you check out? How do you check out? And they propose this idea of a magic pill that would ensure that you could have a completely illness-free life, that you can go through your life without experiencing biological suffering resulting from disease, illness, and then at some point, just check out with your suicide pill at the end of it, if that's the course you want to take.

So Life 2.0 was about trying to sponsor a range of initiatives that will allow people, now allow people, that would compel people towards greater support for the idea that this is something that's good for them. That, in fact, we should utilise technology for our own means and it's something that we are rightfully entitled to do. And I'm not sure that's really good enough. I think that we need to step back from the whole project of human enhancement and the presumption about the ethical issues it presents, and consider a very different approach to thinking about life. So Life 2.0 approaches things a little differently.

I propose a form of what may be called human off-setting. So if carbon off-setting is a reduction in emission of carbon dioxide or greenhouse gases made in order to compensate for, or to off-set an emission made elsewhere, we want to do something. We off-set it and feel better about ourselves, again, something that Lovelock thinks is just a complete waste of time. A human off-set is an efficiency gain in consumption or generation of resource made in order to compensate for some other resource expenditure.

The manner of this off-set could vary, and I don't want to separate out different forms of technological solution. You don't need to completely modify your DNA in order to off-set, but a biotechnological fix is certainly one aspect of it. I think there's a lot we can change about how we currently do things, which precede that very invasive level. We don't need to completely transform our DNA in order to make these kinds of off-sets, and in fact, we need to look carefully about how society organises certain fundamental things that are broken, that don't work. Take organ donation, or organ shortages and blood shortages, these are

systems that aren't working and are completely within our power to change with very simple means, albeit annoying quite a lot of people. You know, opt out rather than opt in.

In fact, the Big Donor Show back in 2007, a television programme in the Netherlands whereby you had a game show situation where there were three participants in need of a kidney, and one donor who would be donating it to one of them, and whereby the audience would vote as to which one was more deserving of it, shone a light on how broken the system is and how inadequate we have become in dealing with fundamental human needs.

Human off-setting is the process by which we modify biology in order to provide an exponential return on our actions as depleting natural resources. But there's another problem exemplified by a simple fact; the single biggest contribution you can make to reducing your use of resources is to not have children. But you're unlikely to stop having children. Many of us are unlikely to do that. All being well, having children is one significant aspect of what gives life value, and even the prospect that these children may have worse lives by us all having too many of them does not dissuade us from pursuing this selfish act. And just to be clear, even if our act is born out of a desire to nurture life from a position of care, or even altruism, it still remains a selfish act. It is about us and what we need.

So modifying our biology as a strategy to deal with the problem of depleting resources, we haven't really thought about that. We think about modifying the environment in various ways. Now Lovelock does appeal to the idea of some sort of precedent here. He talks about synthetic foods, and we've seen with synthetic biology potential for doing this in some large scale. He hasn't talked about, and other people haven't talked about, kind of hard-core human enhancements as a way of trying to approach this, but it may be a starting point.

I want to put this into a broader context, because I think that again, it's not just about those big technological changes, but it's about understanding that this separation that we've made for many years now between sociological and the technological fix has a much wider starting point. So let's take one simple proposition; how could we modify our biology in order to better adjust to the different environmental conditions that we find ourselves? In short, how could we ensure we are comfortably warm when it's cold, and comfortably cool when it's hot?

Now, if you look back over the years, a number of approaches to this have been taken. So here's a few examples of patents that were applied for and developed as an attempt to try to think about how we could modify our biology using some kind of cooling system. So you can see the pipes here flowing liquid down to the leg in order to pull blood towards it and hopefully cool down the body. Back in 1930, we have a similar sort of system, instead in this case, using a helmet as a way of trying to deliver some kind of biological modification. Again, completely invasive, but nevertheless the trajectory here is that desire to change our capacity, to modify our capacities.

By 1967, we see examples of this of course within the space race where suits alone are one clear way in which innovation has happened here. Not the first example of where we have this crossover between space research and wider societal interests, Again, similar principle; delivering cooled or warmed water around a bodysuit in order to change the way in which we feel. And we see increasingly full body suits that hopefully will allow us a way of trying to approach this problem, and if we're successful, then it should hopefully allow us to rely much less on things like central heating or air conditioning. And since then, since about, I guess 1970s, we've seen real world prototypes that have had real world implications for how people operate.

This was developed and has been developing for about ten years now, maybe a bit longer, by a couple of engineers in Stanford. And you can see more or less how you put your hand into this device and wrap it around this cold unit and then air is pulled through it and its purpose is to dramatically and quickly reduce your body core temperature.

The consequences of this have been significant changes to the capacity of the person to do all kinds of activities. So, for example, if you're an athlete you can use a device like this, pull your whole body down and perform much better than you could otherwise. So in the process of modifying these parameters, we also bring about this era of human enhancement that I'm talking about. 2014, a prototype that was developed to apply a kind of wrist-based solution to our sensory experiences of warmth and cold, and it sends signals through your skin and allows you to feel slightly warmer or slightly colder, not dramatically, but again these are principles that are being developed where we can hopefully find ourselves in a situation where we are much less reliant on very demanding cooling and heating systems.

By 2016, we have new research that discovers ways in which we can develop solid state thermal fuel which allows us to perhaps create clothing that is significantly capable of storing energy, storing capacity to warm ourselves later. Because, of course, we don't want something that just works when it needs to, we want something that's going to respond to the kind of conditions we find ourselves in. So the possibility of having clothing that is able to store energy and warm us progressively as we need it, and respond to the environments we're in, seems more and more a possibility. And so these technological fixes that we talk about, I argue operate in a much wider social history, and that separating them out is a mistake.

The number of patents alone that have been used and developed trying to address body regulation systems is as long as your arm, and so looking at this in context, it's crucial to understand why the technological fix, far from being something that... mistrust is an inherent part of our social world. So to conclude, when we think about what it is to operate as a post-human, to think beyond the human, we need first to think beyond our species, not beyond our species' typical functioning, not just trying to make ourselves stronger, fitter, better, but actually to understand what that would entail within our wider ecosystem.

	<p>Life 2.0 denotes a break, not just in our evolutionary trajectory, but in our beliefs about what we think we should be doing on this planet. We are so focused on putting to work other aspects of our environment; the wind, the water, the sun, but we've omitted to consider ourselves as vehicles of resource regeneration. The shift in how we regard what could be done will inform more deeply our sense of what needs to be done to ensure the long-term survivability of our species, and those around us, whose existence enables our own. And just to put this into more or less a hundred and forty characters; if we can't reverse our catastrophic impact on the environment by being more careful, then we need to reverse engineer ourselves.</p> <p>Just a final slide to show you this. This is, for me, the problem with the present paradigm. It's some research that was published just last month, actually in the last few days it's been shown as a proof of principle developing for the last decade where we were able to insert electrodes into a species and control its movements. All sorts of potential valuable insights can emerge from this, but again, it operates with this assumption that life is there for us to be used, modified, and exploited in order to address our fundamental needs. I think it's time we turned the tables, so instead of more drone beetles, more bees.</p> <p>Thanks very much.</p>
Outro	We hope you enjoyed Andy's talk and thanks for listening. You can hear the rest of the talks from 2016 at <a href="http://futureeverything.org/2016podcasts">futureeverything.org/2016podcasts</a> .

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