Looking to the future of technology and human being. An Interview with Anders Sandberg

Una mirada al futuro de la tecnología y del ser humano. Entrevista con Anders Sandberg

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ABSTRACT

Interview with Anders Sandberg, member of the Future of Humanity Institute at Oxford University and expert in human enhancement and transhumanism, about central topics in his works.

KEYWORDS

TRANSHUMANISM, HUMAN ENHANCEMENT, ANDERS SANDBERG, BIOTECHNOLOGY

RESUMEN

Entrevista realizada a Anders Sandberg, miembro del *Future of Humanity Institute* de la Universidad de Oxford y experto en mejoramiento humano y transhumanismo, sobre cuestiones centrales de su labor investigadora.

PALABRAS CLAVE

TRANSHUMANISMO, MEJORAMIENTO HUMANO, ANDERS SANDBERG, BIOTECNOLOGÍA

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THE MOST CONCISE AND ACCURATE characterization I know of Anders Sandberg was written by Duke University philosopher Allen Buchanan, and goes like this: "Sandberg is a multifaceted genius –a philosopher, neuroscientist, futurist, mathematician, and computer graphics artist who works at the *Uehiro Centre for Practical Ethics* at Oxford".[1]

Few philosophers certainly dare to look to the future with his boldness and confidence. You can agree more or less with their ideas, their analyses or their forecasts, but what cannot be denied is that they are always founded on solid scientific knowledge and deep philosophical reflections. In any case, he himself admits that many of his theses are merely exploratory, and do not pretend to be prophecies, let alone assume that the future is somehow mysteriously predetermined. Rather his underlying idea seems to be that the future is in our hands and that this is precisely what allows us to cherish some optimism about it. That conviction does not prevent him from analysing in detail the possible existential risks that threaten us –some of them very serious. His confidence in technology, however, is great enough not to

1 Buchanan, A. (2011), *Better than Human*, Oxford: Oxford University Press, p. 94. At present, Sandberg works at the *Institute for the Future of Humaniy* at Oxford, as it is said afterward.

consider himself defeated beforehand. He is decidedly counted in the ranks of those who consider technological development as the best resource we have to successfully face that future.

Anders Sandberg has been a member of the *Future of Humanity Institute at the University* of Oxford since 2007. There he investigates –in close collaboration with Nick Bostrom, with whom he has published various joint works– on ethical, social and political issues related to new technologies and most especially on human enhancement technologies (cognitive enhancement, emotional enhancement, etc.). They also focus their research on how to prevent and assess the catastrophic global risks that may await us in the future –however low the probability could be–, and on various aspects of cognitive neuroscience and neuroethics. He studied Computer Science at Stockholm University, and received a doctorate in computational neuroscience from said university. He is co-founder and director of the Swedish think tank *Eudoxa*, dedicated to reflecting on transhumanism from a progressive perspective, and between 1996 and 2000 he was the president of the Swedish Transhumanist Association. His computer designs have also been used as illustrations for the covers of some books by Australian science fiction writer Damien Broderick.

Anders Sandberg maintains a recommendable blog on various topics, but often related to the meaning of new technologies (http://aleph.se/andart2/). Much of his academic work can be seen on his website at the Oxford Martin School: https://www.fhi.ox.ac.uk/team/anders-sandberg/.

This interview took place during my research stay at the *Oxford Uehiro Center for Practical Ethics* in April, May and June 2015. Anders met me one morning in early June in his cosy office, located in a corner with large windows in the first floor of a modern building on St. Ebbe's Street that the *Future of Humanity Institute* shares with the *Uehiro Center*. He had made a very good impression on me at some meeting in the Uehiro a few days earlier and that, together with my previous readings of his work, made me decide to visit him. After a brief presentation and an interesting talk about transhumanism and the environmental impact of new technologies, sheltered by the various computer screens –all of them on– which almost completely occupied the space on his table, I handed him the written questionnaire, and within ten days I had his response in my email inbox. It goes without saying that I am very grateful for the kindness and good disposition with which he received me and for the interest he showed in the task of answering my questions. I think the result will be of great use to anyone who has ever been introduced to recent debates about transhumanism and enhancing technologies.

* * *

1. *You are one of the most outstanding authors writing in defence of transhumanist ideas, and also of cognitive enhancement and other kinds of bioenhancemet, from a philosophical perspective. How would you define 'transhumanism', and why do you think that this movement is currently so successful in the mass media? Do you think that transhumanism is basically a philosophical movement, or, on the contrary, it includes other additional aspects, such as religious or political agendas?*

I would define transhumanism as the view that the human condition is not unchanging, that it can and should be questioned and changed, and that we can use applied reason to do this.

Transhumanism is in many ways a natural outgrowth of the humanist project of improving the human condition, but amplified by our modern realization that the human body and mind are objects that to a large extent can be understood and changed technologically. However, transhumanism is also open for the possibility that there can be posthuman modes of existence that hold great value and it would be desirable to explore the posthuman realm to find them. Being human is likely not the best possible state of existence.

Why do mass media like transhumanism? Part of it is likely the transgressive nature of the idea: challenging the human condition is likely to bring out strong emotions, and media thrive on that. There are also elements of cutting edge technology and science fiction scenarios. This all makes for good entertainment, if not a rational debate.

More importantly transhumanism is one of the few movements today that articulates a positive vision of the future. In contrast to many current ideologies it argues things can become vastly better and that there are still open frontiers to explore.

Is transhumanism a philosophical movement? I think one can trace back transhumanist thought to dissatisfaction with the human condition, and the conclusion that we should take steps to actually change it. This is different to apologist views (whether religious or existentialist) that claim the human condition is good or must be accepted, or pessimistic views that claim the human condition cannot be changed. But the optimistic transhumanist view does not have to be founded on particularly deep philosophical reasons. I think, as a philosopher, that it is good to carefully consider the reasons for one's beliefs, but it is easy to find transhumanists who have just picked up the view.

People sometimes view transhumanism as a religious view, but while it overlaps with many religions in its concerns with escaping the human condition, there are both practical differences and no unified value theory.

I recently reviewed transhumanist conceptions of the meaning of life,[2] and was struck by the range of opinions. I could find examples of nearly any well-known approach to the question, from existentialism to perfectionism to Christianity, as well as more exotic ones. I think this shows that transhumanism in general does not have a unified value theory: the technologies discussed are instrumental for achieving enhancing ends, but why these enhancements are desirable depends on theories of value and goals that are more specific. We could speak of particular transhumanisms: existentialist transhumanism, extropian transhumanism, cosmist transhumanism, Buddhist transhumanism, and so on.

In the same way transhumanism mixes well with various political agendas: there are libertarian, social democrat and anarchist transhumanists, each combining the transhumanist optimistic questioning of the human condition with political theories of how society could and should be changed practically. But there is no inherent politics implicit in transhumanism, save for a rejection of certain conservative positions.

2. *You are a member of the academic staff in the Future of Humanity Institute at the University of Oxford. Could you explain briefly what the aim of the Institute is and what your main research topics are?*

The aim of the Future of Humanity Institute is primarily about improving the future of humanity. FHI's remit is to look at the long-term, big picture future of humanity. That includes thinking about threats to our survival –existential risks– and emerging technologies that could change the human condition. We also study how to think rationally about the future and these highly uncertain things

We are part of the Oxford Martin School, founded in 2005 by James Martin to help solve the greatest problems of the 21st century. The School has institutes and projects about nearly any major topic, from climate to war, from nanomedicine to ageing. Our role is to look far ahead and focus on things that make a huge difference in value that affect how we should act.

The institute is not by itself transhumanist, but we deal with many questions closely aligned with the transhumanist inquiry into the human condition.

My own research at FHI has focused on the technology, ethics and social impact of cognitive and emotional enhancement. I have also worked on questions of risk and uncertainty, especially when dealing with complex technological systems, collective cognition and global risks. Finally, I have

2 Anders Sandberg (2014), "Transhumanism and the meaning of life". In *Transhumanism and Religion: Moving into an Unknown Future*, eds. Tracy Trothen and Calvin Mercer, Praeger.

also investigated the physical limits on how far life and intelligence could affect the universe.

3. *Transhumanism makes very daring promises: An indefinitely long life, the overcoming of illnesses and all the corporal limits that have characterized our species, the acquisition of completely new traits, alien to our natural condition, the union with the machines, the possibility of downloading our mind into a supercomputer, and so on. These promises have provoked a notable enthusiasm among some people, but in general they have been received with scepticism. Do you think that these promises are well founded? Are you really confident that most of them can be fulfilled? And if so, do you think that this is a desirable thing, since it probably means the extinction of our species? Aren't you worried about the possibility that we are preparing the way to our own end?*

Transhumanists are neither better nor worse than anybody else at predicting the future. However, the goal is more to motivate the world to build a desired future than to promise what will happen.

Looking at technologies transhumanists have enthused about over the past 30 years, progress have been interestingly uneven:

Cognition enhancing drugs are in use by students and professionals, although their actual effects are relatively limited. Here future progress more depends on the regulatory situation than science. Other forms of cognitive enhancement such as brain stimulation, neurofeedback and computer game training have shown a fair amount of promise. Brain-computer interfaces are still decades away from being simple and safe enough for healthy people to desire them, despite impressive advances thanks to optogenetics and nanotechnology.

Biotechnology has advanced by leaps and bounds. Current capabilities in stem cells, genetic sequencing, synthetic biology, DNA synthesis, and gene editing are definitely impressive and likely to become significantly more powerful in the near future. Yet there is a significant gap between the lab and the clinic. Gene therapy stumbled, and is only now returning. The recent use of CRISPR/cas9 editing to modify human embryos was a radical step, yet it also showed that much more research is needed.

Information technology has perhaps developed more radically than early 90s transhumanists could hope for: not only do 40% of humanity have Internet access (a curve that is rapidly rising) but the functions enabled by the modern web include new forms of social organization and media, surprisingly powerful knowledge dissemination (Wikipedia, MOOCs, search engines), and provides data that is currently driving a second revolution in machine learning, robotics and artificial intelligence. In fact, the concern among many

transhumanists is that we may get *too powerful* forms of automation and AI before we have good methods of controlling them.

Life extension is another case where rapid scientific progress is happening in biogerontology but transferring it to the clinic is far slower than expected (to the immense annoyance of ageing transhumanists, of course). A key issue here is that medical research funding tends to focus on dealing with the outcomes (diseases of ageing) rather than the causes.

The list can be continued with space, nanotechnology, digital currencies, and many other technologies.

My conclusion is that there are enough promising technologies to make the claim that humans of the future will be enhanced virtually certain: even if some of the technologies fail or are slow to develop, there are enough in the pipeline that some will succeed. We just do not know which ones yet.

Many of the technologies that have shown disappointing development have also been slowed for social, economic or cultural reasons rather than underlying scientific impossibility. Transhumanism, as a cultural movement, is of course better placed to engage with these issues than the direct research, although there is a number of scientists and entrepreneurs motivated by transhumanism.

Is transhumanism the end of the species? Francis Fukuyama famously called it the world's most dangerous idea. The core of his –and many others'– unease with transhumanism is that it threatens some human essence, and without this essence society or humanity would not exist.

The problem is of course to define the essence in such a way that it is not as parochial as past moral discrimination against women, other races, sexualities or brain types, yet not becomes so general (like having moral agency) that posthumans would also have it. Even if some enhanced humans were to become a new species by virtue of being fundamentally different it is not clear that this would have any moral importance unless they lost key aspects of moral agency, a fairly unlikely choice.

If current *Homo sapiens* went extinct because it gradually turned into a new species (*Homo excelsior*?) it seems that the loss would be akin to the loss due to *Homo erectus* evolving into *Homo sapiens*: possibly a small loss of species and cultural diversity, but outweighed by a great advantage to the members of the new species. We might wish that future humans spread into a multitude of forms and species so that we gain the value of diversity and choice in addition to whatever benefits there are to belong to them.

However, powerful technologies are also likely to be dangerous if used unwisely. Mental enhancement technology could be turned into mental control technology, superintelligent systems are not guaranteed to have human-compatible goals, control over biology or matter could unleash devastating

new forms of weaponry, and so on. This is why transhumanists, who after all tend to take the potential of radical future technology seriously, are also involved in efforts of finding ways of making such possible technologies safer by design before they come about. We may not get a second chance if we leave off analysis until the new superweapons are already a virtual certainty.

4. *Do you think that there should be some limits to these transformations? The critics of transhumanism do not only remark the ethical problems involved in all that, but also the existence of political and social problems, like the increase of inequalities, the danger of a more powerful control over the individuals, or the eventual creation of two confronted communities, that of human beings and that of posthumans. Do you think that these socio-politic concerns are misleading?*

There are always ethical, practical and social limits to enhancement, but I do not think they are as restrictive as many critics do.

My basic position is that we have a right to morphological freedom: we should be allowed to change –or not change– our own bodies and minds. This follows from basic autonomy, or in a rights framework from our right to freedom and our own bodies.

However, this freedom is constrained by capacity –we need to be fully aware of what we are doing– and whether the change harms the freedom of others. That others may dislike our changes is not enough of a motivation to prohibit them: they need to be actively harmful. In a world where we allow cars that is a high threshold.

One can argue that certain enhancements change us so much that the result is a new person; others may make us non-persons –both would presumably be morally disallowed. However, it is unlikely that many people would pursue such changes. People are far less willing to enhance what they consider core capacities of the self, such as empathy and personality than less self-oriented capacities like alertness, memory and language ability.[3]

Socio-political considerations have different weight depending on one's political philosophy. A classically liberal view like the one sketched above would not accept inequality as a valid reason to limit enhancement. A more social-democratic view would of course think that enhancements that increase inequality are problematic (although one may take a Rawlsian approach and argue that they can be justified if the benefit to the worst off is great enough).

Many of the common concerns are possible to analyze empirically rather

3 Riis, J., Simmons, J. P., & Goodwin, G. P. (2008), "Preferences for enhancement pharmaceuticals: The reluctance to enhance fundamental traits". *Journal of Consumer Research*, 35(3), pp. 495-508.

than philosophically. Typically drugs and gadgets have prices that come down exponentially over time: enhancements that are drug- or gadget-based are likely to become cheap and widespread. Services on the other hand remains expensive when they cannot be automated, and enhancements that are service-based would likely have a higher risk of bad social effects. Still, we know some services are regarded as so essential for society that they are made tax-based like schools and healthcare (basic schooling is even mandatory in many countries) despite their huge costs. It seems plausible that enhancements that had significant life impacts are likely to end up in a similar category.

When analyzed as something a society may actually *do*, rather than some future possibility to philosophize about, enhancement becomes far more manageable. We can consider whether taxation would have beneficial effects on enhancement adoption, we can consider how to maintain privacy, right of access, or safety reporting –considerations that are not alien to our normal sociopolitical discourse. There is a danger of turning enhancement into an abstract screen to project our hopes and fears onto, since that form of discussion typically does not allow for the application large number of useful ethical, social and political tools we actually possess.

5. *In relation to climate change, in a recent paper[4] you claimed that instead of facing this problem by means of geoengineering, it would be easier and less risky to practice human engineering; that is, human beings could be technologically modified to be less destructive of the planetary resources and could be adapted to the deteriorated environmental conditions produced by such climate change. It could be objected, however, that, even if we accept that human engineering is safer than geoengineering, the priority should be –as the ecologists argue– to change our economic and political systems, which at the end of the day constitute the main causes of the problem.*

It is worth remarking that that paper was mainly trying to explore just why the priority should be changing economic and political systems. The standard argument among ecologists seem to be that downstream solutions like geoengineering or learning to live with a changed climate are bad, while upstream solutions like changing economics are good. Is the goodness due to them being upstream, closer to the ultimate causes? One could say our argument suggests a *reductio ad absurdum* of that view. In the end, my own

4 [The paper is the following: S. Matthew Liao , Anders Sandberg & Rebecca Roache (2012), "Human Engineering and Climate Change". *Ethics, Policy & Environment*, 15:2, 206-221, DOI:
10.1080/21550085.2012.685574. A. D.'s note].

assessment is that it at most shows that one needs to take non-ecological ethical considerations into account when trying to solve climate change problems, and that we should be more open to nonstandard solutions.

The climate discourse often implicitly assumes that since climate is a global problem of great weight it automatically has priority over other considerations, but this is overselling the importance. Existential risks, threats to the entire future of humanity, *do* have an overwhelming moral importance[5]. But climate change is merely likely to reduce our future well-being, not threaten our long-term potential: it is important, but not overridingly important[6].

It might appear unexpected that transhumanists, who after all are often depicted as exorbitantly optimistic about the future, are also deeply concerned about existential risk. But this concern follows naturally from questioning the human condition and being optimistic about the future. If the human condition can change deeply, it could change for the worse or even disappear. The transhumanist view that the human condition can be influenced by our actions implies that we have a responsibility for it. If the future can hold tremendously large value –which most transhumanists think– then threats to achieving this value are also more serious. Hence safeguarding the future from accidental or deliberate threats becomes a top priority.

6. *Sometimes it seems as if many transhumanists think like that: since improving our world is very difficult, let us seek only a technological improvement of human beings, and then maybe we will not need this world anymore, nor improve it therefore. Don't you think that changing human beings to fit us into a deteriorated planet means to come to terms with the idea that we don't need to change our way of life just because technology can transform us in less hard consumers (e.g. diminishing our size), or make us more resistant to high temperatures, to draught, to the polluted air and water? This sounds quite conservative, isn't it?*

A common criticism of proposed human enhancements is that they are not solving the underlying problem (note how this is the exact opposite of the criticism against the idea in the human engineering paper!). Instead of truck drivers, pilots or surgeons using drugs to stay more alert it would be better if they had work schedules that gave them enough rest. But this is based on

5 Bostrom, N. (2013), "Existential risk prevention as global priority". *Global Policy*, 4(1), 15-31.

6 There is a relatively low but nonzero probability of it being an existential threat due to extreme tail risks normally discounted from the standard climate discussion. This might change things, but climate would still be one existential risk among other existential risks like nuclear war, bioweapons and asteroid impacts.

the assumption that the underlying problem is solvable: despite obvious, well documented risks rest in these jobs is not implemented for various practical, economical or cultural reasons. The situation is a bit similar to the arguments between proponents of cognitive behavior therapy and psychoanalysis: while psychoanalysis might get at root causes and deep understanding, CBT can resolve practical problems far more quickly and cheaply.

The issue is whether we care about deep causes or whether the actual problems are solved. Instead of eradicating disease pathogens (the cause) we can vaccinate or use antibiotics against them so that nobody gets sick (what we care about). A common intuition is that solving deep causes provides better solutions since they are more resilient (a good example is how both CBT and antidepressants can cure depression, but the coping strategies learned in therapy reduces relapse risks too). Slowing ageing will reduce the burden of many diseases far more than individual cures would. But many approaches are resilient without dealing with causes; policing and societal norms work in promoting nice behavior without actually making people morally perfect. Hence, from a consequentialist perspective, we should not care whether an intervention is biotechnological, psychological or social, but rather ask whether the results are good compared to the costs and risks involved.

Is improving the world difficult? There is no general answer to that. Many transhumanists, being optimistic about technology, actually think many currently ominous problems –climate change, resource scarcity, bad governance– can be solved using technology and/or social changes. But having backup plans –more resilient bodies, climate adaptation, resource efficient living, hidden social organizations– clearly makes the situation better. That a backup plan exists does not imply it is the most desirable: most transhumanists prefer a healthy, rich and free planet over any alternative where the bad things are offset by backup plans.

I think there is a widespread tendency to assume moral hazard to be more significant than it actually is. It drives conservatives to ban HPV vaccinations or contraceptives because they think it might allow more promiscuity, environmentalists to argue against investigating geoengineering or climate adaptation, and some ethics boards to refuse studies into the actual effects of cognitive enhancers in students who are already taking them, since positive findings might be seen as an endorsement. These concerns focus on the wrong problem and typically try to prevent us from learning more about our possible options.

7. Do you think that some persons who are now young enough will be able to access to the enhancement technologies and, therefore, some of them will be part of the future posthuman population?

Even conservative demographic models suggest that a fair number of kids today can expect 100 year lifespans. Given that we already are using enhancement to some extent –from smart drugs to smartphones– and that the enhancements are likely to become radically better over time (including lifespan extension), it seems likely that these kids have a fair shot at becoming posthuman. As the science fiction author Charles Stross pointed out, the generation growing up right now will "never be alone, never lost, never forget".

The interesting question is of course how radically enhanced or posthuman someone can be because it makes them a different person. Is it meaningful to speak of "my" posthuman self, if that being is so vastly different from me that my current contribution to its identity is less than contributions from technology? My own view is that continuity does matter to some extent: a highly enhanced posthuman may still remember its human "childhood", just as we can dimly remember our early childhood –when we were beings that had rather little in common with ourselves in the present.

However, personal identity might be overrated as a guide. It might matter more that the future is full of beings with grand, meaningful lives than that some of them are continuations of ourselves.

8. *There is a short story by Isaac Asimov, "The last question", in which a supercomputer able to improve itself is reiteratedly interrogated along the history of humanity with the following question: "how can the net amount of entropy of the universe be massively decreased?", and the supercomputer always provides the same answer: "there is as yet insufficient data for a meaningful answer". And finally, trillions and trillions of years in the future, even after the death of the entire Universe the supercomputer find an answer to the question and pronounce: "Let there be light!". Could the posthuman beings, in your opinion, aspire to a situation of spiritual transcendence similar to that that Christianism and other religions promise in the form of an afterlife? Could it be possible that posthumans reach in a distant future, through a process of constant improvement, the status of a god or at least of an angel?*

In discussions about transhumanism I often quote Pico della Mirandola's "Oration on the Dignity of Man" where he has God tell Adam that the true gift of being human is the ability to remake one's nature:

> We have made you a creature neither of heaven nor of earth, neither mortal nor immortal, in order that you may, as the free and proud shaper of your own being, fashion yourself in the form you may prefer. It will be in your power to descend

> to the lower, brutish forms of life; you will be able, through your own decision, to rise again to the superior orders whose life is divine.

While I do not take the religious imagery or the linear Chain of Being seriously, I think Mirandola's vision is the right one. We can remake ourselves, and we can become better in fundamentally important ways.

Humans have access to realms of activity and thought that are forever beyond the ken of other apes: we can experience art, science, religion and philosophy. We can reflect on ourselves and our place in the universe, taking moral responsibility for what we do. I think it is not too inaccurate to say that this a form of spiritual advancement compared to the apes. Yet there is no reason to think that our capacities are the upper limit of what beings can experience. This is why exploring the posthuman realm is important: there may be valuable states or activities we cannot even comprehend as humans, far more important than anything we currently know.

There is a difference between power over the material and mental worlds, and having an accurate understanding and pursuit of value. The first kind is merely instrumental, while the second one is ethical. Many transhumanists believe that we need the first kind in order to become better at the second kind: the deep philosophical questions have resisted us for millennia, and hence we may need to either ensure our survival until they get resolved (perhaps millennia in the future), or we need to create greater minds that can help resolve them. Once we know better where we ought to be going, we should go there – but in the meantime becoming better at knowing seems to be a good strategy.

9. *It has been said in some occasion that transhumanist aims conceal a lack of attention to the most serious and urgent issues that humankind suffers at present. Problems like hunger, poverty or social injustices, which could be relieved through technology, and which are the main impediment for a real improvement in the life of the majority of people. Transhumanism, then, has been blamed for neglecting these grave current problems, which should be however our main concern. I suppose you think this charge is unfair. Do you think that transhumanism has a real social sensitivity? As far as I know, the Future of Humanity Institute is involved in a number of humanitarian activities.*

As I remarked earlier, there exist many combinations of the basic transhumanist mindset and different social sensitivities. While libertarian transhumanists may think giving people maximal freedom and prosperity will improve the world the most, progressive transhumanists think various forms of redistribution or proactive help are the solution. And of course there are

selfish transhumanists that do not care about others.

The Future of Humanity Institute often happens to be consequentialist in ethical outlook. This has led to a great deal of overlap with the effective altruism movement, which aims at finding the evidence-based interventions that have the greatest positive impact. Philosophical considerations such as the value of future generations, the benefit of careful analysis, and the importance of thinking big fits well with transhumanism.

One important issue in the transhumanist social outlook is how much we should worry about current problems compared to gains in the future. Spending all available resources on the present may mean important risks go unaddressed and we lose important opportunities.

A good example is cellphones: originally little more than toys for rich executives, their widespread adaptation in the West led to both radical fall in price and improvement in capabilities. Today smart cellphones are rapidly spreading in developing countries where they have major effects on poverty and freedom (circumventing information monopolies and lack of infrastructure, allowing trusted banking, etc.) Spending the resources that were spent on early-1990s phones on poverty would have had a far smaller effect, and the rest of the world would also be worse off.

Not all innovations have such win-win effects. But many technologies of transhumanist interest are likely to have positive effects on key world problems. Better health (especially slowing of ageing) has enormous positive effects on the economy and ability to live full lives. Cognitive enhancement helps boost human capital and the ability to solve world problem. Reduction of resource constraints using automation, biotechnology or nanotechnology can improve societal resilience and environmental impact. Moral enhancement may improve the disposition to fix key issues. Many of these effects are also network effects: making a few people smarter, healthier or richer has less impact than making many smarter, healthier or richer since economies of scale apply.

10. *Transhumanism does not hide the fact that the achievement of its goals involves the use of eugenic means. Its supporters claim that, unlike the earlier eugenics, it is about "liberal" eugenics, and hence the decisions about the traits to be selected are completely in the hands of the parents, of the individuals, and not in the hands of the State or the elites in power. What is your view on this issue? Is liberal eugenic exempt from any of the moral problems which can be attributed to the old eugenic practices?*

I do think liberal eugenics avoids the problems of old eugenics: it is not based on state coercion, it does not prescribe a single target of genetic perfection, and the moral reasons for enhancing are pluralistic rather than to

further some collective aim.

I also think heritable genetic change of humans will be a smaller practical and ethical issue than many others (transhumanist or not). The reason is that human generation times are long compared to the rate of technological change: by the time a genetically selected or enhanced child has grown up and will be able to enjoy the effects, it is fairly likely that other technologies –gene therapy, smart drugs, implants, nanotechnology, etc.– will allow genetically un-enhanced people of the same age roughly the same benefits.

However, these considerations do not get transhumanism off the hook! As I see it, the core ethical issue in the debate about eugenics is not genetics, but that it involves changing pre-persons or young persons. I suspect that many important enhancements of health, longevity, intelligence, and new capabilities such as human-machine interfaces may have to be installed at an early age so that the growing body and mind incorporates them properly. That has the same ethical issues as direct genetic change.

In the case of very early changes, when there is only a pre-person, I think the case is relatively unproblematic (but others clearly disagree). I agree with Julian Savulescu's principle of procreative beneficence (if you have a choice, ceteris paribus, have the child with the best chances for a good life). The problems begin when we consider the case of a child, who is emerging as a person: here interventions are person-affecting, and it is much more complex to find the right balance between autonomy and beneficence. I do not know a succinct ethical answer to how to handle such situations: here we are dealing the thick concepts of actual parenthood.

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Research topics: Cognitive enhancement, transhumanism, global risks, cognitive neuroscience, neuroethics.

Recent selected publications:

(2020), Cotton-Barratt, O., Daniel, M. and Sandberg, A., "Defence in Depth against Human Extinction: Prevention, Response, Resilience, and Why They All Matter", *Global Policy*, doi: 10.1111/1758-5899.12786

(2012) Earp, B.D., Sandberg, A. & Savulescu, J., "Natural Selection, Childrearing, and the Ethics of Marriage (and Divorce): Building a Case for the Neuroenhancement of Human Relationships". *Philos. Technol*. 25, 561–587. https://doi.org/10.1007/s13347-012-0081-8

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Recent selected publications:

(2019) (With Carissa Véliz) "Would Moral Enhancement Limit Freedom?", *Topoi*, 38(1), pp. 29-36.

(2015) "Scientific Understanding and the Explanatory Use of False Models". en M. Bertolasso (ed.) *The Future of Scientific Practice: 'Bio-Techno-Logos'*, London: Pickering & Chatto Publishers, pp. 161-178.