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#### Non-transhumanist projects trades off with involvement and consciousness raising for the posthuman world – its linear

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Basic conditions for realizing the transhumanist project If this is the grand vision, what are the more particular objectives that it translates into when considered as a guide to policy? What is needed for the realization of the transhumanist dream is that technological means necessary for venturing into the posthuman space are made available to those who wish to use them, and that society be organized in such a manner that such explorations can be undertaken without causing unacceptable damage to the social fabric and without imposing unacceptable existential risks. Global security. While disasters and setbacks are inevitable in the implementation of the transhumanist project (just as they are if the transhumanist project is not pursued), there is one kind of catastrophe that must be avoided at any cost: Existential risk – one where an adverse outcome would either annihilate Earth-originating intelligent life or permanently and drastically curtail its potential.[6] Several recent discussions have argued that the combined probability of the existential risks is very substantial.[7] The relevance of the condition of existential safety to the transhumanist vision is obvious: if we go extinct or permanently destroy our potential to develop further, then the transhumanist core value will not be realized. Global security is the most fundamental and nonnegotiable requirement of the transhumanist project. Technological progress. That technological progress is generally desirable from a transhumanist point of view is also self-evident. Many of our biological shortcomings (aging, disease, feeble memories and intellects, a limited emotional repertoire and inadequate capacity for sustained well-being) are difficult to overcome, and to do so will require advanced tools. Developing these tools is a gargantuan challenge for the collective problem-solving capacities of our species. Since technological progress is closely linked to economic development, economic growth – or more precisely, productivity growth – can in some cases serve as a proxy for technological progress. (Productivity growth is, of course, only an imperfect measure of the relevant form of technological progress, which, in turn, is an imperfect measure of overall improvement, since it omits such factors as equity of distribution, ecological diversity, and quality of human relationships.) The history of economic and technological development, and the concomitant growth of civilization, is appropriately regarded with awe, as humanity’s most glorious achievement. Thanks to the gradual accumulation of improvements over the past several thousand years, large portions of humanity have been freed from illiteracy, life-expectancies of twenty years, alarming infant-mortality rates, horrible diseases endured without palliatives, and periodic starvation and water shortages. Technology, in this context, is not just gadgets but includes all instrumentally useful objects and systems that have been deliberately created. This broad definition encompasses practices and institutions, such as double-entry accounting, scientific peer-review, legal systems, and the applied sciences. Wide access. It is not enough that the posthuman realm be explored by someone. The full realization of the core transhumanist value requires that, ideally, everybody should have the opportunity to become posthuman. It would be sub-optimal if the opportunity to become posthuman were restricted to a tiny elite. There are many reasons for supporting wide access: to reduce inequality; because it would be a fairer arrangement; to express solidarity and respect for fellow humans; to help gain support for the transhumanist project; to increase the chances that you will get the opportunity to become posthuman; to increase the chances that those you care about can become posthuman; because it might increase the range of the posthuman realm that gets explored; and to alleviate human suffering on as wide a scale as possible. The wide access requirement underlies the moral urgency of the transhumanist vision. Wide access does not argue for holding back. On the contrary, other things being equal, it is an argument for moving forward as quickly as possible. 150,000 human beings on our planet die every day, without having had any access to the anticipated enhancement technologies that will make it possible to become posthuman. The sooner this technology develops, the fewer people will have died without access. Consider a hypothetical case in which there is a choice between (a) allowing the current human population to continue to exist, and (b) having it instantaneously and painlessly killed and replaced by six billion new human beings who are very similar but non-identical to the people that exist today. Such a replacement ought to be strongly resisted on moral grounds, for it would entail the involuntary death of six billion people. The fact that they would be replaced by six billion newly created similar people does not make the substitution acceptable. Human beings are not disposable. For analogous reasons, it is important that the opportunity be become posthuman is made available to as many humans as possible, rather than having the existing population merely supplemented (or worse, replaced) by a new set of posthuman people. The transhumanist ideal will be maximally realized only if the benefits of technologies are widely shared and if they are made available as soon as possible, preferably within our lifetime.

#### Transhumanism solves multiple inevitable extinction scenarios

Kurzweil ’08 [Ray Kurzweil; - Forbes. Inc. magazine ranked him #8 among entrepreneurs in the United States, calling him the “rightful heir to Thomas Edison,” and PBS selected Ray as one of 16 “revolutionaries who made America,” along with other inventors of the past two centuries. He is considered one of the world’s leading inventors, thinkers, and futurists, with a 30-year track record of accurate predictions (86% accuracy rate). Kurzweil was the principal inventor of the first CCD flatbed scanner, the first omni-font optical character recognition, the first print-to-speech reading machine for the blind, the first text-to-speech synthesizer, the first music synthesizer capable of recreating the grand piano and other orchestral instruments, and the first commercially marketed large-vocabulary speech recognition. Kurzweil is the recipient of the acclaimed MIT Lemelson Prize, the world’s largest for innovation. In 1999, he received the National Medal of Technology, the nation’s highest honor in technology, from President Clinton in a White House ceremony. And in 2002, he was inducted into the National Inventors Hall of Fame, established by the U.S. Patent Office. He has received 20 honorary doctorates, and honors from three U.S. presidents. Kurzweil has authored 7 books, 5 of which have been national bestsellers. The Age of Spiritual Machines has been translated into 9 languages and was the #1 best-selling book on Amazon in science. ay Kurzweil’s book, The Singularity Is Near, was a New York Times best seller. His latest New York Times best seller is How to Create a Mind: The secret of human thought revealed. In 2012, Ray Kurzweil became a Director of Engineering at Google, at Research at Google — heading up a team of engineers developing machine intelligence and natural language understanding 2008; “The Singularity is Near” https://books.google.com/books?hl=en&lr=&id=0d8oDwAAQBAJ&oi=fnd&pg=PT15&dq=technology+singularity+and+death&ots=IzE8CGevEi&sig=5VUEEK6pshIpR6sUk2oBzPtbyZs#v=onepage&q=death&f=false] AL

I reported on brain uploading in chapter 4. The straightforward brain-porting scenario involves scanning a human brain (most likely from within), capturing all of the salient details, and reinstantiating the brain's state in a different—most likely much more powerful—computational substrate. This will be a feasible procedure and will happen most likely around the late 2030s. But this is not the primary way that I envision the transition to nonbiological experience taking place. It will happen, rather, in the same way that all other paradigm shifts happen: gradually (but at an accelerating pace). As I pointed out above, the shift to nonbiological thinking will be a slippery slope, but one on which we have already started. We will continue to have human bodies, but they will become morphable projections of our intelligence. In other words, once we have incorporated MNT fabrication into ourselves, we will be able to create and re-create different bodies at will. However achieved, will such fundamental shifts enable us to live forever? The answer depends on what we mean by "living" and "dying." Consider what we do today with our personal computer files. When we change from an older computer to a newer one, we don't throw all our files away. Rather, we copy them and reinstall them on the new hardware. Although our software does not necessarily continue its existence forever, its longevity is in essence independent of and disconnected from the hardware that it runs on. Currently, when our human hardware crashes, the software of our lives —our personal "mind file"—dies with it. However, this will not continue to be the case when we have the means to store and restore the thousands of trillions of bytes of information represented in the pattern that we call our brains (together with the rest of our nervous system, endocrine system, and other structures that our mind file comprises). At that point the longevity of one's mind file will not depend on the continued viability of any particular hardware medium (for example, the survival of a biological body and brain). Ultimately software-based humans will be vastly extended beyond the severe limitations of humans as we know them today. They will live out on the Web, projecting bodies whenever they need or want them, including virtual bodies in diverse realms of virtual reality, holographically projected bodies, foglet-projected bodies, and physical bodies comprising nanobot swarms and other forms of nanotechnology. By the middle of the twenty-first century humans will be able to expand their thinking without limit. This is a form of immortality, although it is important to point out that data and information do not necessarily last forever: the longevity of information depends on its relevance, utility, and accessibility. If you've ever tried to retrieve information from an obsolete form of data storage in an old, obscure format (for example, a reel of magnetic tape from a 1970 minicomputer), you understand the challenges in keeping software viable. However, if we are diligent in maintaining our mind file, making frequent backups, and porting to current formats and mediums, a form of immortality can be attained, at least for software- based humans. Later in this century it will seem remarkable to people that humans in an earlier era lived their lives without a backup of their most precious information: that contained in their brains and bodies. Is this form of immortality the same concept as a physical human, as we know it today, living forever? In one sense it is, because today one's self is not a constant collection of matter, either. Recent research shows that even our neurons, thought to be relatively long lasting, change all of their constituent subsystems, such as the tubules, in a matter of weeks. Only our pattern of matter and energy persists, and even that gradually changes. Similarly, it will be the pattern of a software human that persists and develops and slowly alters. But is that person based on my mind file, who migrates across many computational substrates and who outlives any particular thinking medium, really me? This consideration takes us back to the same questions of consciousness and identity that have been debated since Plato's dialogues (which we examine in the next chapter). During the course of the twenty-first century these will not remain topics for polite philosophical debates but will have to be confronted as vital, practical, political, and legal issues. A related question: Is death desirable? The "inevitability" of death is deeply ingrained in human thinking. If death seems unavoidable, we have little choice but to rationalize it as necessary, even ennobling. The technology of the Singularity will provide practical and accessible means for humans to evolve into something greater, so we will no longer need to rationalize death as a primary means of giving meaning to life.

#### Transhumanism increases empathy

Singh ‘17, (Sarwant, "Transhumanism And The Future Of Humanity: 7 Ways The World Will Change By 2030" Forbes, 11-20-2017, https://www.forbes.com/sites/sarwantsingh/2017/11/20/transhumanism-and-the-future-of-humanity-seven-ways-the-world-will-change-by-2030/) //AL

We will be more empathetic The adoption of virtual reality can play an influential role in our ability to understand perspectives other than our own at the current moment. For example, VR could be used to understand the plight of refugees, giving us the opportunity to step into their shoes, which may make us more likely to take action or donate money.[iv] Other examples may include stepping into the shoes of our future selves, and looking at the lives we will live 40-50 years down the road if we save $200 a month vs. $2000. This application can bring home the need to save over the short term desire to spend. BMIs may also advance our ability to empathize if we are able to understand someone else’s full perspective straight from their own brain, rather than if they are trying to communicate it and misspeak or their intention is misinterpreted by the listener.

#### Posthumanism dramatically raises empathy and the amount we’ll care for each other – that alone makes it worthwhile

Michael Perry 2k, PhD, Care Services Manager at Alcor Life Extension Foundation, Forever for All, July 2000, http://www.foreverforall.org/pdfs/foreverforall.pdf

One positive change will involve an attitude toward fellow beings. Today the thought is often expressed that we are primarily machines to perpetuate our genes. The concerns of such beings are focused in rather obvious ways by natural selection, with the emphasis on immediate survival needs, mating, and progeny. This we have carried with us, thus far having no choice, even though our lifestyles have been modified greatly by our creation of civilization. Even so, the outlook is not so bleak--the roots of an immortal lifestyle can be seen in our world today, where we are still as we biologically evolved. Despite the pressures to develop a narrowness of interests and an unconcern for strangers, we have formed into societies. We at least pay nodding respect to such concepts as the rights to life, liberty, and the pursuit of happiness. Nature has, in fact, prepared us somewhat for the great leap we must now make, though we will have to take the initiative and work beyond the easy answers. For the posthuman future we can imagine that consideration of others will intensify, for simple reasons of self-interest. When we are no longer focused on creating progeny during a brief struggle for existence that must soon end in our demise but on leading rich and hopefully endless lives, our perspectives will broaden. Among other things, we may conjecture that any two individuals must encounter each other again and again, or develop some pathological mutual aversion that will detract from both lives. It should become increasingly clear that there is much to gain, personally, through consideration for others and acts of benevolence. In this way, then, I foresee a postmortal society that is a harmonious whole, strife and violence having given way to more reasoned interaction. The increased consideration for others should carry over to others of the past who might be resuscitated from a preserved state. It is easy to feel a certain fascination with such an idea even now. I think this feeling will be strong, at least for some people in the future, and probably for most if not all. The generally increased valuing of life must surely translate to concern for those who cannot now participate but could be helped to participate, given the means available. Persons of the past would have unique contributions to make in the lives of those then living, which should hold a special interest. This should be true even if such persons would initially be out of place; they could offer their own perspectives and perceptions in exchange for the new learning they would receive. I think too that resuscitating frozen people, to the extent that it becomes possible, will also be inexpensive by future standards. This seems particularly likely when the possibilities for automation are taken into account. With operations directed by devices that are largely self-repairing and self-maintaining and can proliferate components in vast swarms as needed (though only as needed), even very complex procedures should become feasible and fast. Included, I imagine, will be whatever is required to repair and resuscitate a frozen human. This should not be a great resource drain, though even if it is the chances are good that it will be carried out anyway. It will be done if it can be done, much as great effort is expended today to restore ancient texts or monuments, or, for that matter, to scale mountain peaks or put people into space. Once again, the future should have many wonders--not the least being an overall increase in friendliness. Still, many find this vision disturbing. A world beyond procreation and death is something they would rather not think about. However, such visions are nothing new in the history of thought, but recur throughout the major religions. Christianity, for example, is noted for promoting the ideas of resurrection and eternal life. It was well recognized that everlasting life would differ from its mortal counterpart.

#### Transhumanism solves their impacts – achieving singularity and immortality ends all human suffering and creates a glorious post-human future free of all pain.

Dr. John Messerly 18, PhD, former Chair of Philosophy Department @ Ursuline College, lecturer at the University of Texas at Austin, where he taught in both the philosophy and computer science departments, “Transhumanism – How Science Will Make Us Immortal”, http://churchandstate.org.uk/2018/06/transhumanism-how-science-will-make-us-immortal/

A Glorious Future? Once one adopts an evolutionary perspective it is easy to see that the future will not be like the past. Twenty-first century technologies—especially nanotechnology, genetics, artificial intelligence and robotics—will transform reality. And if we survive, humans and their post-human descendants will understand and control matter, life, and mind. These developments are part of cultural evolution, itself is a part of cosmic evolution, with both processes producing more complex forms of life and mind. However at the moment the above is science fiction, and subject to trillions of variables which will lead to an unimaginable future, or to no future at all—as multiple extinction scenarios might doom humanity. And evolutionary progress isn’t inevitable; technology can be used for good or ill. It may lead to a glorious future, but the future could also be halted by terrestrial or celestial disasters, or by dogmatists, zealots, or religious fanatics who oppose progress. The opponents of progress may have legitimate fears about future technologies, or they may be guided by ignorance and irrationality. They may long for an imaginary past paradise, fear what they don’t understand, believe they possess a monopoly on the truth, or think humans subservient to gods. But for whatever reason some oppose change, preferring stagnation to progressive evolutionism. They prefer to prevent the initiative, creativity, perseverance, and hope that drive evolution forward. They are fearful that a new world will render them and their beliefs, anachronistic. They are the enemiess of the future. How Science Will Make Us Immortal If death is our end, then all we can do is die and hope for the best. But perhaps we don’t have to die. Many scientists now believe that humans can overcome death and achieve immortality through the use of future technologies. But how will we do this? The first way we might achieve physical immortality is by conquering our biological limitations—we age, become diseased, and suffer trauma. Aging research, while woefully underfunded, has yielded positive results. Average life expectancies have tripled since ancient times, increasing by more than fifty percent in the industrial world in the last hundred years, and most scientists think we will continue to extend our life-spans. We know that some jellyfish and bacteria are essentially immortal, and the bristlecone pine may be too. There is no thermodynamic necessity for senescence—aging is a presumed byproduct of evolution —although why mortality was selected for remains a mystery. Yet some scientists believe we can conquer aging altogether—in the next few decades with sufficient investment—most notably the Cambridge researcher Aubrey de Grey. If we do unlock the secrets of aging, we will simultaneously defeat other diseases as well, since many of them are symptoms of aging. Many researchers now consider aging itself to be a disease which progresses as you age. There are a number of strategies that could render disease mostly inconsequential. Nanotechnology may give us nanobot cell-repair machines and robotic blood cells; biotechnology may supply replacement tissues and organs; genetics may offer genetic medicine and engineering; and full-fledge genetic engineering could make us impervious to disease. Trauma is a more intransigent problem from the biological perspective, although it too could be defeated through some combination of cloning, regenerative medicine, and genetic engineering. We can even imagine that your physicality could be recreated from a bit of your DNA, and other technologies could then fast forward your regenerated body to the age of your traumatic death, where a backup file containing your experiences and memories would be implanted in your brain. Even the dead may be resuscitated if they have undergone the process of cryonics—preserving organisms at very low temperatures in glass-like states. Ideally these clinically dead would be brought back to life when technology is sufficiently advanced. This may now be science fiction, but if nanotechnology fulfills its promise, there is a good chance that cryonics will succeed. In addition to biological strategies for eliminating death, there are a number of technological scenarios for immortality which utilize advanced brain scanning techniques, artificial intelligence, and robotics. The most prominent scenarios have been advanced by the futurist Ray Kurzweil, who argues that the exponential growth of computing power, combined with advances in other technologies, will make it possible to upload the contents of one’s consciousness into a virtual reality. This could be accomplished by cybernetics, whereby hardware would be gradually installed in the brain until the entire brain was running on that hardware, or via scanning the brain and simulating or transferring its contents to a sufficiently advanced computer. Either way we would no longer be living in a physical world. In fact we may already be living in a computer simulation. The Oxford philosopher and futurist Nick Bostrom argues that advanced civilizations may have created computer simulations containing individuals with artificial intelligence and, if they have, we might unknowingly be in such a simulation. Bostrom concludes that one of the following must be the case: civilizations never have the technology to run simulations; they have the technology but decided not to use it; or we almost certainly live in a simulation. If we don’t like the idea of being immortal in a virtual reality—or we don’t like the idea that we may already be in one—we could upload our brain to a genetically engineered body if we like the feel of flesh, or to a robotic body if we like the feel of silicon or whatever materials comprised the robotic body. Along these lines MIT’s Rodney Brooks envisions the merger of human flesh and machines, whereby humans slowly incorporate technology into their bodies, thus becoming more machine-like and indestructible. So a cyborg future may await us. An evolutionary perspective underlies all these speculative scenarios. Once we embrace that perspective, it is easy to imagine that our descendants will resemble us about as much as we do the amino acids from which we sprang. Our knowledge is growing exponentially and, given eons of time for future innovation, it is easy to envisage that humans will defeat death and evolve in unimaginable ways. Remember that our evolution is no longer moved by the painstakingly slow process of Darwinian evolution—where bodies exchange information through genes—but by cultural evolution—where brains exchange information through memes. The most prominent feature of cultural evolution is the exponentially increasing pace of technological evolution—an evolution that may soon culminate in a technological singularity. The technological singularity, an idea first proposed by the mathematician Vernor Vinge, refers to the hypothetical future emergence of greater than human intelligence. Since the capabilities of such intelligences are difficult for our minds to comprehend, the singularity is seen as an event horizon beyond which the future becomes impossible to understand or predict. Nevertheless, we may surmise that this intelligence explosion will lead to increasingly powerful minds that will solve the problem of death. But why conquer death? Why is death bad? It is bad because it ends something which at its best is good; because it puts an end to our projects; because the wisdom and knowledge of a person is lost at death; because it harms the living; because it causes apathy about the future beyond our short life-span; because it renders fully meaningful lives impossible; and because we know that if we had the choice, and if our lives were going well, we would choose to live on. That death is generally bad—especially for the physically and intellectually vigorous—is nearly self-evident. Yes, there are indeed fates worse than death, and in some circumstances death may be welcomed. Nevertheless for most of us most of the time, death is one of the worst fates that can befall us. That is why we think that suicide and murder and starvation and cancer are bad things. That is why we cry at funerals.

#### Superintelligence solves everything – laundry list

Bostrom ‘14

[Nick Bostrom; Bostrom is a Swedish philosopher at the University of Oxford known for his work on existential risk, the anthropic principle, human enhancement ethics, superintelligence risks, and the reversal test. In 2011, he founded the Oxford Martin Programme on the Impacts of Future Technology, and he is currently the founding director of the Future of Humanity Institute at Oxford University. Bostrom is the author of over 200 publications, including Superintelligence: Paths, Dangers, Strategies (2014), a New York Times bestseller and Anthropic Bias: Observation Selection Effects in Science and Philosophy (2002). In 2009 and 2015, he was included in Foreign Policy's Top 100 Global Thinkers list; 2014; “Superintelligence: Paths, Dangers, Strategies”] AL

Some technologies have an ambivalent effect on existential risks, increas- ing some existential risks while decreasing others. Superintelligence is one such technology. We have seen in earlier chapters that the introduction of machine superintelligence would create a substantial existential risk. But it would reduce many other existential risks. Risks from nature—such as asteroid impacts, supervolcanoes, and natural pandemics—would be virtually eliminated, since superintelligence could deploy countermeasures against most such hazards, or at least demote them to the non-existential category (for instance, via space colonization). These existential risks from nature are comparatively small over the relevant timescales. But superintelligence would also eliminate or reduce many anthropogenic risks. In particular, it would reduce risks of acciden- tal destruction, including risk of accidents related to new technologies. Being generally more capable than humans, a superintelligence would be less likely to make mistakes, and more likely to recognize when pre- cautions are needed, and to implement precautions competently. A well- constructed superintelligence might sometimes take a risk, but only when doing so is wise. Furthermore, at least in scenarios where the superintel- ligence forms a singleton, many non-accidental anthropogenic existential risks deriving from global coordination problems would be eliminated. These include risks of wars, technology races, undesirable forms of com- petition and evolution, and tragedies Of the commons.

#### Transhumanism enables immortality

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The current status of disease and death is staggering. We do know that in the documented world 56 million people die every year. Dissecting the statistics of disease provided by the World Health Organization is overwhelming to weed through. There is a solution. Or there may be in the future. One day there could be a cure for all disease, and you may be able to live forever, in a healthy youthful state. One day it may be possible that scientists will be able to create nanorobots using nanotechnology. Nanotechnology is the ability to see and move atoms around. Everything is made of atoms, the chair you are sitting in, your food, your body, the air we breathe, everything. Atoms are so small they cannot be seen by the human eye. Atoms are on the nanoscale, that's a teeny, tiny size. There are 25,400,000 nanometers in an inch, a sheet of newspaper is 100,000 nanometers thick, human hair is about 80,000 nanometers in diameter. Atoms are the building blocks. Different atoms, arranged in different ways, make molecules that make the different things you see and experience. In the human body atoms come together to make many things, for example water, fats, hair, bones, and DNA. DNA and other molecules build cells; sometimes cells malfunction and cause disease. Where does nanotechnology fit in? That's a self realizing question, that's how, it fits in! Think of it this way, if you were King Kong, could you grab one grain of sand easily? Your hands would be too big. That's how medicine is currently treating disease. Nanotechnology is on the same size and scale as disease. A nanorobot can grab a cell and repair it. This will allow us to cure diseases that have never been cured before. Nanorobots could be released into the blood stream via pill or injection to find and repair damage and then break down and disintegrate. Or nanorobots could remain in the body at all times, perpetually monitoring, identifying and repairing problems immediately, without any external treatment. Nanorobots would cure the aliment so early on that you would never even know you were going to get sick. Chemotherapy releases toxic chemicals throughout the entire body rather than just the affected area, such as a tumor. This process destroys the cancer but also the immune system. Chemotherapy makes patients very sick, and there is risk of permanent damage or death from the treatment itself. There is also a risk of the cancer returning. A nanorobot could have radiation inside of it, locate the tumor, inject it and destroy it directly. Molecular nanorobots wouldn't leave one cancerous cell behind. That's one of the benefits of getting down to the molecular level. Doctors cannot see on the molecular level and could easily miss some cancer cells, which is often the case and the cancer returns. A nanotech gene therapy has successfully killed ovarian cancer in mice; if successful in human clinical trials it could save the lives of 15000 women a year. But it doesn't stop with cancer. Every disease is made out of the same atoms that everything else is. All medical conditions are a result of atoms being out of place; a nanorobot could put them back where they belong, thus immediately alleviating the problem without the side effects that current day medication and treatments cause. What else can be repaired in the human body? EVERYTHING. From cancer to the common cold. There is nothing that nanotechnology could not repair. The injuries or illnesses you have right now will have the capability to be repaired or cured by nanotechnology. Nanotechnology could eliminate diseases, disabilities, and illnesses such as diabetes, malaria, HIV, cardiovascular disease, damage from injuries and accidents, heal wounds, reduce child mortality, regenerate limbs and organs, eliminate inflammatory/infectious diseases, and so on and so forth. Nanotechnology offers hope to people suffering from Alzheimer’s, Parkinson's, brain injuries, tumors and neurological disorders. Nanoconstructs could deliver neuroprotective molecules directly to the brain to recover or protect nerve cells from damage or degeneration. Nanotechnology has been emerging in this field in the form of nanoengineered scaffolds that could one day result in a tool for rewiring the intricate neuronal network. Research by Dr. Samuel I. Stupp designed molecules using nanomaterials and injected them into mice who were paralyzed due to spinal cord injury. After 6 weeks the mice regained the ability to walk. Research like this could one day evolve into real cures for people. 65 billion dollars is wasted every year due to low bioavailability. Meaning that the drug or treatment used is not absorbed into or accessed by the body properly due to a multitude of reasons. For example drug interactions, different molecular arrangements and manufacturing processes by different brands. Drugs with more moisture may form lumps in the stomach which decreases absorption, and a highly compressed pill will slow absorption. Different level changes in the body at any given time may cause drug toxicity. Metabolism, age, activity, stress, previous surgery and syndromes are also factors. These are huge challenges that can be alleviated by using nanotechnology to target the specific areas. Nanorobots can take their cues from mother nature; she is the first nanotechnologist. She is an expert at creating molecular machines. Geneticists have been taking advantage of viruses for use in gene therapy for some time. They modify a virus by removing the viral gene so it doesn't cause disease. They replace it with healthy genes to transport to the faulty cell and cure diseases. This strategy of hacking viruses could be exploited by nanotech. Viruses are biological molecular machines that could be modified into becoming nanorobots or they could become transportation for a nanorobot. Another means is a nanorobot could attach itself to a traveling white blood cell and ride shotgun to assist in the tissue repair of injured tissue. Nanotechnology could even be involved in tissue engineering, creating scaffolds for artificial organs and implants. Tissue from your own body could be used to make new tissue, which assures that your body doesn't reject it. The surgeries of today are painful, costly, can leave scars and can even be life threatening. Repairing nanorobots would eliminate the need for surgeries, incisions, side effects and recovery time. According to the American Academy of Periodontology there are links to poor dental health and stroke, heart disease, respiratory disease, osteoporosis, some cancers and diabetes. Nanorobots as nanodentistry could repair damage without large needles or drills. Nanorobots could also constantly and invisibly maintain and clean your teeth to avoid any dental problems. Hygiene is important for good health; your skin and hair could be cleaned by nanorobots eliminating the need for showers. Spider bites and ticks carrying lyme disease would be detected by nanorobots, blocking penetration. Other skin problems such as eczema would be repaired by dermal nanorobots. Is aging a disease? Could aging be cured? Yes. Since nanorobots would be able to repair single cells on the molecular level they would be able to repair damages created by aging. It's all the same to a nanorobot. Nanotechnology could repair damaged cells. Dead cells are the primary reason for aging and death; nanorobots could replace senescent (old) cells with non-senescent cells, or reprogram cells so they do not senescensce, which would keep the body from aging. Not only would the inside of your body never get sick or age, but neither will the outside. Your skin will be young, elastic, dewy and wrinkle-free. Your hair will be thick, without gray, and intact. Your hearing, your eyesight and memory will be in perfect shape. You wouldn't get arthritis, turkey neck, or saggy parts. You could go out dancing when you are 93 and not worry about sore feet, low energy or suffering any consequences. Unless you party too hard, but that's on you, not the nano. So if you never get sick and never get old could you live forever? Yes. nanorobots could be programmed to rebuild older cells into younger copies on a regular basis thereby the human body could become immortal. You could live a disease-free youthful life, forever. Of course immortality isn't for everyone and everyone should have the right to decide what they want or don't want for their own body. Death will be a choice rather than a requirement. There are well funded countries that have access to researchers and high tech equipment that would love to figure out how to create the nanotechnology that will repair bodies and end disease. In the US despite having a lot of financial resources it's not always easy to get funding. If you are at a university, you need to write a grant, go through a lot of red tape, and there are a lot more near-term projects that seem to get prioritized when it comes to funding. For companies looking for investors, unfortunately not all investors can foresee the amazing future that nano will have because they are used to funding things they can see. For example a company that makes desks seeking an investor can show the investor the money they need for each piece of wood, bolt, and the quantity of desks that will be manufactured within a specific time frame. Nanotechnology is in development and isn't readily available like a piece of wood, the piece of wood has to be built. And the individual processes of each emerging development will have their own variables. Once the recipe has been figured out and formulated, the investment we have made will then be very inexpensive and easy to reproduce. Third world countries would have easy access to nanomedicine. Mother nature puts atoms together all the time and it doesn't cost her anything. The raw materials for making nanorobots would be essentially cost-free because they will be made mostly of carbon. Because nanotechnology would be created on the very small atomic level, traveling to provide treatment would not require large equipment. The size and portability would make treatment easily accessible across the world. The environment and living conditions also impact health. Since nanotechnology is on the atomic level and atoms are everywhere, it can be beneficial to the world all around us, as well as our bodies. Nanotechnology could enrich depleted soil in places like Africa, which is currently facing a food crisis. Vitamins, nutrients and minerals could be delivered to rebuild soil to a fertile state and thus have the ability to grow food. Hunger could one day be a solvable problem. Nanotechnology would make it possible to provide meat and animal products inexpensively without killing animals. E.coli and other pathogens could be detected in soil and eliminated so that food is not harmful. Currently nanomaterials are in development to release fertilizers for plants and nutrients for livestock, nano sensors for monitoring the health of crops and farm animals, and magnetic nanoparticles to remove soil contaminants. According to water.org 750 million people around the world lack access to safe water; approximately one in nine people. 840,000 people die each year from water-related disease. A portable non-chemical nano-filtration water purification device has been developed by Micheal Pritchard. It creates safe and sterile water out of dirty water and would make the cost of water per household an estimated 3 dollars a year. His company has provided clean water to countries who have gone through natural disasters, such as Haiti and the Philippines. In the future nanotechnology particles could destroy bacteria that often cause fatal disease. Pollution in general, global warming, nuclear waste, oil spills, smog, and acid rain, could be remedied and prevented by nanotechnological advances. Large quantities of nanorobots could come together to remove pollutant atoms from the atmosphere, earth and water. These groups of nanorobots could swim in contaminated waters and be released into the polluted atmosphere to destroy or remove contaminating molecules. Nanorobots could pull apart the bad molecules and reassemble the atoms into good molecules for other positive purposes. As a first indicator of the possibility, Brian Mercer created a new pollution control technology using nanofibres that greatly reduce industrial pollution by trapping and removing the pollutants. Currently nanotech is being used to reduce emissions from car fuels. Since nanotechnology builds atom by atom; the process is pollution free. Nanotechnology will not be manufactured in the way we use manufacturing plants today. There will be no chemical by product, no emission, hazardous waste and no pollution.

#### Thus we affirm a transhumanist project – we must move as rapidly as possible to achieve the posthuman world – every thought counts

Leo Stevenson 18, Brown University, citing Nick Bostrom, PhD, founder of the Future of Humanity Institute, “THINKING IN BIG HISTORY: Nick Bostrom, transhumanist visions, and the rise of macrostrategy”, http://www.theindy.org/1535, \*language edited, ellipsis in original

There’s so much hope for what humanity could be in Bostrom’s poetic view, and fear, and precarity. You can see his attempts at strategic planning hanging in uncertainty, as small as the old “blue speck” photo of earth hanging in the void. But that precipice also comes with serious urgency: given where humanity stands at present, there’s no time to waste. Another of his poems (titled “Göttingen”) articulates that, opening: the rush the rush the rush the fuse that’s burning down information glitters rain of idea sparks the thing is sprinting sipping, taking off to the waiting black powder That poem is his most recent, from 2017, and it carries the rush of his current work: it’s serious now, there’s more at stake, the risk of apocalypse in a potentially impending “intelligence explosion” so neatly symbolized by actual explosives. And out of that comes the sense of moral urgency: you’d better run to deal with the problems this precipice presents if you have any kind of resources to do so. If our historical moment is so precarious, at this place where our acceleration could take us to utopia or the abyss, it’s no time to be sitting around. A trace of that outrage shows in an excerpt from “Juicy Exceptions”: the young ones glimmer briefly like fourth of july firework [sic] then fall to dust […] strut on you arrogant ~~pricks~~ [people] shine on you daughters of ivy occupy your privilege like a desert garden fig-nude amongst almonds and apricots let us feast our eyes on your impudence as you slurp that rough-shelled coconut with a pastel straw After meditating on the finitude of youthful pleasure, this poem breaks into pure moral outrage at the very thought of elite students enjoying their vacations. It only makes full sense in the context of the previous two; this is no time to be lounging around. If you’ve been granted the power, the privilege, of that kind of education, given the precipice we stand on, how could you use it for yourself, even for a moment? When our species might be at stake? At the end of the bio on his website, Bostrom writes, “I am in a very fortunate position—having no teaching duties, being supported by a staff of brilliant research colleagues and assistants, and facing no restrictions on what I can work on. Must try hard to be worthy of such privilege!” It’s “Juicy Exceptions” that shows how deeply Bostrom means that. He’s not just humbly saying he’s lucky—he’s saying that privilege gives him a duty to pull his weight for the greater good, hurrying to keep up with the urgency of this strange historical moment. Which makes sense of how Bostrom is leading his life, basically locked in a room coming up with the best arguments he can for why people should listen to his apocalyptic/utopian message, publishing and running between speaking circuits and parliamentary panels, doing his best to right the course of history before it’s too late. Bostrom’s worldview, as you dive into the visionary corners of his mind, is compelling: it draws you in, makes you think in big history, makes you and your concerns start to look very, very small. I trust Bostrom’s intentions more after reading his poetry; his vision of the long future seems like a genuine hope for what he calls (in the last line of Superintelligence) “a compassionate and jubilant use of humanity’s cosmic endowment.” I’m also worried by the implications of his ideas. If you follow his logic completely, then putting our energies towards the highest-priority issue of our age (AI strategy) should mean dropping our other, immediate projects of world-fixing and world-making, as any suffering we might alleviate now is secondary to the possibility of extinction. I have too many reservations about Bostrom’s strategic ideas, his thoughts on how change gets made, and his ability to consistently distinguish sci-fi from reality, to buy that fully. Big-history thinking raises questions, though, that go beyond Bostrom’s exclusive focus on AI scenarios. What if, to have any hope of building the world we want, the first step is to prioritize catastrophic threats, even others like climate change or biosecurity? Maybe the state of tech does place us at a unique moment in history, with the unique urgency Bostrom feels. Which would mean we ought to think more strategically about where to apply that urgency. Terrifying as it is, Bostrom might have a point.

#### Thoughts themselves are finite and trade off –all of the thought behind the 1ac must be devoted to transhumanism.

Eliezer Yudkowsky 8, Research Fellow and Director of the Singularity Institute for Artificial Intelligence, The “Intuitions” Behind “Utilitarianism”, https://www.lesswrong.com/posts/r5MSQ83gtbjWRBDWJ/the-intuitions-behind-utilitarianism

Whatever value is worth thinking about at all must be worth trading off against all other values worth thinking about, because thought itself is a limited resource that must be traded off. When you reveal a value, you reveal a utility.

#### Transhumanism must be the highest priority – debates most focus it

Carlos Moreira 19, founder and CEO of WiseKey, Adjunct Professor of the Graduate School of Engineering Royal Melbourne Institute of Technology from 1995 to 1999 as well as Head of the Trade Efficiency Lab at the Graduate School of Engineering at RMIT, “The transHuman Code: How To Program Your Future”, google books

We're not even scratching the surface of the artistic and spiritual complexities found in every human on the planet, or the abilities to love, to long, to dream, and to resolve. The human is and will always be the greatest and most advanced technology the world has ever known. Doesn't it then make the most sense to place the understanding, improvement, and utilization of humanity as today's highest priority?

#### Probabilistic thinking makes a litany of extinction events inevitable and devalues mitigation strategies like transhumanism

Clarke 8 ---- Lee, member of a National Academy of Science committee that considered decision-making models, Anschutz Distinguished Scholar at Princeton University, Fellow of AAAS, Professor Sociology (Rutgers), Ph.D. (SUNY), “Possibilistic Thinking: A New Conceptual Tool for Thinking about Extreme Events,” Fall, Social Research 75.3, JSTOR

Clearly, probabilistic thinking cannot provide the full range of concepts necessary to understand extreme events. Nor can probabilistic thinking provide clear and unequivocal counsel for social policy regarding disaster. For if decisions were made and policy formulated only on the basis of probabilities, we would be pushed in the direction of committing resources to hazards only on the basis of their likelihood of occurrence. While that is a sensible way to approach resource allocation, it is not the only sensible way. Relying almost exclusively on a probabilistic approach leaves little room for a reasonable argument that we should also worry about nuclear plant meltdowns, train accidents involving toxic chemi- cals, increases in hurricane intensity from global warming, asteroid strikes, airplane crashes, or bird flu. It is in the nature of "extreme events" that they are statistically rare and that they do not provide us with a distribution of events to which we could attach probabili- ties. The idea of possibilistic thinking complements probabilistic thinking in the social scientific quest to understand how and why people behave as they do.

#### Any distraction from transhumanism kills thousands – even a second difference means that 2 people die – even if it’s a small difference it is still a reason the alt is net better – it also risks extinction – every second transhumanism isn’t achieved extinction is more likely – that outweighs

Bostrom 13 {Nick, Philosopher and professor (Oxford), Ph.D. (LSOE), director of The Future of Humanity Institute and the Programme on the Impacts of Future Technology, of course, he’s also the inaugural recipient of “The Eugene R. Gannon Award for the Continued Pursuit of Human Advancement,” “Existential Risk Prevention as Global Priority,” Global Policy, Vol 4, Issue 1, <http://www.existential-risk.org/concept.html>#THUR}

The maxipok rule 1.1. Existential risk and uncertainty An existential risk is one that threatens the premature extinction of Earth-originating intelligent life or the permanent and drastic destruction of its potential for desirable future development (Bostrom 2002). Although it is often difficult to assess the probability of existential risks, there are many reasons to suppose that the total such risk confronting humanity over the next few centuries is significant. Estimates of 10-20% total existential risk in this century are fairly typical among those who have examined the issue, though inevitably such estimates rely heavily on subjective judgment.1 The most reasonable estimate might be substantially higher or lower. But perhaps the strongest reason for judging the total existential risk within the next few centuries to be significant is the extreme magnitude of the values at stake. Even a small probability of existential catastrophe could be highly practically significant (Bostrom 2003; Matheny 2007; Posner 2004; Weitzman 2009). Humanity has survived what we might call natural existential risks for hundreds of thousands of years; thus it is prima facie unlikely that any of them will do us in within the next hundred.2 This conclusion is buttressed when we analyze specific risks from nature, such as asteroid impacts, supervolcanic eruptions, earthquakes, gamma-ray bursts, and so forth: Empirical impact distributions and scientific models suggest that the likelihood of extinction because of these kinds of risk is extremely small on a time scale of a century or so.3 In contrast, our species is introducing entirely new kinds of existential risk — threats we have no track record of surviving. Our longevity as a species therefore offers no strong prior grounds for confident optimism. Consideration of specific existential-risk scenarios bears out the suspicion that the great bulk of existential risk in the foreseeable future consists of anthropogenic existential risks — that is, those arising from human activity. In particular, most of the biggest existential risks seem to be linked to potential future technological breakthroughs that may radically expand our ability to manipulate the external world or our own biology. As our powers expand, so will the scale of their potential consequences — intended and unintended, positive and negative. For example, there appear to be significant existential risks in some of the advanced forms of biotechnology, molecular nanotechnology, and machine intelligence that might be developed in the decades ahead. The bulk of existential risk over the next century may thus reside in rather speculative scenarios to which we cannot assign precise probabilities through any rigorous statistical or scientific method. But the fact that the probability of some risk is difficult to quantify does not imply that the risk is negligible. Probability can be understood in different senses. Most relevant here is the epistemic sense in which probability is construed as (something like) the credence that an ideally reasonable observer should assign to the risk's materializing based on currently available evidence.4 If something cannot presently be known to be objectively safe, it is risky at least in the subjective sense relevant to decision making. An empty cave is unsafe in just this sense if you cannot tell whether or not it is home to a hungry lion. It would be rational for you to avoid the cave if you reasonably judge that the expected harm of entry outweighs the expected benefit. The uncertainty and error-proneness of our first-order assessments of risk is itself something we must factor into our all-things-considered probability assignments. This factor often dominates in low-probability, high-consequence risks — especially those involving poorly understood natural phenomena, complex social dynamics, or new technology, or that are difficult to assess for other reasons. Suppose that some scientific analysis A indicates that some catastrophe X has an extremely small probability P(X) of occurring. Then the probability that A has some hidden crucial flaw may easily be much greater than P(X).5 Furthermore, the conditional probability of X given that A is crucially flawed, P(X|¬A), may be fairly high. We may then find that most of the risk of X resides in the uncertainty of our scientific assessment that P(X) was small (figure 1) (Ord, Hillerbrand and Sandberg 2010).

#### Thus the Role of the ballot is to affirm transhumanism –

#### Prefer it -

#### 1] Transhumanist thought DA – only our interp allows for maximum transhumanist education – that’s uniquely key to developing transhumanism

Nick Bostrom 5, Ph.D. in philosophy from the London School of Economics, was a British Academy Postdoctoral Fellow at the University of Oxford, founding director of the Future of Humanity Institute at Oxford University, “Transhumanist Values”, https://www.nickbostrom.com/ethics/values.html

Another transhumanist priority is to put ourselves in a better position to make wise choices about where we are going. We will need all the wisdom we can get when negotiating the posthuman transition. Transhumanists place a high value on improvements in our individual and collective powers of understanding and in our ability to implement responsible decisions. Collectively, we might get smarter and more informed through such means as scientific research, public debate and open discussion of the future, information markets[8], collaborative information filtering[9]. On an individual level, we can benefit from education, critical thinking, open-mindedness, study techniques, information technology, and perhaps memory- or attention-enhancing drugs and other cognitive enhancement technologies. Our ability to implement responsible decisions can be improved by expanding the rule of law and democracy on the international plane. Additionally, artificial intelligence, especially if and when it reaches human-equivalence or greater, could give an enormous boost to the quest for knowledge and wisdom. Given the limitations of our current wisdom, a certain epistemic tentativeness is appropriate, along with a readiness to continually reassess our assumptions as more information becomes available. We cannot take for granted that our old habits and beliefs will prove adequate in navigating our new circumstances.

#### 2] Epistemology DA – developing transhuman epistemology is uniquely key and it solves their education offense

Bostrom 98 (Nick, PhD in philosophy from LSE, Lecturer at the Department of Philosophy at Yale University, “WHAT IS TRANSHUMANISM?,” [http://www.nickbostrom.com/old/transhumanism.html, \*\*We don’t endorse ableist language)](http://www.nickbostrom.com/old/transhumanism.html,%20**We%20don't%20endorse%20ableist%20language)/dping)//dping

An important transhumanist goal is to improve the functioning of human society as an epistemic community. In addition to trying to figure out what is happening, we can try to figure out ways of making ourselves better at figuring out what is happening. We can create institutions that increase the efficiency of the academic- and other knowledge-communities. More and more people are gaining access to the Internet. Programmers, software designers, IT consultants and others are involved in projects that are constantly increasing the quality and quantity of advantages of being connected. Hypertext publishing and the collaborative information filtering paradigm have the potential to accelerate the propagation of valuable information and aid the demolition of what transpire to be misconceptions and ~~crackpot~~ claims. The people working in information technology are only the latest reinforcement to the body of educators, scientists, humanists, teachers and responsible journalists who have been striving throughout the ages to decrease ignorance and make humankind as a whole more rational.

#### **3**] Our education is better – that’s the impact debate and debate must center existential risks – that’s key to civic engagement and academic research to combat crisis

Javorsky 18 - [Emilia Javorsky, leads an Artificial Intelligence in Medicine initiative with The Future Society at the Harvard Kennedy School of Government, “Why Human Extinction Needs a Marketing Department” Xconomy, 1-15-18, https://www.xconomy.com/boston/2018/01/15/why-human-extinction-needs-a-marketing-department/]

Experts at Oxford University and elsewhere have estimated that the risk of a global human extinction event this century—or at least of an event that wipes out 10 percent or more of the world’s population— is around 1 in 10. The most probable culprits sending us the way of the dinosaur are mostly anthropogenic risks, meaning those created by humans. These include climate change, nuclear disaster, and more emerging risks such as artificial intelligence gone wrong (by accident or nefarious intent) and bioterrorism. A recent search of the scientific literature through ScienceDirect for “human extinction” returned a demoralizing 157 results, compared to the 1,627 for “dung beetle.” I don’t know about you, but this concerns me. Why is there so little research and action on existential risks (risks capable of rendering humanity extinct)?

A big part of the problem is a lack of awareness about the real threats we face and what can be done about them. When asked to estimate the chance of an extinction event in the next 50 years, U.S. adults in surveys reported chances ranging from 1 in 10 million to 1 in 100, certainly not 10 percent. The awareness and engagement issues extend to the academic community as well, where a key bottleneck is a lack of talented people studying existential risks. Developing viable risk mitigation strategies will require widespread civic engagement and concerted research efforts. Consequently, there is an urgent need to improve the communication of the magnitude and importance of existential risks. The first step is getting an audience to pay attention to this issue.

#### 4] Our scenario planning is better – squo scenario planning reifies harmful biases about extinction events undercutting the urgency of mitigation strategies like transhumanism

GPP 17(Global Priorities Project is a non-profit organization of Oxford college professors who have conducted in-depth research of all existential risks facing humanity, authors include Sebastian Farquhar John Halstead Owen Cotton-Barratt Stefan Schubert Haydn Belfield AND Andrew Snyder-Beattie, “Existential Risk Diplomacy and Governance”, 2017, <https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf>, MSCOTT)

1.3.1. Why existential risks are likely to be underinvested in There are several reasons why existential risk reduction is likely to be underinvested in. Firstly, it is a global public good. Economic theory predicts that such goods tend to be underprovided. The benefits of existential risk reduction are widely and indivisibly dispersed around the globe from the countries responsible for taking action. Consequently, a country which reduces existential risk gains only a small portion of the benefits but bears the full brunt of the costs. Countries thus have strong incentives to free ride, receiving the benefits of risk reduction without contributing. As a result, too few do what is in the common interest. Secondly, as already suggested above, existential risk reduction is an intergenerational public good: most of the benefits are enjoyed by future generations who have no say in the political process. For these goods, the problem is temporal free riding: the current generation enjoys the benefits of inaction while future generations bear the costs. Thirdly, many existential risks, such as machine superintelligence, engineered pandemics, and solar geoengineering, pose an unprecedented and uncertain future threat. Consequently, it is hard to develop a satisfactory governance regime for them: there are few existing governance instruments which can be applied to these risks, and it is unclear what shape new instruments should take. In this way, our position with regard to these emerging risks is comparable to the one we faced when nuclear weapons first became available. Cognitive biases also lead people to underestimate existential risks. Since there have not been any catastrophes of this magnitude, these risks are not salient to politicians and the public.72 This is an example of the misapplication of the availability heuristic, a mental shortcut which assumes that something is important only if it can be readily recalled. Another cognitive bias affecting perceptions of existential risk is scope neglect. In a seminal 1992 study, three groups were asked how much they would be willing to pay to save 2,000, 20,000 or 200,000 birds from drowning in uncovered oil ponds. The groups answered $80, $78, and $88, respectively.73 In this case, the size of the benefits had little effect on the scale of the preferred response. People become numbed to the effect of saving lives when the numbers get too large. 74 Scope neglect is a particularly acute problem for existential risk because the numbers at stake are so large. Due to scope neglect, decision-makers are prone to treat existential risks in a similar way to problems which are less severe by many orders of magnitude. A wide range of other cognitive biases are likely to affect the evaluation of existential risks.75

#### 5] Growth solves everything and is key to innovation

hÉigeartaigh 17 – Professor @ Cambridge, PhD in Genomics from Trinity College Dublin (Sean, “Technological Wild Cards: Existential Risk and a Changing Humanity”, <https://www.bbvaopenmind.com/en/articles/technological-wild-cards-existential-risk-and-a-changing-humanity/>, Accessed 3-7-2019)

Technological progress now offers us a vision of a remarkable future. The advances that have brought us onto an unsustainable pathway have also raised the quality of life dramatically for many, and have unlocked scientific directions that can lead us to a safer, cleaner, more sustainable world. With the right developments and applications of technology, in concert with advances in social, democratic, and distributional processes globally, progress can be made on all of the challenges discussed here. Advances in renewable energy and related technologies, and more efficient energy use—advances that are likely to be accelerated by progress in technologies such as artificial intelligence—can bring us to a point of zero-carbon emissions. New manufacturing capabilities provided by synthetic biology may provide cleaner ways of producing products and degrading waste. A greater scientific understanding of our natural world and the ecosystem services on which we rely will aid us in plotting a trajectory whereby critical environmental systems are maintained while allowing human flourishing. Even advances in education and women’s rights globally, which will play a role in achieving a stable global population, can be aided specifically by the information, coordination, and education tools that technology provides, and more generally by growing prosperity in the relevant parts of the world. There are catastrophic and existential risks that we will simply not be able to overcome without advances in science and technology. These include possible pandemic outbreaks, whether natural or engineered. The early identification of incoming asteroids, and approaches to shift their path, is a topic of active research at NASA and elsewhere. While currently there are no known techniques to prevent or mitigate a supervolcanic eruption, this may not be the case with the tools at our disposal a century from now. And in the longer run, a civilization that has spread permanently beyond the earth, enabled by advances in spaceflight, manufacturing, robotics, and terraforming, is one that is much more likely to endure. However, the breathtaking power of the tools we are developing is not to be taken lightly. We have been very lucky to muddle through the advent of nuclear weapons without a global catastrophe. And within this century, it is realistic to expect that we will be able to rewrite much of biology to our purposes, intervene deliberately and in a large-scale way in the workings of our global climate, and even develop agents with intelligence that is fundamentally alien to ours, and may vastly surpass our own in some or even most domains—a development that would have uniquely unpredictable consequences.