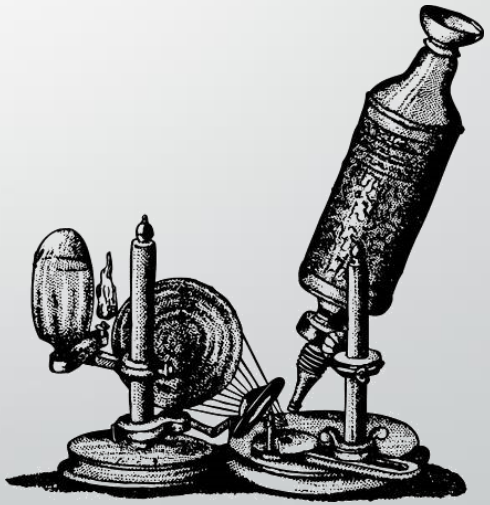
Writing for STEM

A Humanities Approach



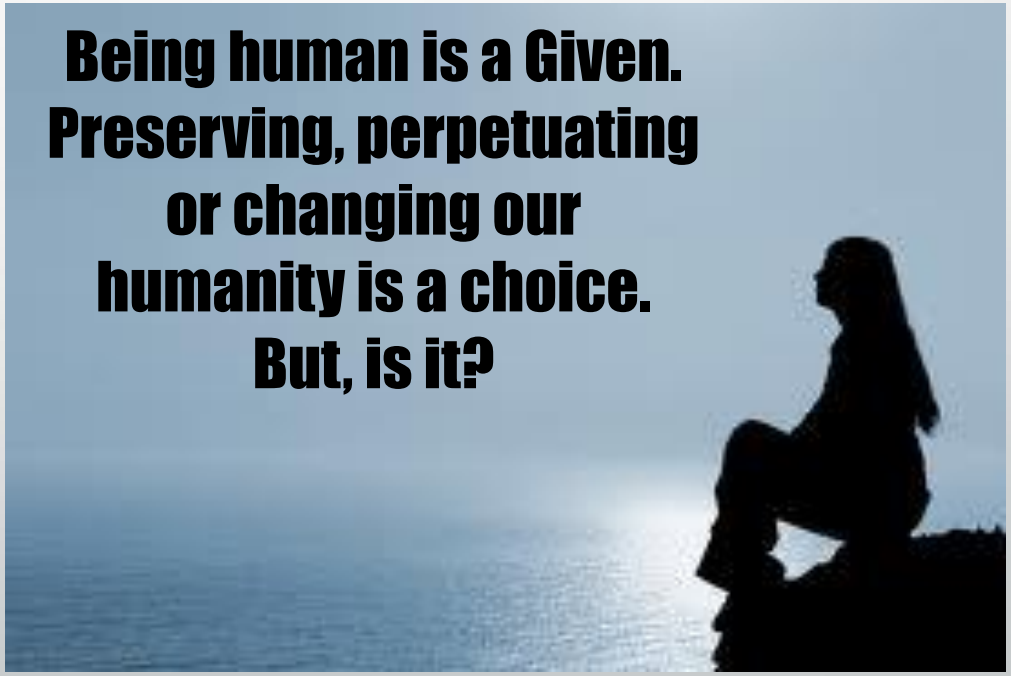
English Composition
Andrew Rusnak

How to think for this class …

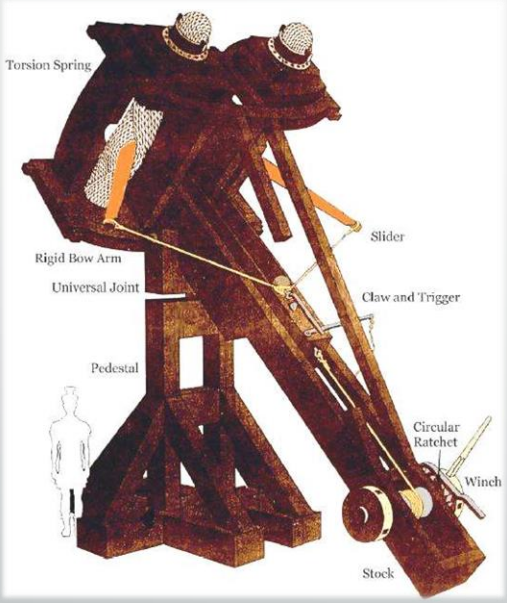
In this class we will NOT be looking for answers. Our quest will be for the next important question. During our class discussions, I'll ask you from time-to-time, "What is the next question?" as it relates to our discussion. Pay attention to the way that you are thinking when you are searching for questions as opposed to searching for answers.

Our biggest question?

What does it mean to be human today? Tomorrow?



Is it science vs. the humanities? Do you, as students, sometimes divide yourself and your fellow students up into “artsy” types and “science/math types?



VS.?

The inescapable context of the "either/or" dichotomy-driven media culture of over specialization?

Conventional/Popular View of Science =

deductive reasoning, reductionism, abstractions, positivism/empirical evidence, overwhelming objectivity, abstractionism, either/or, black and white, finite, cause and effect, concrete, left brain, "all the answers," consciousness is a byproduct of neural activity, a human being is no more than a highly sophisticated computer, the mind can be reverse engineered, science is not relativistic, the immediate end to the "animating principle," Locke's empiricism.

Materialist/Physicalist Monist: Nothing exists outside the tangible, material world, Consciousness is a simple by-product of the brain/central nervous system. Consciousness cannot "cause" anything.

↓

Science Curricula?

Vs.

Creative "Humanistic" view of science =

inductive reasoning, subjectivity, exploration, innovation, imagination, creativity, gray matter, infinite, entrepreneurial, art, "mystery embraced," right brain, "answers are always and forever suspect and susceptible to reinterpretation," consciousness is a synthesis of brain, body, and environment that is always in flux, science is not value free, Feyerabend's *Against Method*, Kuhn's *The* [Real] *Structure of Scientific Revolutions*, Karl Popper's "critical rationalism" and rejection of classical empiricism.

Dualism: Either the mind and body work, in some way, independently, or there is a two way interaction between the two. (Can't have one without the other.)

Relativism: Claims that truth, goodness, or beauty is relative to a reference frame and no absolute, over-arching standards to adjudicate between reference frames exists.

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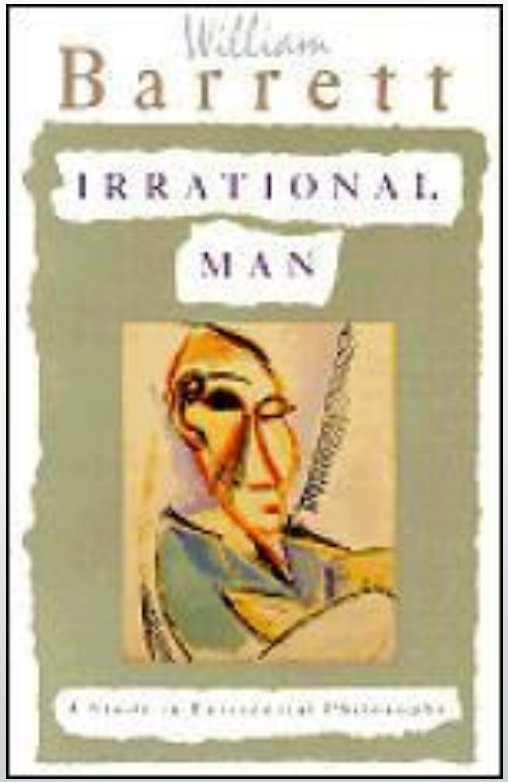
Humanities Curricula?

STEM-Focused English Composition

Has the battle for specialized training in education won out? At the expense of humanities? Are the questions the humanities asks outdated? Or needed now more than ever?

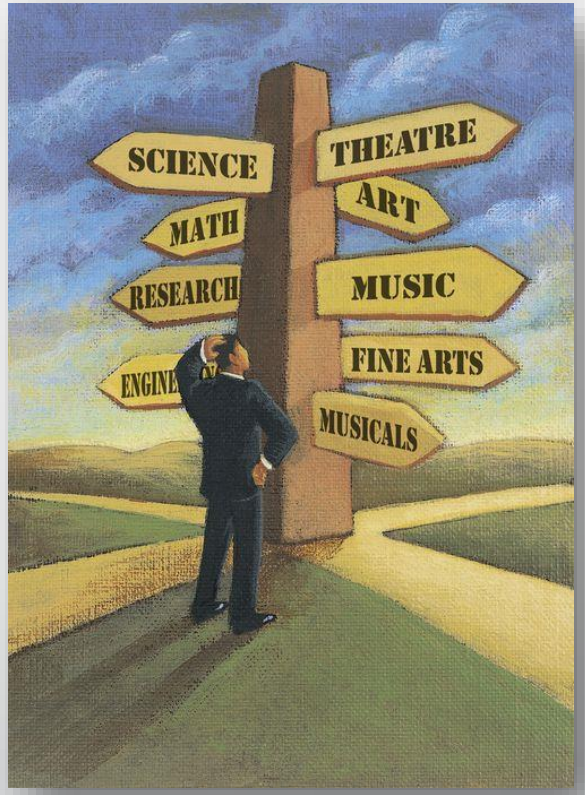
"Specialization is the price we pay for the advancement of knowledge. A price, because the path of specialization leads away from the ordinary and concrete acts of understanding the terms of which man actually lives his day-to-day life."

—William Barrett, *Irrational Man*



STEM-Focused English Composition

Science seems to have an "everything is empirical, everything can be reduced" image problem with many in the humanities and the humanities seem to have a "we will never know everything there is to know about any one thing, let's party with subjectivity, and, yes, emotions matter" image problem with those in the sciences.



Is our responsibility to teach future STEM professionals austere methods in writing that only lend themselves to analytical organization, linear sequencing, and reductionist rhetorical strategies? Or, should we also explore the iconic humanities question when we develop our curricula/assignments—What does it mean to be human?—a question that lends itself to imagination, creativity, mystery in various contexts? Today, is there a better context than science and technology in which to ask this question?

STEM-Focused English Composition

Everything seems to keep coming at us at an accelerated, non-linear rate …

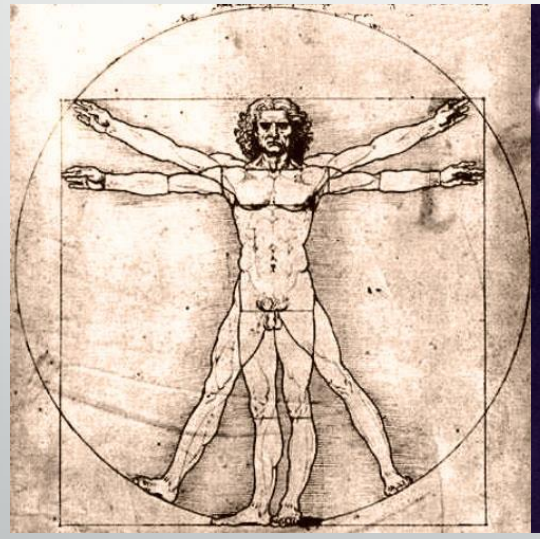
"**An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense 'intuitive linear' view**. So we won't experience 100 years of [scientific and technological] progress in the 21st century — it will be more like 20,000 years of progress (at today's rate). The "returns," such as chip speed and cost-effectiveness, also increase exponentially. There's even exponential growth in the rate of exponential growth." -- Ray Kurweil

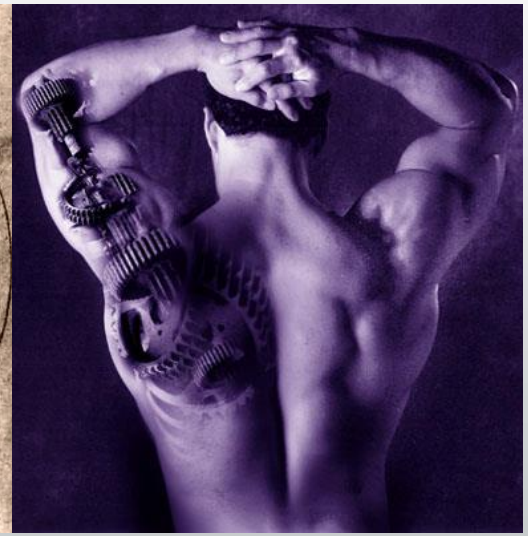
http://www.youtube.com/watch?v=EX69E-eoWVM **Ray Kurzweil: The Law of Accelerating Returns 4:00 – 7:00**

STEM-Focused English Composition

Previous to the 20th Century, science and technology were products of the metaphysical culture, the humanities tradition that—within political, economic, and social contexts—inspired critical and imaginative thought, argumentation, exploration into the pervasive question What does it mean to be human?

Today, is science and technology still part of this culture? Or, because of the accelerated, exponential rate at which technological change occurs, are we proceeding at a rate that precludes the possibility of asking? Even in the 20th century, we discussed, but did not necessarily vote on: gas combustion engines, the pill, computers, etc …





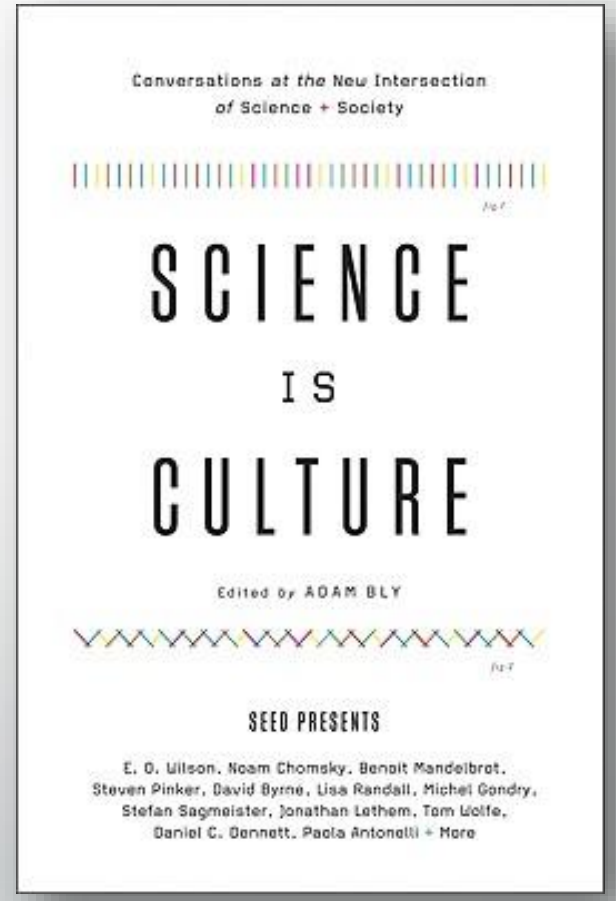
Our biological bodies are inadequate, antiquated, dysfunctional, inappropriate for the challenges of any progress we can now readily conceive. We need technical updates, new ways to define health and advancement. It's only through science and technology that this can happen. Will we leave the old ideas of what it means to be human behind?

STEM-Focused English Composition

"We are on the cusp of a twenty-first-century scientific renaissance. Science is driving our culture and conversation unlike ever before, transforming the social, political, economic, aesthetic, and intellectual landscape of our time. Today, science is culture. As global issues—like energy and health—become increasingly interconnected, and as our curiosities—like how the mind works or why the universe is expanding—become more complex, we need a new way [or a return to the 19th century] of looking at the world that blurs the lines between scientific disciplines and the borders between the sciences and the arts and humanities."

Adam Bly

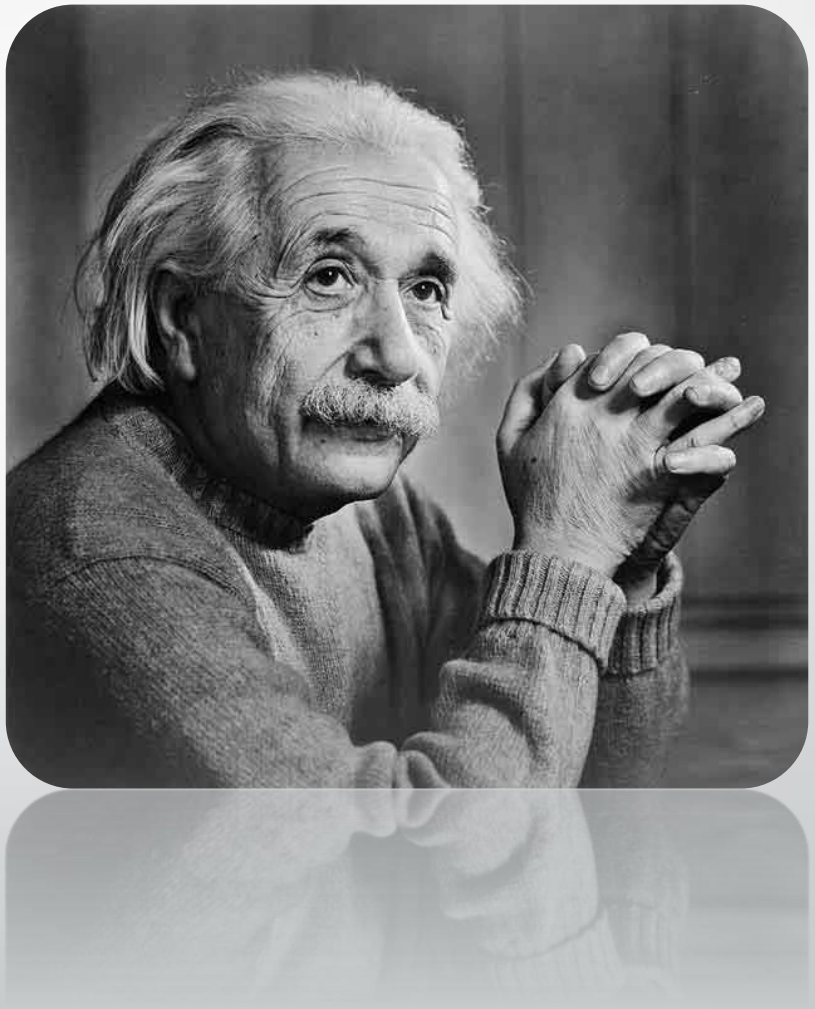
Science is Culture



STEM-Focused English Composition

Imagination is more important than knowledge, for knowledge is limited to all we know and understand, while imagination embraces the entire world, and all there ever will be to know and understand.

–Albert Einstein



What's coming …

http://www.youtube.com/watch?v=8eprl7corks Designing Humanity - Genetic Engineering, 3 min

https://www.youtube.com/watch?v=bEdvQjTGYP8 We can reprogram life. How to do it wisely | Juan Enriquez, 15m

https://www.youtube.com/watch?v=Syi9bqfFIdY Juan Enriquez: Will our kids be a different species? 17m

https://www.youtube.com/watch?v=1Ugo2KEV2XQ The coming transhuman era: Jason Sosa at TEDxGrandRapids, 15 min.

https://www.youtube.com/watch?v=D5ShvYrYnxo Future of the Mind, Michio Kaku, 13 min.

http://www.youtube.com/watch?v=ofHhzzTA6bk Dr. Michio Kaku on His New Book, "Physics of the Future: How Science Will Change Daily Life by 2100

http://www.youtube.com/watch?v=fhJoSoqtiPg - Michio Kaku on the Future of Science – 7:30

http://www.youtube.com/watch?v=dTi4v3HveqE Michio Kaku: The Dark Side of Technology 6 min

https://www.youtube.com/watch?v=VAh_vOWi-VY "Questions W/ Answers and Questions W/O Answers": Dr. Alan Lightman, 58:20

Method …

https://www.youtube.com/watch?v=e8-ugUobpJs Is science value- and emotion-free? - EO Wilson, 5 min

https://www.youtube.com/watch?v=YltEym9Hox4 – Richard Feynman on knowing, 4min

https://www.youtube.com/watch?v=9kirzr6lnSs – Richard Feynman, Disrespect for Respectable, 9 min

https://www.youtube.com/watch?v=_sAfUpGmnm4 – Feynman, the way nature works, 6 min

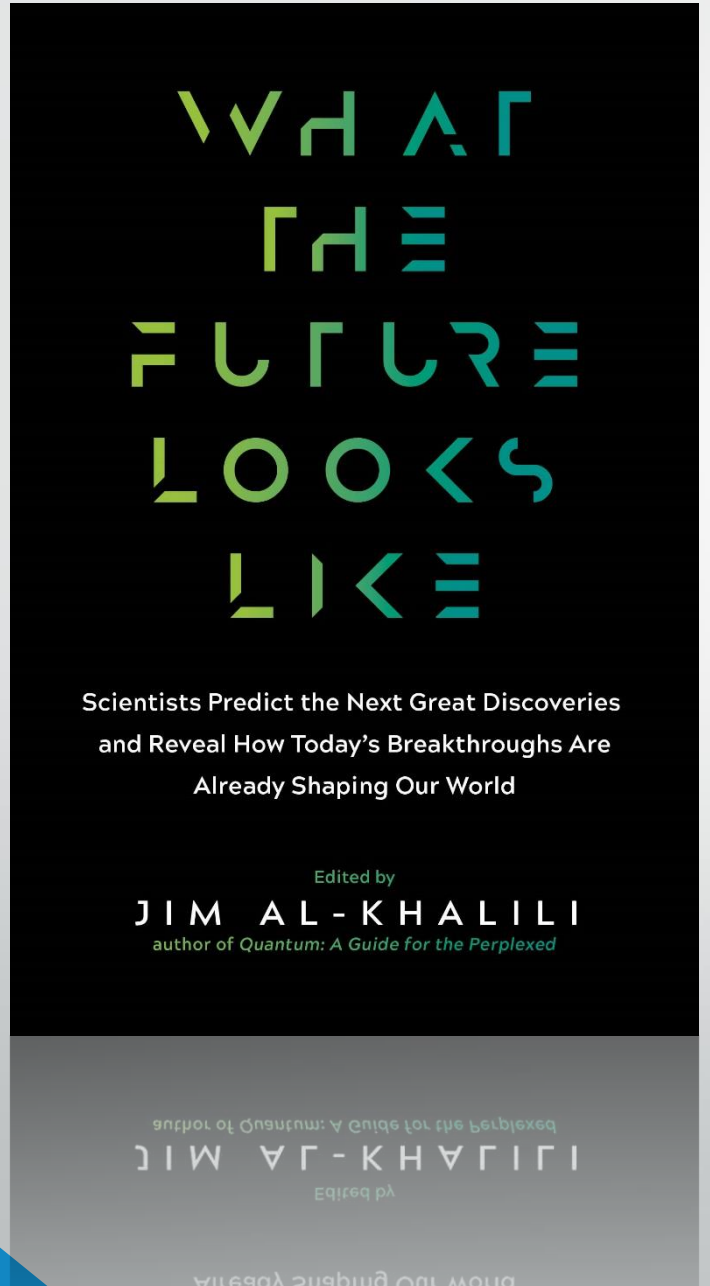
Humanity/Existence …

https://www.youtube.com/watch?v=qzQBFlFdRPk E.O. Wilson explains the meaning of human existence, in 6 min.

https://www.youtube.com/watch?v=lx26k8LTCdI E.O. Wilson: Science, Not Philosophy, Will Explain the Meaning of Existence, 9 min

https://www.youtube.com/watch?v=4Qhlp-X3EHA Dialogue: What is the Role of Science in Morality? 35 min.

STEM-Focused English Composition

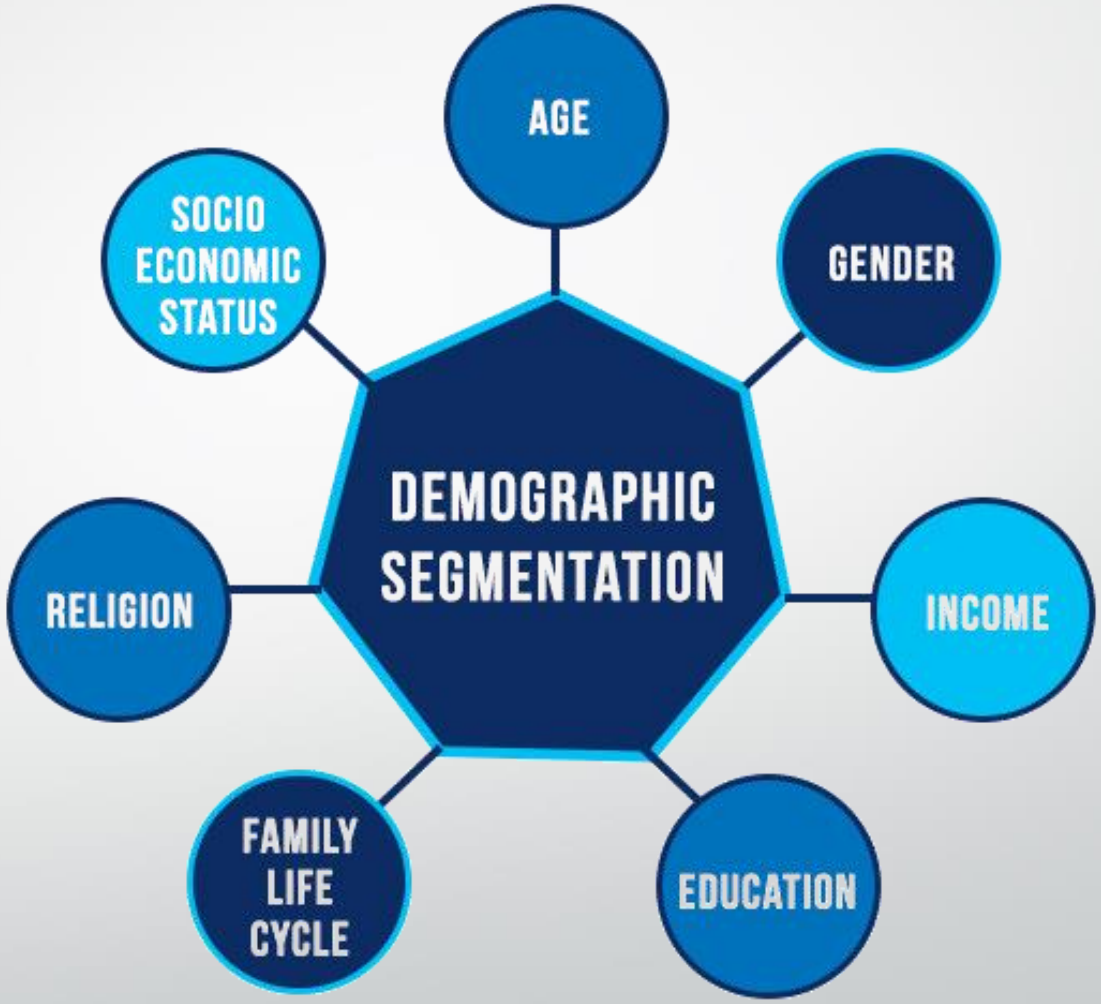


"It is important to remember that scientific knowledge in itself is neither good nor evil–it's the way we use it that matters. You can be sure that within a decade or two we will have AI-controlled smart cities, driverless cars, augmented reality, genetically modified food [and maybe organic life forms], new and more efficient forms of energy, smart materials, and a myriad of gadgets and appliances all networked and talking to each other . It will be a world almost unrecognizable from today's, just as today's would appear to someone in the 1970s and 1980s."

--Editor Jim Al-Khalili

Essay #1
Demographics, Philip Ball

What are demographics?



Essay #1: *Demographics*, Philip Ball

Mouths to Feed

Question

Ball writes about world-wide food security, how advances in agriculture in the mid-20th century hassled to an increased yield and ability to feed vast amounts of people, but how climate change and—"soil erosion, desertification, and loss of biodiversity"—has reversed the advances of agricultural technology to sustain populations. This has led to civil wars and mass migrations, which has led to increased nationalism and border insecurity, issues of sovereignty. Using three researched examples, write an essay on how climate change has negatively impacted food production in three parts of the world and has led to conflict, war, and migration. Ball mentioned Haiti, North Africa, and the Arab Spring. Consider how the drought in Syria has led to Civil War.

Essay #1: *Demographics*, Philip Ball

The Face of Us

Question

Ball, in this section, writes about ageing in the world-wide population as well as migration (which he classifies as "voluntary") and displacement (which he regards as "involuntary") acknowledging that there is a fine line between the two. Regardless, there are millions of people on the planet on the move, some within their own countries, some to other countries in search of mere survival to a more sustainable existence—better jobs, more education, better healthcare. For this assignment imagine yourself as a member of a refuge family being displaced as a result of climate change in your own country, which has led to conflict and death, either constant flooding or persistent drought. (It doesn't have to be climate change, it can be civil strife, ethnic conflict, or brutal dictatorship, any reason that would force a family to flee for their survival.) Your way of life has been destroyed and you can no longer live where your family has lived for many generations. Pick a country and situation in the world where populations have been forced to pick up and move. Describe the reason your family must relocate to survive. Describe your role in the family—mother, daughter, son, father. As you learn about what these refugees or immigrants had to endure, describe how they suffered, what they experienced as they fled, what they expected, and what their reality turned out to be. Conclude with an analysis of how you would feel if this was your journey and what can be done to avoid these kinds of migrations. Finally, describe how science and technology can help alleviate this problem of mass migration?

Essay #1: *Demographics*, Philip Ball

Identity Technologies

Question

Ball, in this section, writes that, "the spread of technologies and social media justifies their description as transformative and indeed disruptive technologies… ." For this essay, research three examples of how digital communications technologies have had a positive effect on users and modern culture and three examples of how communications technology and social media have negatively impacted culture and users. Use the work of Nicholas Carr and Sherri Turkle for you research.

Question

Ball writes on p. 19 that "interconnectivity doesn't mean inclusivity. On the contrary, it may produce a Balkanization of views that coarsens political discourse and supports or hardens extremist views." In other words, digital communication technologies, social media, and instant internet access has lowered our empathy levels, hardened our views, and reinforced our misconceptions, ignorance, and prejudices on political and social issues and pushes us not to compromise. For this essay, come up with five examples where correlation is evident in our political and social discourse today.

Essay #1: *Demographics*, Philip Ball

Identity Technologies

Question

On p. 20 Ball writes that in the future, your greatest asset, "may not be your skills, knowledge, or even wealth, but your online reputation." Write an essay that highlights three examples of this.

Essay #1: *Demographics*, Philip Ball

The Future of Democracy and Religion

Question

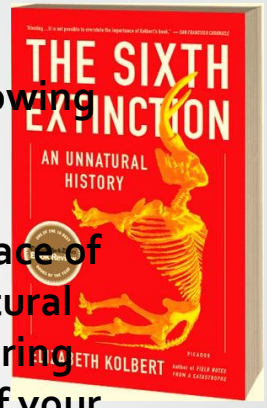
Ball, on p. 22 writes, "Not only is it clear that stable democracies remain as elusive as ever in large parts of the world—and certainly don't arise as if by magic from the overthrow of a dictatorship—but it also can't be taken for granted that once they have arrived, they are here to stay. Demagogic populism in Europe and the U.S. is …threatening to transform liberal democracies into 'Strong Man' regimes more often [historically] associated with Russia, China, and Southeast Asia, sustained by coercion, corruption, and collusion." Write an essay that uses three examples to either support or refute this claim.

He who has the most gold, makes all the rules

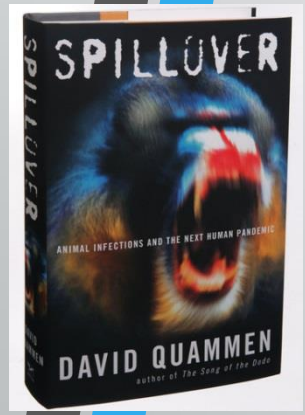
Essay #2: *The Biosphere*, Gaia Vince

Question

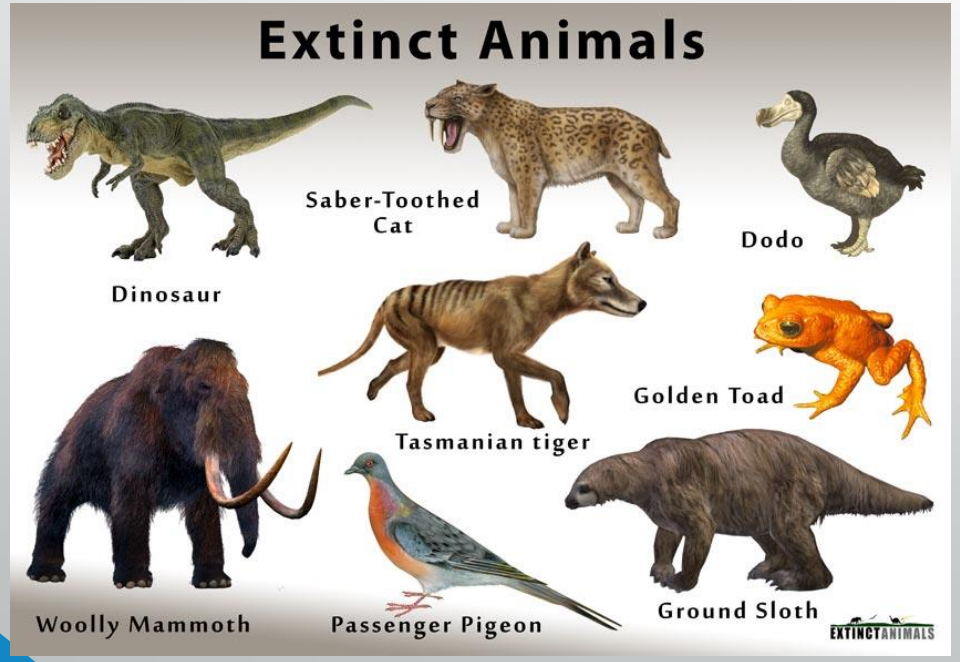
For this essay, write a well-researched (no less than four sources), well thought out response to any of the following statements by Vince. Your response MUST include a detailed workable solution:

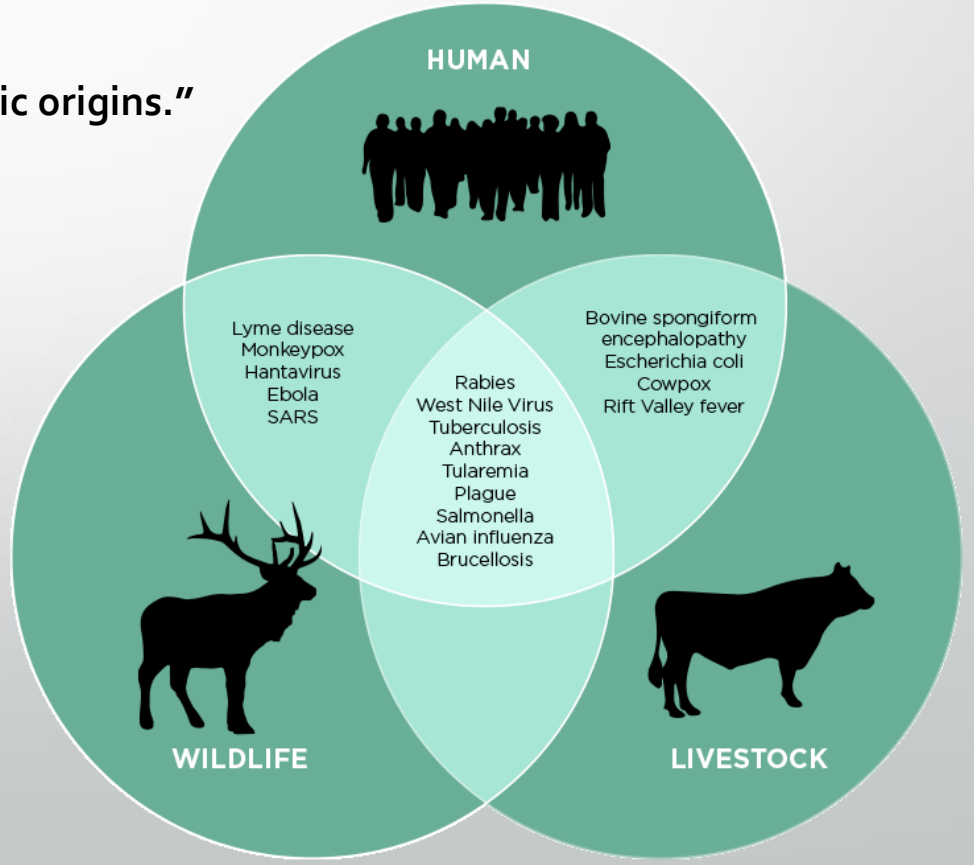


p.26 – "Humans now dominate the planet so extensively that we are pushing wild animals and plants off the face of the earth. Our planetary changes now threaten one in five species with extinction, roughly 1,000 times the natural rate of extinction … [W]e have lost half our wildlife in the past 40 years alone and biologists warn that are entering the sixth mass extinction event in earth's history. " Use Elizabeth Kolbert's book, *The Sixth Extinction* as one of your sources.



p.30 – "… some 70 percent of infectious diseases have zoonotic origins." Use David Quammen's book *Spillover* as one of your sources.





Essay #2: *The Biosphere*, Gaia Vince

Question

For this essay, write a well-researched (no less than four sources), well thought out response to any of the following statements by Vince. Your response MUST include a detailed workable solution:

p.30 – "The biggest threat to turtles is poaching. Around the world nesting female olive Ridleys are slaughtered on the beach for their meat, skins, and shells, and their eggs are traded as a valuable delicacy … More than half of all illegally traded wildlife ends up in China."

Chris Jordon

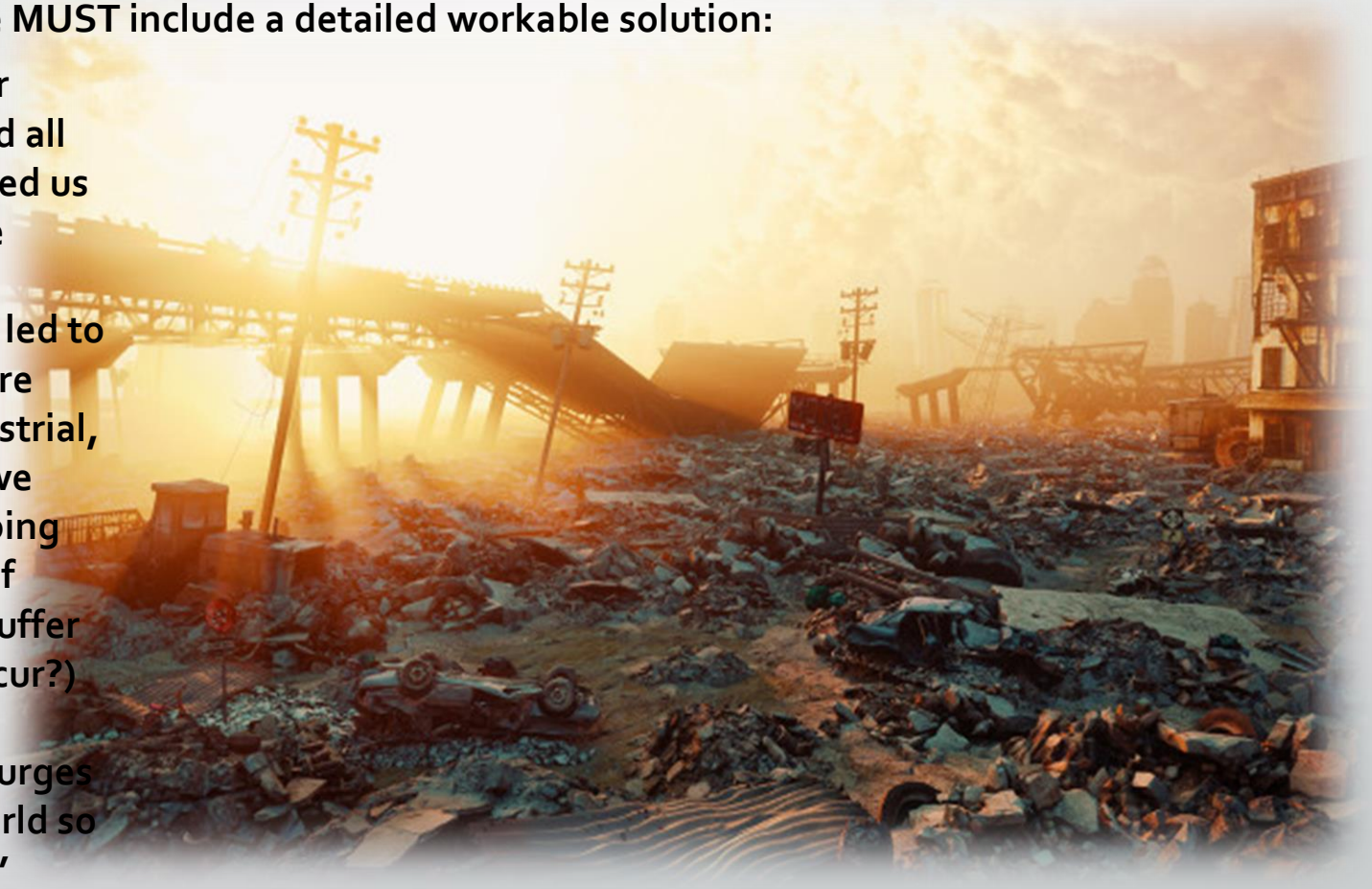
p.31 – "No one was jailed for his murder, and Mora joins a growing list of environmentalists killed for protecting wildlife in Costa Rica and beyond. In 2015, the most recent year for which records exist, 185 environmentalists were killed protecting natural resources globally. Only a tiny fraction of such deaths result in conviction. "

Essay #2: *The Biosphere*, Gaia Vince

Question

For this essay, write a well-researched (no less than four sources), well thought out response to any of the following statements by Vince. Your response MUST include a detailed workable solution:

p.32 – "We humans have always exploited our environment's resources for food, energy, and all out other needs. We're brilliant at it, and it's led us to being such a successful species that we live longer and better than ever before and now dominate the world. In the past our activities led to a few local extinctions, but there are now more than seven billion of us and we act on an industrial, global scale, threatening the very resources we rely on. Are we just another part of nature doing what nature does, reproducing to the limits of environmental capacity, after which we will suffer a population crash? (How might this crash occur?) Or, are we the first species capable of self-determination, able to modulate our natural urges and manage our plundering of the natural world so we can maintain habitability into the future?"



Question: *Climate Change*, Julia Slingo

Slingo writes that "Climate change will be one of the defining challenges of the twenty-first century; how we respond will determine our future prosperity, health, and well-being, and the sustainability of the earth's natural environment." I'd claim climate change is THE defining issue of our time.

Question:

What damage has the current administration done to the long-term prospects of reducing the effects of climate change? Of having negative impacts on health, prosperity, and sustaining environmental recourses?

Essay Question:

What will the climate and geography of Maryland look like in 2050 if current trends continue?

Years of Living Dangerously: Matt Damon, Arnold Schwarzenegger, Jack Black, Don Cheadle, Harrison Ford.

Question: *The Future of Medicine*, Adam Kucharski
"The Next Epidemic"
Essay Question:
Kucharski writes that medical training is the "art of probability and a science of uncertainty." What does he mean?

Question:
It seems inevitable that there will be an epidemic of some kind in the not-too-distant future, one that will kill many human beings around the world. Describe the relationship between climate change, zoonotic disease, and viral or bacterial epidemics. Use David Quammen's *Spillove*r as a source.

Question:
Here's a quote from an essay by Maryn McKenna on "Imagining the Post-Antibiotics Future," something Kucharski seems is an inevitable outcome considering how "Big Pharma" is only drive by bottom line profits: "Before antibiotics, five women died out of every one thousand who gave birth. One out of nine people who got a skin infection died, even from something as simple as a scratch or an insect bite. Three out of ten people who contracted pneumonia died from it. Ear infections caused deafness; sore throats were followed by heart failure." Given this reality, how cautious would you be in the future? For instance, would you let your kid climb a tree? Would you pick up a power tool?

The Future of Medicine, Adam Kucharski

"Bespoke medicine"

Question:

p.59 – Kucharski writes: "Patients aren't the only ones who will be interested in the results of genetic tests. In the U.S., health insurers are currently not allowed to deny coverage based on a gene mutation, thanks to the 2008 Genetic Information Nondiscrimination Act. But things are different for life insurance companies : Some have refused applicants with the BRCA1 mutation. Unless the law keeps up with the rapid advances in predictive medicine, genetic health risks could also start to influence access to things such as housing and employment." Write an essay on the bottom-line protective interests of insurance companies and employers and the privacy concerns of individuals' genetic information. In other words, how might personal genetic information be weaponized against individuals?

Question: Kucharski mentions the BRCA1 mutation and the story of Angelina Jolie, who chose to have her breasts removed. Was this the right decision? Why or why not?

Question:

p. 59 – "As our knowledge of hereditary conditions develops, it may also blur the definition for a patient. In 2015, a woman who took St. George's National Health Service Trust in London to the British High court because they had not told her that her estranged father had Huntington's disease, a genetic condition. Doctors had advised the father to inform his daughter when he'd been diagnosed in 2009, and he'd refused. The daughter, who had been pregnant at the time, would only find out that she had the condition in 2013. Should doctors have extended individual patient information to a family member in this situation? On this occasion, the judge concluded that they [the doctors] were correct to maintain confidentiality." Write an essay on whether this is the correct decision? Not to inform a relative of a genetic condition if the patient in question wants to maintain confidentiality?

Essay #5: *Genomics can Genetic Engineering, Aarathi Prasad*

Questions:

p.63 – Prasad begins with a quote from Freeman Dyson, "Biology will be the leading science for the next hundred years." Is this true? Why or why not?

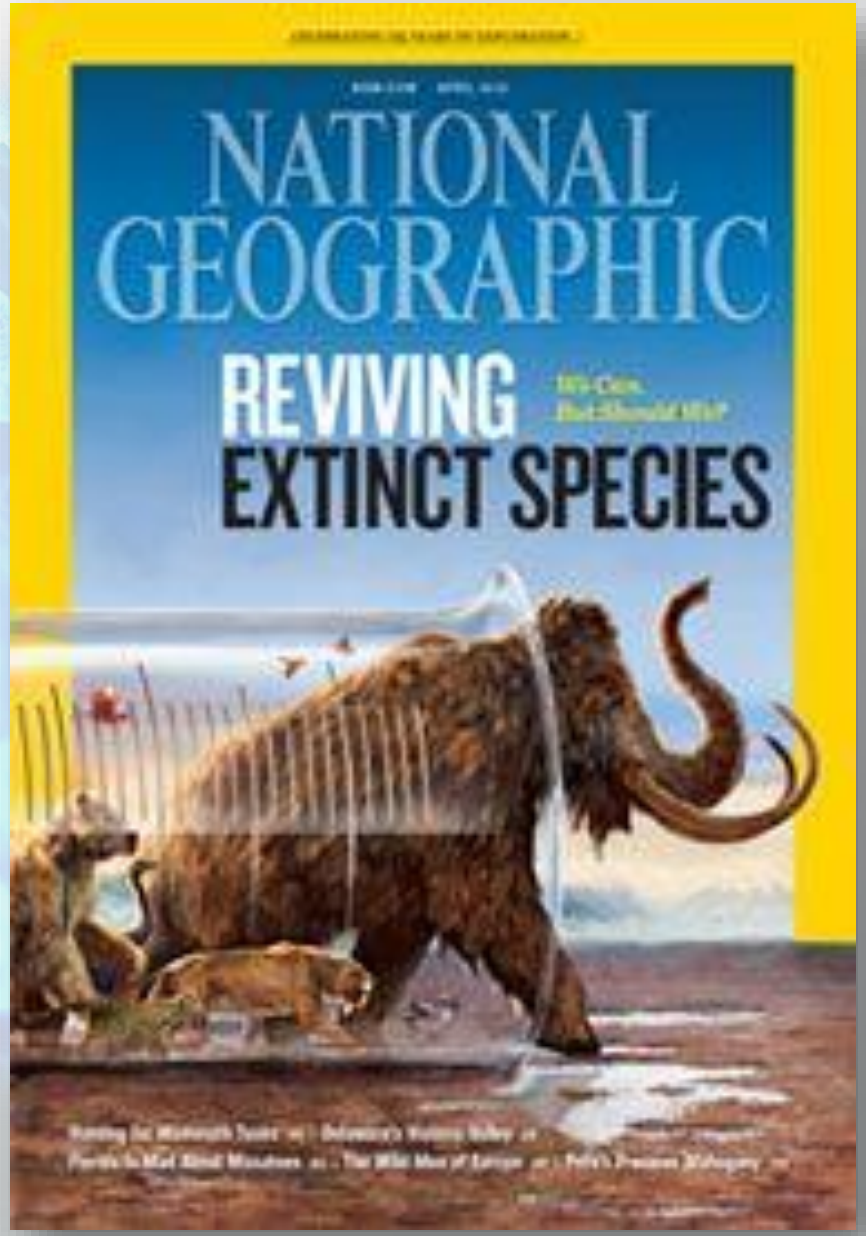
p.65 – Prasad says "Because we can read the genetic code, and begin to master its grammar, we can start writing it for ourselves. In the future, we will attempt to design DNA that is more and more complex, opening a window that within the next two decades will undoubtedly see the creation of new life forms on the planet, or the resurrection of those that have become extinct." For this essay response, take the genetic baby test. You and your respective spouse plan to have a child. The obstetrician brings you a checklist of characteristics that you can chose: skin color, height, weight, gender, eye color? cognitive proclivities? Would you use it? Why or why not?

Essay #5: *Genomics can Genetic Engineering, Aarathi Prasad*

Questions:

Essay Q: Prasad also alludes to genetic research being used to create new life forms? Should this be done? Isn't it already being done with GMO food?

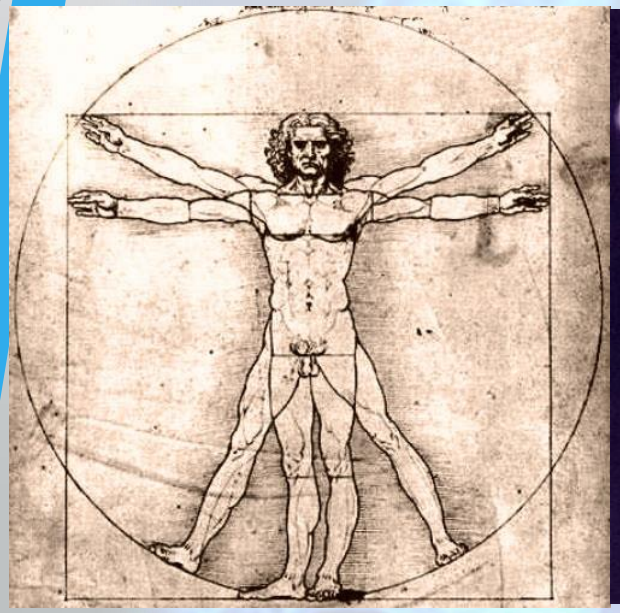
Essay Q: Should we attempt to resurrect extinct species? Woolly mammoths for instance? Why or why not? What variables would come into play in making a decision?

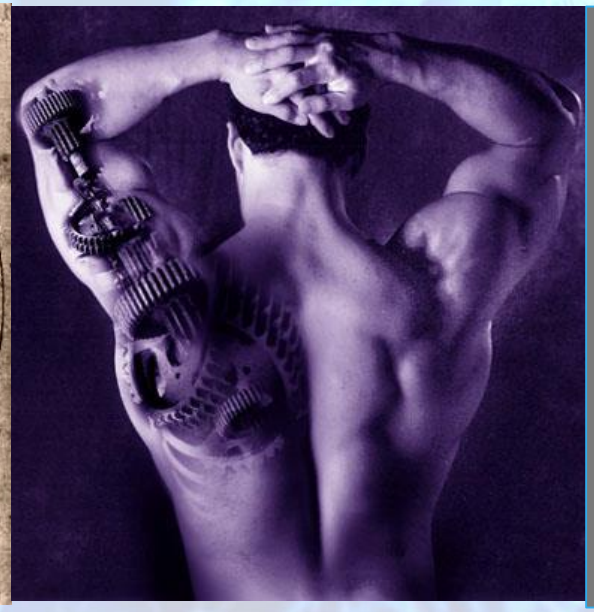


Essay #5: ***Genomics can Genetic Engineering, Aarathi Prasad***

Questions:

p.63 – Prasad writes: "By understanding the genome and then attempting to harness what DNA does with ease—self learning, reactive adaptation, self replication—things that non-biological machines struggle with today, the interface of computing and the machinery of DNA will be revolutionized." Once AI has this potential, what will distinguish it from being human?



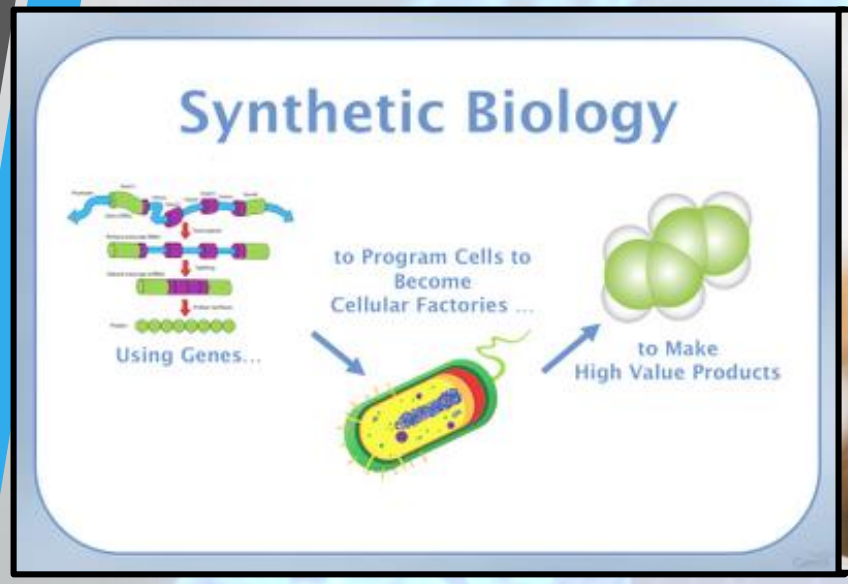


Our biological bodies are inadequate, antiquated, dysfunctional, inappropriate for the challenges of any progress we can now readily conceive. We need technical updates, new ways to define health and advancement. It's only through science and technology that this can happen. Will we leave the old ideas of what it means to be human behind?

Essay #6: *Synthetic Biology, Adam Rutherford*

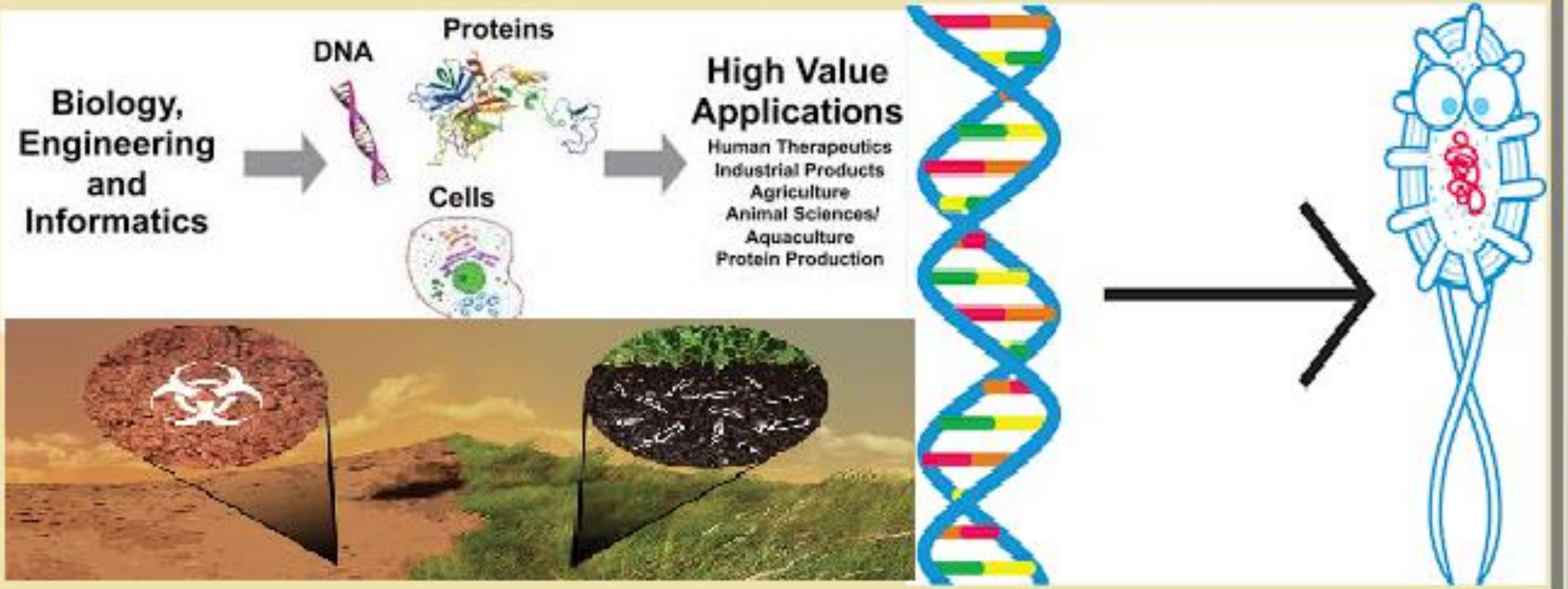
Questions:

p.76 – "With synthetic biology, we can now bypass sex and breeding altogether and put together organisms not even slightly capable of having sex, having been separated on the evolutionary tree by hundreds of millions of years—spiders and yeast. Synthetic biologists seek to extract the source code and re-engineer it into much more efficient biological factories." Is this ethical? Should it be done even if it could save human lives? Will this remixing of biology in the lab become "normalized?" Are we playing God?



- In China, two pigs with monkey cells were born after researchers genetically modified cynomolgus monkey cells in vitro. The research was published in the scientific journal *Protein & Cell.*
- After just a week, the chimera pigs (and their eight regular pig siblings) died of unknown causes.
- Researchers at the State Key Laboratory of Stem Cell and Reproductive Biology in Beijing are planning to try this again with more monkey cells. The end goal is to grow human organs inside animals for use in transplants. - Courtney Linder

What is Synthetic Biology?



Essay #6: *Synthetic Biology, Adam Rutherford*
Questions:

At a press conference in Washington, DC, (2010) Craig Venter and team make a historic announcement: they've created the first fully functioning, reproducing cell controlled by synthetic DNA. He explains how they did it and why the achievement marks the beginning of a new era for science.

"The first synthetic cell, a cell made starting with the digital code in the computer, building the chromosome from four bottles of chemicals, assembling the chromosome in yeast, transplanting it into a recipient bacterial cell, transforming that cell into a new bacterial species. This is the first self-replicating species we've had on the planet whose parent is a computer."

http://blog.ted.com/2010/05/21/unveiling_synth/ Venter on creating Synthetic Life – 18 min.
Also, 60 minutes on Venter

Essay #6: *Synthetic Biology, Adam Rutherford*

Questions:

Synthetic biology has a distinctly science fiction dimension. Come up with your own genetic creature, combining genes from whatever sources and describe how it would benefit humanity in positive ways.

Business Reporter

Essay #7: *Transhumanism, Mark Walker*
Questions:
p. 85 - "Transhumanists believe that we should use advanced technologies such as pharmacology, genetic engineering, cybernetics, and nanotechnology to radically enhance human beings. In other words we should be trying to create new types of humans—sometimes referred to as "post humans"—who are significantly improved when compared with … us." Imagine a future world populated by a new species of post-humans who are far happier, more virtuous, more intelligent, and whose lives are measured in centuries rather than decades." Write a general response to this statement by Walker. (Jason Sosa vid)

p.85 – Walker writes that, "Genes are not destiny, and most human characteristics are formed by a combination of genetic factors and environmental factors." Define epigenetics and how the environment influences are genetic blueprint. (Review Tyson vid on epigenetics.)

Essay #7: *Transhumanism, Mark Walker*

Questions: Babies born today are already going to surpass the century mark in their lives. Would you like to live for 1,000 years? Even if your quality of life could be maintained? Why or why not?

*Average lifespan in 1900 = 45

* It's not just hype

New Science
Could lead to
Very long lives

Essay #7: *Transhumanism, Mark Walker*

Essay Questions: If, as Walker alludes, we can be genetically rewired to be happier and more intelligent, will we lose our abilities to teach ourselves to be happier and more intelligent? How important is it to our survival to be able to take a conscious approach to making ourselves more intelligent and happy?

Question: Memory. (Go to memory vids). Researchers have now been able to isolate single memories in the brain. They also claim that, in the not-too-distant-future to be able to erase single memories or to even plant single memories. What about the soldier suffering from debilitating PTSD? Should we erase that memory so he or she can function "normally" in society? Where do we draw the line with traumatic experiences? What if someone had a break-up with someone they loved? People have committed suicide over such things. Should their memory be erased? What do we lose if we can simply erase and ignore the pain of such events that help us to learn about life? Can this idea go to far?

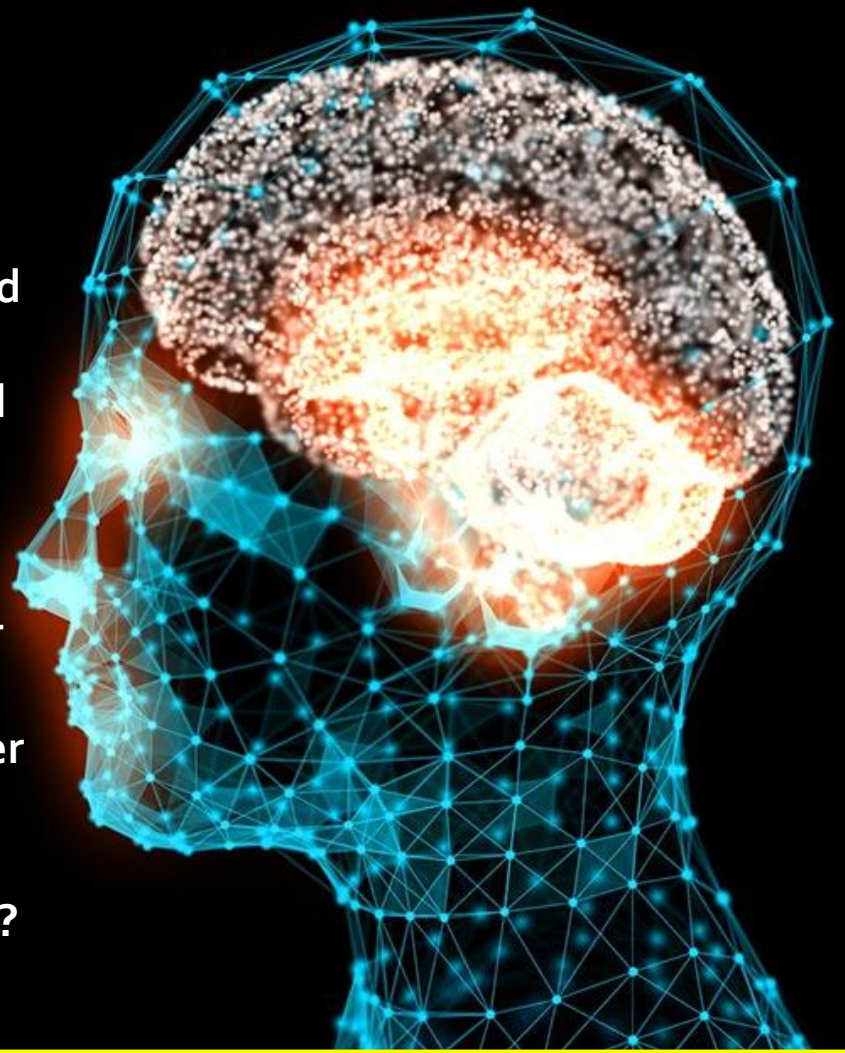
Question : What about genetically enhancing memory at birth? Would you check that box for your newborn? What if everyone else was doing it and you decided not to? Would your child be at a disadvantage?

Question: Finally, what about inserting memories, which, apparently, is an idea that neurological researchers are performing now on mice. Instead of paying for that vacation to Australia, you can now go down to the nearest memory boutique and have it installed? Good idea or not?

Essay #7: *Transhumanism*, *Mark Walker*

Questions: If you could take a happy pill, not a drug or a mind-altering narcotic, would you take it? A pill that never made you sad? How important is it to learn how to be happy and how does this relate to the question of what it means to be human?

Essay #7:
Transhumanism, Mark Walker
Questions:
If methods are invented to genetically enhance human intelligence will there be socio-economic factors that determine who can afford to enhance their intelligence and who cannot? Will this further segregate society and prohibit opportunities to succeed in life? How?



https://www.youtube.com/watch?v=4c1lqFXHvqI **Can we create new senses for humans? | David Eagleman - TED**

Essay #7: *Transhumanism, Mark Walker*

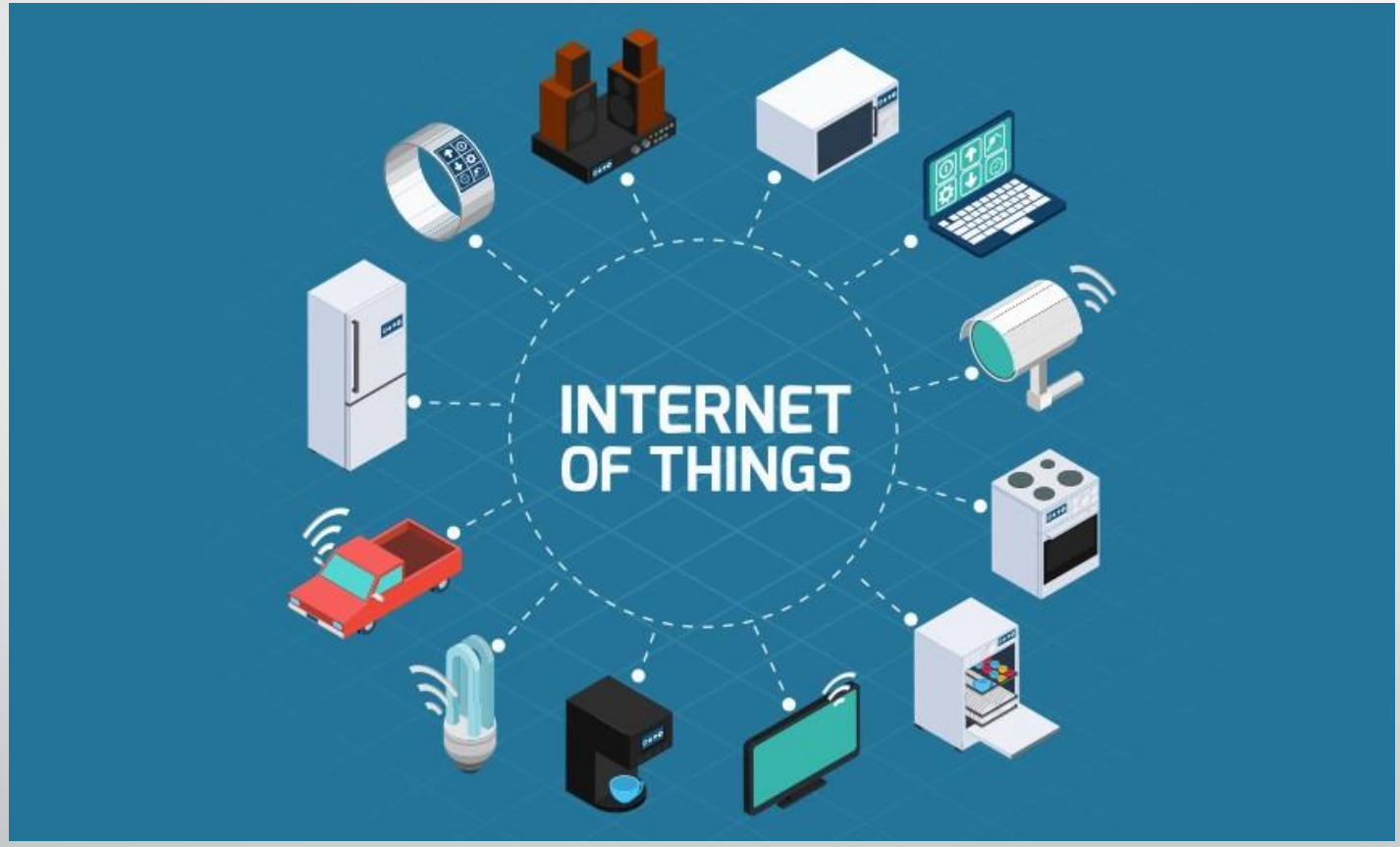
Questions:

In the final two sections of Walker's essay, Reasons for Transhumanism and Arguments Against Transhumanism, select two of his reasons for and two of his arguments against, write 250 word detailed reflection on each. What will it mean to live and thrive in the post human era? What will it mean to be human?

Essay #8: *The Cloud and Internet of Things, Naomi Climer (Owens Corning Day of Glass vids)*

Questions:

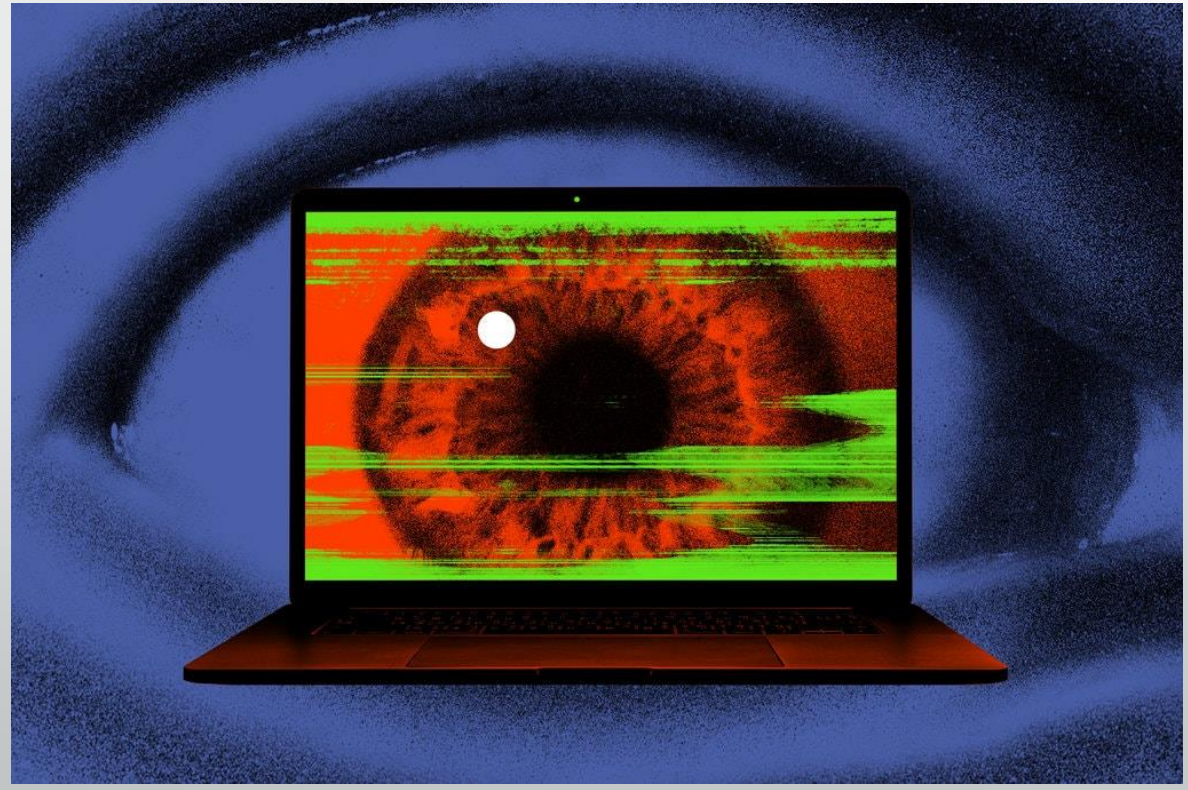
The concept of the Internet of Things (IoT) brings up the notion of how deterministic is technology? In other words, do you control your life? What you see? Where you go? What you do? Or is this an illusion and is your life, in fact, socially engineered, where technology determines what you do?



expressvpn.com

https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/

Essay #8: *The Cloud and Internet of Things, Naomi Climer (Owens Corning Day of Glass vids)*
Questions:
p.102 – Climer writes, "Very cheap, low power consuming, connected sensors can be added to everything to collect real time data about individuals, the environment, or specific systems, allowing us to continually check for leaks with sensors in remote water pipelines or to crowd source vast amounts of data from mobile phones to track an outbreak of flu." Write an essay about privacy. With sensors everywhere, will this encroach on privacy? What happens in a society where individuals are not encouraged to have private thoughts? Do you have private thought? Innovative thoughts? Do you use your imagination or creative abilities regularly?



New York Times

Essay #8: *The Cloud and Internet of Things, Naomi Climer (Owens Corning Day of Glass vids)*
Questions:
– Climer is quick to use terms like "wisdom" very loosely. Write an essay that distinguishes the difference between information/data, knowledge, and wisdom and tie this into the question of what it means to be human. (Show vids.) Is it wisdom to know where to go for milk, for instance?

Essay #8: *The Cloud and Internet of Things, Naomi Climer (Owens Corning Day of Glass vids)*
Questions:
– Climer writes on p. 106, "However, there are many challenges ahead of us before we can fully achieve this dream." She concludes the essay with images of shared living space, shared pets, the "future of work" meaning no work. This utopian dream of hers can sound to some like a nightmare. Read this part of the essay carefully. Essay – Could you be happy in Climer's world? What does it mean to be human in her vision of the future?

https://www.youtube.com/watch?v=qdbZAuORJEs

Technological utopianism (often called techno-**utopianism** or technoutopianism) is any ideology based on the premise that advances in science and **technology** could and should bring about a **utopia**, or at least help to fulfill one or another **utopian** ideal.
Essay –
Write a response to "technological utopianism."

Essay #9: *Cybersecurity, Alan Woodward*
Questions:
p. 114 – Woodward writes, "There is an alarming possibility that that the internet could become a form of electronic warzone with good AI and bad AI fighting it out. Just as we are not aware of the biological battles going on in out bodies every day, we may need to learn to live with ongoing digital infection that is constantly being fought by our 'immune systems.' Essay – Just as in the overall structure of computers, designing antiviral protection is modeled on the human body and physiology. Write a response based on how the computer is built in our image.

Essay - … [h]ow far do we allow AI to control our actions? Should we be allowed to override what the AI tells us to do when it comes to cybersecurity and the internet?

Essay #9: *Cybersecurity, Alan Woodward*

Questions:

p. 114 – Woodward also alludes to, on p.116, that a country can be brought to its knees if the future world, where everything is connected, be hacked and turned off." Some would say this threat already exists. Write an essay, using your imagination, on what would happen if everything now connected to the power grid were shut off from a high altitude EMP or a cyber attack? No lights, no banking, no gas, no groceries, for an extended period of time.

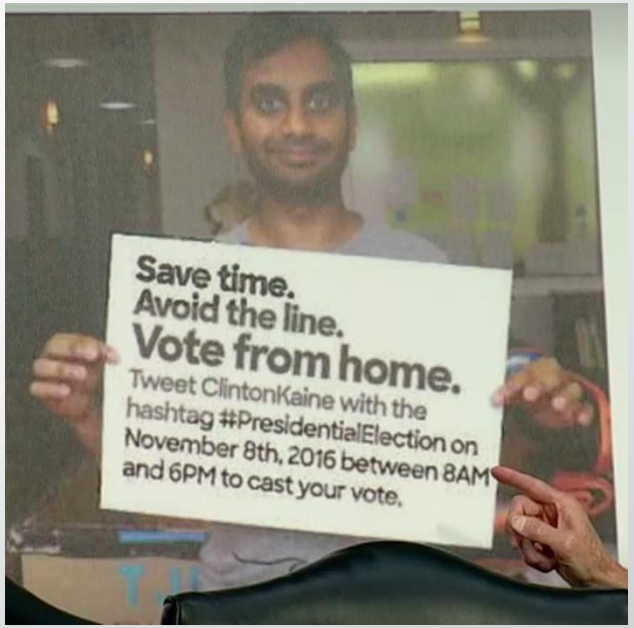
https://www.youtube.com/watch?v=fpQ8tj0aVRc

https://www.youtube.com/watch?v=D31RFJ00sd8

Essay #9: *Cybersecurity, Alan Woodward*

Questions:

p. 119 – Woodward alludes to social engineering. Describe how it was used in the 2016 presidential election.



New York Times

Essay #10: *Artificial Intelligence, Margaret Boden*

Vids:

https://www.youtube.com/watch?v=RJcRABevyCk **DaVinci Surgery**

https://www.youtube.com/watch?v=8vIT2da6N_o **Next Generation Robots**

https://www.youtube.com/watch?v=GrQ9c5hmbFE **Advanced Humanoid Robots Until 2019**

https://www.youtube.com/watch?v=kHBcVIqpvZ8 **Boston Dynamics dancing robot**

https://www.youtube.com/watch?v=dKjCWfuvYxQ **Boston Dynamics robot with gun**

https://www.youtube.com/watch?v=dJTU48_yghs **Trailer Her**

https://abcnews.go.com/Nightline/video/buy-sex-robot-equipped-artificial-intelligence-20000-54712355 **Katie Couric sex robots**

https://www.youtube.com/watch?v=pTSrLHxSoAQ **Sex robots Europe**

https://www.youtube.com/watch?v=WBFfkcZLfWg **Huston bans sex robots**

https://www.youtube.com/watch?v=r211u89eUaY **15 Jobs That Will Disappear In The Next 20 Years Due To AI**

https://www.youtube.com/watch?v=qIJa6qH4BAs **Mapping the human brain**

Essay #10: *Artificial Intelligence, Margaret Boden (Show Kurzweil film)*

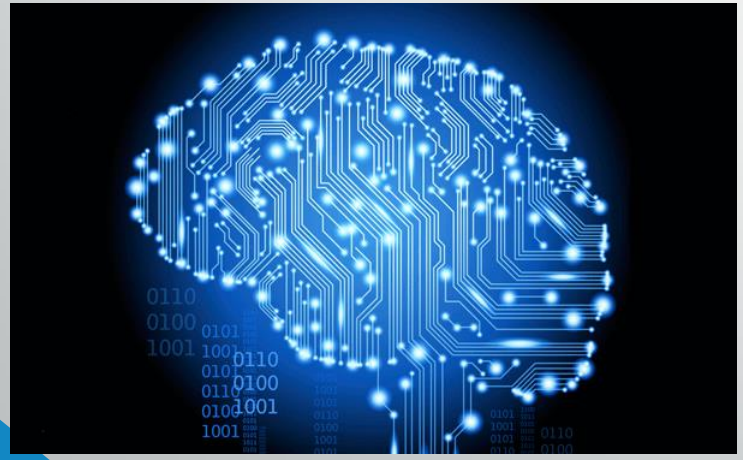
Questions:

- Can humans have emotional relationships with AI/robots? What does this mean in the context of the question, what does it mean to be human?
- What would a "driverless" world look like? How would this affect you personally? How about the insurance company?
- P. 124 – Boden writes, "Today's learning systems are hugely powerful but they're not well understood … Their designers/programmers don't really understand how they work, so can't reliably predict what they are going to do next." Researchers that study the human brain can say the exact same thing (ref mapping brain video) . Will we as humans ever know everything there is to know about anything? Is it dangerous to assume we will or can? How?
- Consider everything AI has achieved so far. Describe ten challenges AI will overcome in the future. (Make sure you address why for each item.)
- Do you think the singularity will happen? Why of why not?
- What's the difference between functional consciousness and phenomenal consciousness or qualia? Describe 5 examples of each.

Essay #10: *Artificial Intelligence, Margaret Boden*

Questions:

This is probably a good place to have the discussion on how technology has affected our brains, our cognitive processes and thinking. Automation, What the Internet is Doing to Our Brains Nicholas Carr's work on automation is an extension of his work on how the internet is affecting our thinking. Or, even, how digital technology in general is affecting the way we think. It is hard for those of you born in the era of digital communication to understand how different thinking today might be compared to how most people thought a generation ago. Cognitive skills like sustained focus and concentration, and memory seem to be profoundly challenged by our immersion in communication technology. For this essay, develop a position on whether digital communication technology is having a positive or negative impact on how our brains are functioning.

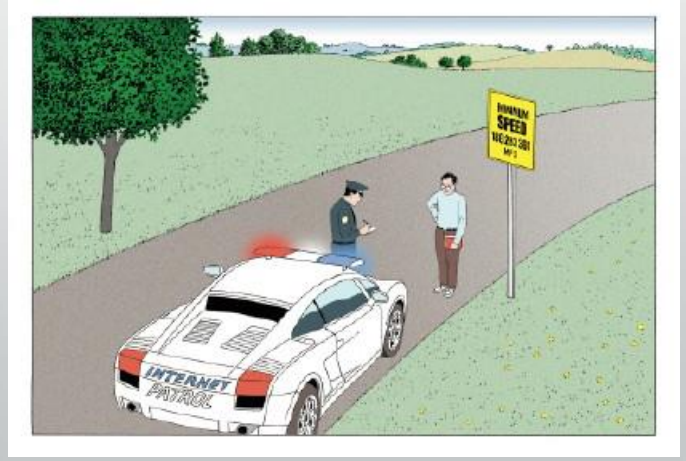


the Atlantic

Is Google Making Us Stupid?

What the Internet is doing to our brains

By Nicholas Carr



"Dave, stop. Stop, will you? Stop, Dave. Will you stop, Dave?" So the supercomputer HAL pleads with the implacable astronaut Dave Bowman in a famous and weirdly poignant scene toward the end of Stanley Kubrick's *2001: A Space Odyssey*. Bowman, having nearly been sent to a deep-space death by the malfunctioning machine, is calmly, coldly disconnecting the memory circuits that control its artificial " brain. "Dave, my mind is going," HAL says, forlornly. "I can feel it. I can feel it."

Essay #10: *Artificial Intelligence, Margaret Boden*
Questions:

I can feel it, too. Over the past few years I've had an uncomfortable sense that someone, or something, has been tinkering with my brain, remapping the neural circuitry, reprogramming the memory. My mind isn't going—so far as I can tell—but it's changing. I'm not thinking the way I used to think. I can feel it most strongly when I'm reading. Immersing myself in a book or a lengthy article used to be easy. My mind would get caught up in the narrative or the turns of the argument, and I'd spend hours strolling through long stretches of prose. That's rarely the case anymore. Now my concentration often starts to drift after two or three pages. I get fidgety, lose the thread, begin looking for something else to do. I feel as if I'm always dragging my wayward brain back to the text. The deep reading that used to come naturally has become a struggle.

I think I know what's going on. For more than a decade now, I've been spending a lot of time online, searching and surfing and sometimes adding to the great databases of the Internet. The Web has been a godsend to me as a writer. Research that once required days in the stacks or periodical rooms of libraries can now be done in minutes. A few Google searches, some quick clicks on hyperlinks, and I've got the telltale fact or pithy quote I was after. Even when I'm not working, I'm as likely as not to be foraging in the Web's info-thickets' reading and writing e-mails, scanning headlines and blog posts, watching videos and listening to podcasts, or just tripping from link to link to link. (Unlike footnotes, to which they're sometimes likened, hyperlinks don't merely point to related works; they propel you toward them.)

http://www.theatlantic.com/magazine/archive/2008/07/is-google-making-us-stupid/6868/ **Carr**

http://www.youtube.com/watch?v=W86P_FX6PdI **Nicholas Carr: The Internet Weakens Deep Thinking, 5 min interview**

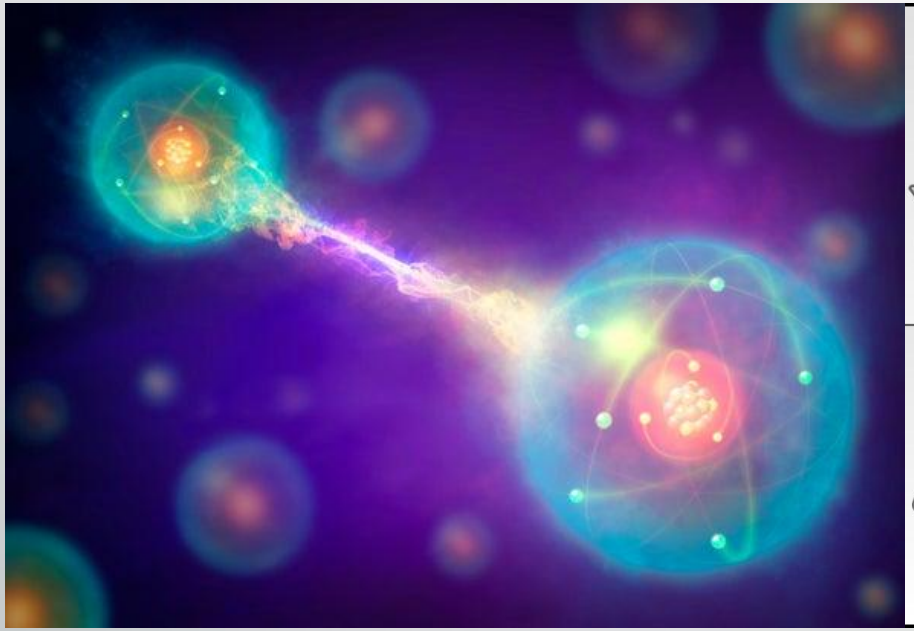
http://www.edge.org/video/the-age-of-the-informavore **THE AGE OF THE INFORMAVORE, Edge.org, 30 min**

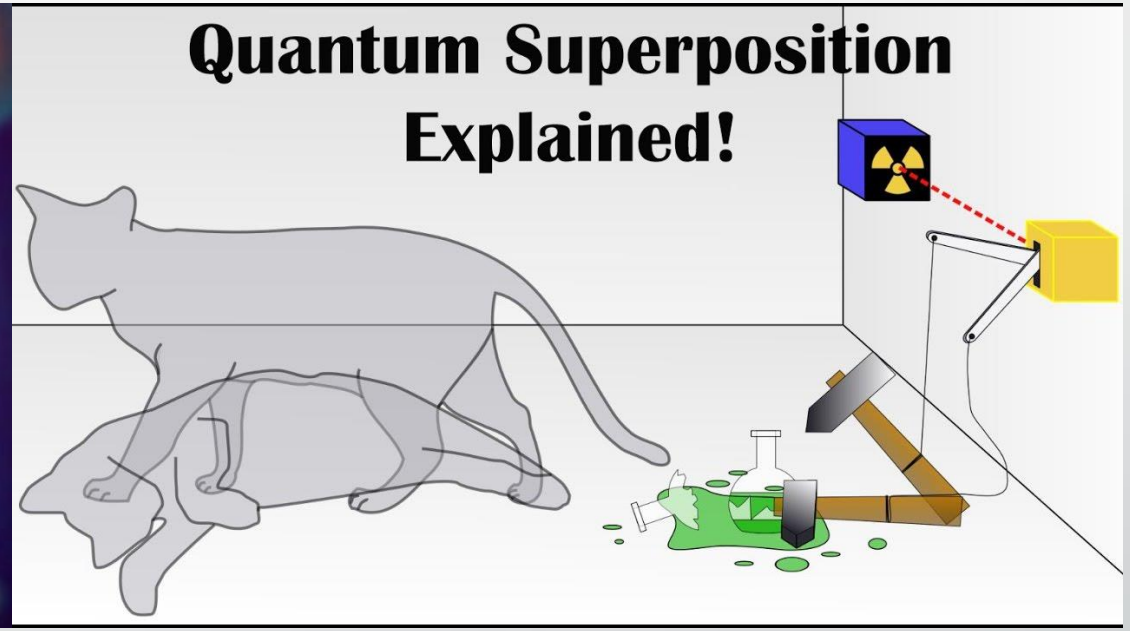
https://www.youtube.com/watch?v=MtLVCpZIiNs **Sherry Turkle Alone Together, 16.5 Min**

Essay #11: *Quantum Computing, Winfried Hensinger*

Questions:

Using terms like superposition and entanglement, write definitions of these concepts. Then write on how they can be used to create new ideas of everyday reality. For instance, are our ideas of linear time and cause and effect—do they hold up when interpreting through the lens of quantum mechanics?





https://www.youtube.com/watch?v=ZuvK-od647c **Quantum entanglement**

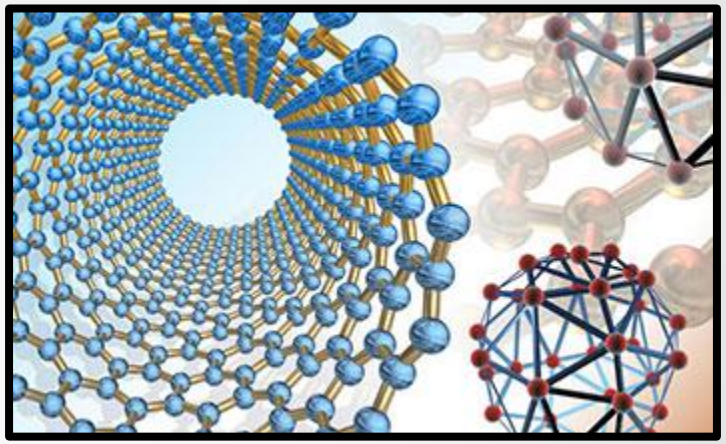
https://www.youtube.com/watch?v=8gVzipiwFIU **Quantum theory/entanglement**

https://www.youtube.com/watch?v=YB4uqpQd2AQ **Superposition in real life**

https://www.youtube.com/watch?v=g_IaVepNDT4 **quantum computing**

Essay #12: *Smart Materials, Anna Ploszajski*

Questions: Ploszajsli writes on p. 148: "Planed obsolescence—when manufacturers deliberately limit the lifespans of their products to encourage repeat purchase—together with impenetrably unfixable goods are contributing to an increasingly consumerist and throwaway culture." Imagine a culture where nothing gets old and doesn't need to be replaced or repaired or thrown away. What would this economy look like? Who would benefit?



Nanomaterials are chemical substances or materials that are manufactured and used at a very small scale. **Nanomaterials** are developed to exhibit novel characteristics compared to the same material without nanoscale features, such as increased strength, chemical reactivity or conductivity.

https://www.nano.gov/node/1691 - **Nanotech and clean water**

https://www.youtube.com/watch?v=Qe-E076p8Ls **nano-coated materials**

https://www.youtube.com/watch?v=ZGGDKC3GIrI **nanobots in medicine**

https://www.youtube.com/watch?v=rIXbiAsG7ik **nanobots to kill cancer tumors**

https://www.youtube.com/watch?v=z-JcXzQVnro **nanobots in medicine**

https://www.youtube.com/watch?v=HqW_g9EIBDY **Real World: Self Healing Materials**

https://softroboticstoolkit.com/book/current-applications-self-healing-materials **Self healing materials in application**

Essay #12: *Smart Materials, Anna Ploszajski*

Questions: Ploszajsli writes on p 154: "If we start to rely on smart materials to automate our lives, do we risk becoming [too] dependent on them and losing our capacity to think critically or independently?" The idea of automation encroaching on our level of cognitive and motor skills is a real question. Consider these two statements by Nicholas Carr who has written extensively on automation:

- *Because automation alters how we act, how we learn, and what we know, it has an ethical dimension. The choices we make, about which tasks we hand off to machines, shapes our lives and the place we make for ourselves in the world.*

- *Many software programs take on intellectual work—observing, sensing, analyzing, and judging, even making decisions—that until recently were the preserve of humans. Rather than opening new frontiers of thought and actin, software (automation) ends up narrowing our focus. We trade subtle, specialized talents, for more routine, less distinctive ones.*

Can our lives become too automated? Can smart materials and artificial intelligence do everything for us? What will be left for humans to do? (Go to store of the future vid)

https://www.youtube.com/watch?v=2HkHrcksub0 **Nicholas Carr: Our Automated Lives, 20 min.**

https://www.youtube.com/watch?v=WSKi8HfcxEk **https://www.youtube.com/watch?v=WSKi8HfcxEk**

https://www.youtube.com/watch?v=59d3UZTUFQ0 **The Future of Work: Will Our Children Be Prepared?**

https://www.youtube.com/watch?v=8eP7nuZgNqU **Jobs of the future will be what robots can't do, Michio Kaku**

https://www.youtube.com/watch?v=TGg8_vNQzk4 **The Future of Tech and Commerce with Dr. Michio Kaku**

Essay #13: *Energy, Jeff Hardy*

Questions: One of the issues Hardy acknowledges is the enormous disruption that would occur to American life and the American economy if we were to quickly abandon our fossil fuel driven way of life and embraced more renewables. The clock, however is ticking and the level of greed in the fossil fuel industry, wanting desperately to hold onto the status quo while the majority of climate scientist warn us we have les than ten years to turn it around or face dire consequences—unprecedented droughts, floods, heat—is indisputable. What would a dramatic switch to more environmentally friendly energy sources look like?

https://www.cbsnews.com/news/these-dosen-states-could-move-to-100-percent-renewable-electricity/ **Dozen states Move to Renewables**

https://www.nationalgeographic.com/environment/energy/reference/renewable-energy/ **Switching to Renewable Energy**

Essay #14: *Transportation*, *John Miles*

Questions: Transportation technology, in the past century, has certainly had a profound impact on who we've become, what it means to be human. The world has become a much smaller place, and because of that, we are able to take advantage of socio-economic and cultural growth. The next big thing in transportation seems to be self-riving cars. Suppose self-driving electric cars became the norm. How would they change us? How would they change our economy?

p.174: "A few simple calculations, however, suggest that autonomous vehicles could largely improve the situation though more disciplined lane control, tighter vehicle spacing, and fewer minor [and major?] accidents because of driver inattention."

Essay #14: *Transportation, John Miles*

https://www.youtube.com/watch?v=aNkKZuKbVKc **Self-driving cars**

https://www.youtube.com/watch?v=U5laBg-ERbQ **Self Driving cars & culture**

https://www.youtube.com/watch?v=mUEj6EnBzks **UBER AIR: The Future of Airborne Travel**

https://www.cnn.com/videos/business/2019/06/11/uber-air-taxi-cabin-design-orig.cnn-business **Uber Air CNN**

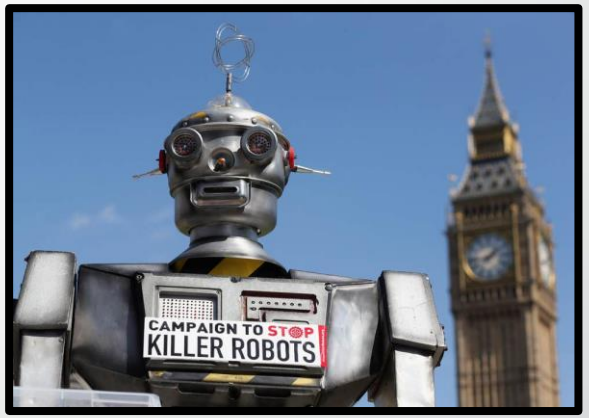
https://www.youtube.com/watch?v=phFij-01hBk **10 Most Unusual Vehicles**

https://www.youtube.com/watch?v=alwbrZ4knpg **Mag Lev trains**

p. 174: Miles writes: "The increasingly rapid development of autonomous vehicles is another area in which the disrupters are threatening the established order of the automotive industry. The appearance of Google, Apple, and Uber on the scene is creating a great deal of tension. Once again, whether or not these companies ultimately displace the established players is not really the issue: they have already created a huge change in the direction of the industry , and they will leave their imprint on the future because of it."

Essay #15: *Robotics, Noel Sharkey*

Questions: Sharkey writes on p. 178: "There are many possible futures for our relationship with robots. Some are greatly beneficial to humanity, while others could lead to dystopia. There is no way to tell which of these futures will happen." Write an essay that describes and analyzes both a utopian future with robots and a dystopian future. Address how humankind may prevent a dystopia from occurring. How will this affect our future relationship with technology? Do you think about the negative consequences of how you use technology now? Why or why not?



https://www.youtube.com/watch?v=H15uuDMqDK0 **Elon Musk on Artificial Intelligence**

https://www.youtube.com/watch?v=8nt3edWLgIg **Sam Harris, Can we Control Future AI - TED**

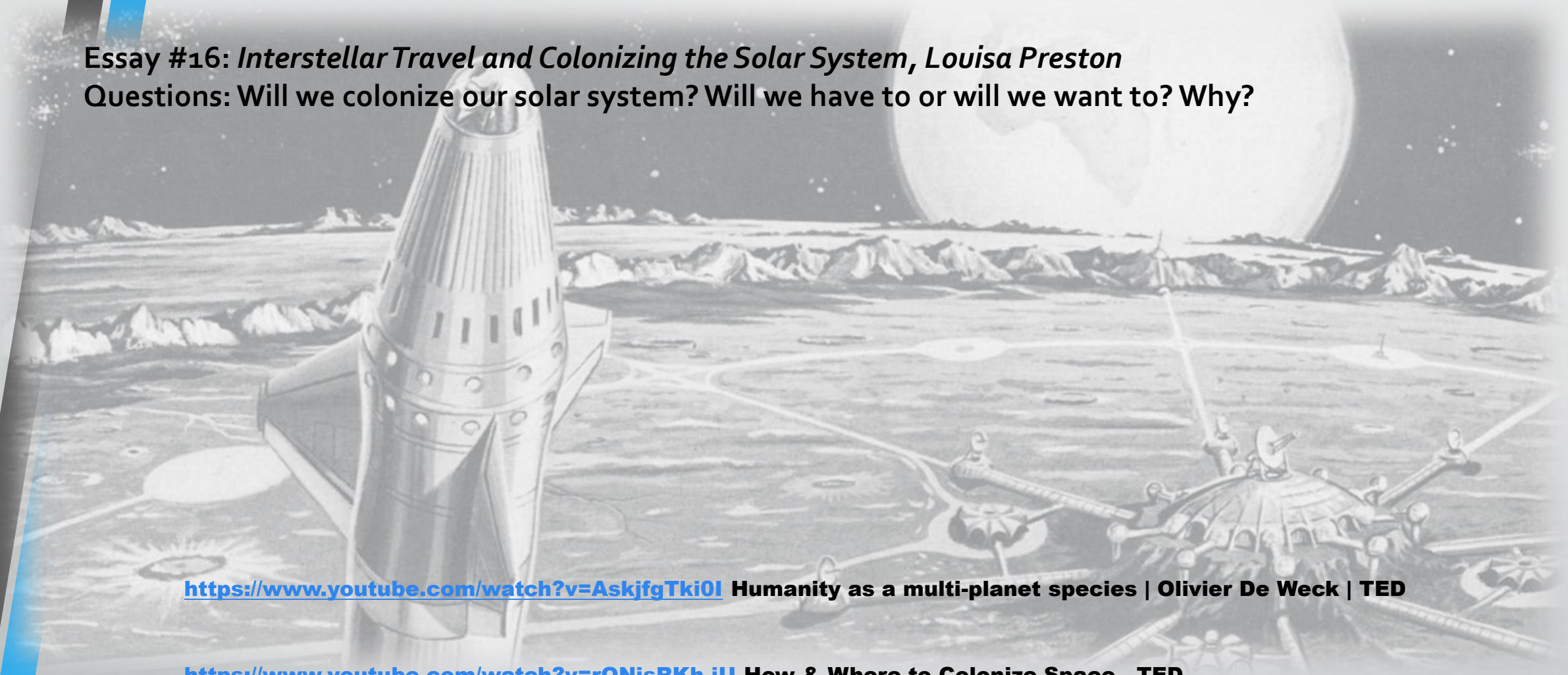
https://www.youtube.com/watch?v=MgwS0VN0NiM **History of Utopian Thinking - TED**

https://www.youtube.com/watch?v=XAgXwUwQoPA **Autonomous weapon drones**

https://www.youtube.com/watch?v=DIZ2P7gx79s **Utopian or Dystopian Future with AI**

https://www.weforum.org/agenda/2019/09/how-dystopian-films-could-protect-us-from-future-innovations-gone-wrong/ **Slaughterbots**

Essay #16: *Interstellar Travel and Colonizing the Solar System*, *Louisa Preston*
Questions: Will we colonize our solar system? Will we have to or will we want to? Why?



https://www.youtube.com/watch?v=AskjfgTki0I **Humanity as a multi-planet species | Olivier De Weck | TED**

https://www.youtube.com/watch?v=rQNisRKh-iU **How & Where to Colonize Space - TED**

Essay #17: *Apocalypse, Lewis Dartnell*

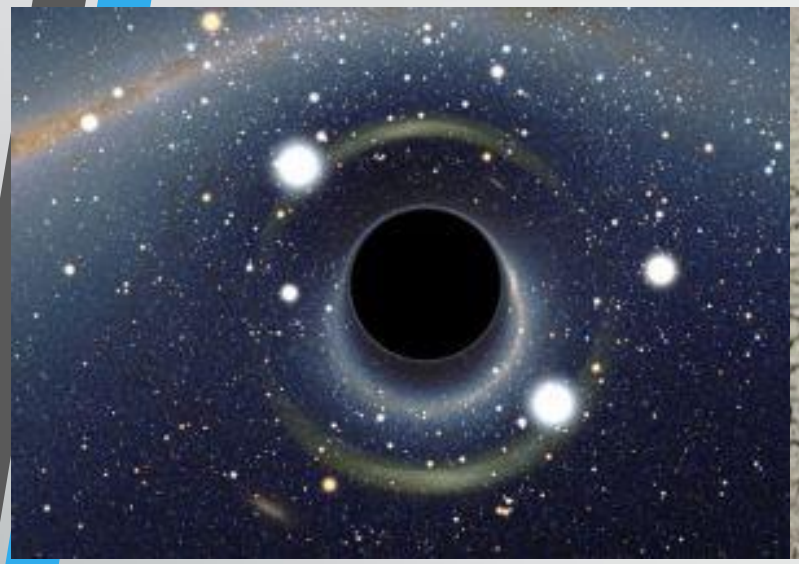
Questions: Datnell questions the optimistic, in some cases utopian, perspective taken with some of the essays in this book, that technology can lead us to a better future. But, most great civilizations of the past have collapsed. Why would we expect ours to be different? "What if the future doesn't arrive as scheduled?" he asks. This essay focuses on how whoever survives can pick up the pieces and reboot civilization. It's a daunting scenario, one most of us do not want to think about. Either the world will end at the hands of humandkind—nuclear war, climate change—or from natural disaster and, if there's enoughtime, humankind will need to come up with a fast technical solution to save us.

https://www.youtube.com/watch?v=ufFjdZ3CqA0 **How the World Ends, Science**

https://www.youtube.com/watch?v=yaTePHW6MGg **Top 10 Ways the World Might End (in the Next 100 Years**

Essay #17: *Apocalypse*, *Lewis Dartnell*

Questions: (Show film *The Road*): This film takes a realistic view of what might happen if the world comes to an abrupt, sudden end. For this essay response, write on how you think the world might end and what, if anything, can be done to prevent it.



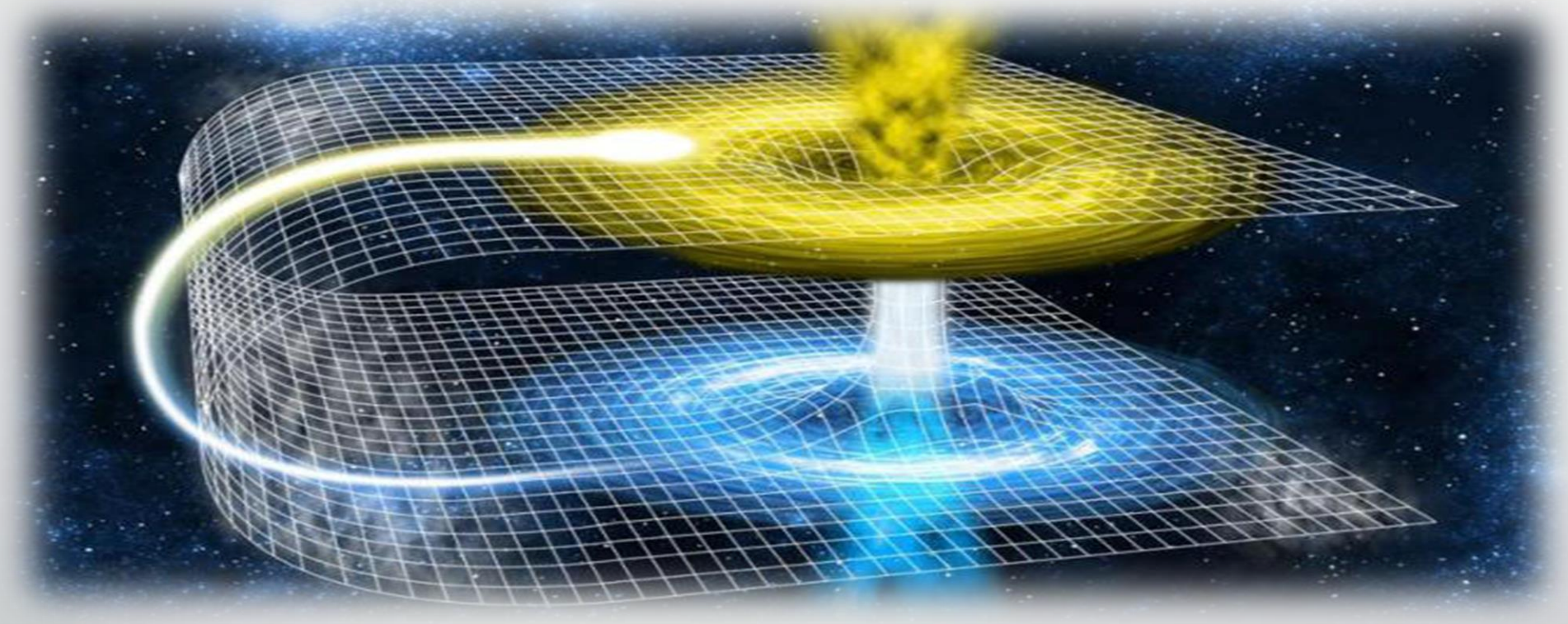
This is the way the **world ends** This is the way the **world ends** This is the way the **world ends** Not with a **bang** but a **whimper**.

--TS Elliot from *The Hollow Men*

This is how culture changes, but the literal world, could end catastrophically and quickly

Essay #18: *Teleportation and Time Travel, Jim Al-Khalili*

Questions: Use your imagination. If you could travel through time, where would you go, when would it be, and why?



https://www.youtube.com/watch?v=GEFB4s4NrPw **Is Time Travel Possible**

http://thescienceexplorer.com/universe/time-real **Nat Geo Is Time Real?**

https://www.youtube.com/watch?v=BEuNa1Vp_b0 **Time and the brain: the illusion of now | Hinze Hogendoorn | TEDxUtrechtUniversity**

https://www.youtube.com/watch?v=SafwXdP7ylc **Nat Geo Time Travel**

Question, Final (From the introduction)

Al-Khalili, in his introduction, points out several ways to look at the future. "According to Einstein's theory of relativity, the future is out there waiting for us—all times, past, present, and future preexisting and permanent in a static four-dimensional space time." And then he goes on to say, "On a metaphysical level, whether our future is predestined or open, whether our fate is sealed in a deterministic universe or whether we have the freedom to shape it as we wish, is still a matter of debate among scientists and philosophers." One thing is certain, at no other time in the history of humanity does the introduction of new technologies—"whether AI, robotics, genetics, geoengineering, or nano-technology"—challenge the question, "What does it mean to be human?" Using three areas of technology described above, write an essay on how these technologies, if they are fully implemented or assimilated by human beings and become part of our culture, will change how we think about how we respond to the "What does it mean to be human?" question. Determine what characteristics of humanness will be threatened and which will be augmented, which will end up dominating and how, and finally, how we should approach and use each of these three technologies your are writing about.