MVE420:
Nya teknologier, global risk och mänsklighetens framtid

http://www.math.chalmers.se/Math/Grundutb/CTH/mve420/1415/

Introduktionsföreläsning, 24 mars 2015

Olle Häggström

Denna kurs kommer att utmärkas av en vilja att diskutera framtida teknologier långt bortom det ganska korta perspektiv där vi vet med bestämdhet vad som går att göra och vad som är att vänta.

Vi behöver därför tillåta oss en hel del spekulation. Men vi bör försöka spekulera med gott omdöme, vilket bl.a. innebär:

(a) en välavvägd grad av ödmjukhet, och en förmåga att skilja mellan spekulation och prediktion,

(b) en vilja att genom studium av argument för och emot olika spekulativa scenarier kunna nyansera, och skilja de välgrundade från de ogrundade, samt de rimliga från de orimliga.

En ambition är att kunna ta ställning till radikala teknikoptimistiska idéer som t.ex. de som uttrycks i citaten på de följande fyra bilderna.

The first ultraintelligent machine is the last invention that man need ever make. **(Jack Good, 1965)**

We have the means right now to live long enough to live forever. Existing knowledge can be aggressively applied to dramatically slow down aging processes so we can still be in vital health when the more radical life extending therapies from biotechnology and nanotechnology become available. But most baby boomers won't make it because they are unaware of the accelerating aging process in their bodies and the opportunity to intervene. **(Ray Kurzweil, 2005)**

Imagine what the world might be like if we were *really* good at making things – better things – cleanly, inexpensively, and on a global scale. What if ultra-efficient solar arrays cost no more to make than cardboard and aluminum foil and laptop computers cost about the same? Now add ultra-efficient vehicles, lighting, and the entire behind-the-scenes infrastructure of an industrial civilization, all made at low cost and delivered and operated with a zero carbon footprint.

If we were *that* good at making things, the global prospect would be, not scarcity, but unprecedented abundance – radical, transformative, and sustainable abundance. We would be able to produce radically more of what people want and at a radically lower cost – in every sense of the word, both economic and environmental. **(Eric Drexler, 2013)**

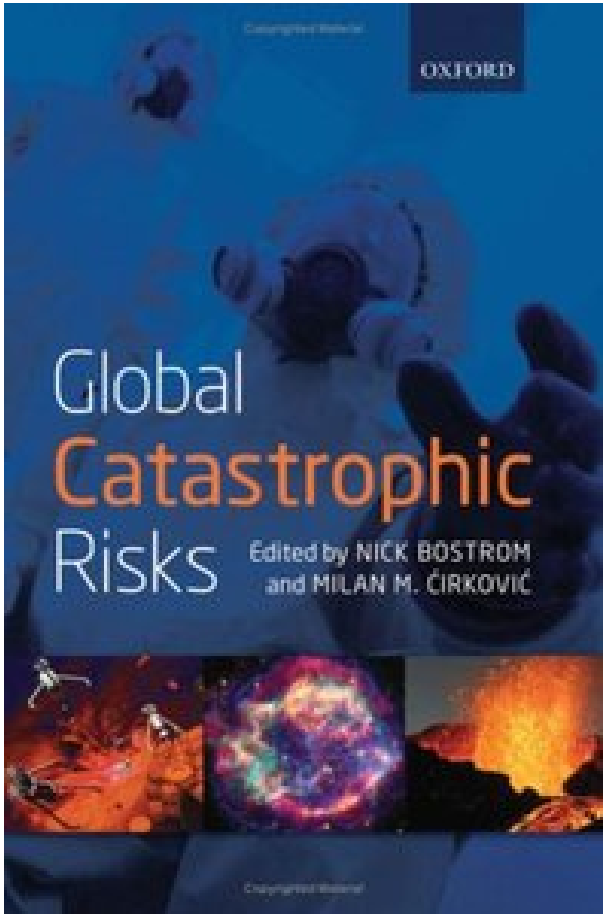
I see a bright future for the biotechnology industry when it follows the path of the computer industry, [...] becoming small and domesticated rather than big and centralized. [...]

Domesticated biotechnology, once it gets into the hands of housewives and children, will give us an explosion of diversity of new living creatures, rather than the monoculture crops that the big corporations prefer. New lineages will proliferate to replace those that monoculture farming and deforestation have destroyed. Designing genomes will be a personal thing, a new art form as creative as painting or sculpture.

Few of the new creations will be masterpieces, but a great many will bring joy to their creators and variety to our fauna and flora. The final step in the domestication of biotechnology will be biotech games, designed like computer games for children down to kindergarten age but played with real eggs and seeds rather than with images on a screen. Playing such games, kids will acquire an intimate feeling for the organisms that they are growing. The winner could be the kid whose seed grows the prickliest cactus, or the kid whose egg hatches the cutest dinosaur. **(Freeman Dyson, 2007)**

Jämte dessa entusiastiska visioner finns också ett antal undergångsscenarier. Kärnvapenkrig och kilmatkatastrof är de två mest kända exemplen, men det finns fler som vi kan ha anledning att beakta och försöka undvika.

En förutsättning för att klara denna kurs är nog att kunna resonera kring sådana scenarier utan att övermannas av dysterhet...


OXFORD
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Risks
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MARTIN REES
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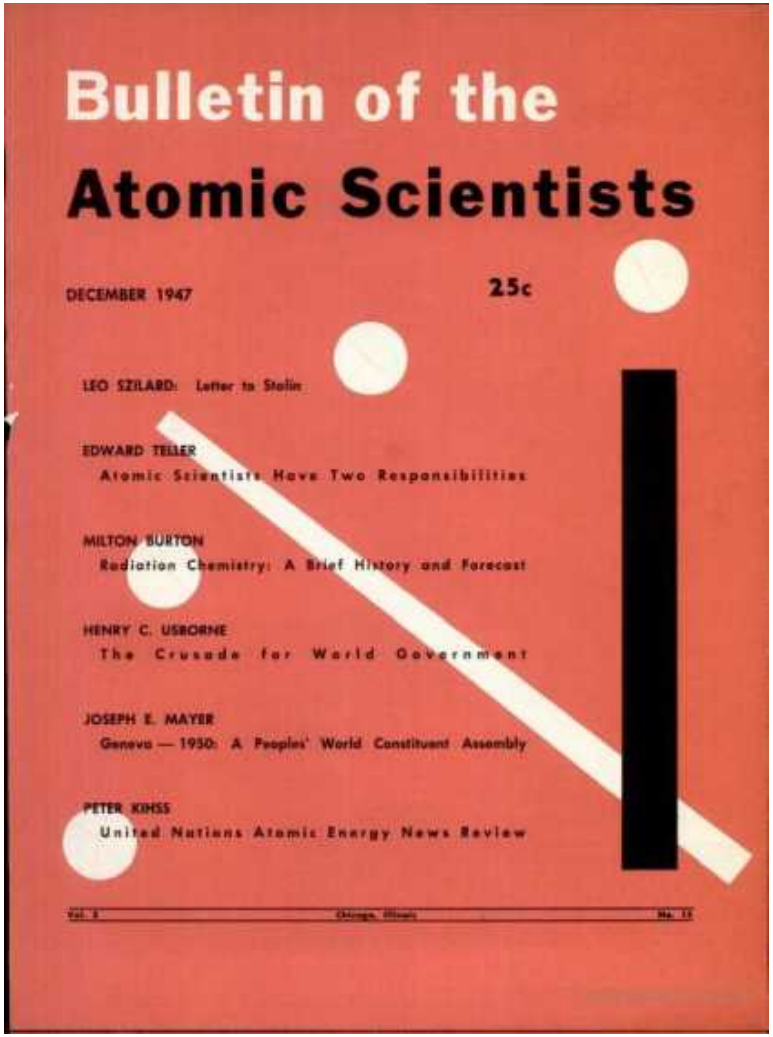
WILL THE HUMAN RACE SURVIVE THE TWENTY-FIRST CENTURY?
'One of the most provocative and unsettling books I have read for many years' — J G Ballard in the Daily Telegraph

- Nick Beckstead (2013) *On the Overwhelming Importance of Shaping the Far Future*, Ph.D. thesis, Department of Philosophy, Rutgers University.
- Nick Bostrom (2013) Existential risk prevention as a global priority, *Global Policy* **4**, 15–31.

Kärnvapen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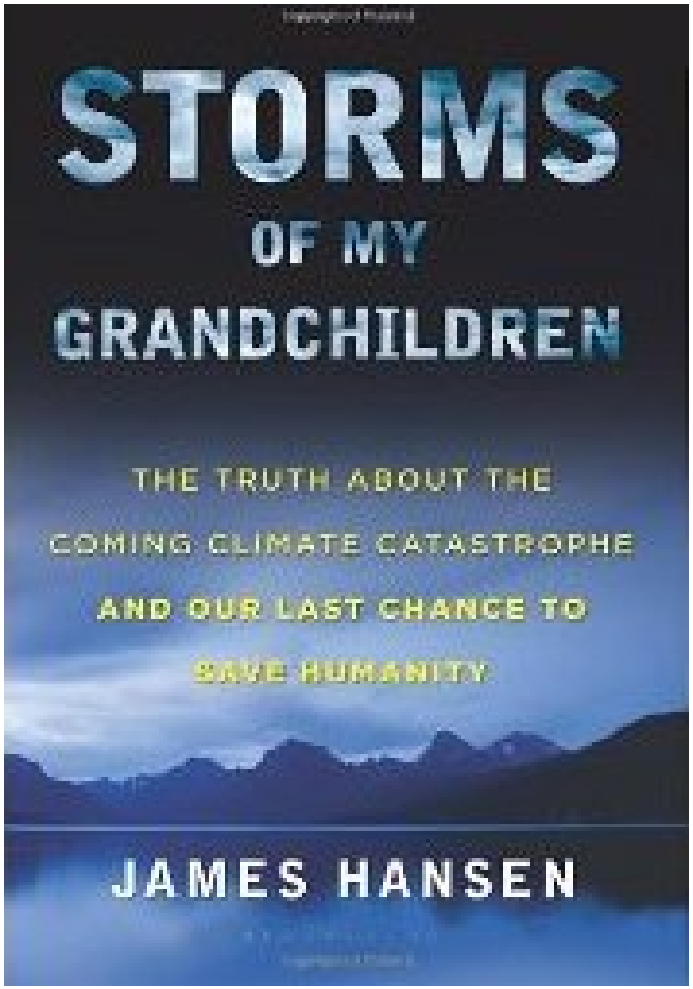
PETER KIHSS
United Nations Atomic Energy News Review

Klimatförändringar


STORMS
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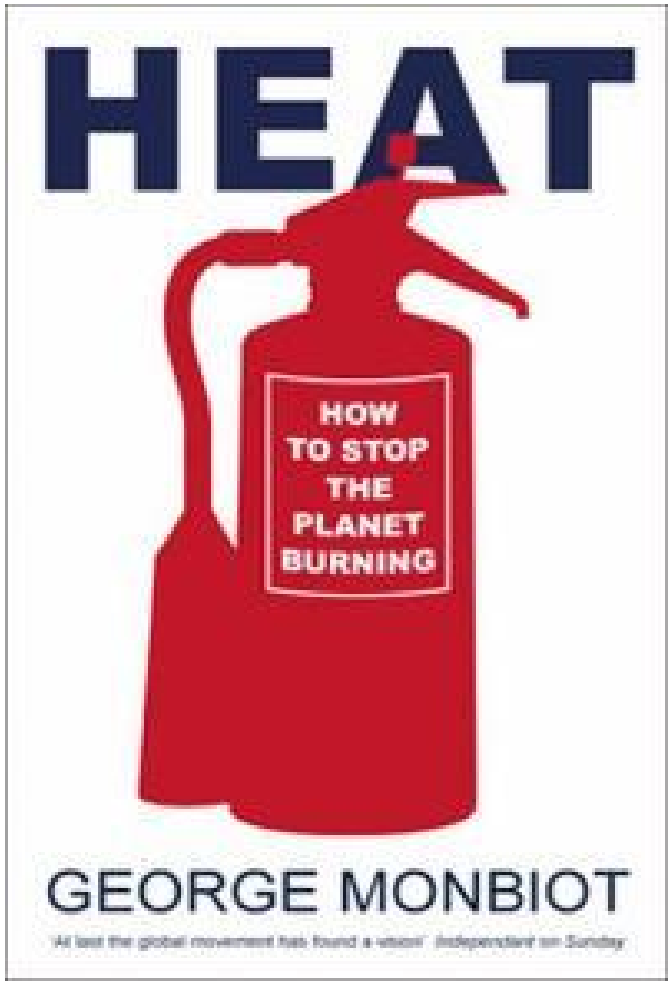
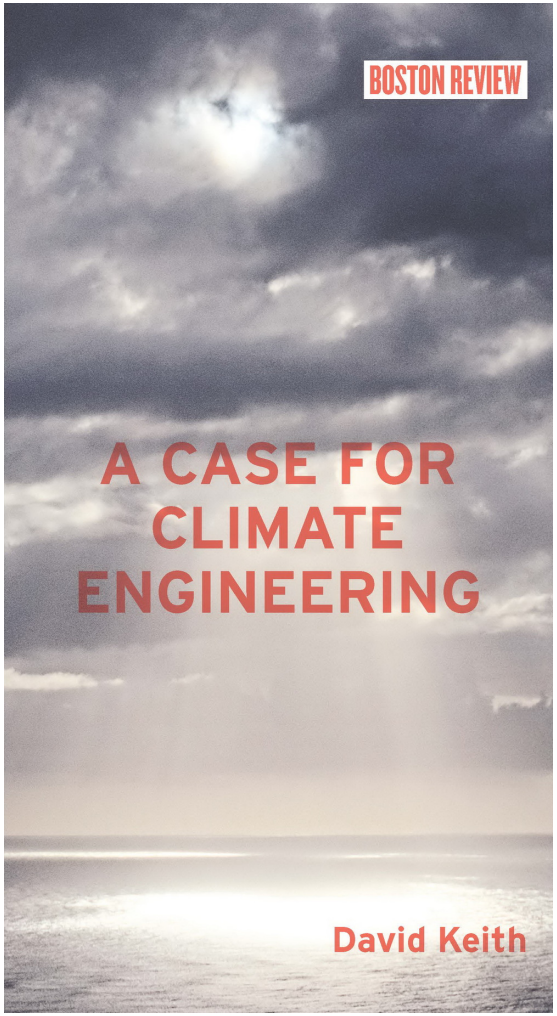
THE TRUTH ABOUT THE
COMING CLIMATE CATASTROPHE
AND OUR LAST CHANCE TO
SAVE HUMANITY
JAMES HANSEN


HEAT
HOW TO STOP THE PLANET BURNING
GEORGE MONBIOT
'At last the global movement has found a vision' Independent on Sunday


MAKTEN ÖVER KLIMATET
CHRISTIAN AZAR
»...'Makten över klimatet' är den bästa klimatboken hittills...«
»Skall ni läsa en enda bok om klimatfrågan i år, så vet ni nu vilken.«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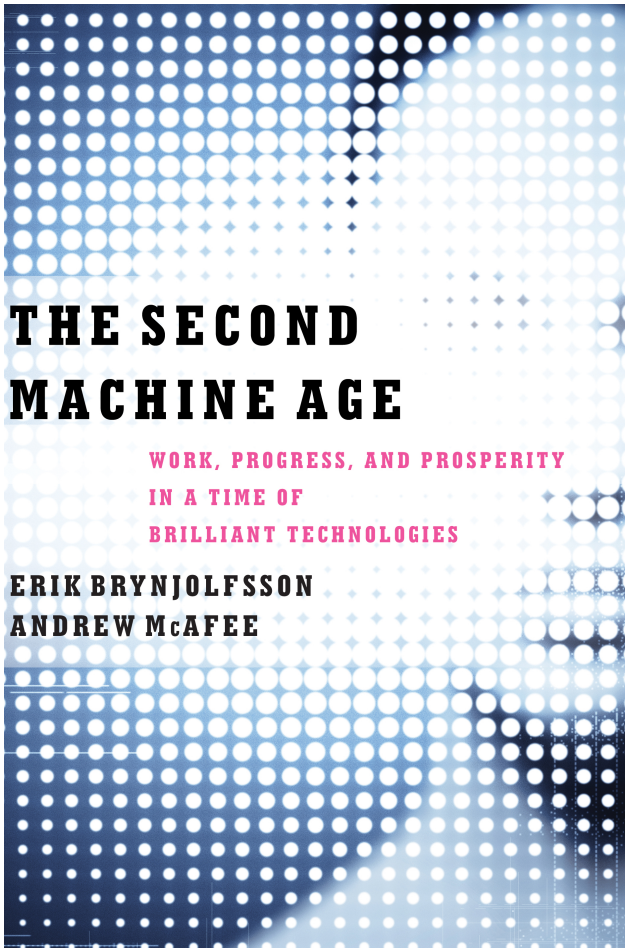
A CASE FOR CLIMATE ENGINEERING
David Keith

Robotisering och arbetsmarknad


THE SECOND
MACHINE AGE
WORK, PROGRESS, AND PROSPERITY
IN A TIME OF
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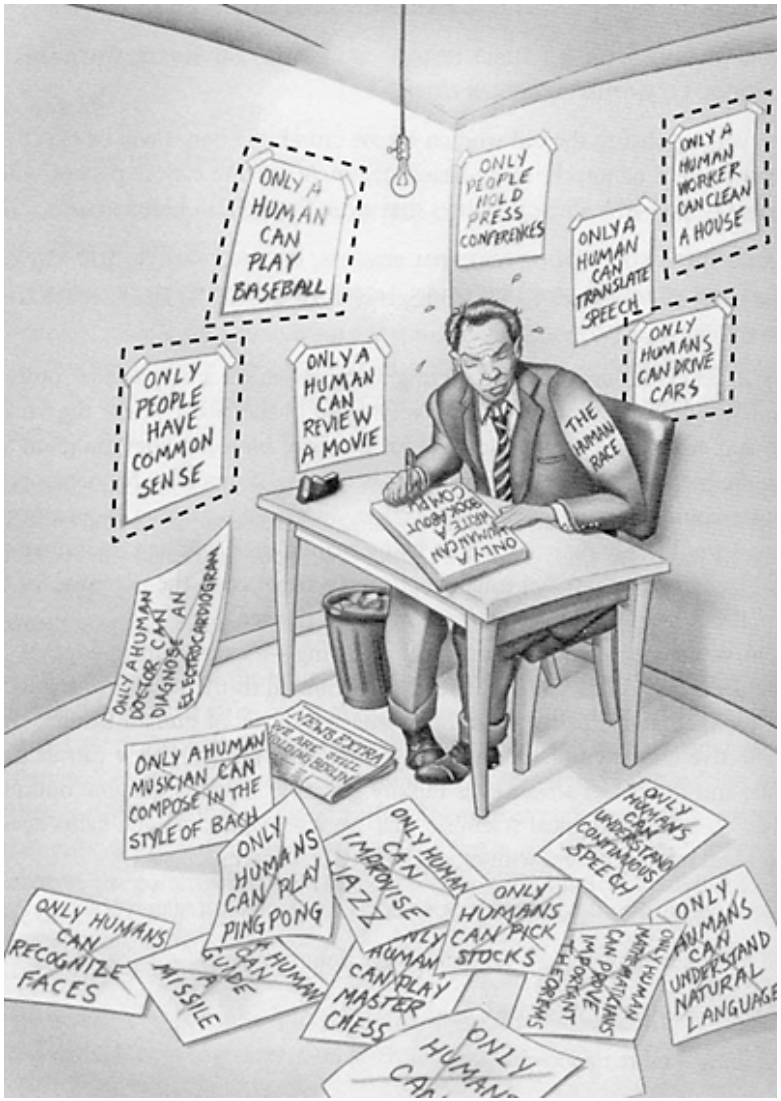
ERIK BRYNJOLFSSON
ANDREW McAFEE

- Carl Benedikt Frey and Michael Osborne (2013) The future of employment: How susceptible are jobs to computerization?, preprint, Oxford University.
- Stefan Fölster (2014) Vartannat jobb automatiseras inom 20 år – utmaningar för Sverige, Stiftelsen för Strategisk Forskning.

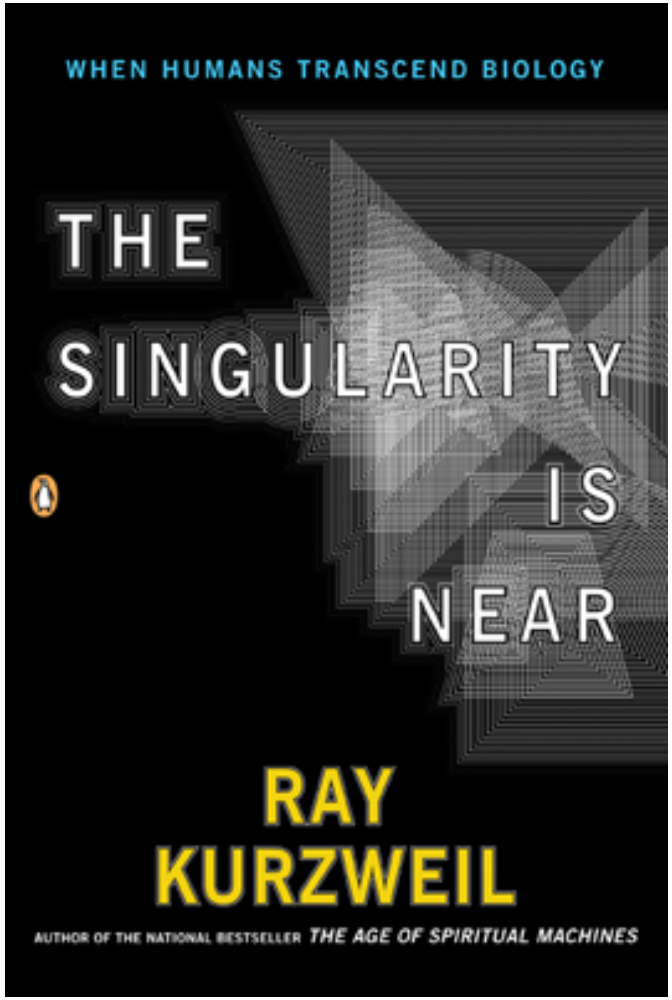
Mer radikala robotscenarier, artificiell intelligens


ONLY A HUMAN CAN PLAY BASEBALL
ONLY PEOPLE HOLD PRESS CONFERENCES
ONLY A HUMAN WORKER CAN CLEAN A HOUSE
ONLY A HUMAN CAN TRANSLATE SPEECH
ONLY PEOPLE HAVE COMMON SENSE
ONLY A HUMAN CAN REVIEW A MOVIE
ONLY HUMANS CAN DRIVE CARS
THE HUMAN RACE
ONLY A HUMAN CAN WRITE A BOOK ABOUT COMPUTERS
ONLY A HUMAN DOCTOR CAN DIAGNOSE AN ELECTROCARDIOGRAM
NEWS EXTRA
ONLY A HUMAN MUSICIAN CAN COMPOSE IN THE STYLE OF BACH
ONLY HUMANS CAN PLAY PING PONG
ONLY HUMANS CAN IMPROVISE JAZZ
ONLY HUMANS CAN UNDERSTAND CONTINUOUS SPEECH
ONLY HUMANS CAN RECOGNIZE FACES
A HUMAN CAN GUIDE A MISSILE
A HUMAN CAN PLAY MASTER CHESS
ONLY HUMANS CAN PICK STOCKS
ONLY HUMANS CAN UNDERSTAND NATURAL LANGUAGE

My contention is that machines can be constructed which will simulate the behaviour of the human mind very closely. [...] It seems probable that once the machine thinking method had started, it would not take long to outstrip our feeble powers. There would be no question of the machines dying, and they would be able to converse with each other to sharpen their wits. At some stage therefore we should have to expect the machines to take control. **(Alan Turing, 1951)**

Let an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines; there would then unquestionably be an intelligence explosion, and the intelligence of man would be left far behind. Thus the first ultraintelligent machine is the last invention that man need ever make. **(Jack Good, 1965)**

In contrast with our intellect, computers double their performance every 18 months, so the danger is real that they could develop intelligence and take over the world. [...] We should follow [the path of genetic engineering] if we want biological systems to remain superior to electronic ones. **(Stephen Hawking, 2001)**


WHEN HUMANS TRANSCEND BIOLOGY
THE SINGULARITY IS NEAR
RAY KURZWEIL
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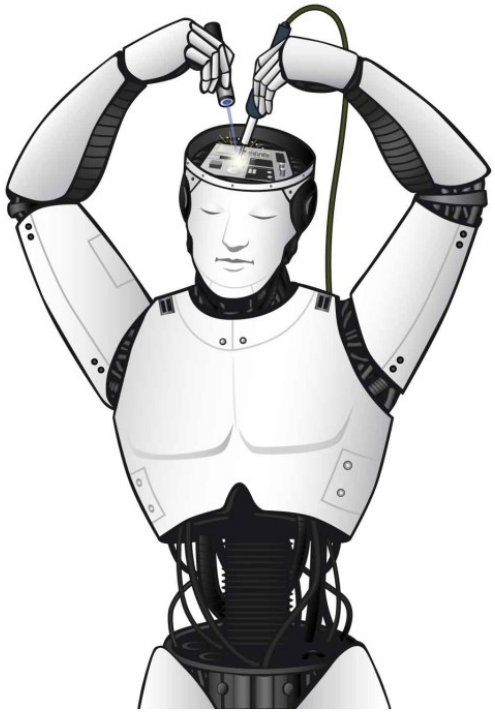
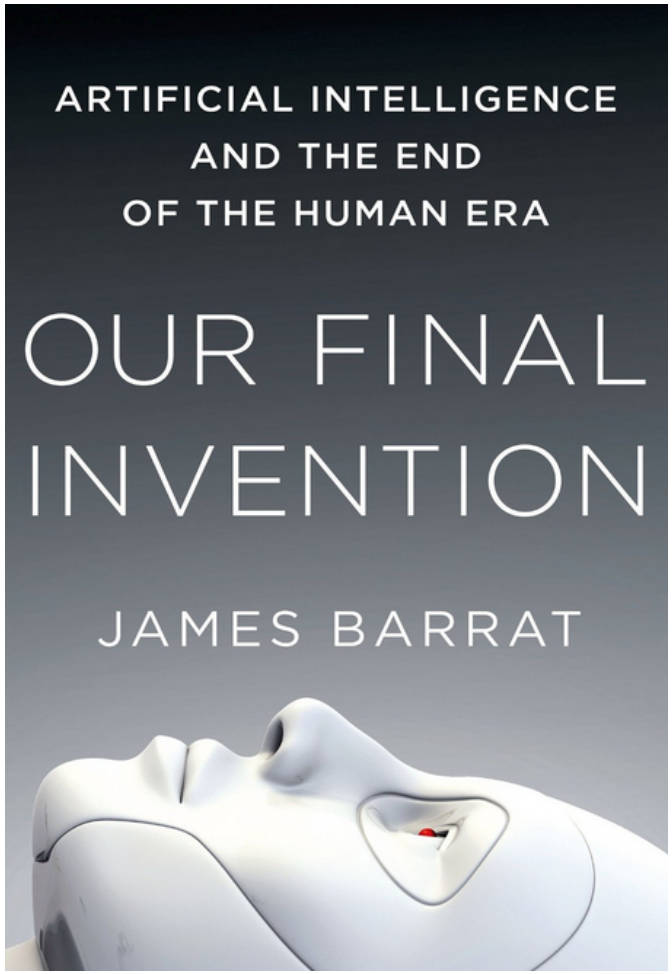
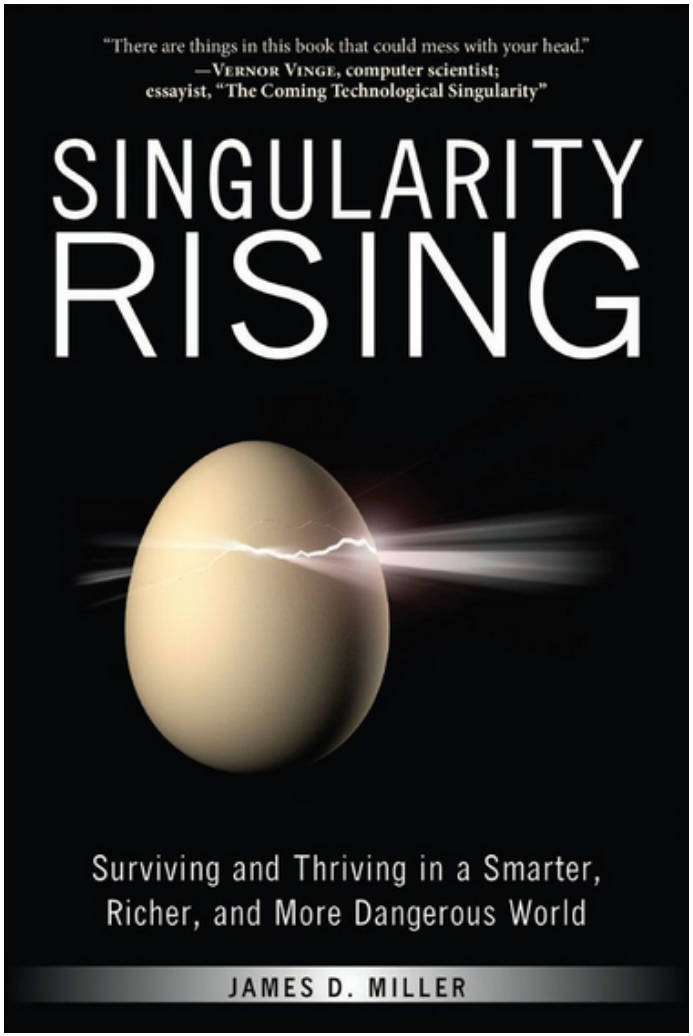
THE HANSON-YUDKOWSKY AI-FOOM DEBATE

ROBIN HANSON AND ELIEZER YUDKOWSKY




ARTIFICIAL INTELLIGENCE
AND THE END
OF THE HUMAN ERA
OUR FINAL
INVENTION
JAMES BARRAT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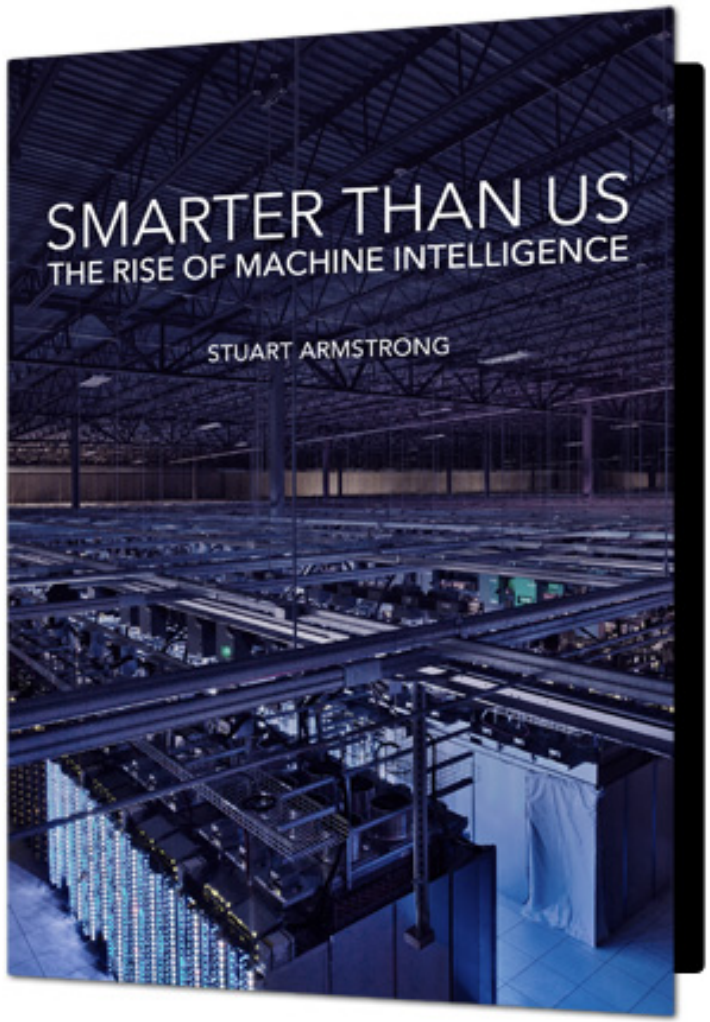
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THE RISE OF MACHINE INTELLIGENCE
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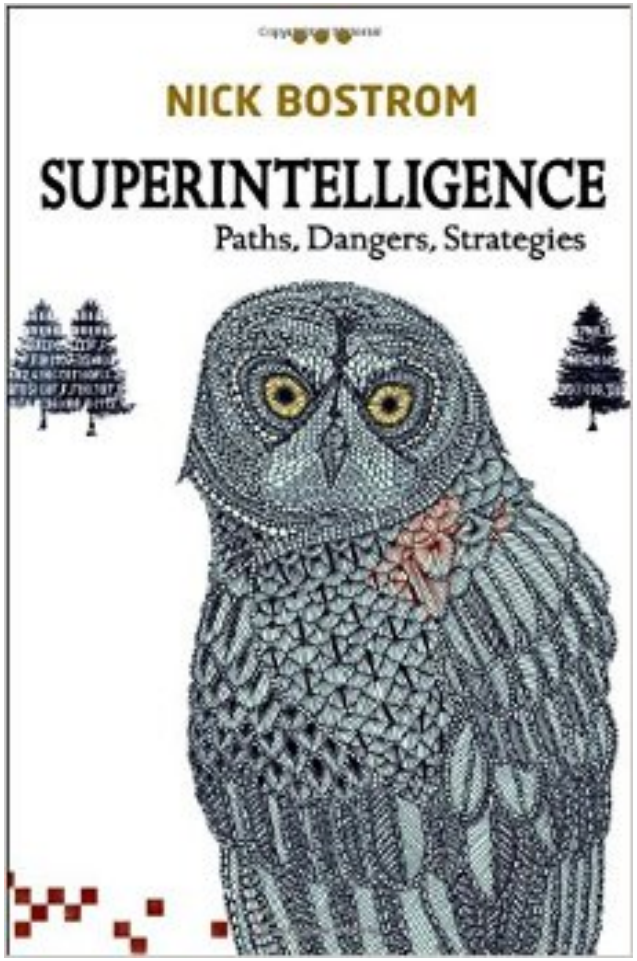
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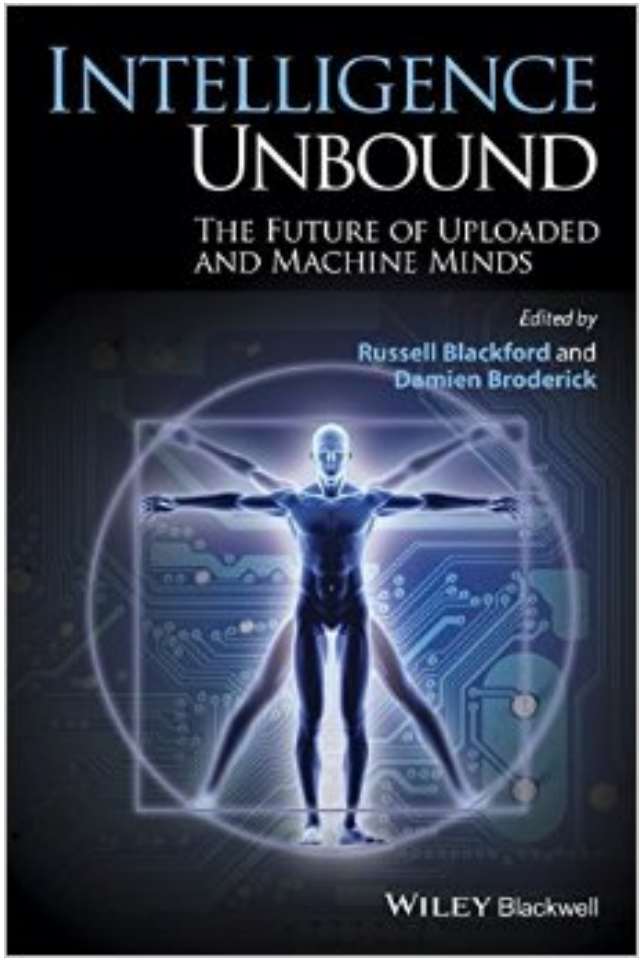
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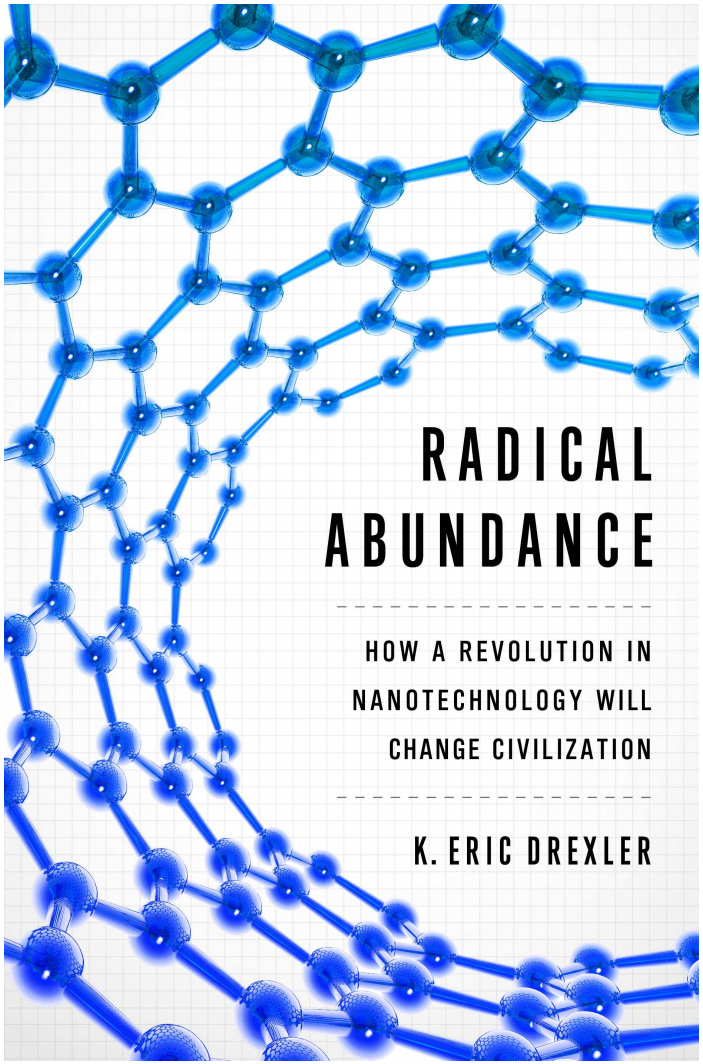
- Eliezer Yudkowsky (2013) Intelligence explosion microeconomics, Machine Intelligence Research Institute, Berkeley.
- Kaj Sotala och Roman Yampolskiy (2015) Responses to catastrophic AGI risk: a survey, *Physica Scripta* **90**, 018001.

Radikal nanoteknologi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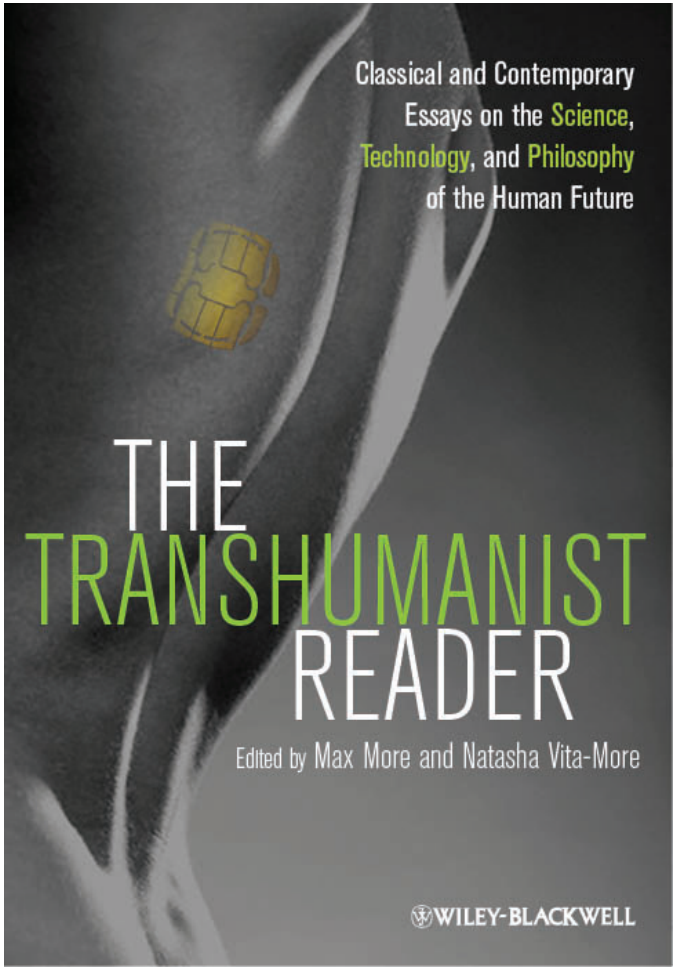
Rymdkolonisering

- Tom Murphy (2011) Stranded resources, *Do the Math*, October 25.
- Stuart Armstrong and Anders Sandberg (2013) Eternity in six hours: Intergalactic spreading of intelligent life and sharpening the Fermi paradox, *Acta Astronautica* **89**, 1–13.
- Nick Beckstead (2014) Will we eventually be able to colonize other stars? Notes from a preliminary review, Oxford University.

Modifiering av den mänskliga naturen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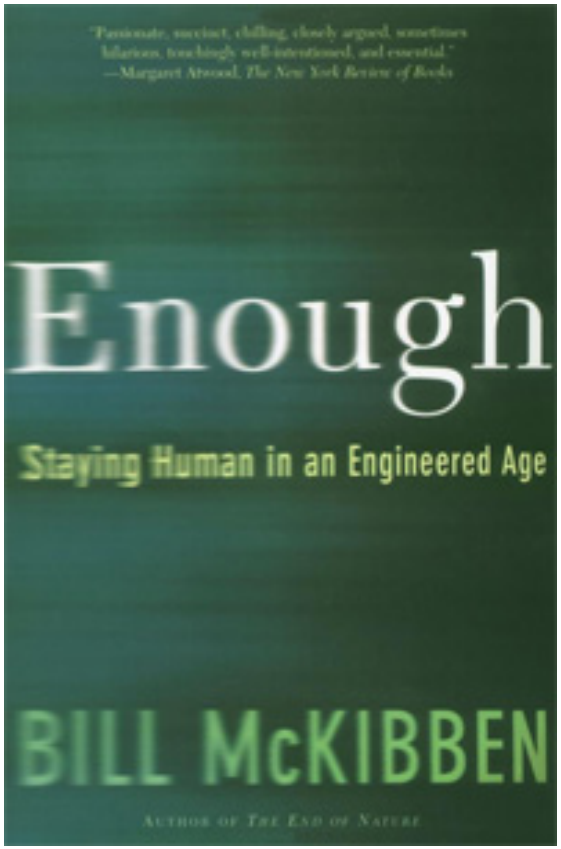
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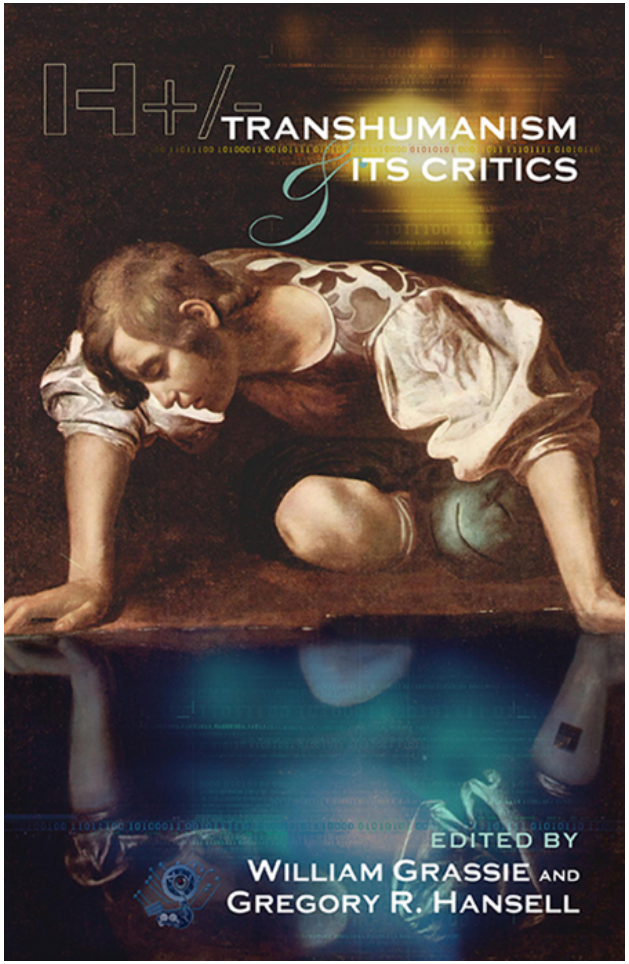
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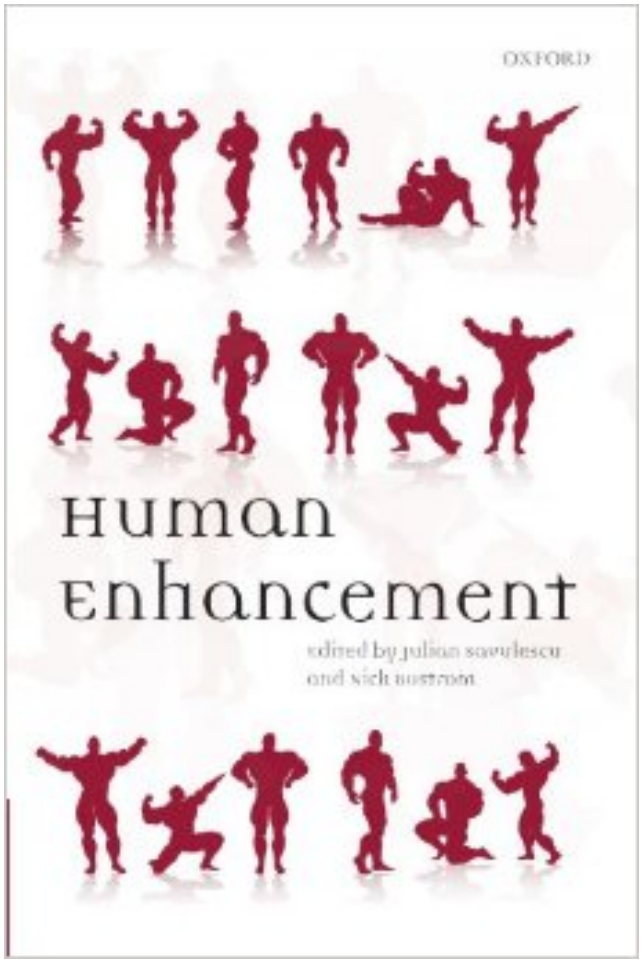
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