Environmental Health: Past and Present With a Little Future

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~60 Years Ago (1960):
The Vision of the Future
In 1969, astronauts landed on the Moon. The onboard computer had 2K of RAM.

Operated at 0.043 MHz; your cell phone is at least 1200 MHz
Individuals Impacting Science: Good and Bad

Legacy of Lead in Gasoline

Frigidaire owned by General Motors with the Dupont connection
John Houbolt: 1919-2014
The Tipping Point in the U.S., but.....
Into the Present:
Analog to Digital Revolution

Binary logic: 0 and 1

Artificial Intelligence (AI), Machine Learning and Technology

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<td>$2^{32} = \sim 4,294,967,296$</td>
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Artificial Intelligence (AI), Machine Learning and Technology

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<td>$2^{128} = \sim 340,282,366,920,938,463,463,374,607,431,768,211,456$</td>
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From rust belt to robot belt: Turning AI into jobs in the US heartland

Artificial intelligence is offering an amazing opportunity to increase prosperity. But whether or not we will seize it is our choice.

by David Rotman    June 18, 2018

-50% of current work activities in the US are technically automatable by adopting existing technologies

6 of 10 current occupations have more than 30% of activities that are technically automatable

+1 robot = -6 jobs

Half of millennials could be competing with robots for jobs

By Danielle Paquette  May 1


CSAIL robot disinfects Greater Boston Food Bank

Using UV-C light, the system can disinfect a warehouse floor in half an hour — and could one day be employed in grocery stores, schools, and other spaces.

Rachel Gordon | MIT CSAIL
June 29, 2020

Watch Video

© 2020 Johns Hopkins University
1920

1940

Isaac Asimov’s

Three Laws of Robotics

1) A robot may not injure a human being, or, through inaction, allow a human being to come to harm.

2) A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

3) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Gort,
Klaatu barada nikto
Heavy Manufacturing to Digital Manufacturing

1950s

2050s

$1000 prize for making a 1/64 inch motor (400,000 nanometers)
$1000 prize for making a 1/64 inch motor (400,000 nanometers)

Challenge set in December 1959, paid off in November 1960
First 3D-printed pill approved by US authorities

In a world first, the US Food and Drug Administration has given the go-ahead for a 3D-printed pill to be produced.

The Biology Century and Convergence

Biology Century
When you hear hoof beats....

- you don’t think zebras.
- Bayesian logic
- But...
- Sometimes it is a zebra.

The environment affects health in both obvious and subtle ways and this course was designed to sensitize you to these principles.

The Future:
Building Solution Teams
There is No \( \text{\textbf{E}} \) in Team, Can I Survive?
Principles

• Trust
  – Open discussions of expectations at the beginning
  – Many mid-course corrections needed

• Every team member looking out for each other
  – Internal mentoring

• Everyone is committed to the principle that the whole is greater than the sum of the parts

• Share the successes and the failures