EXISTENTIAL RISKS OF AI

Leilani H Gilpin (MIT), Matias Aranguiz (SJTU)
OUTLINE

• Current Events
• Autonomous weapons
• Synthetic biology
• Guest Lecture
UK SEEKS ETHICAL AI

• Prime minister Theresa May says, “she wants to lead the world in deciding how artificial intelligence can be deployed in a safe and ethical manner.” (BBC News).

• Creating a new advisory body
RAY KURZWEIL AT MIT

The Future of Intelligence, Artificial and Natural
WHAT IS SYNTHETIC BIO?

- Interdisciplinary: Biology + engineering
- Goal - build artificial biological systems for research, engineering, and medical applications.

Synthetic Biology Open Language (SBOL) for use with BioBricks Standard
A SCARY COMBINATION

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MILESTONES

• 1978 - Nobel Prize to Arber, Nathans and Smith for the discovery of restriction enzymes.

• 2000 - (2) articles in Nature - creation of synthetic biological circuit devices of a genetic toggle switch and biological clock by combining genes with E. coli cells
NECESSARY TECHNOLOGIES

• Standardized DNA parts
• DNA Synthesis
• DNA Sequencing
• Modular protein assembly
• Modeling
RESEARCH EXAMPLES

• Synthetic DNA
• Synthetic Transcription Factors
• Applications
  • Biological computers
  • Biosensors
  • Information storage
• Synthetic life

Top7 protein that was designed for a fold that had never been seen in nature. (Image courtesy - Nature)
BIGGEST PROBLEM

Control ice cream at -40C before thermal cycling

Ice cream +4% antifreeze proteins at -40C before thermal cycling

Control ice cream after seven cycles from -14 to -12C

Ice cream +4% antifreeze proteins after seven cycles from -14C to -12C
BIGGEST PROBLEM

• We’re not aware

• Better washing detergent

• Anti-freeze from fish blood in low-fat ice creams

• Adding large amounts of data

• Ethics and legality

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**The US Government Hopes $190 Million Will Make Gene Editing Mainstream**

Kristen V. Brown · Yesterday 2:15pm

The first U.S. trial using CRISPR to treat disease in people is imminent, a significant step in testing the true power...

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**Chinese Scientists Have Successfully Cloned Monkeys for the First Time**

Kristen V. Brown · Yesterday 12:57pm

In a major feat, Chinese scientists have cloned monkeys using the same technique that gave us Dolly the sheep more than...
ETHICAL INITIATIVES

• EU - SYNBIOSAFE

• US - Presidential Commission for the Study of Bioethical Issues

• Concerns - Control and access
ETHICAL PROBLEMS

- Biohacking
- Genetic engineering
- CRISPR
AUTONOMOUS WEAPONS (DRONES)
USA

• Congressional Authorizations for the Use of Military Force

• After 9/11

• “To use all necessary and appropriate force against those nations organizations, or persons he determines planed, authorized, committed, or aided the terrorist attacks that occurred on September 11, 2001, or harbored such organizations or persons.”
USA WAR ZONES
Iraq and Afghanistan

NO WAR ZONES
(But are using drones): Pakistan, Somalia, and Yemen

Last year - 161 strikes in Yemen and Somalia

Current Statistics
4,721
MINIMUM CONFIRMED STRIKES

7,275-10,586
TOTAL KILLED

737-1,551
CIVILIANS KILLED

242-330
CHILDREN KILLED

The figures above are running totals of US actions and resulting deaths since the Bureau began recording data.

Source - Bureau of Investigative Journalism.
MISSILE TECHNOLOGY CONTROL REGIME

• 1987

• Voluntary

• Drones that can carry weapons of mass destruction

• China and Israel
COUNTRIES WITH ARMED DRONES
ONGOING QUESTIONS

• With operator vs autonomous (AI)
• Ethics in wars - *jus ad bellum*
• Soldiers vs civilian (who die)
• Soldiers vs machines (who kill)
FACIAL RECOGNITION

• SGR-A1 Sentry Robot
  
  “In unsupervised mode, the SGR-A1 identifies and tracks intruders in the demilitarized zone, eventually firing at them without any further intervention by human operators”.
INTERNATIONAL CAMPAIGNS

- Stop Killer Robots
- Future of Life Institute
KILLER ROBOT PSA