

**COLDIRETTI**

**FORUM INTERNAZIONALE DELL'AGRICOLTURA E DELL'ALIMENTAZIONE**  
***INTERNATIONAL FORUM ON AGRICULTURE AND FOOD***

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**PRESENTAZIONE DI**  
**WENDELL WALLACH**



**The European House**  

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**Ambrosetti**

# AI, Food and Agriculture



Wendell Wallach  
Rome  
November 23, 2024

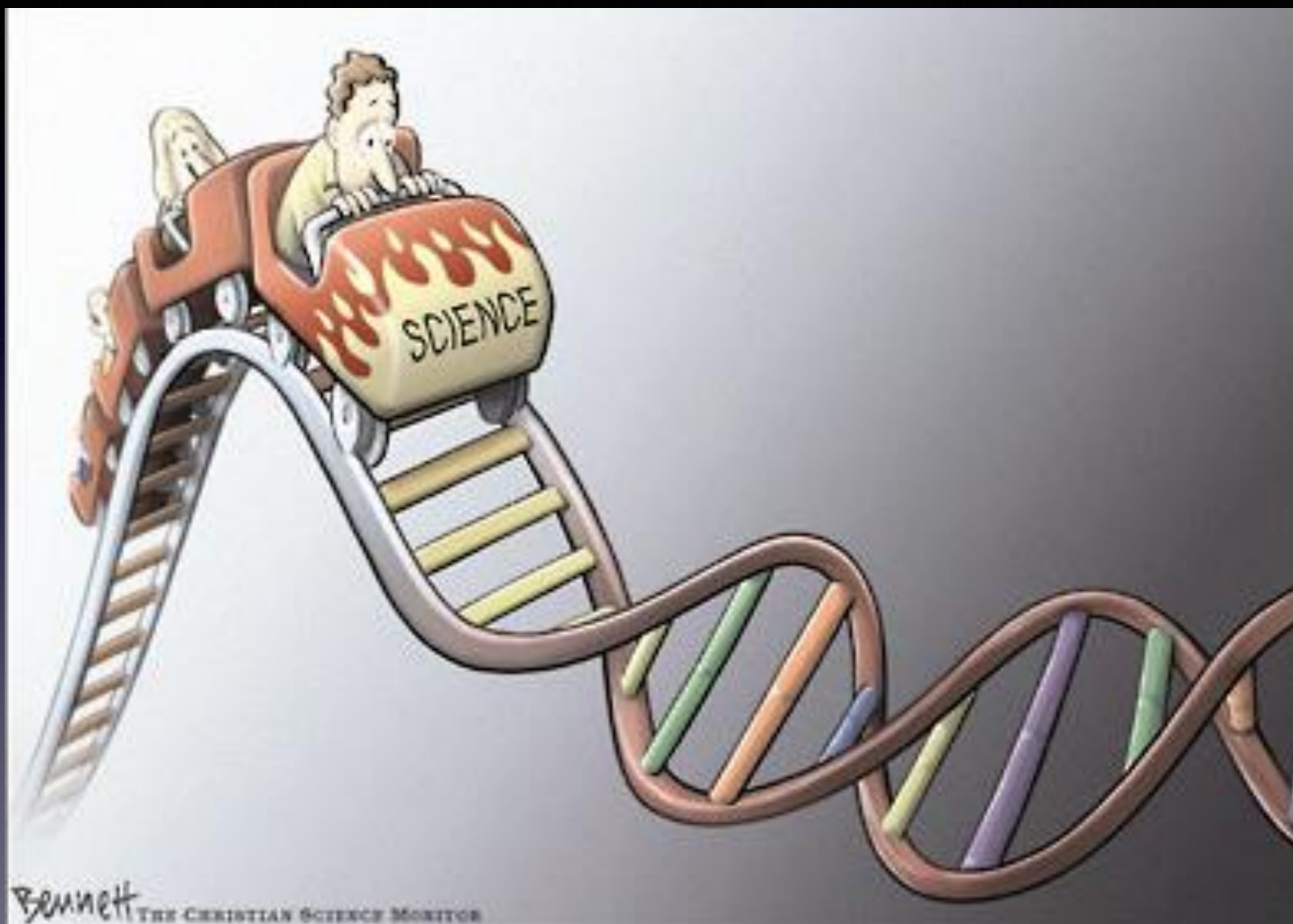


by irishbryan



Worth 1000.com

by bozosafari



Bennett THE CHRISTIAN SCIENCE MONITOR





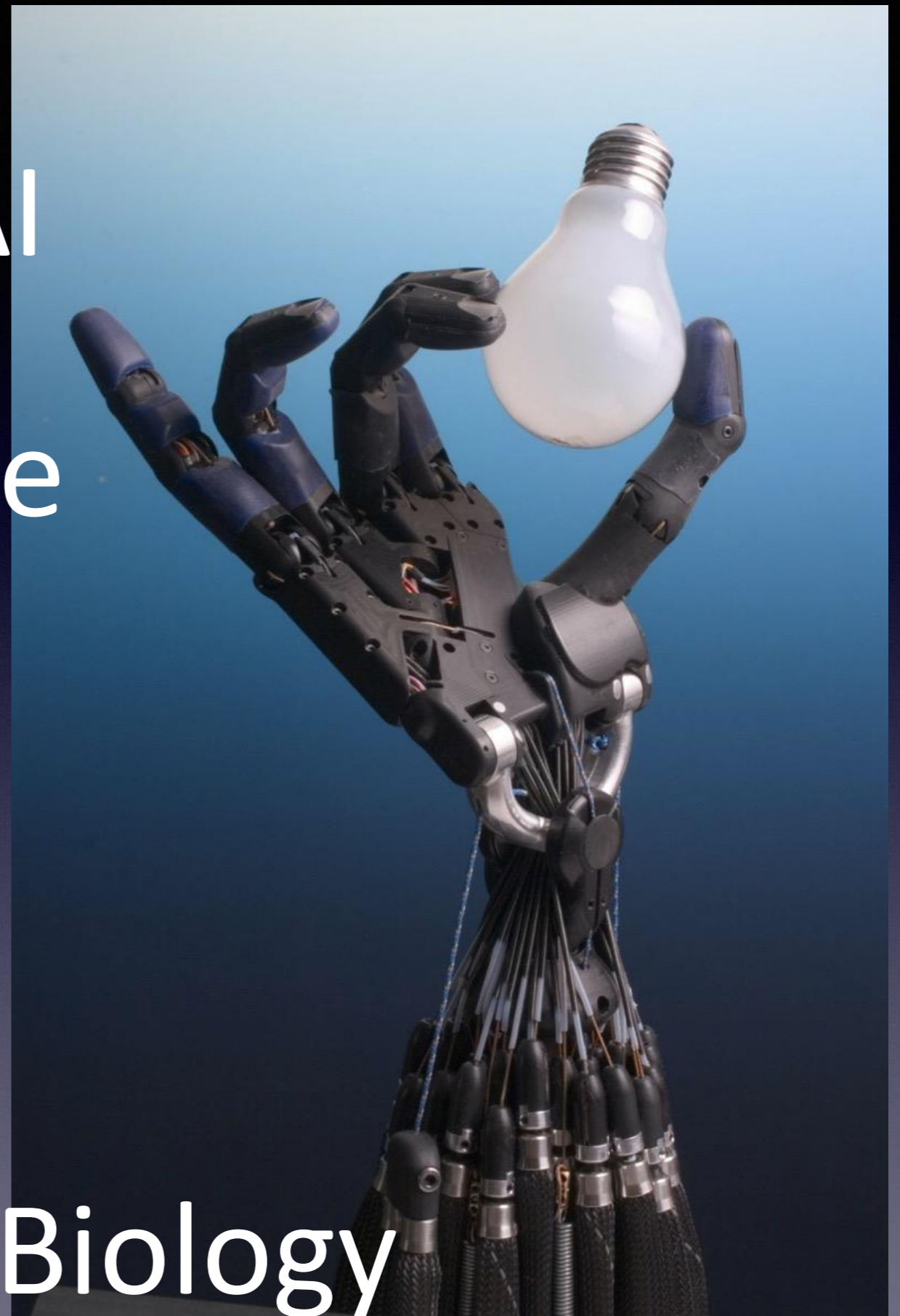
Brief History of AI

AI and Agriculture

AI and Climate

AI Ethics

AI and Synthetic Biology

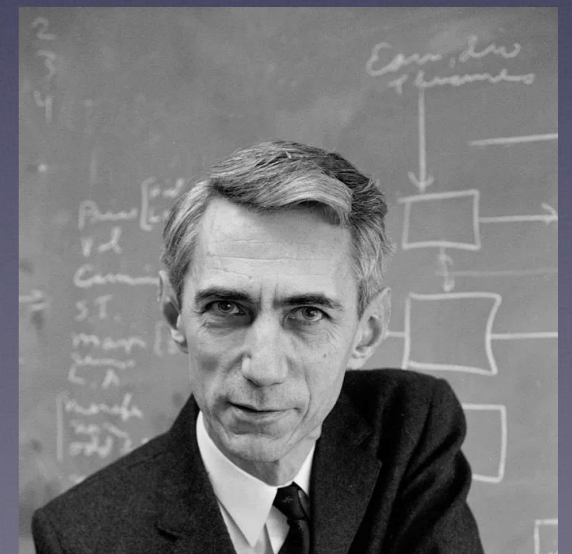
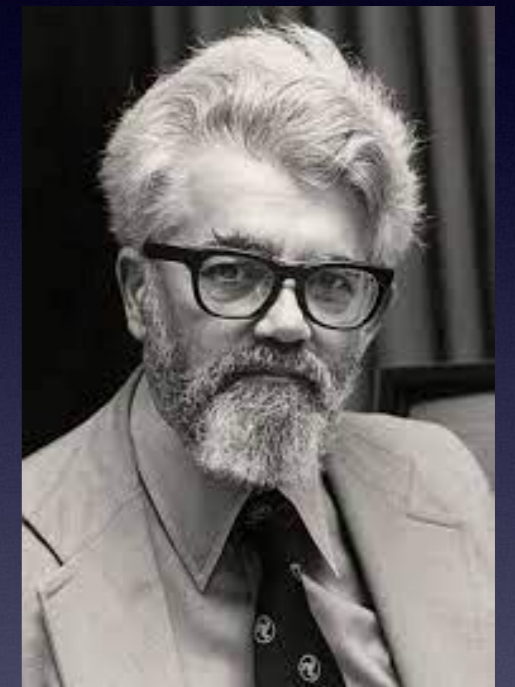




# Artificial Intelligence

Simulation of  
Human Intelligence Processes  
(Human Cognition)  
by a Machine

- Cybernetics – control systems (World War II)
- Alan Turing (1950)
  - Computing Machinery and Intelligence
    - “Can Machines Think?”
- Dartmouth College – John McCarthy (1956)
  - Shannon, Simon, Minsky, etc.
- AI summer and winters
  - Artificial Neural Networks (1958-1969)
  - Gary Kasparov v. IBM Deep Blue (1997)

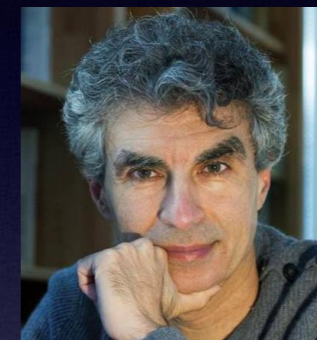
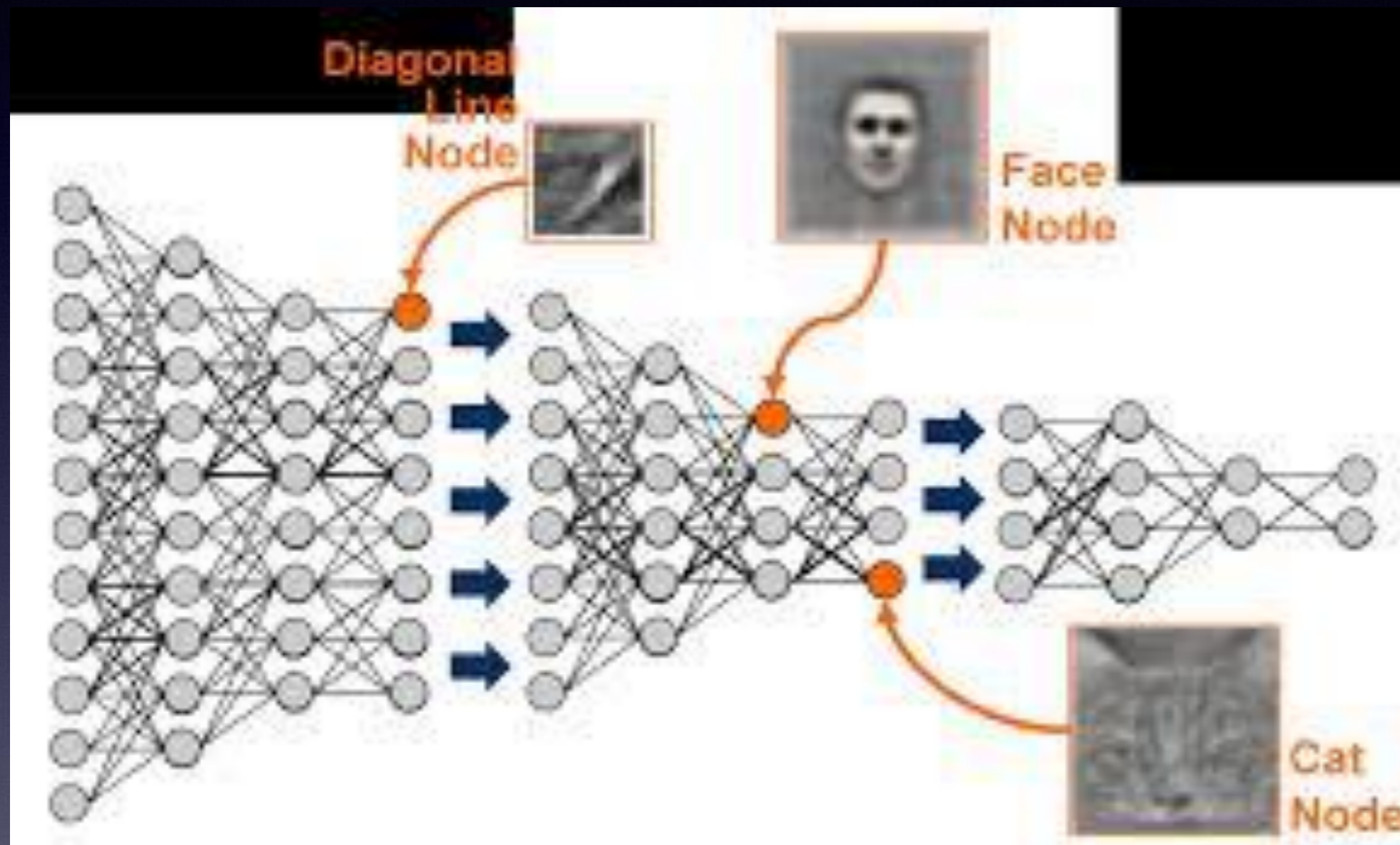


# Machine Learning (ML)

## 2012

# Deep Learning

Geoffrey Hinton  
"The Godfather  
of deep learning"



Yoshua Bengio



Yann LeCun



Andrew Ng

# AI in Agriculture

- Predictive Analytics
- Precision Farming
- Soil Analysis and Optimization
- Weeding and Disease Prevention
- Control of Indoor Farming
- Crop Output and Harvesting
- Managing Irrigation



# Precision Agriculture



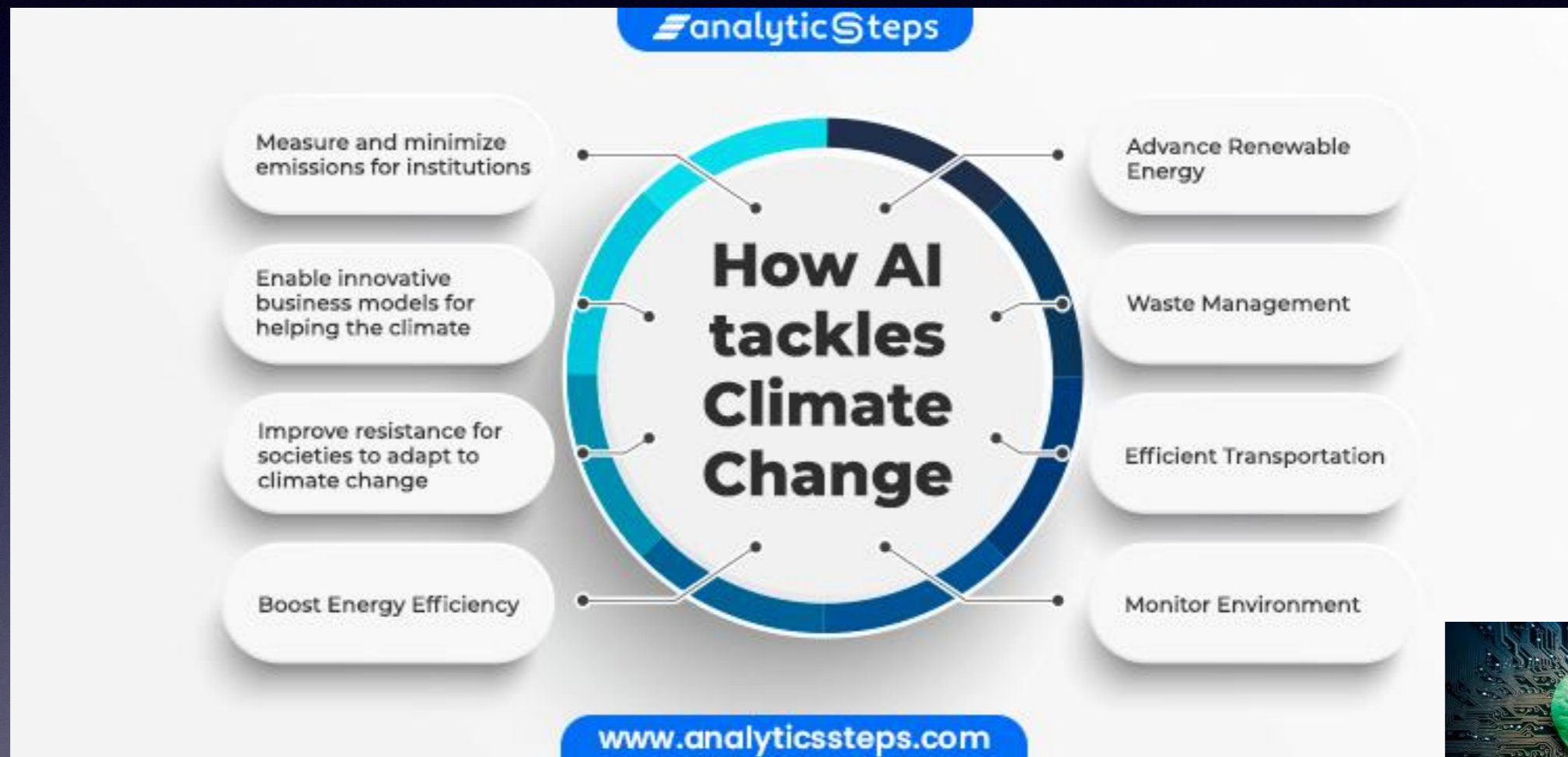


- Microinsurance NGO — underwrites risks for millions of landholder farmers
  - Problem: Drought in Africa every 10-12 years
- Packages with grain and fertilizer —register by cellphone
- Deep learning analysis of cloud cover
- 9.18 M farmers insured
- 27.14 M claims payout to 755, 839 farmers



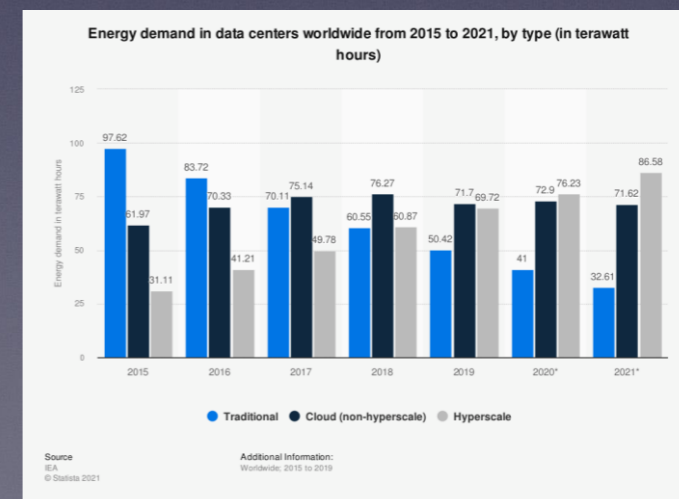
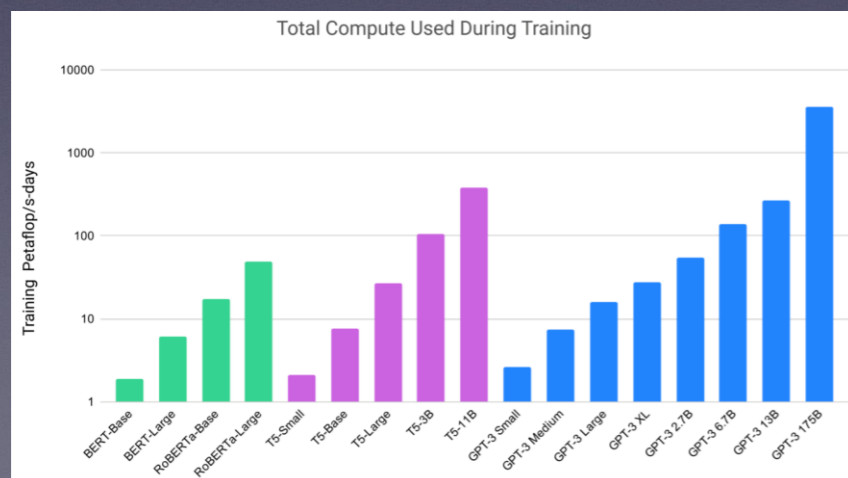


# AI Tackling Climate Concerns In a Changing Landscape



# AI's Carbon Footprint

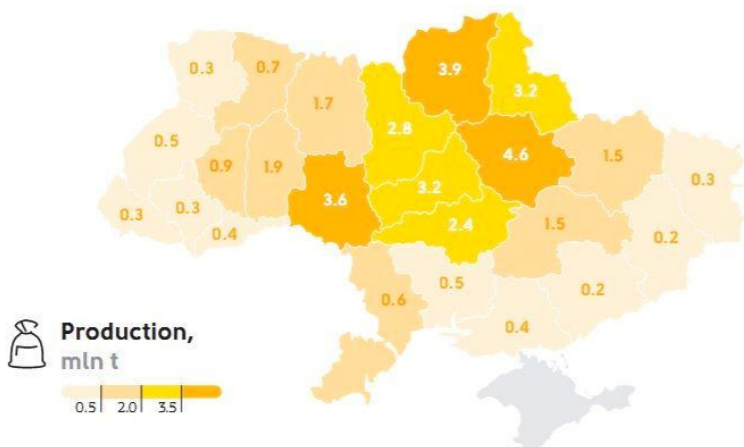
- AI will certainly help optimize energy efficiency.
- **AI REQUIRES A LOT OF ENERGY!!!!**
  - Popular GPT-3 model — energy use of 126 Danish homes per year, and CO<sub>2</sub> emissions of 430,000 miles of driving.
- CarbonTracker — tracks negative impact of the training model.



# AI and Food

## Management of Supply Chains

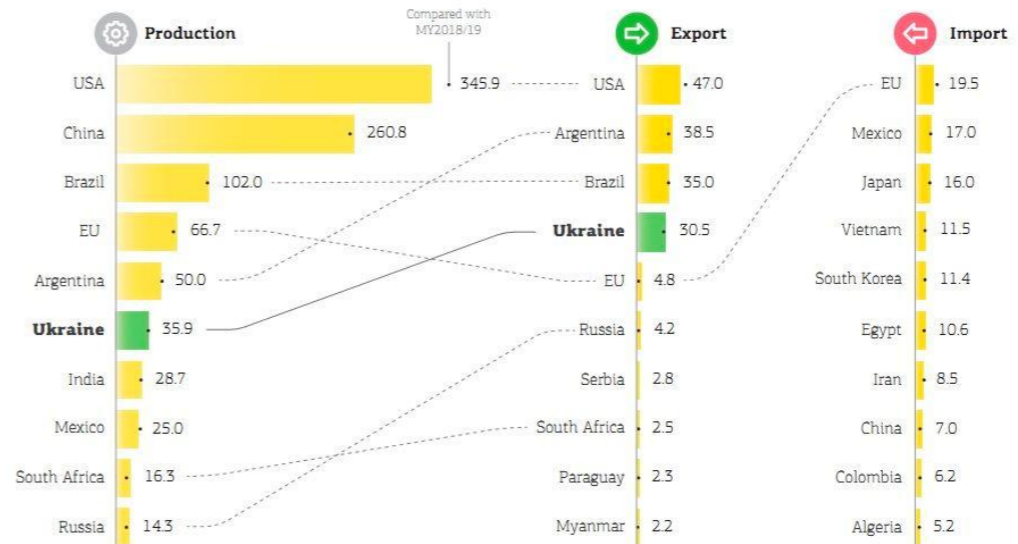
### CORN PRODUCTION IN UKRAINE AND WORLDWIDE IN MY2019/20



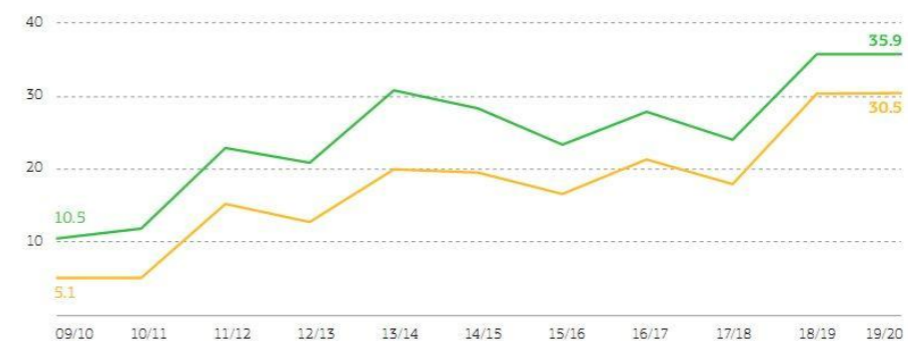
#### Top 5 export directions from Ukraine, USD mln

929	569	508	506	323
China	Spain	Egypt	Netherlands	South Korea

#### Largest producers, exporters, importers, mln t



#### Corn production and export from Ukraine, mln t



# AI Ethics

## Both Sides NOW

AI Ethics is about maximizing benefits while mitigating harms, risks, and undesired societal consequences.

# AI and Synthetic Biology

- Breeding New Species

- Plants

- Animals

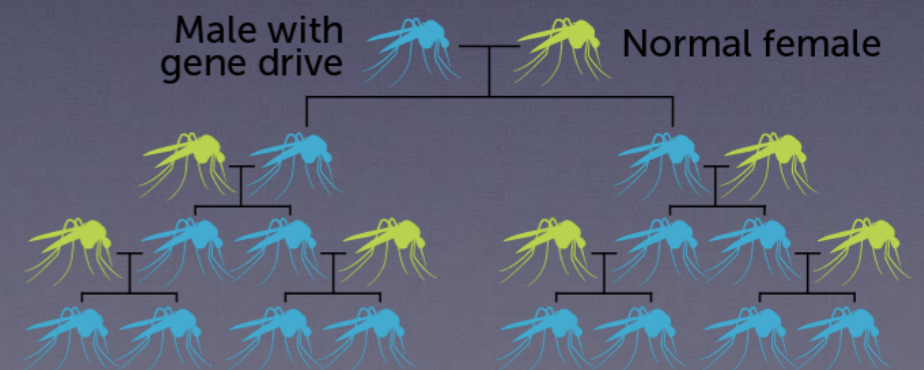
- Insects/ Gene Drives



Altered gene is almost always inherited

- CRISPR/Cas9

Gene drive inheritance



Altered gene is almost always inherited

# Thank You!



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