INTRODUCTION TO SOCIOLOGY

Soc 1101: Summer 2023

Shelley Yan

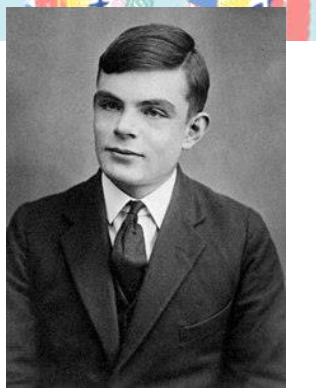
Department of Sociology

Cornell University

Artificial Intelligence, Genetics, & Reflexivity

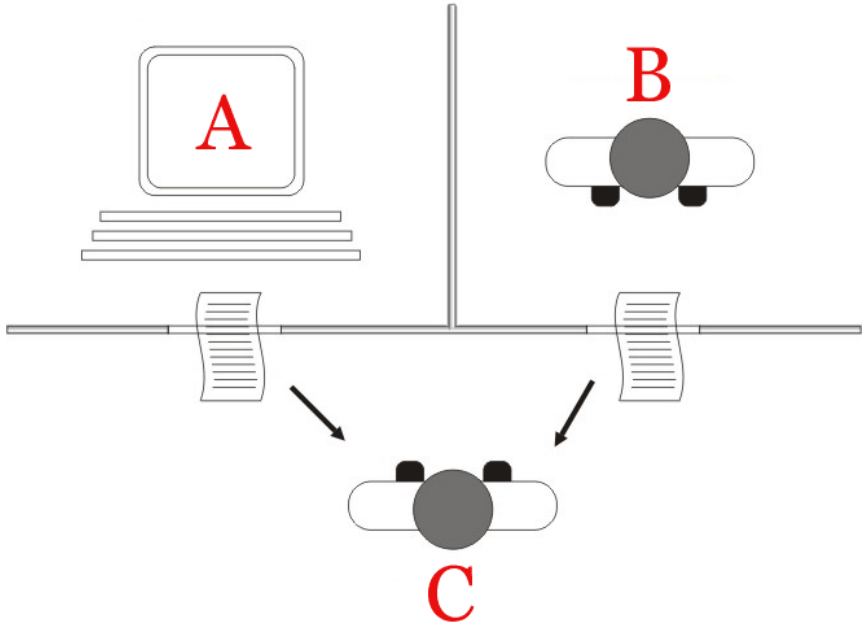
Lecture 23

WHAT IS ARTIFICIAL INTELLIGENCE (AI)

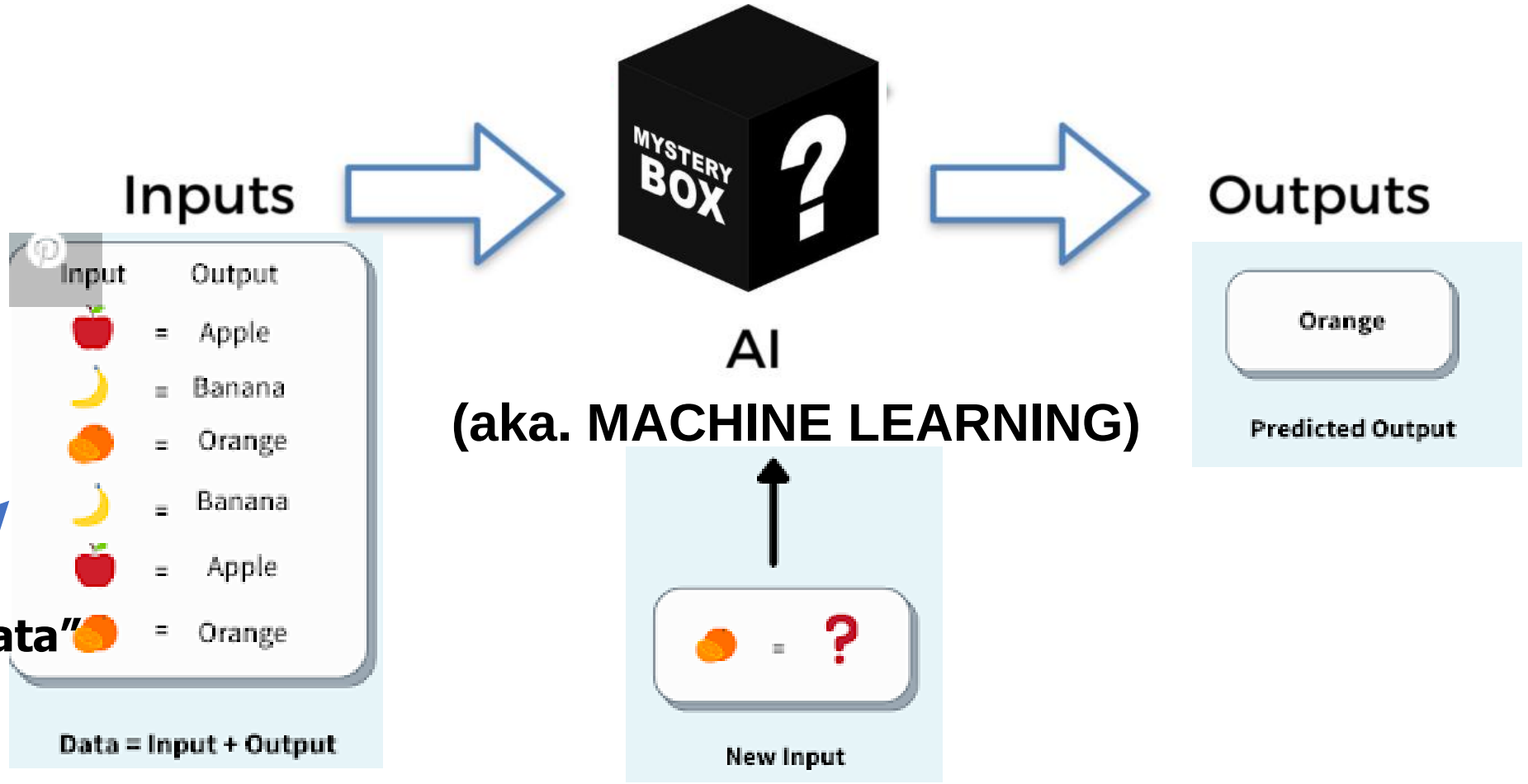


Alan Turing (1912-1954)
British mathematician, founder of computer science

- Artificial Intelligence leverages computers and robots to mimic the intelligence (e.g., problem-solving and decision-making) of the human mind.
- The Turing test judges a computer's ability to converse with a human being in a way that the human cannot tell that it's a machine they're talking to



WHAT IS ARTIFICIAL INTELLIGENCE (AI)



SOME APPLICATIONS OF AI

- Recommendation systems for
  - Marketing and sales
  - Job-search and hiring
  - Online content consumption
- Assisted decision-making in
  - Criminal justice
  - Healthcare
  - Autonomous vehicles
- Automatic grading systems in
  - Education
  - Road/legal tests

Employment and Hiring Bias

- **Reinforcement of gender and racial stereotypes in job recommendations**

Reuters : Amazon scraps secret AI recruiting tool that showed bias against women

Discrimination through Optimization:
How Facebook's Ad Delivery Can Lead to Biased Outcomes

MUHAMMAD ALI*, Northeastern University, USA
PIOTR SAPIEZYNSKI*, Northeastern University, USA
MIRANDA BOGEN, Upturn, USA
ALEKSANDRA KOROLOVA, University of Southern California, USA
ALAN MISLOVE, Northeastern University, USA
AARON RIEKE, Upturn, USA

Discrimination through Optimization (neu.edu)

Reuters: Amazon scraps secret AI recruiting tool that showed bias against women

> *Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women. […] The team had been building computer programs since 2014 to review job applicants' resume with the aim of mechanizing the search for top talent, five people familiar with the effort told Reuters. […] In effect, Amazon's system taught itself that male candidates were preferable. It penalized resumes that included the word "women's," as in "women's chess club captain." And it downgraded graduates of two all-women's colleges, according to people familiar with the matter. They did not specify the names of the schools.*
>
> *Amazon edited the programs to make them neutral to these particular terms. But that was no guarantee that the machines would not devise other ways of sorting candidates that could prove discriminatory, the people said.*

A beauty contest was judged by AI and the robots didn't like dark skin

The first international beauty contest decided by an algorithm has sparked controversy after the results revealed one glaring factor linking the winners

[Artificial intelligence (AI) | The Guardian]

ALGORITHMIC FAIRNESS & BIAS: CRIMINAL JUSTICE SYSTEM

- **The COMPAS algorithm is used by US courts to assess the tendency of a convicted criminal to recidivist.**
  - **Release during pre-trial?**
  - **Sentencing?**
- **Motivation: Correct for judge's conscious and unconscious bias (e.g., hungry judge effect)**
- **As required by law, COMPAS *doesn't* include race in calculating its risk scores. *However,***


VERNON PRATER
Prior Offenses
2 armed robberies, 1 attempted armed robbery
Subsequent Offenses
1 grand theft
LOW RISK 3
BRISHA BORDEN
Prior Offenses
4 juvenile misdemeanors
Subsequent Offenses
None
HIGH RISK 8


DYLAN FUGETT
LOW RISK 3
BERNARD PARKER
HIGH RISK 10

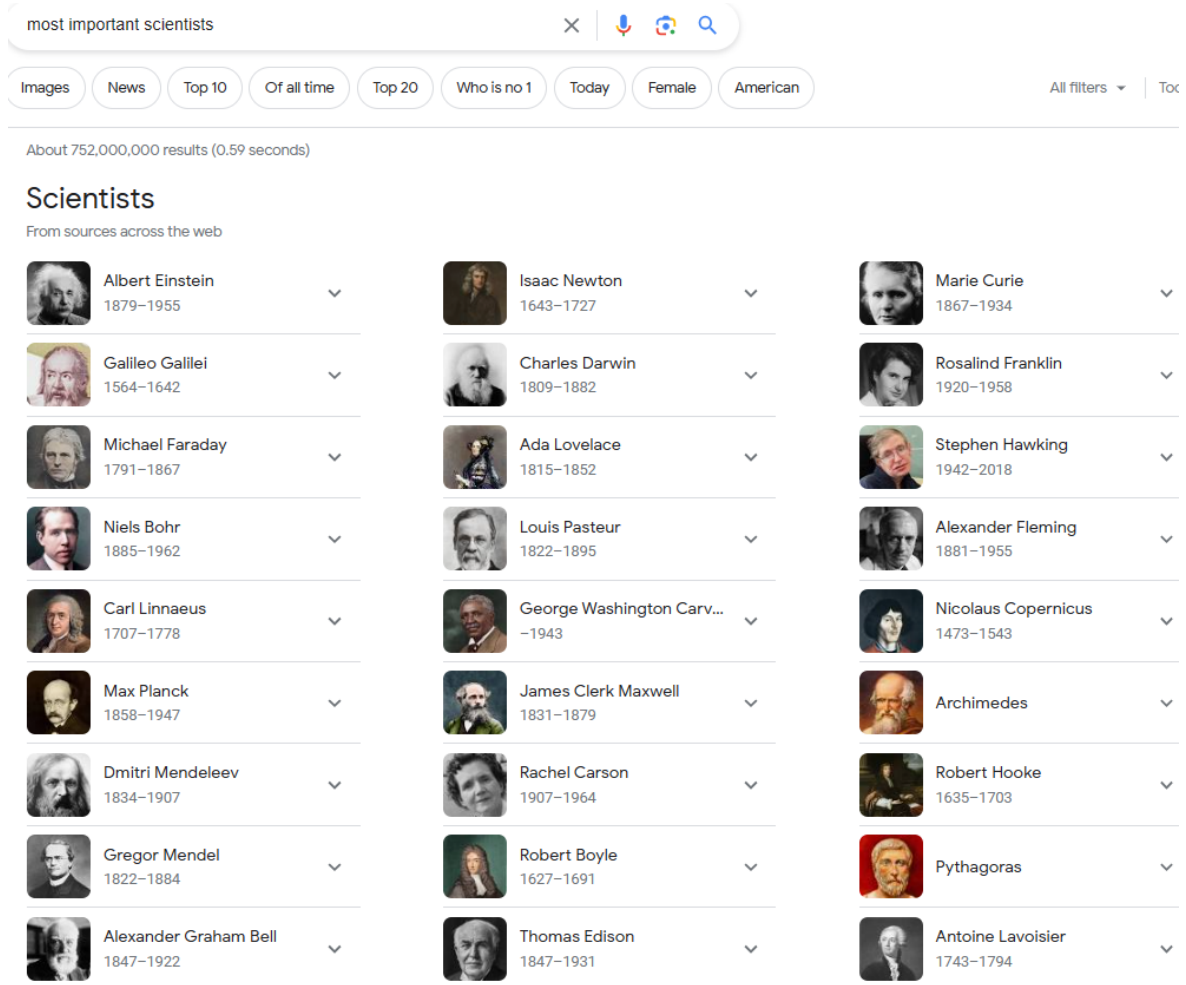

JAMES RIVELLI
LOW RISK 3
ROBERT CANNON
MEDIUM RISK 6

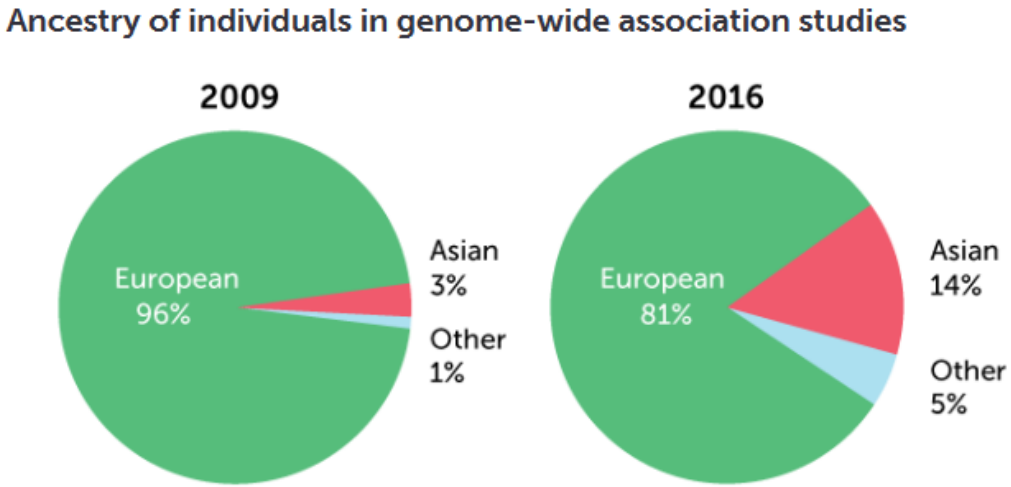

JAMES RIVELLI
Prior Offenses
1 domestic violence aggravated assault, 1 grand theft, 1 petty theft, 1 drug trafficking
Subsequent Offenses
1 grand theft
LOW RISK 3
ROBERT CANNON
Prior Offense
1 petty theft
Subsequent Offenses
None
MEDIUM RISK 6

Taste-based vs Statistical Discrimination

- **<u>Statistical discrimination:</u> Individuals discriminate due to information uncertainty.**
  - Inference of individual behavior based on knowledge about group statistics when information is imperfect
- **<u>Taste-based discrimination</u>: Individuals discriminate due to bias even when there is no behavioral uncertainty.**
- **N.B.: Knowledge of statistical discrimination may => the rationalization of stereotypes (Tilcsik 2020)**

BIAS/SKEWNESS BAKED IN TRAINING DATA



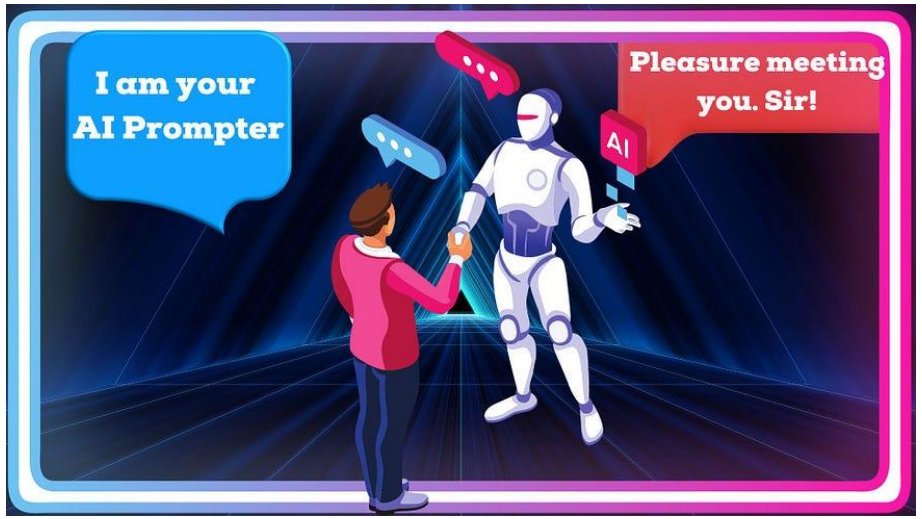


[DNA databases are too white, so genetics doesn't help everyone. How do we fix that? (sciencenews.org)]

INFLUENCES ON JOBS

AI Could Eliminate Millions of Jobs By 2027, but Cognitive Skills Are Increasingly Important for Employers

A new report by the World Economic Forum found that nearly 2% of current roles could disappear by 2027.



14 Million Jobs Could Disappear In 5 Years: Is Yours Safe? | Entrepreneur

Many unknowns…

Emergence of ever-changing new jobs

Adaptation of the education system?

Artificial intelligence quietly relies on workers earning $2 per hour

The

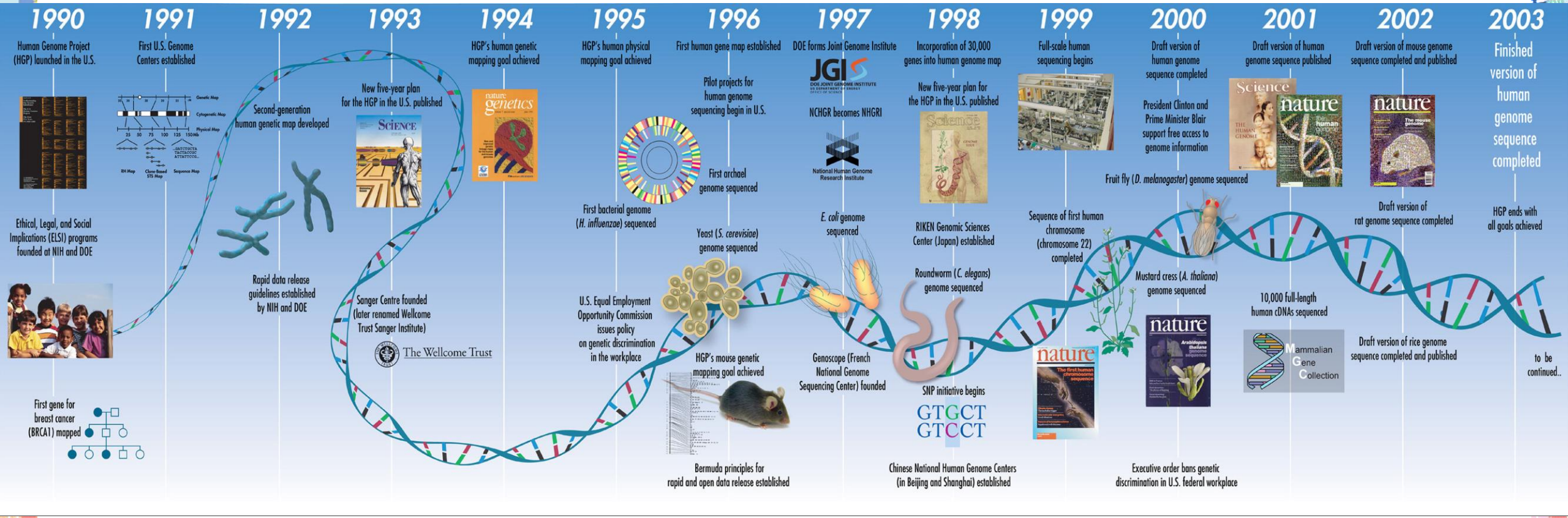
By Phil Jones Published: 07th January, 2022 at 16:00

Try 3 issues of BBC Science Focus Magazine for £5!

Amazon Mechanical Turk, described as "artificial artificial intelligence", uses low-paid workers to complete mini-tasks that AI can't do on its own.

Artificial intelligence quietly relies on workers earning $2 per hour | BBC Science Focus Magazine

THE HUMAN GENOME PROJECT



Science & Environment

Two genes linked with violent crime

By Melissa Hogenboom
Science reporter, BBC News

28 October 2014 | Science & Environment

23andMeBlog home categories bloggers

New genetic variants found to influence major depression risk

August 1, 2016

Scientists find gene linked to alcoholism

Tuesday, October 19, 2010 — The variant, in a gene called CYP2E1, is associated with a person's response to alcohol. For the ten to twenty percent of people that possess this variant, those first few drinks leave them feeling more inebriated than the rest of the human population, who harbor a different version of the gene.

CHAPEL HILL — Researchers from the University of North Carolina at Chapel Hill School of Medicine have discovered a gene variant that may protect against alcoholism.

News & Perspective > Psychiatry

'Warrior Gene' Linked to Antisocial Behavior

Nancy A. Melville

January 18, 2016

Science / Scie

Scientists find DNA differences between gay men and their straight twin brothers

DETERMINISTIC VS PROBABILISTIC CAUSATION

- **Deterministic causation: Whenever A occurs, B occurs**
- **Probabilistic causation: The occurrence of A increases the probability of B occurs**
- **Causation of genes on social behavior ≠ gene determinism**

GENE AND ENVIRONMENT INTERACTIONS

"Genetic factors do not determine behaviors in any straightforward way. Rather, they combine with – and even change in response to – "environmental factors," which include everything from mother's womb to nutrition and prescription drugs, to the subject of sociology proper, social context." – Shanahan, Bauldry and Freeman 2010

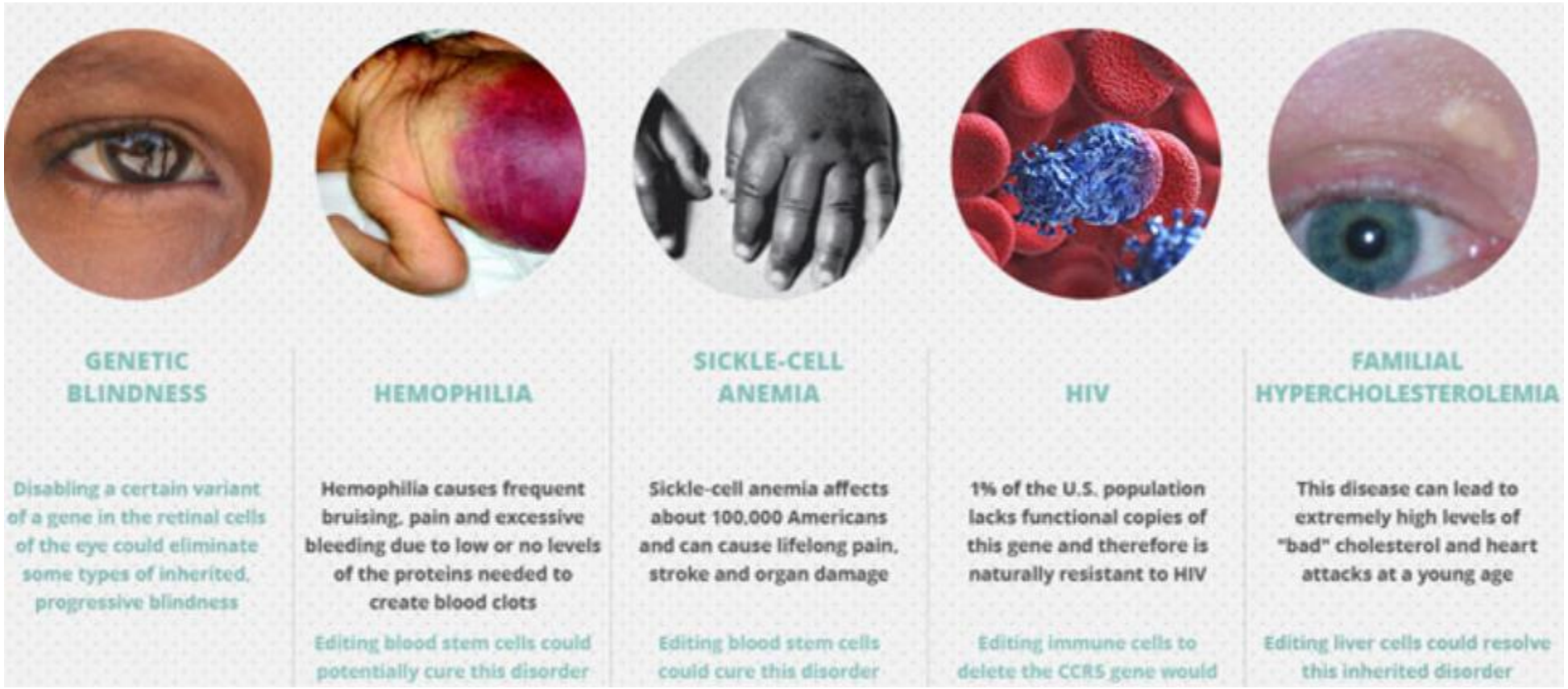
GENE AND ENVIRONMENT INTERACTIONS

- **Social experiences alter gene expressions**
  - **Epigenetic process: depending on the social context, some genes can be "turned on or off"**
  - **Transcriptional process: adverse early environments increase likelihood of heightened genetic expressions to stressors**
- **Genes are highly reactive to status, stress, and social connectedness**

WHY BIOLOGISTS AND SOCIOLOGISTS NEED EACH OTHER

- **Genes can't single-handedly determine why some kids grow up rich and others poor.**
- **However, genetics can help explain why some kids are resilient and others are more impacted by their social environments.**
- **Sociogenetic research can help us better understand differential sensitivity to social contexts.**

GENETIC TESTING AND EDITING FOR HEALTH



Editing Out Diseases with the Help of Bioengineering - UC Riverside

PROMISES & CONCERNS OF GENE EDITING

- Gene preference selection vs eradication of crippling disease
- Splitting of human beings into superhuman elites and everyone else (Harari 2018)
- Unknown consequences
  - Body (other genes)
  - Ecosystems

INFOTECH & BIOTECH

- **Even more importantly, the twin revolutions in infotech and biotech could restructure not just economies and societies but our very bodies and minds.**
- **In the past, we have gained the power to manipulate the world around us and to reshape the entire planet, but because we didn't understand the complexity of the global ecology, the changes we made inadvertently disrupted the entire ecological system and now we face an ecological collapse. In the coming century biotech and infotech will give us the power to manipulate the world inside us and reshape ourselves, but because we don't understand the complexity of our own minds, the changes we will make might upset our mental system to such an extent that it too might break down.**

THANK YOU!

- **Last section meeting: 8pm Today EST**
- **Quiz 6**
- **Short essay 2 due Monday 10 pm. Absolute deadline: Next Tuesday 10pm.**
- **Make-up assignments for section participation: Submit by next Tuesday 10pm.**

- **A.I. is as threatening as climate change and nuclear war, says historian Yuval Noah Harari | Euronews**

SOCIOLOGY AND AI: ALGORITHMIC FAIRNESS