THE GREAT ENTERPRISE REINVENTION

HFS

Ted Talk: The Environmental Impacts of AI and Frontier Technologies – Safeguarding A Sustainable Future

Dr. Christina Yan Zhang
CEO
The Metaverse Institute

26 September 2024
Cambridge, UK

THE METAVERSE INSTITUTE

WORLD ECONOMIC FORUM
"Right now, we are facing a man-made disaster of global scale. Our greatest threat in thousands of years. Climate change."
David Attenborough
Broadcaster and naturalist

My Story

Made in China

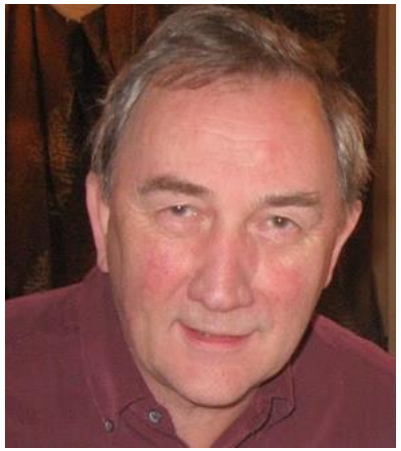
EDUCATION
IS
GREAT
BRITAIN & NORTHERN IRELAND
Christ Church College
University of Oxford
www.britishcouncil.org

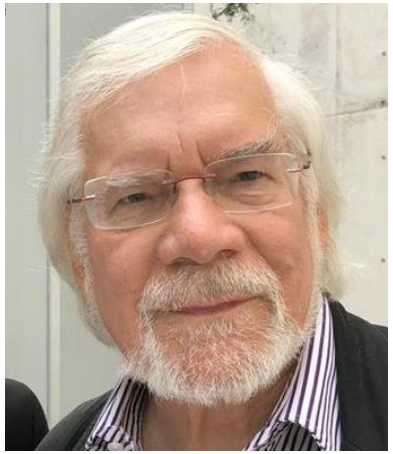
A Metaverse Pioneer since 2006, full scholarship PhD in using digital twins in the metaverse for the AEC industry

Loughborough University

1st for Communication and Media Studies

The Complete University Guide 2024





The Use of Second Life as a Tool for Higher Education Internationalisation

by

Yan Zhang

A research dissertation submitted in partial fulfilment of the requirements of the award of the degree of Master of Arts Of Loughborough University

September 2007

Supervisor: Prof. Graham Murdock
School of Social Sciences

The Use of Massively Multiplayer Online Games to Augment Early-Stage Design Process in Construction

by

Christina Yan Zhang

A Doctoral Thesis submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy of Loughborough University

April 2012

©Christina Yan Zhang, 2012

Prof. Michael Pickering

Emeritus Professor of Media and Cultural Analysis

- The UK's Arts and Humanity Research Council Peer Review College(2002-2012)
- Reviews Editor for the European Journal of Communication
- Editorial board of Memory Studies and the Folk Music Journal
- Founding member of the Communications and Media Studies course

Prof. Graham Murdock

Professor Emeritus of Culture &Economy

- World renowned founding expert in critical political economy of culture and communications
- Vice President of the International Association of Media and Communciation Research (IAMCR) (2016-2020)
- Member of the European Science Foundation's Expert Panel of Research Proposal Evaluators
- Founding member of the Communications and Media Studies course

Prof. Peter Golding

Emeritus Professor of Sociology

- World renowned founding expert in critical political economy of culture and communications
- Pro-Vice-Chancellor (Research & Innovation) at Northumbria University (2009-2014)
- Pro-Vice-Chancellor (Research) at Loughborough University (2006-2009)
- Chair of the communications, media and cultural studies sub-panel for 2008, 2014 REF(Research Exercise Framework).
- Chair of the Higher Education Funding Council for England Media Studies Advisory Committee.

Dame Shirley Pearce DBE

Emeritus Professor of Health Psychology

- Vice-Chancellor of Loughborough University 2006-2012
- The inaugural Chair of the College of Policing (the first professional body for policing) 2013-2016
- Chair of Governors of the London School of Economics and Political Science 2016-2020
- Board member at the Higher Education Funding Council for England (HEFCE) 2009 -2015
- Previous Board member of University of Cambridge, the Healthcare Commission and Health Education England

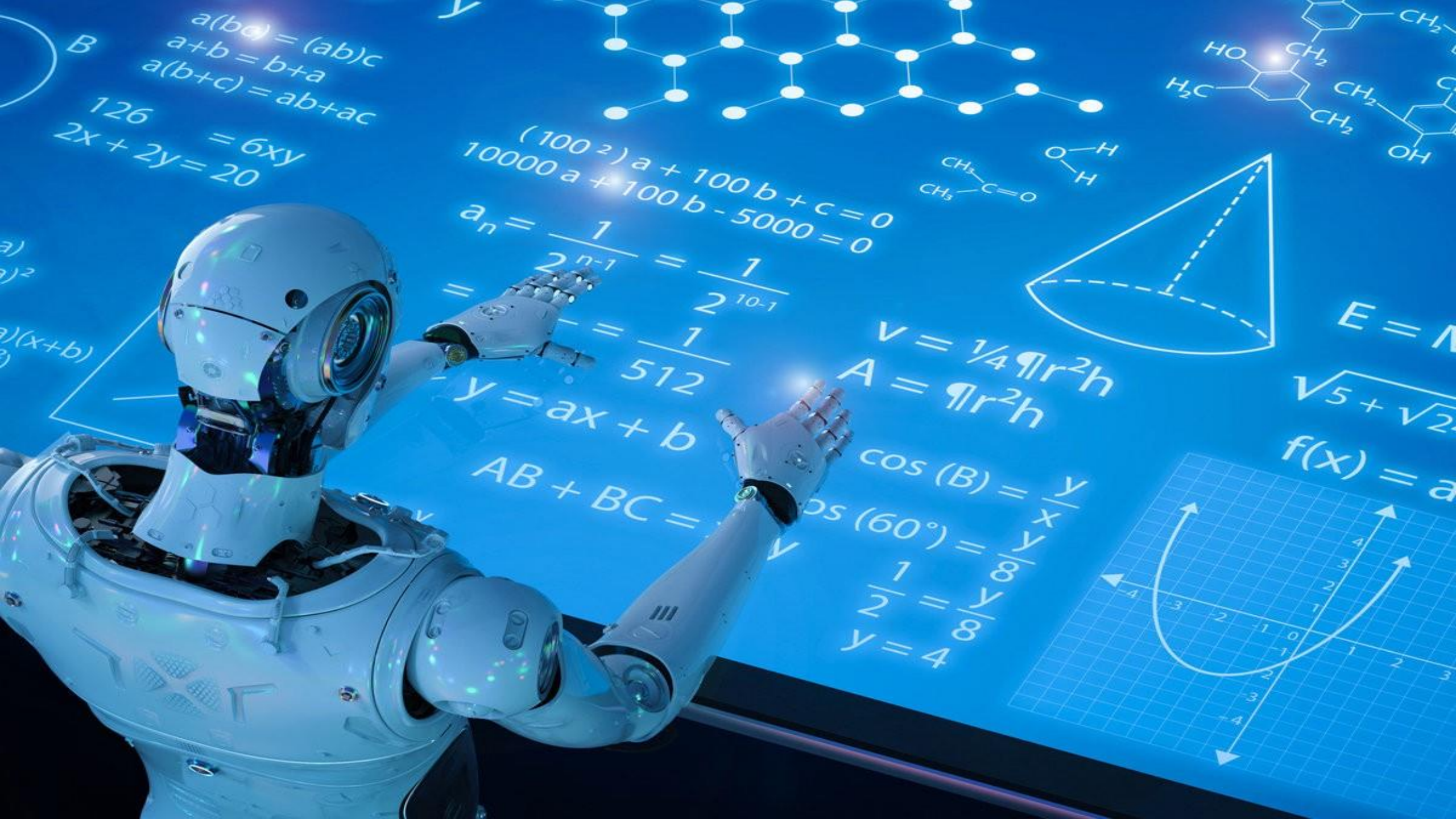
ECONOMIST IMPACT

"The Metaverse has increasingly become a convergence of a whole range of technologies coming together to form the next generation of the internet, which is more interactive, intuitive and immersive."

Dr. Christina Yan Zhang
Chief executive, **The Metaverse Institute**

Enterprise Metaverse Summit

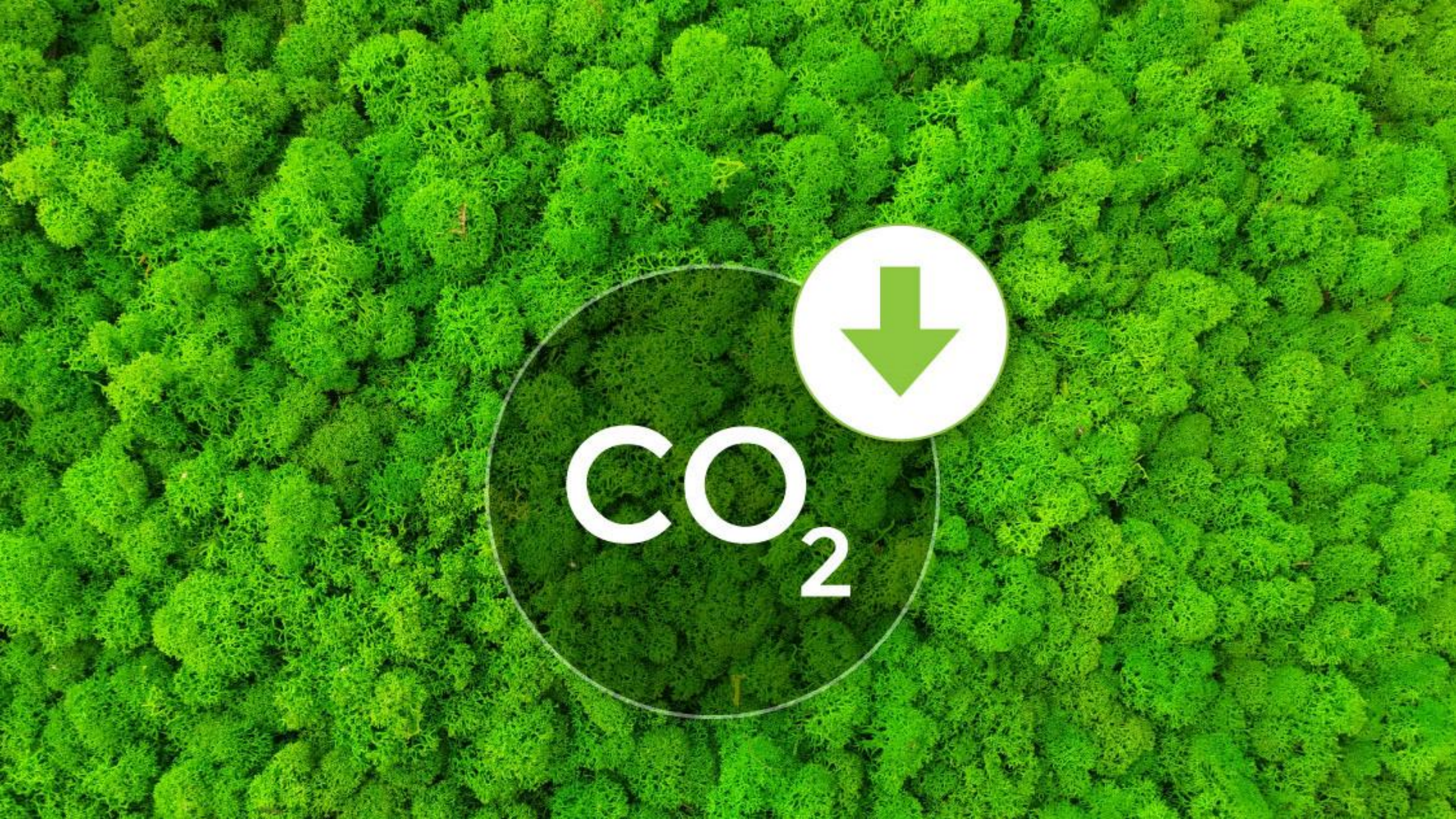
June 28th-29th 2023 | London and virtual


a(bc) = (ab)c
a+b = b+a
a(b+c) = ab+ac
126 = 6xy
2x + 2y = 20
(100 ²) a + 100 b + c = 0
10000 a + 100 b - 5000 = 0
$a_n = \frac{1}{2^{n-1}} = \frac{1}{2^{10-1}}$
$= \frac{1}{512}$
y = ax + b
AB + BC =
v = ¼¶r²h
A = ¶r²h
cos (B) = y/x
os (60°) = y/8
1/2 = y/8
y = 4
E = M
f(x) =

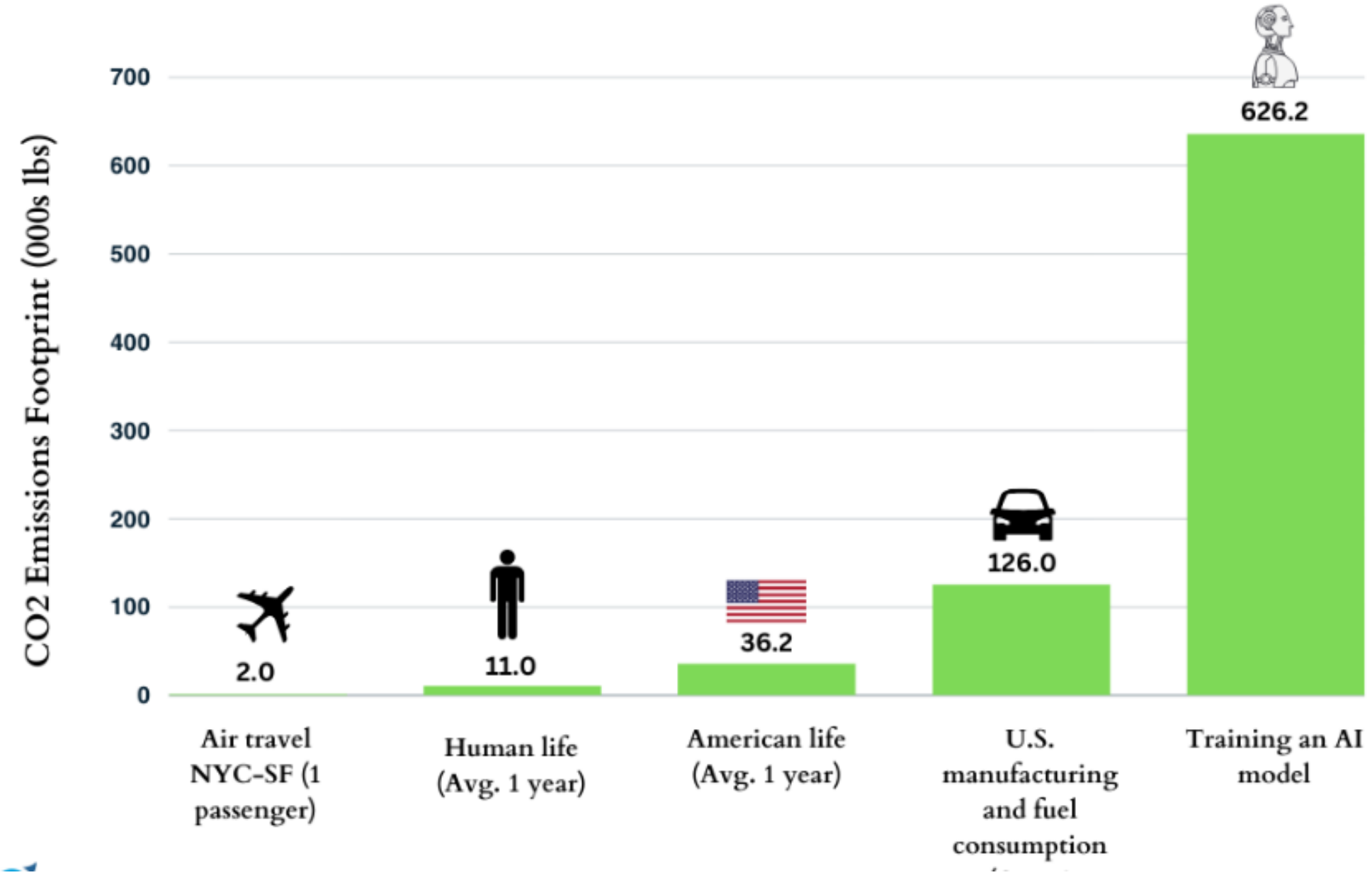
Godmother of AI built $1bn spatial intelligence AI start-up in 4 months: World Labs is developing a model to understand the 3D physical world. This represents a big breakthrough in AI, helping it to interact with real-world environments and advancing more sophisticated autonomous systems. On 13 Sept 2024, she raised Series A $230M to train AI to understand 3D world with world's top investors and tech leaders backing.

Bloomberg Technology

AI HELPING HUMANS BUILD BETTER WORLDS


CO_2

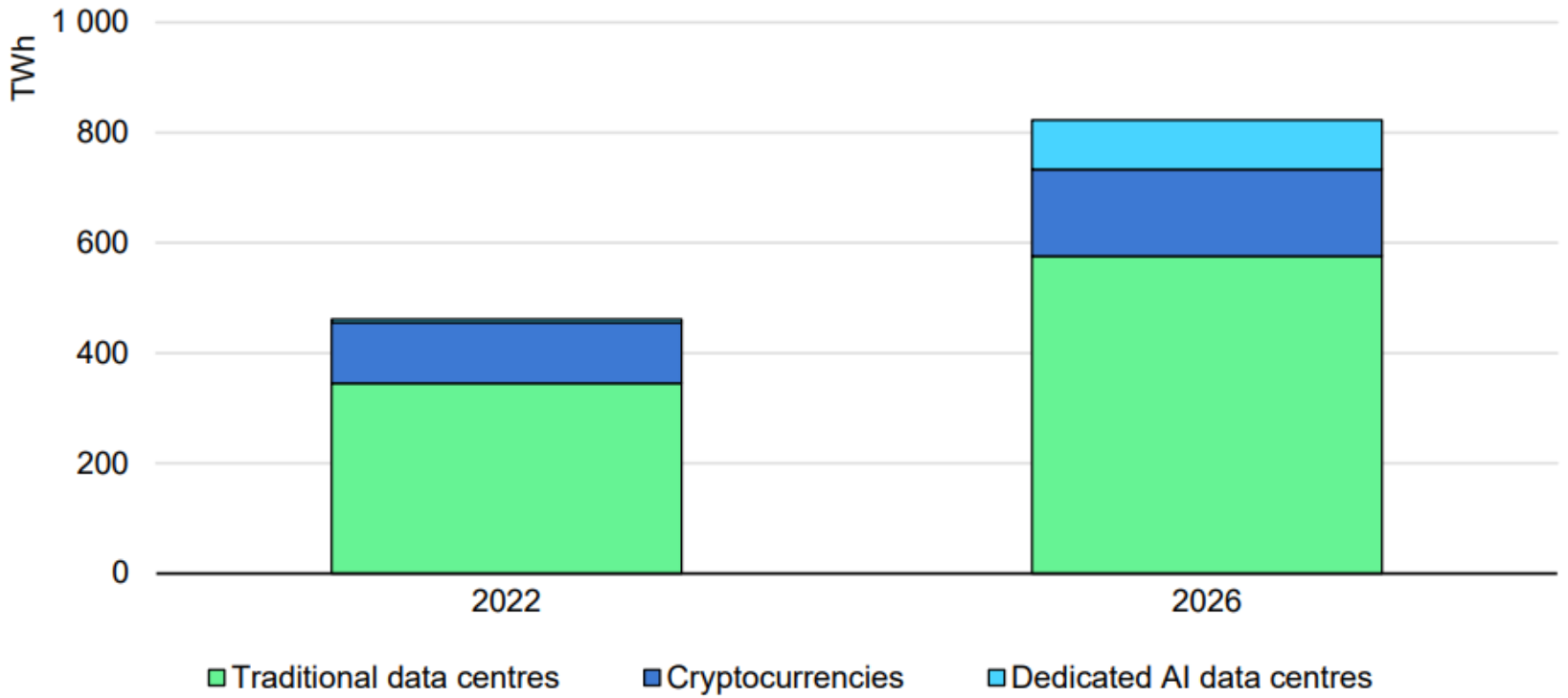
University of Massachusetts Amberst (June 2019): training one 213M parameters Large language Model(GPT 4 is 1.7 trillion parameters) emit more than 626,000 pounds of carbon dioxide equivalent, 5X more of one American car, 315 rounds of air travel between New York Cities and San Francisco.



International Energy Agency(Jan 2024): The AI server market is currently dominated by tech firm NVIDIA with 95% market share. In 2023, NVIDIA shipped 100 000 units that consume an average of 7.3 TWh of electricity annually. By 2026, the AI industry is expected to consume 10 X its demand in 2023, ranked 45th out of 212 countries, more than the annual consumption of Kuwait, Finland, Switzerland, Austria, Singapore, Qatar, New Zealand etc.

- Electric

Estimated electricity demand from traditional data centres, dedicated AI data centres and cryptocurrencies, 2022 and 2026, base case

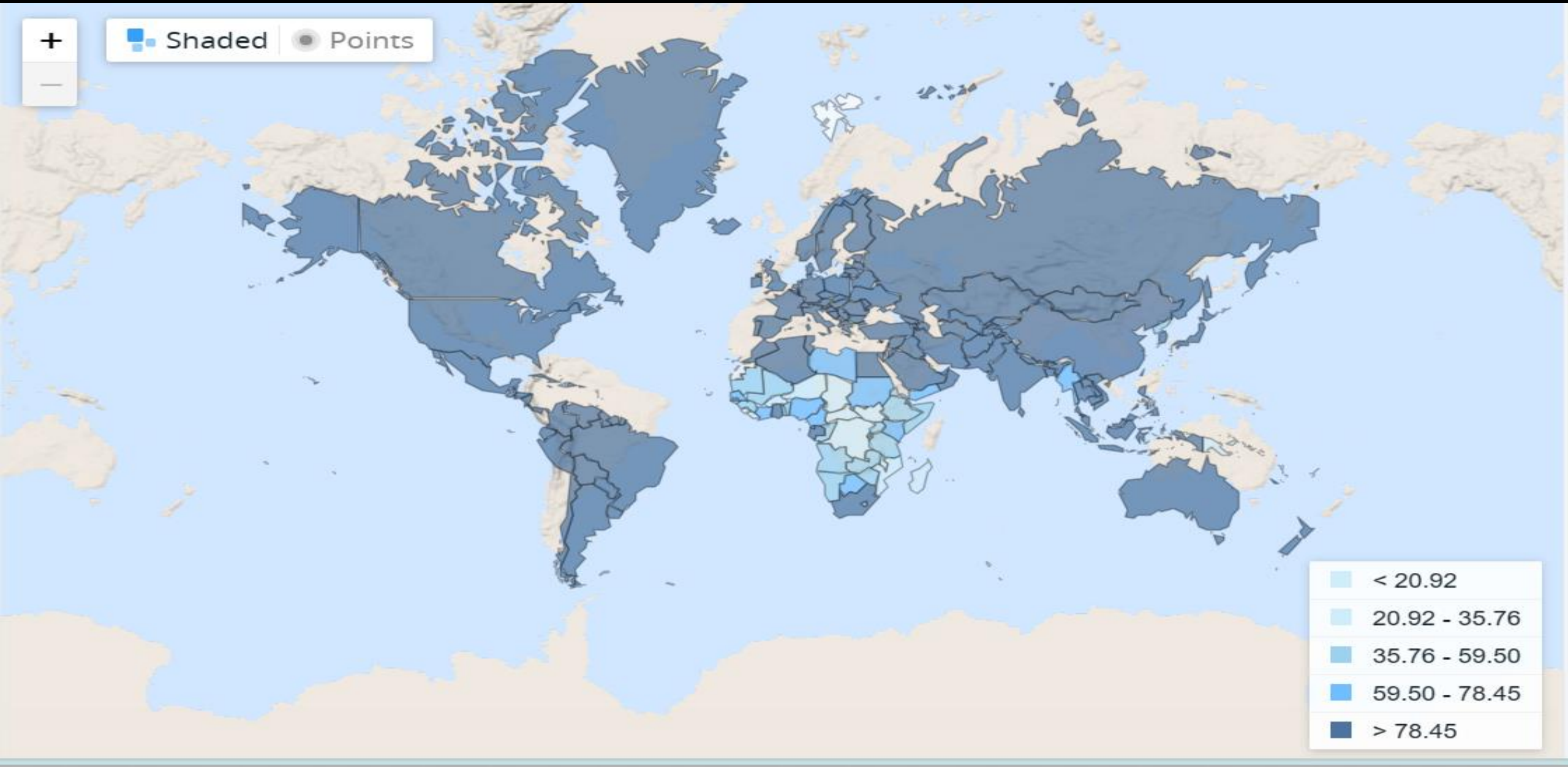


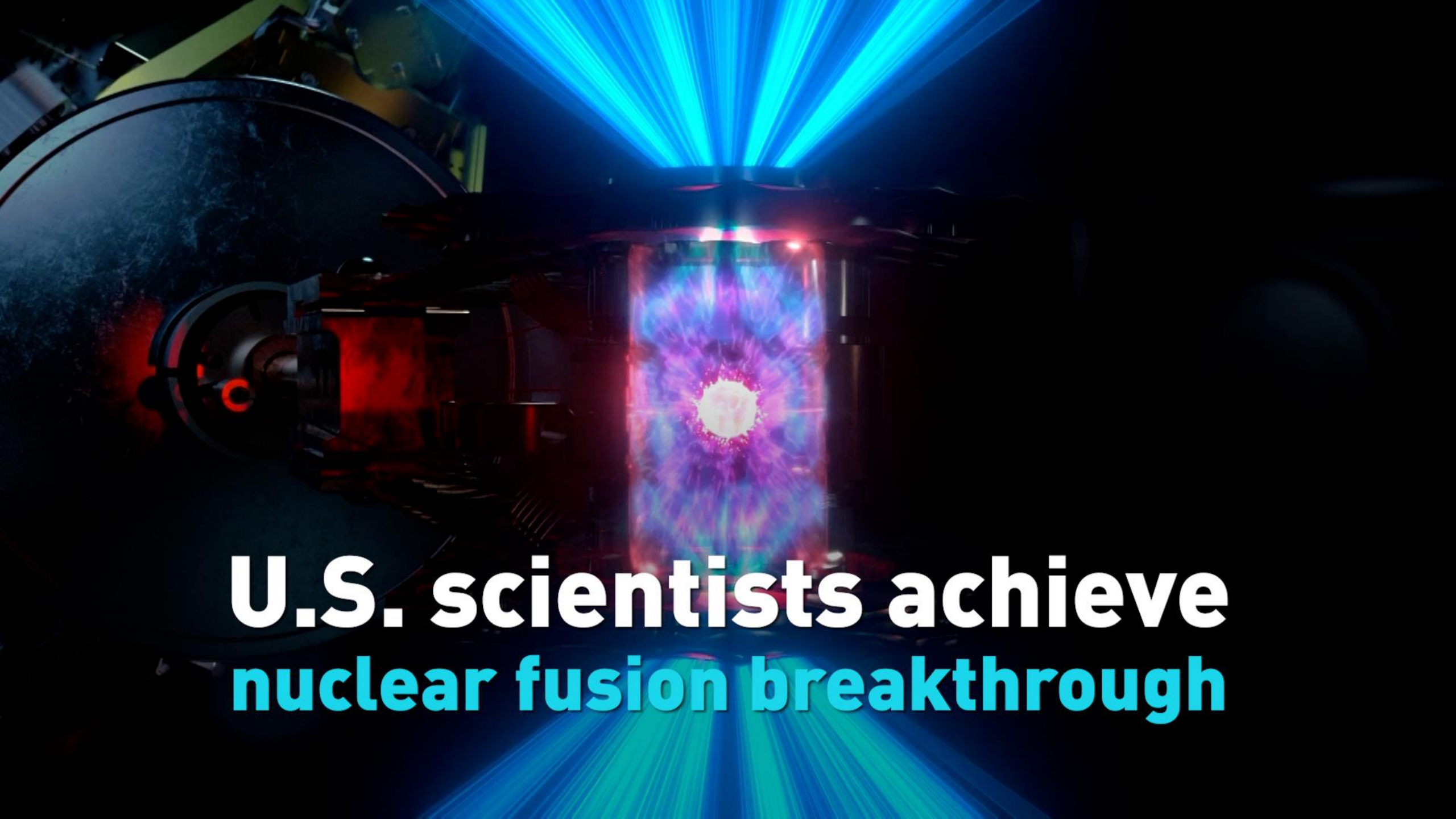
IEA. CC BY 4.0.

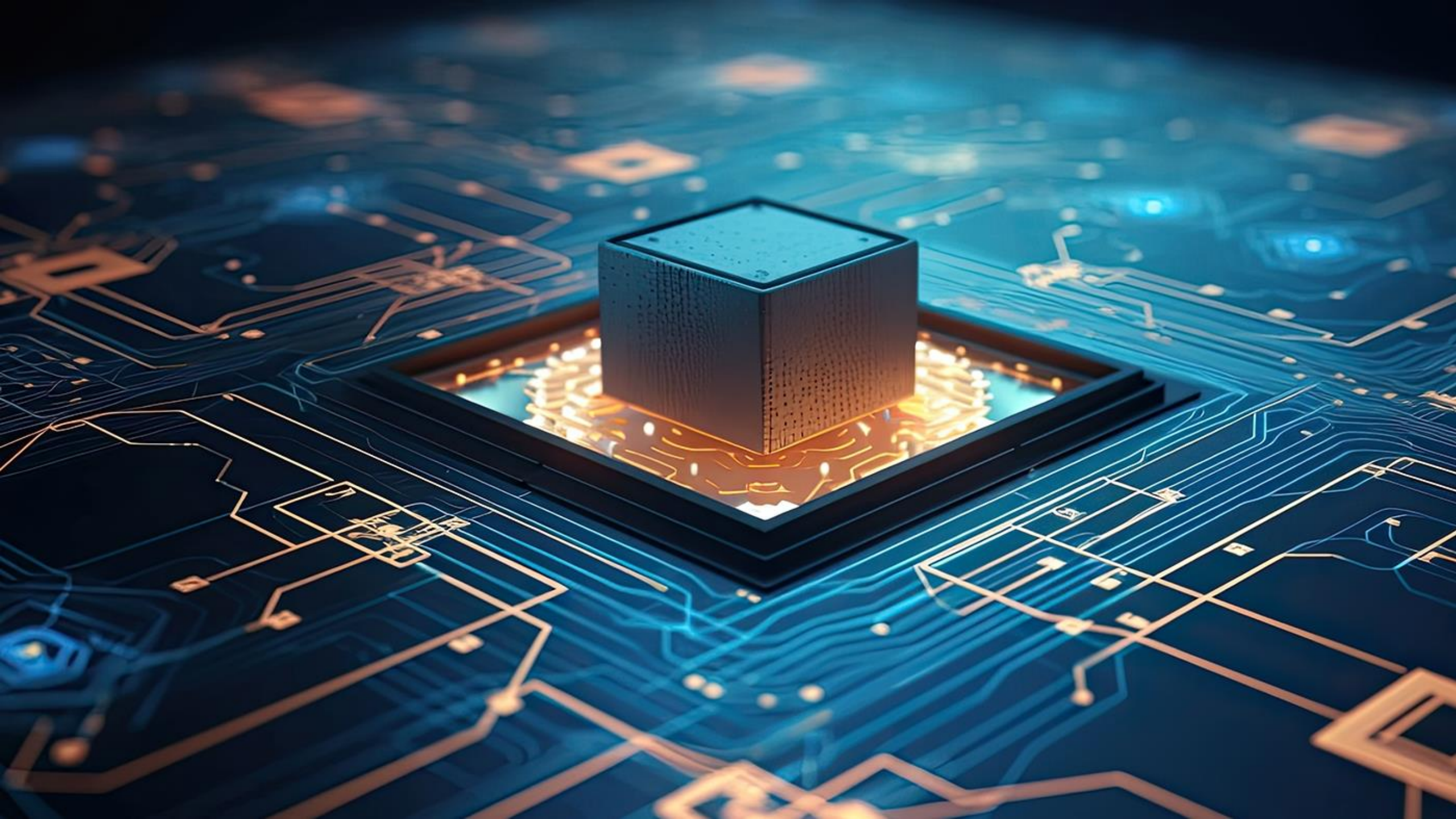
Note: Data centre electricity demand excludes consumption from data network centres.

Sources: IEA forecast based on data and projections from Data Centres and Data Transmission Networks; Joule (2023), Alex de Vries, The growing energy footprint of artificial intelligence; Crypto Carbon Ratings Institute, Indices; Ireland Central Statistics Office, Data Centres Metered Electricity Consumption 2022; and Danish Energy Agency, Denmark's Energy and Climate Outlook 2018.

World Bank: over 1.2 bn population, 16% of the world's population have little or no access to electricity (basic lighting, charge a phone, or power a radio for 4 hours/day), 620 million Africans (2/3 population)




U.S. scientists achieve
nuclear fusion breakthrough



Intel have built the world's largest neuromorphic computer(structured to mimic the human brain) which can perform AI workloads 50 times faster and use 100 times less energy than conventional computing systems that use central processing units (CPUs) and graphics processing units (GPUs).

Hala Point, the World's Largest Neuromorphic System

Largest capacity: 1.15 billion neurons and 128 billion synapses

Fast: 380 trillion synaptic operations per second, 240 trillion neuron operations per second, 16 petabytes per second of memory bandwidth

Scalable: 1,152 Loihi 2 processors with 140,544 neuromorphic cores and 2,304 x86 cores

Efficient: 15 TOPS/W executing sparse deep neural networks with an equivalent 20 quadrillion 8-bit operations per second*

Introducing Intel's most advanced neuromorphic system to date, code-named Hala Point. This system demonstrates state-of-the-art computational efficiencies for more efficient and sustainable AI.

Hala Point could enable advancements in future real-time continual learning, inference, and optimization for applications like science and engineering problem-solving, logistics, smart city infrastructure management, large language models (LLMs) and AI agents.

*Characterization performed with a multi-layer perceptron (MLP) network with 14,784 layers, 2,048 neurons per layer, 8-bit weights stimulated with random noise. The Hala Point implementation of the MLP network is pruned to 10:1 sparsity with sigma-delta neuron models providing 10% activation rates. Results as of testing in April 2024. Results may vary.

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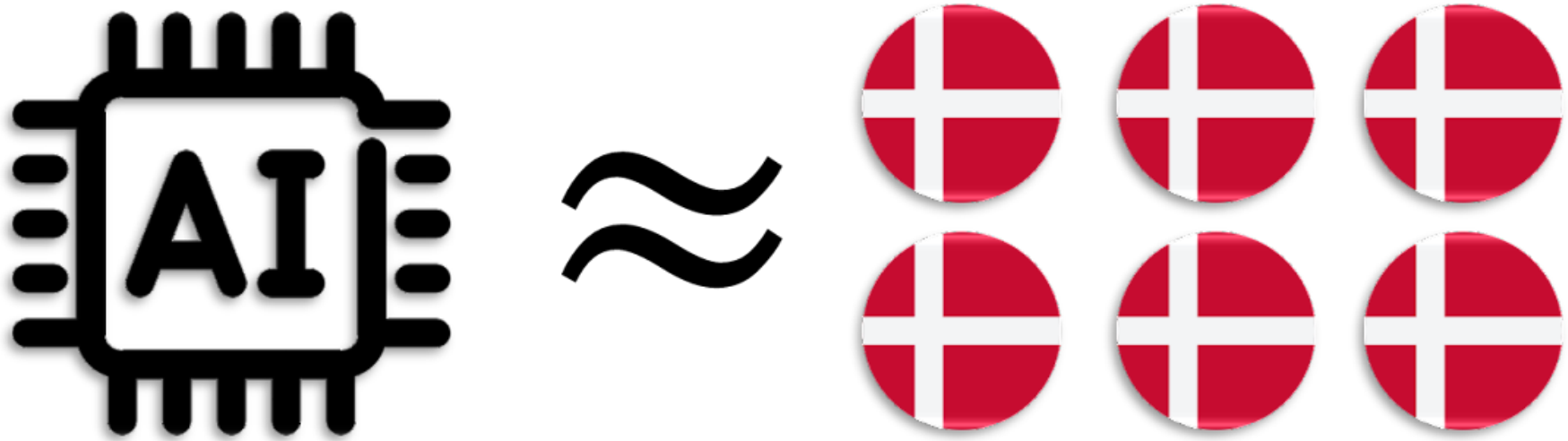
intel.

OCED(Nov 2023) “How much water does AI consume? The public deserves to know” article quote Cornell University findings(Oct 2023) that the global AI demand may be accountable for 4.2 -- 6.6 billion cubic meters of water withdrawal in 2027, which is more than the total annual water withdrawal of 4 – 6 Denmark.

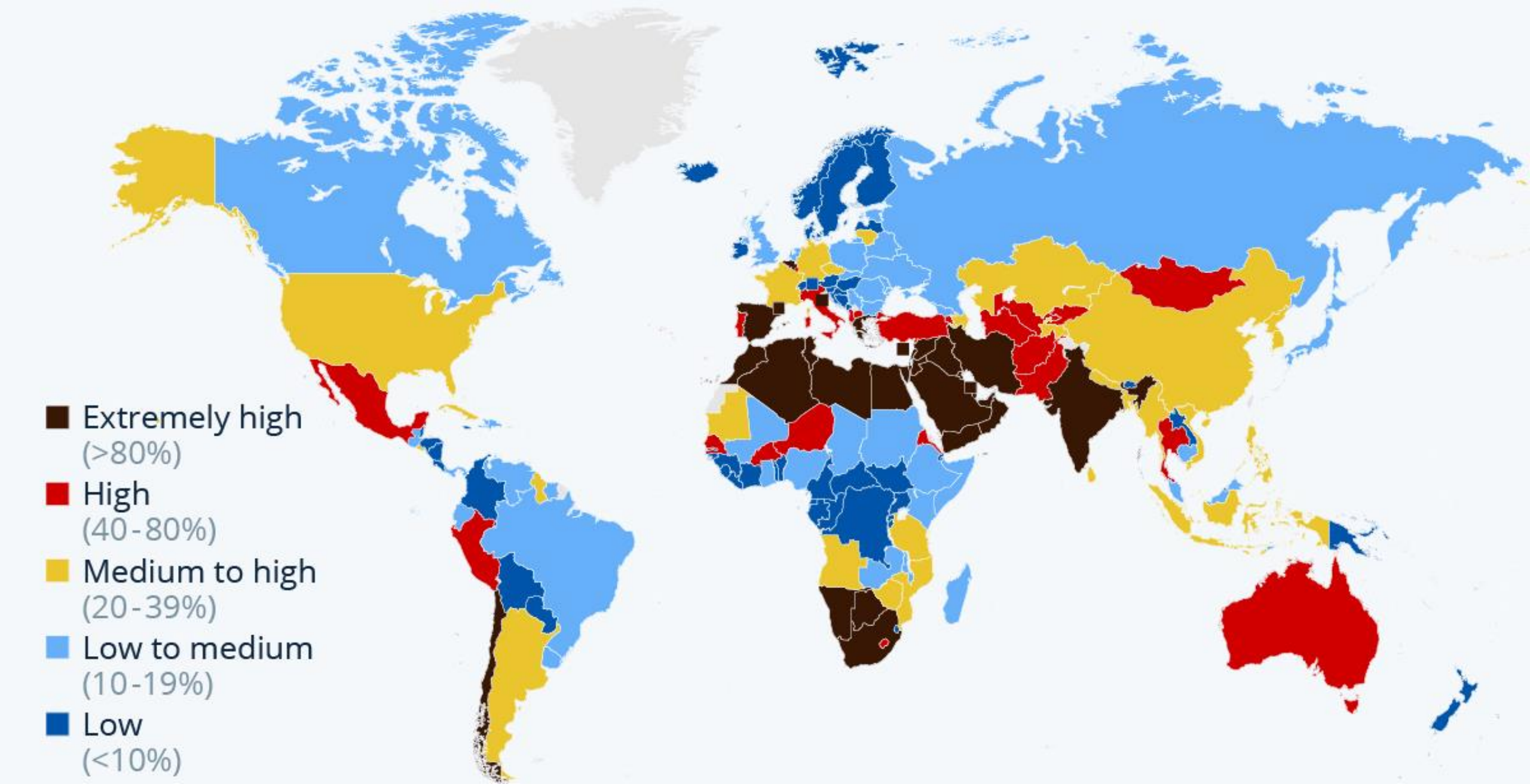
Global AI's Scope 1 & 2 Water Withdrawal in 2027

Est. 4.2~6.6 Billion Cubic Meters



4~6x Annual Water Withdrawal of Denmark

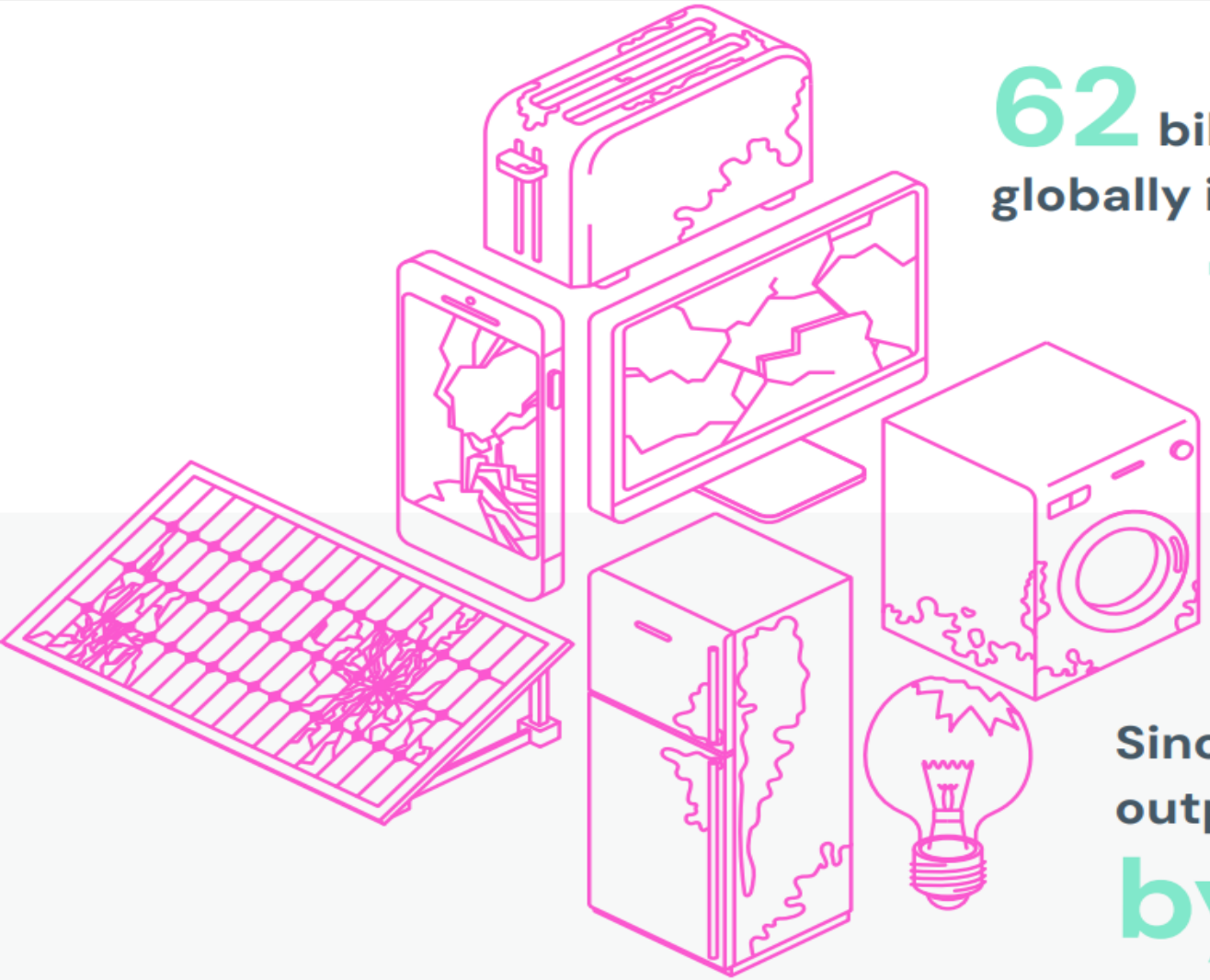
UN(Nov 2023): 2/3 of global population, 6 bn people will face water scarcity by 2050.



CNBC(June 2024): The EU's $2.1 million ASCEND study(11 partners including Orange, HP, Airbus) concluded after 16 months of studies that launching data centres into orbit is technically, economically and environmentally feasible. They aim to deploy 13 space data centres building blocks with a capacity of 10 megawatts in 2036, and 1,300 building blocks by 2050 to achieve 1 gigawatt(power one million home by one hour).

WALL

The Global E-waste Monitors 2024(UN)： In 2022, 62 bn kg of e-waste was generated, 7.8 kg per capita per year, 22.3% of e-waste was recycled in an environmentally sound manner. Since 2010, the growth of e-waste generation is outpacing the formal recycling by 5X.



62 billion kg of e-waste generated globally in 2022.

7.8 kg per capita.

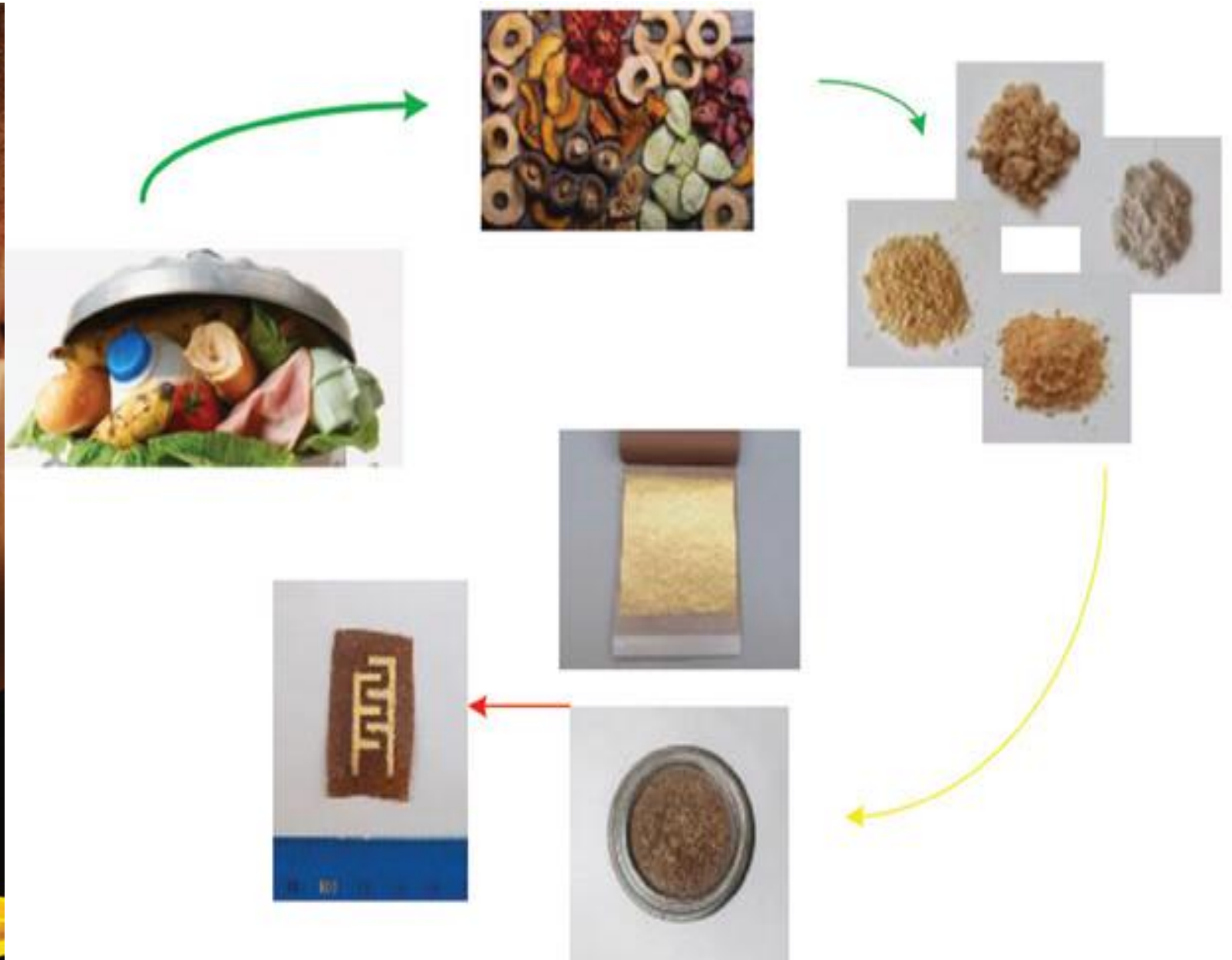
22.3% of this e-waste was documented as formally collected and recycled in an environmentally sound manner.

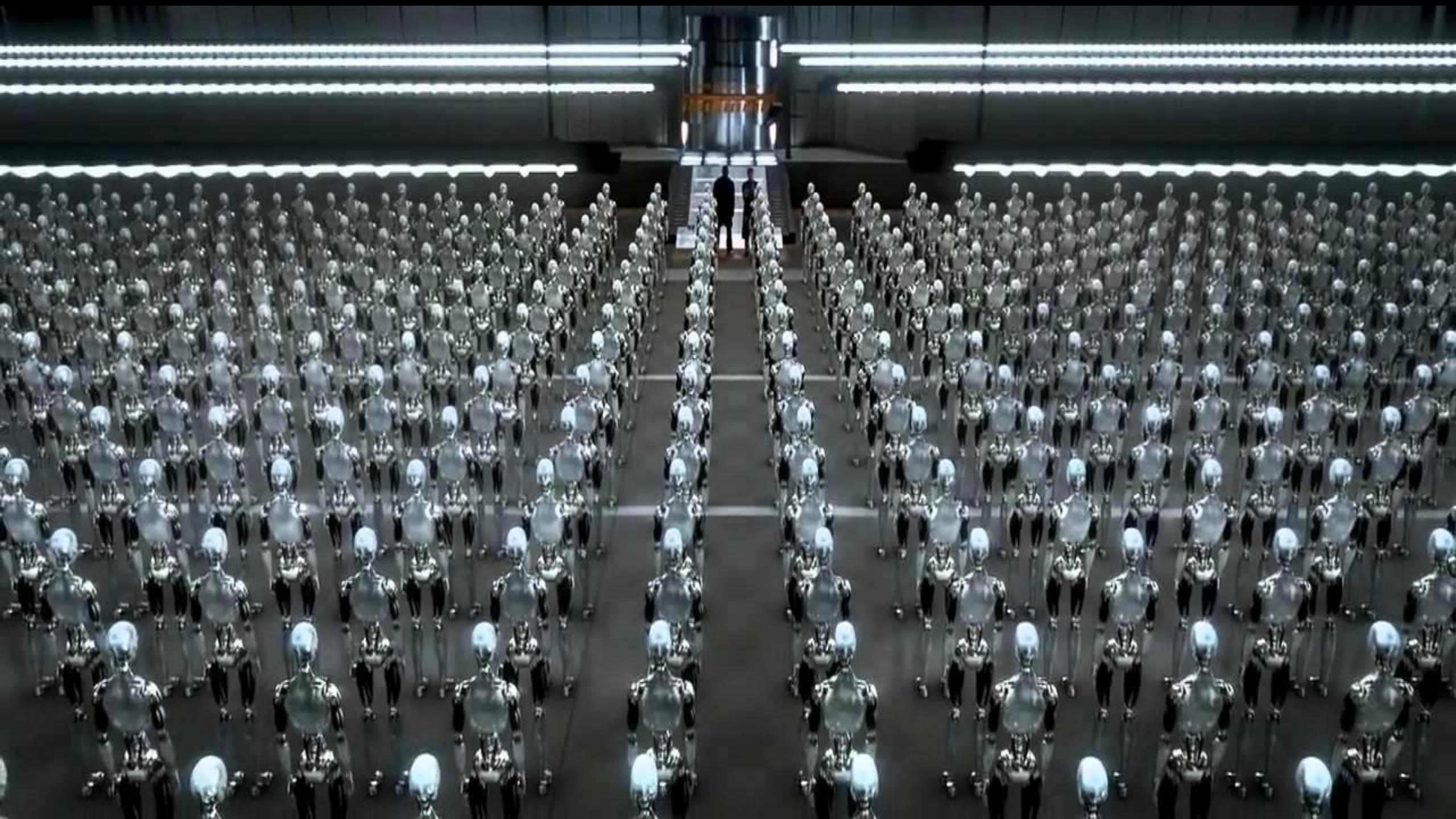
Since 2010, the growth of e-waste generation is outpacing the formal collection and recycling

by almost a factor of 5.

UN (March 2024): Food Waste Index Report 2024, 30% of food is lost or wasted globally, that is one billion meals a day, contribute 10% of greenhouse gas emission, costing the global economy $1 trillion per year.

Wiley(July 2024): An EU funded project to develop a fully functional electronic components using 100% food waste(discarded orange, grapefruit, lemon, apple, banana, potato, and carrot peels), undergo dehydration, pulverization to obtain fine powder. Natural adhesives like water, honey, sugar, starch, and gelatin are used to interconnect the materials.





“Who doesn’t want to see (Star Wars character) C-3PO? I think everyone will want one. So I think the ratio of humanoid robots to humans will probably be at least two to one, something like that.

So, which means like somewhere on the order of 10 billion humanoid robots, maybe 20 or 30 billion”.

Elon Musk
CEO of Tesla
Annual Meeting of Tesla
June 13, 2024

THE TERMINATOR (1984)
I'LL BE BACK
SCENE
THE TERMINATOR FANS

29 Jan 2024: First human to receive Elon Musk's Neuralink Brain Computer Chip

inc.

NEWSLETTERS SUBSC

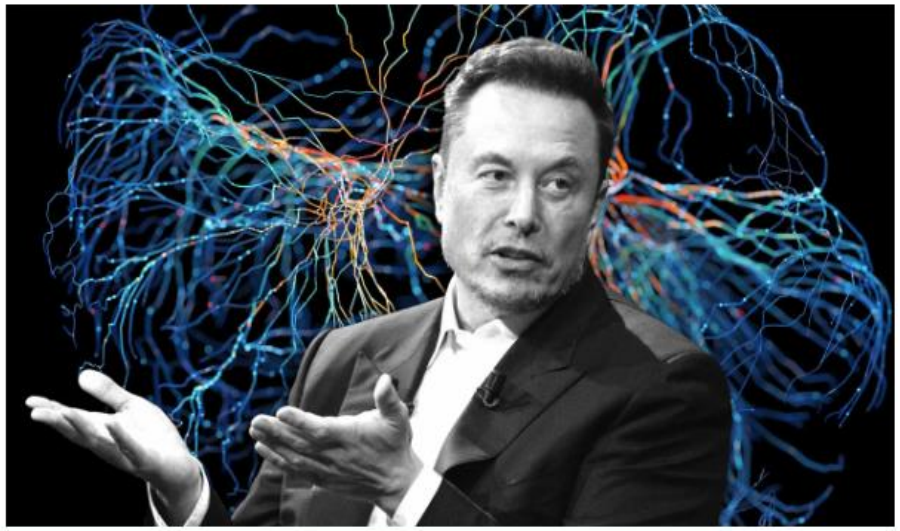
FUTURE OF HEALTHCARE INNOVATION

Neuralink Brain Implant Wins an FDA Nod to Tackle Blindness

The regulatory approval is just the first phase of a long project, but Neuralink owner Elon Musk is already touting his brain implant tech as a world-changing solution for people with vision loss.

BY KIT EATON @KITEATON

SEP 18, 2024



MARKETS BUSINESS INVESTING TECH POLITICS CNBC TV INVESTING CLUB PRO

Brain implant startup backed by Bezos and Gates is testing mind-controlled computing on humans

PUBLISHED SAT, FEB 18 2023•9:00 AM EST

Ashley Capoot
@ASHLEYCAPOOT

SHARE

KEY POINTS

- Synchron is part of an emerging crop of companies testing technology in the brain-computer interface industry.
- The system is implanted through the blood vessels and allows patients to operate technology using only their minds.
- "It helps them engage in ways that we take for granted," Synchron CEO Tom Oxley said.

Philip O'Keefe, one of Synchron's patients in the SWITCH clinical trial, using his BCI.
Source: Synchron

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NEWS

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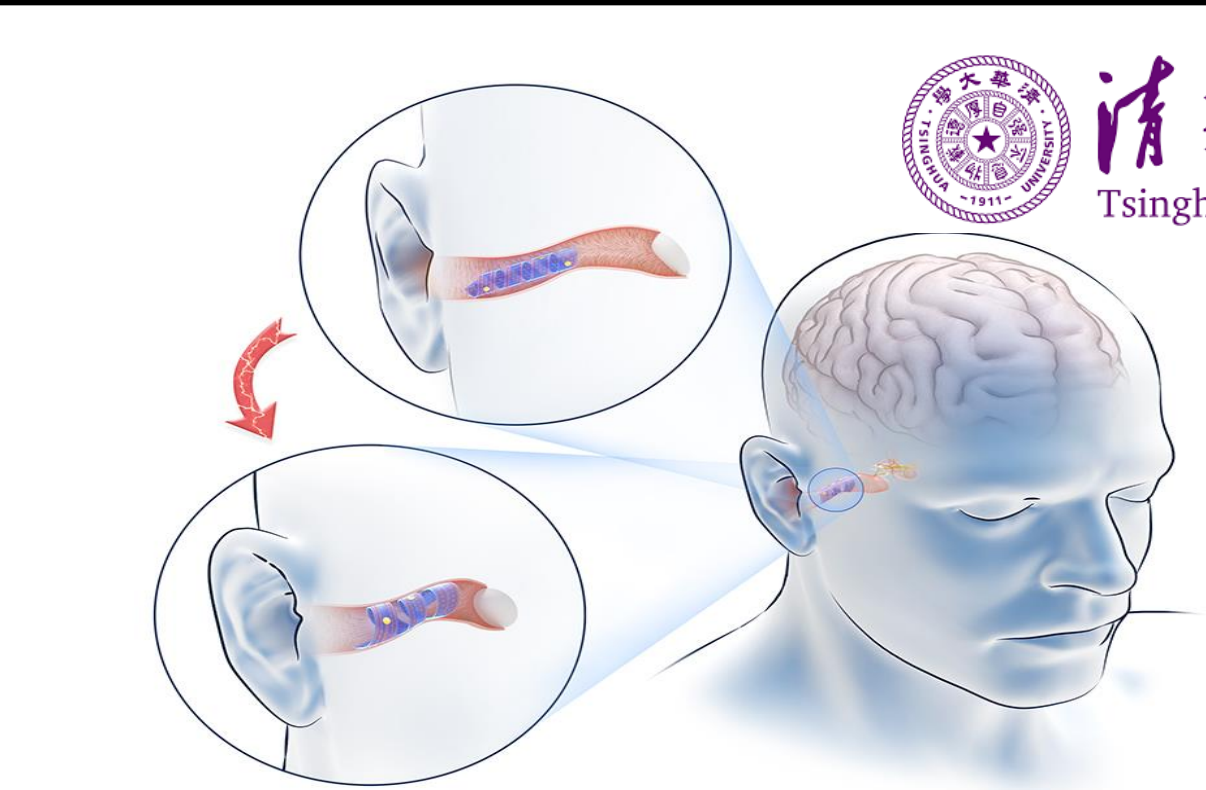
Science & Environment

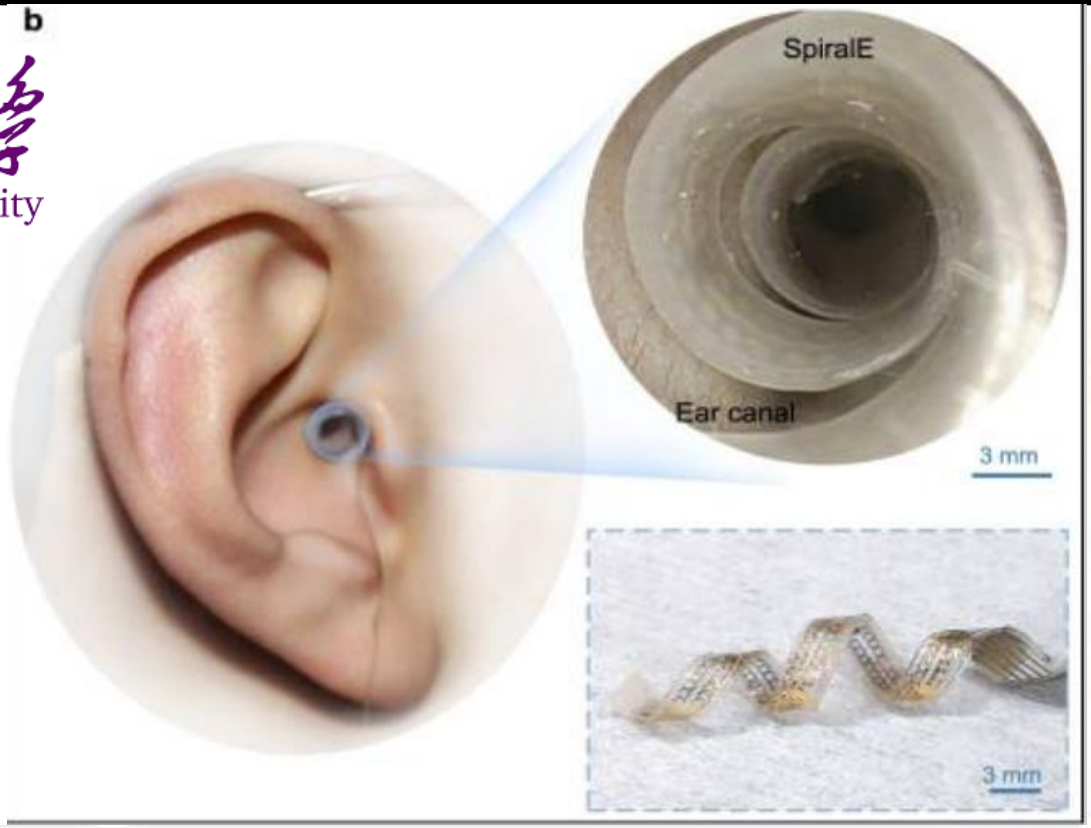
Brain implants help paralysed man to walk again

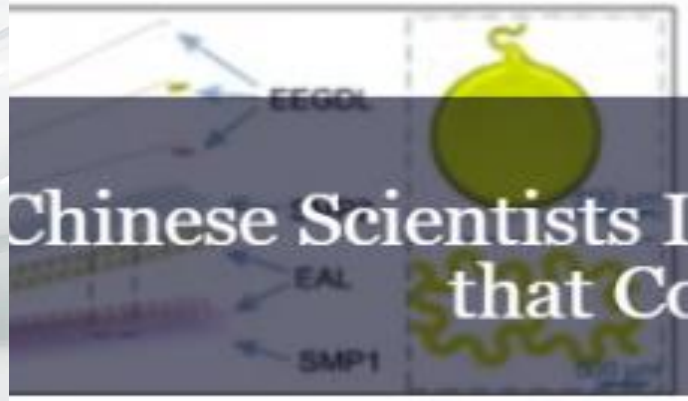
24 May 2023

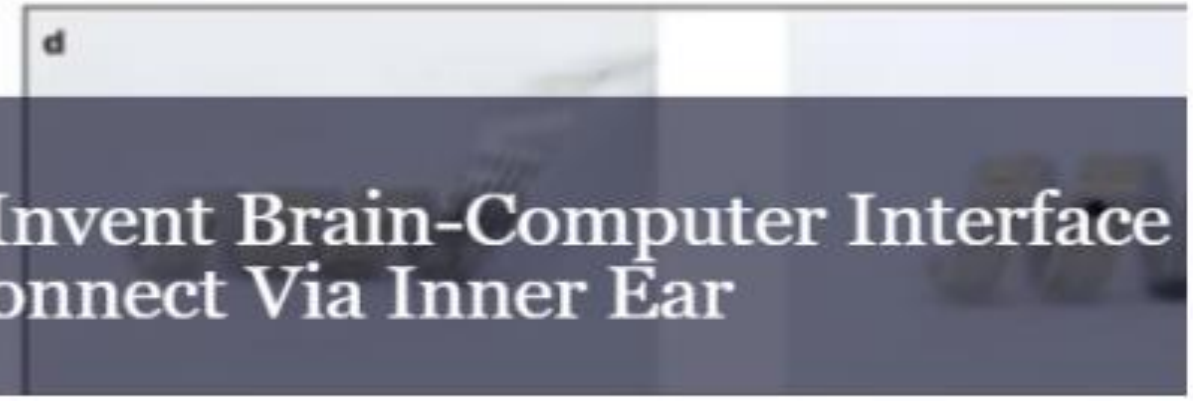
Tsinghua University(July 2023) None Invasive, none surgical Brain Computer Interface- the ultimate solution for human to survive the technological singularity?



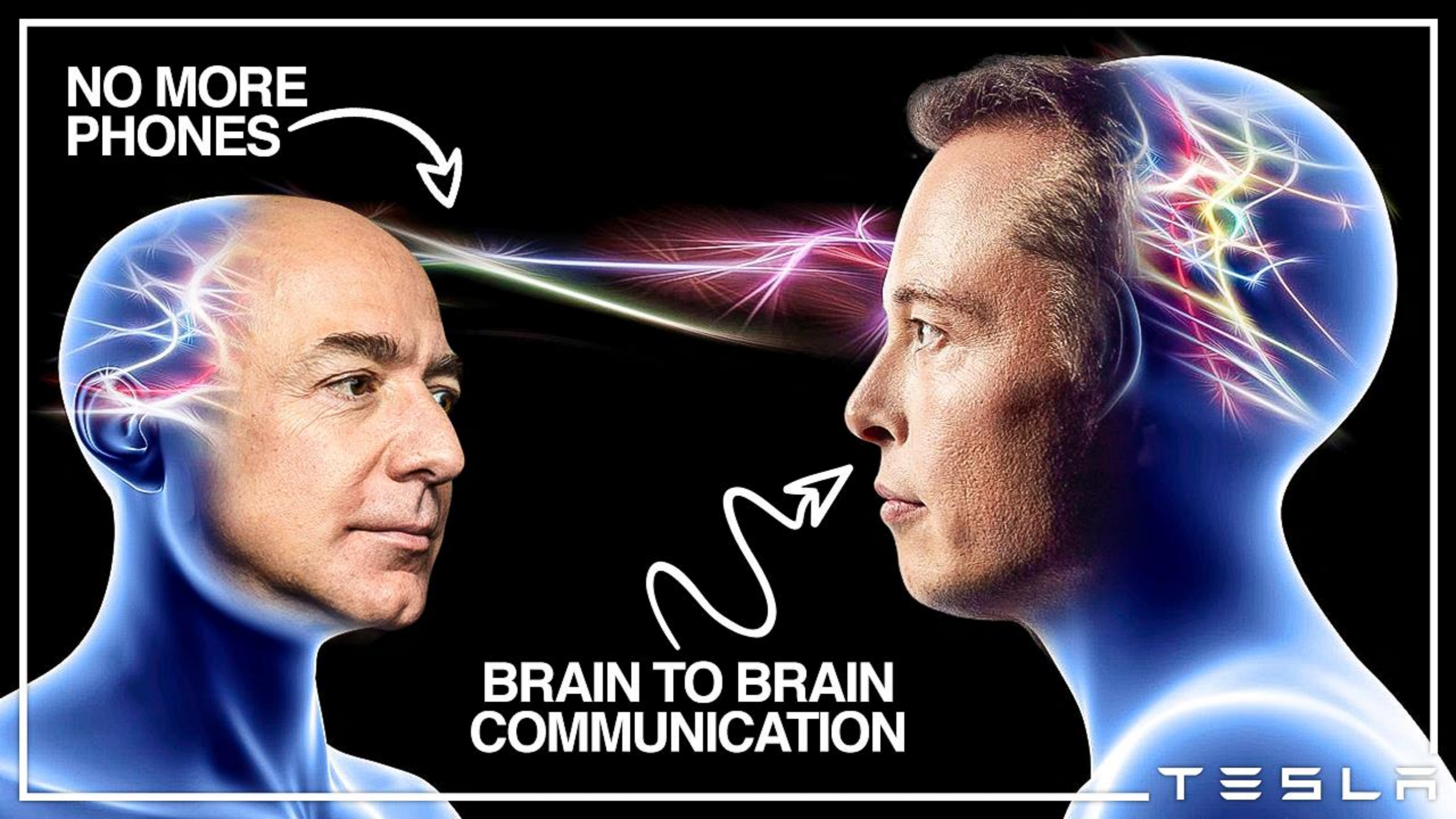
清華大學
Tsinghua University





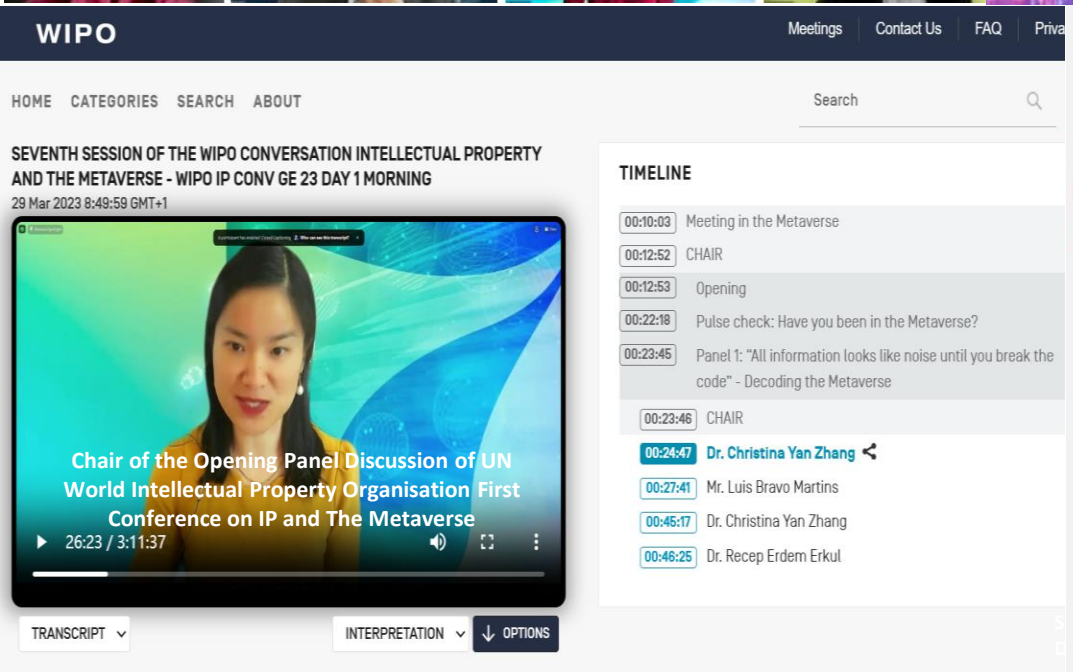


Chinese Scientists Invent Brain-Computer Interface that Connect Via Inner Ear


NO MORE
PHONES
BRAIN TO BRAIN
COMMUNICATION
TESLA

Work across many different UN agencies to lead international standards for emerging technologies. This includes Co-Chair of the UN ITU Task Group on Pre-standardisation for CitiVerse: work with members states to develop the first UN Roadmap on how emerging technologies can be used to create People-centred digital future to support UN Sustainable Development Goals.

Keynote speaker at UNESCO event on using Metaverse for Education and training



"If working apart we are a force powerful to destabilise our planet, surely working together we are powerful enough to save it…

In my lifetime I've witnessed a terrible decline.

In yours, you could and should witness a wonderful recovery."

Sir David Attenborough

COP 26

UN climate conference

Thank
you

Christina@metaverse-institute.org

Christina Yan Zhang

ChristinaYZhang