

# An Open Cocktail of Engineering, AI, DRR....



LI Pan, AI & Big Data Working Group, WFEO-CEIT May 4, 2023



World Federation of Engineering Organizations  
 Fédération Mondiale des Organisations d'Ingénieurs



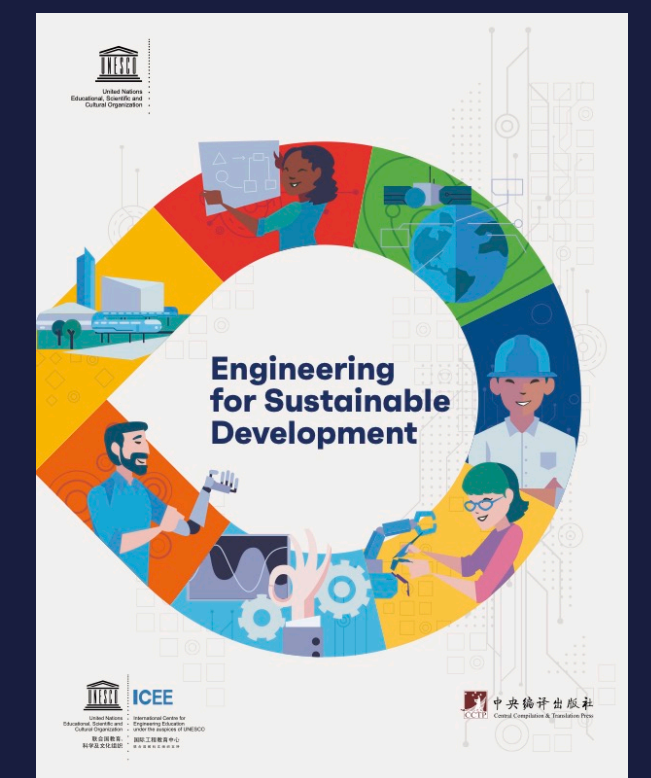
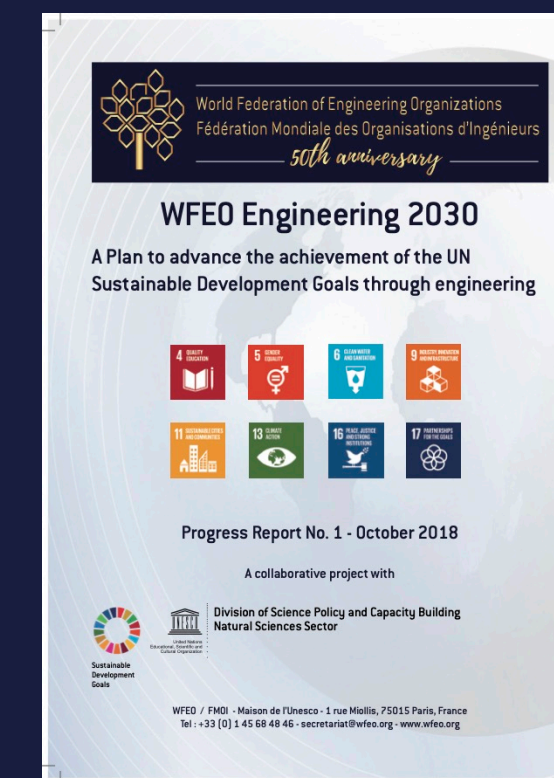
WFEO President Prof. José Vieira  
 addresses at the United Nations 2023 Water Conference

# Engineering for Sustainable Development

- The peak international body for professional engineering institutions
- Founded in 1968, under the auspices of UNESCO
- 100+ national professional engineering institutions
- 12 international and continental/regional professional engineering institutions
- Representing 30 million engineers



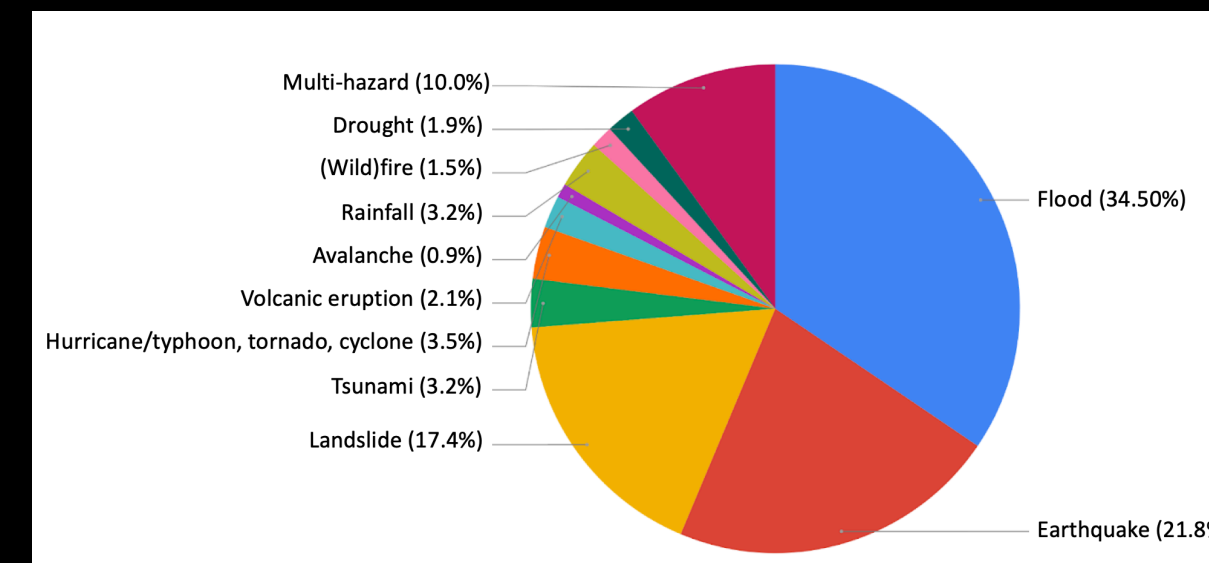
WFEO Academy



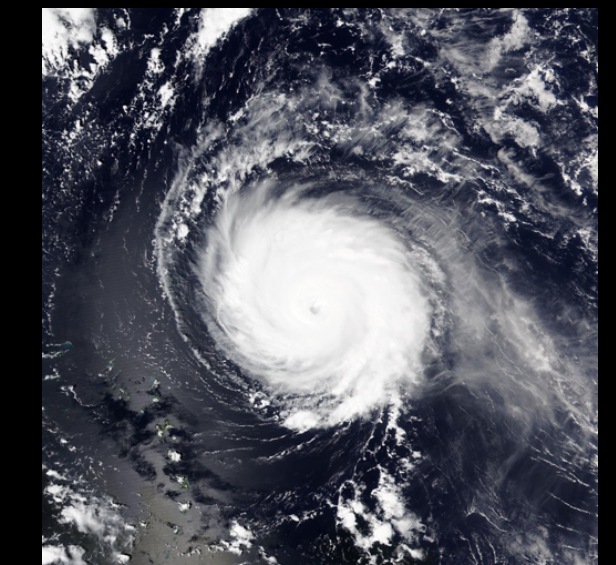
# AI for Disaster Risk Reduction

## How AI can help protect us from disasters

- Understanding natural hazards
- Interoperable and cross-border solutions
- The challenge of refining statistical models
- Optimizing relief resources
- Anticipating earthquakes and tsunamis



Applications of AI on DRR between 2018 and 2021, literature survey



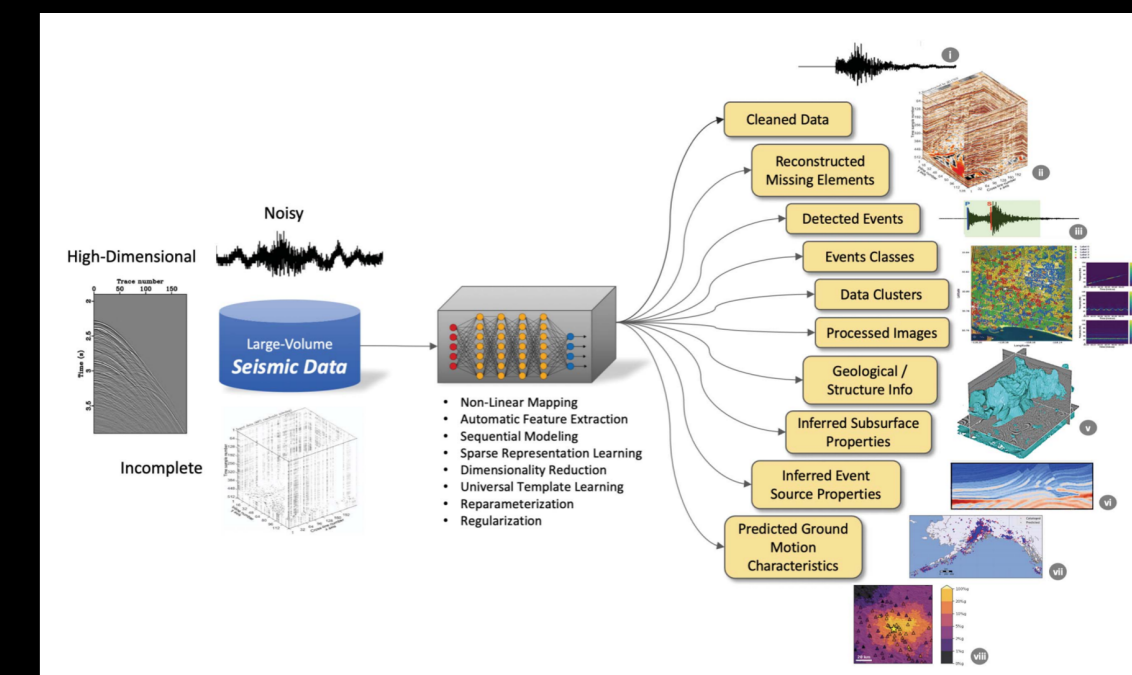
SpaceML Worldview Search identifies Hurricane Sam, 2021

Focus Group on AI for Natural Disaster Management



WORLD  
METEOROLOGICAL  
ORGANIZATION

UN  
environment



Deep-learning seismology, Mousavi & Beroza, 2022, Science



Decision Support System for Fleet and Emergency Management by ELEDIA

# New Era: Generative AI

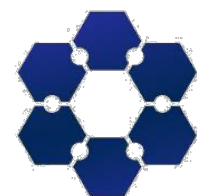
will transform how people live and work



OpenAI



Microsoft



ANTHROPIC

LLMs      Emergent abilities      GPT  
Prompt      Token      Attention Network

Deep Learning, GPUs, Database (Common Crawl)      Transformer

Instruct      Algorithms, Computing Power, Data

Autoregression      RLHF      Alignment

Bigness is better

GPT-4 passed American Uniform Examination in the 90th percentile



Bing

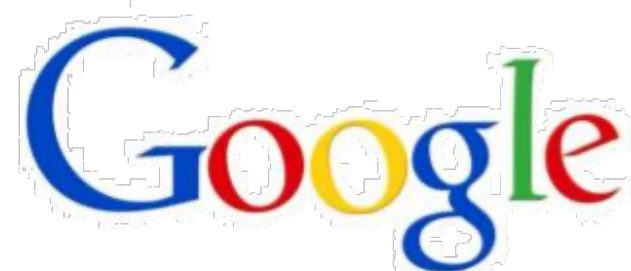
AI21 labs



Meta



文心一言



just too much (papers, codes, models, etc.)  
to follow



MOSS

Bloomberg  
TELEVISION

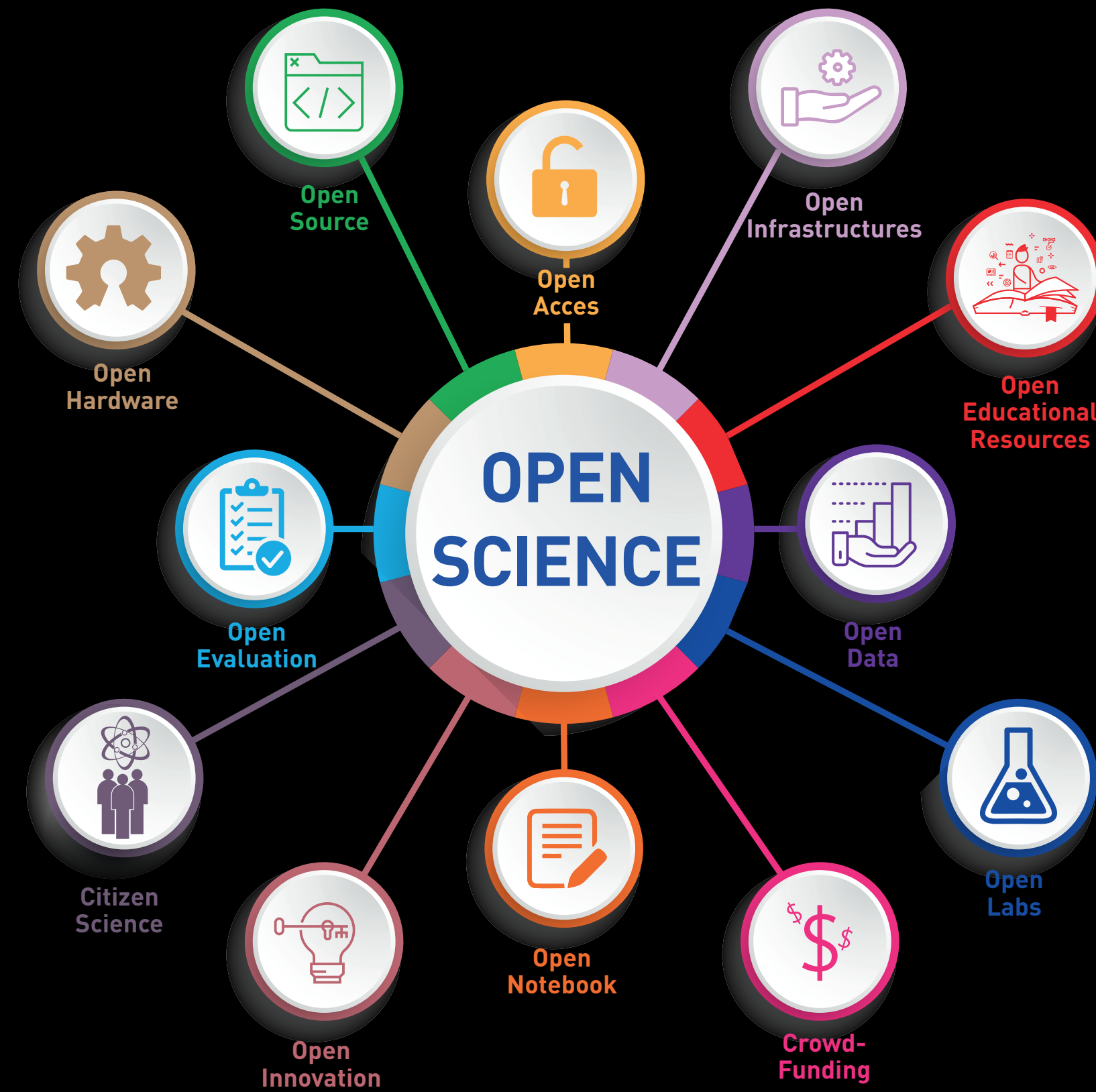


“The limits of my language mean the limits of my world”

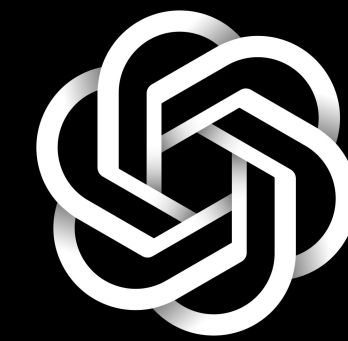
-Ludwig Wittgenstein, Austrian philosopher

# Generative AI and Open Science

## A balance of openness and sustainability



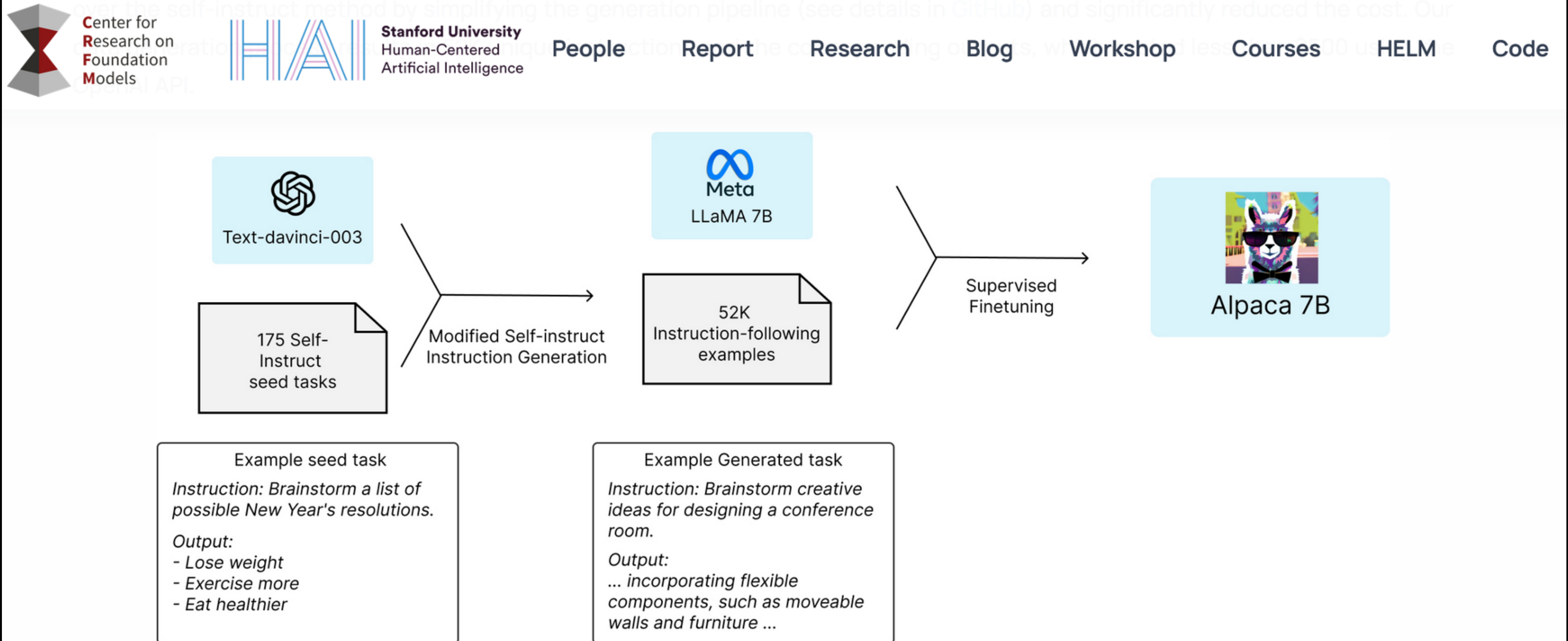
Components of Open Science



Using GPT to translate all STEM classics into different languages

# Open Source AI Model

## Everyone can train his/her own edge/student model



# Excitement, Concerns, Fears

- Improve people's living standard on the Earth
  - Developing new drugs, designing new materials to fight against climate change, realizing fusion power...
  - 10x increase in world GDP
- Rescue us from tedious tasks and routine physical and mental labor
- Empower us as superman capable of writing songs, poem, essays, drawing, coding, etc.



an equal impact as the web browser had in the early 1990s

iPhone Moment for AI

# Excitement, Concerns, Fears

- Spread misinformation, scam people, etc.
- Alignment problems: AI single-mindedly pursue a goal, but in the process do something harmful
- Bias, Privacy, Intellectual-property Rights
- Black Boxes: outrun the creators' understanding and control



The Sorcerer's Apprentice  
by Johann Wolfgang von Goethe



Until maybe a couple of years ago had I been asked what is the most pressing and important conversation we should be having about our future, I might have said climate change or one of the other big challenges facing humanity, such as terrorism, antimicrobial resistance, the threat of pandemics or world poverty.

But today I am certain the most important conversation we should be having is about the future of AI. It will dominate what happens with all of these other issues for better or for worse.

--Jim Al-Khalili, in 2018

Iraqi-British theoretical physicist, author and broadcaster



# Excitement, Concern, Fears

- Elon Musk, feel that generative AI can be a tool for misinformation and could become a huge risk to jobs, or worse, a risk to humanity.

## Pause Giant AI Experiments: An Open Letter

We call on all AI labs to immediately pause for at least 6 months the training of AI systems more powerful than GPT-4.

Signatures

27565

Add your signature

PUBLISHED

March 22, 2023

- Yoshua Bengio, Founder and Scientific Director at Mila, Turing Prize winner and professor at University of Montreal
- Stuart Russell, Berkeley, Professor of Computer Science, director of the Center for Intelligent Systems, and co-author of the standard textbook "Artificial Intelligence: a Modern Approach"
- Bart Selman, Cornell, Professor of Computer Science, past president of AAAI
- Elon Musk, CEO of SpaceX, Tesla & Twitter
- Steve Wozniak, Co-founder, Apple
- Yuval Noah Harari, Author and Professor, Hebrew University of Jerusalem.
- Emad Mostaque, CEO, Stability AI
- .....



Reuters

<https://www.reuters.com> > technology > china-releases-dr... ⋮

### China proposes measures to manage generative AI services

10 Apr 2023 — The **CAC** said that China supports AI innovation and application and encourages use of safe and reliable software, tools and data resources, but ...



Reuters

### EU proposes new copyright rules for generative AI

Companies deploying generative AI tools, such as ChatGPT, will have to disclose any copyrighted material used to develop their systems,...

5 days ago



# The Godfather of AI's Regrets and Worries

## *'The Godfather of A.I.' Leaves Google and Warns of Danger Ahead*

For half a century, Geoffrey Hinton nurtured the technology at the heart of chatbots like ChatGPT. Now he worries it will cause serious harm.

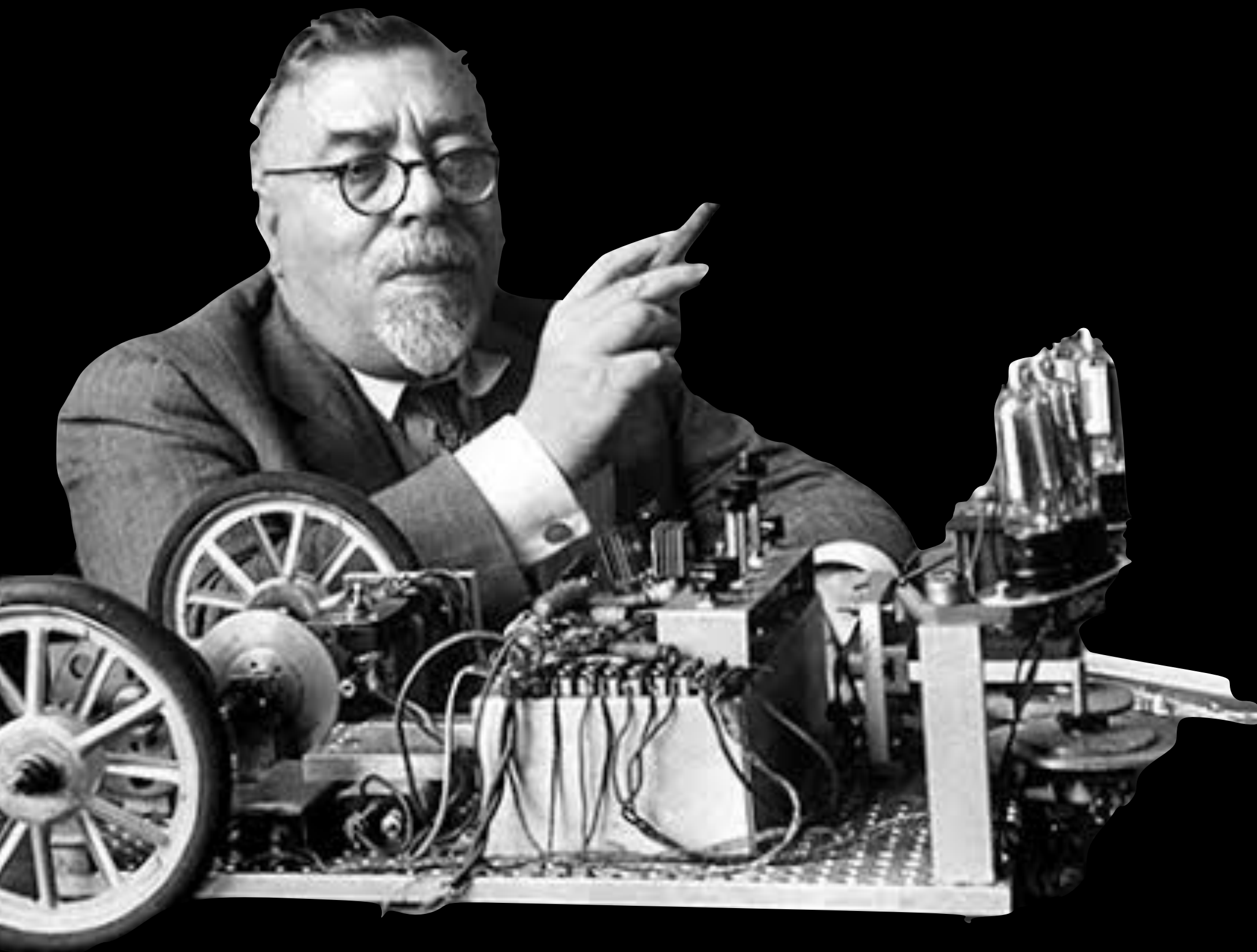
New York Times



# The Godfather of AI's Regrets and Wears

—Geoffrey Hinton

- “Right now, they're not more intelligent than us, as far as I can tell. But I think they soon may be”
- “It is hard to see how you can prevent the bad actors from using it for bad things”
- “Look at how it was five years ago and how it is now. Take the difference and propagate it forwards. That’s scary.”
- Hinton fears that as the world gets filled with fake imagery and text that nobody will be able to tell “what is true anymore”.
- “I console myself with the normal excuse: If I hadn’t done it, somebody else would have”

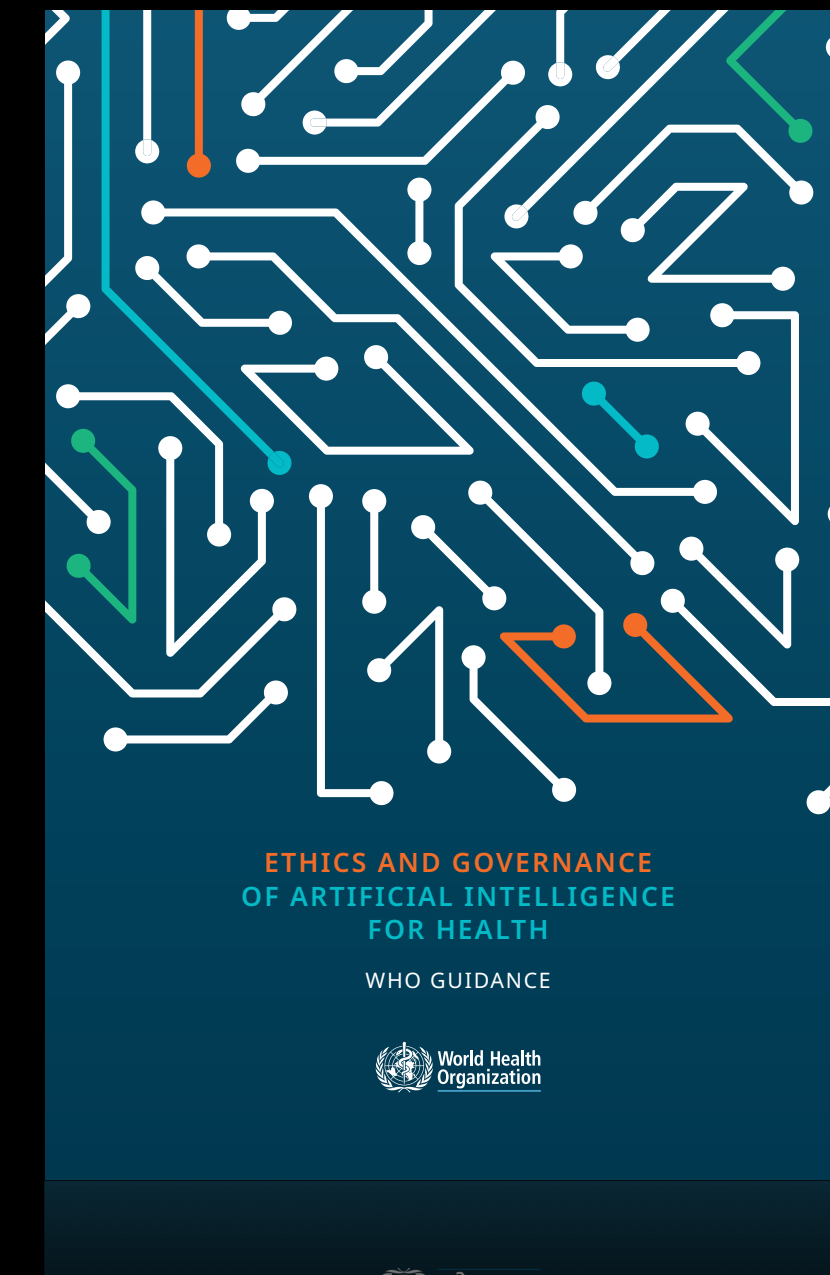


To be effective in warding off disastrous consequences, our understanding of our man-made machines should in general develop *pari passu* [step-by-step] with the performance of the machine. By the very slowness of our human actions, our effective control of our machines may be nullified. By the time we are able to react to information conveyed by our senses and stop the car we are driving, it may already have run head on into the wall.

—Norbert Wiener, American mathematician

# Discreet, Confident, Positive to face this AI New Era

- ChatGPT ≠ Explore, Vision ≠ Visionary
- Machines should work. People should think. - IBM Pollyanna Principle
- Provably safe and beneficial AI is possible and desirable. - Stuart Russell



# Big Data and AI Principles in Engineering

Promoting responsible conduct of Big Data and AI innovation and application in Engineering

- Good for Humanity and Its Environment
- Inclusiveness, Fairness, Public Awareness and Empowerment
- Opening and Sharing while Respecting Privacy and Data Integrity
- Transparency
- Accountability
- Peace, Safety and Security
- Collaboration



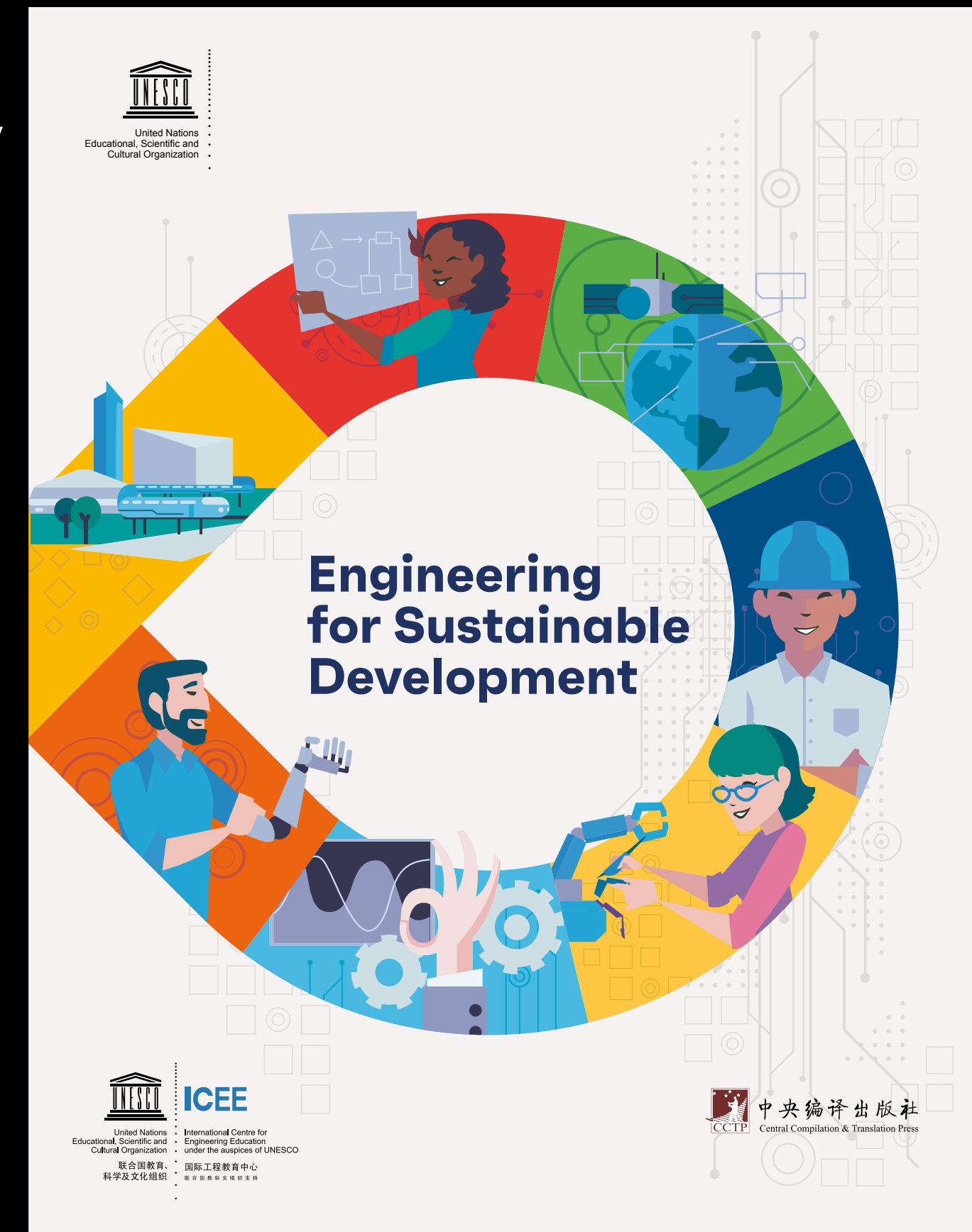
<http://www.wfeo.org/big-data-and-ai-principles-in-engineering/>

Created by Nozen/Watercolor Model

# Recommendations

To accelerate the development of AI with human values for sustainable development,

- Promote international and interdisciplinary cooperation between academic institutions, universities and industry, as well as civil society across the world, and advance AI innovation and applications for the implementation of the Sustainable Development Goals.
- Promote international dialogue to reach a global consensus on AI governance, and adopt global principles, guidelines and standards for the responsible conduct of AI.
- Promote AI education and literacy to help people adapt to the AI era, engineers to conduct responsible application and innovation, and all actors, especially business leaders and policy-makers, to make informed decisions, with special efforts to narrow the digital divide between rich and poor countries to ensure that the benefits can be shared by all and 'leaves no one behind'.





# Thank you!

[www.wfeo.org](http://www.wfeo.org)

[lipankit@163.com](mailto:lipankit@163.com)



Created by Nozen/Watercolor Model  
Prompt: a cocktail martini glass with  
UN SDGs circle, AI, engineering, open  
science, DRR inside, transparent  
background, horizontal view