

# summing up... who are you?



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA

DEPARTMENT  
OF PHYSICS AND ASTRONOMY  
"AUGUSTO RIGHI"

## 7th Physical Sensing and Processing Summer School

REGISTRATION  
DEADLINE  
June 30th

# PHYSICS

2nd edition

## FOR A BETTER PLANET

In English  
Up to 50 participants  
No participation fee  
Lunch and  
coffee breaks provided

07/11  
JULY  
2025

ACCELERATORS  
AI  
BIOINFORMATICS  
CLIMATE  
GEOPHYSICS  
HEALTH  
MATERIALS  
SOCIETY

### ORGANIZATION COMMITTEE:

Daniel Remondini, Nico Curti, Claudia Testa,  
Luca Pasquini, Filippo Zaniboni, Cristian Vignali

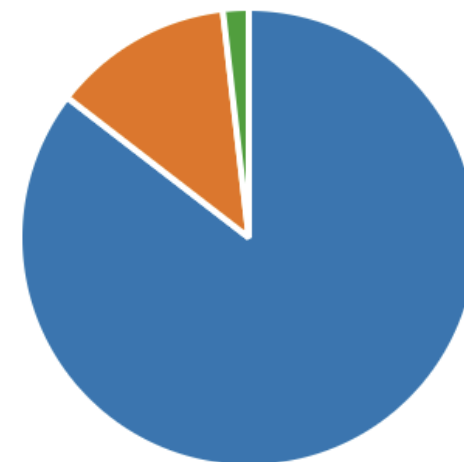
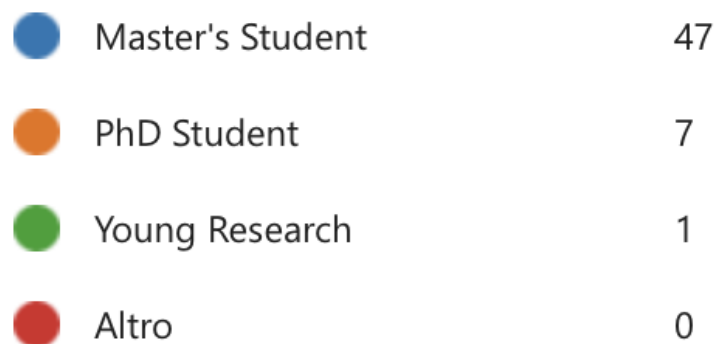
### INVITED SPEAKERS:

Irene Farabella, Istituto Italiano di Tecnologia – Genova  
Fabio Monforti, Joint Research Centre – European Commission  
James Grist, Oxford University – Oxford  
Donato Vincenzi, University of Ferrara – Ferrara  
Stefano Bastianini, Department of Biomedical and Neuromotor Sciences – Bologna  
Antonio Buonerba, University of Salerno  
Roberto Piacentini, University of Sacro Cuore  
Camilla Marella, Fisica Medica - Arcispedale S. Maria Nuova












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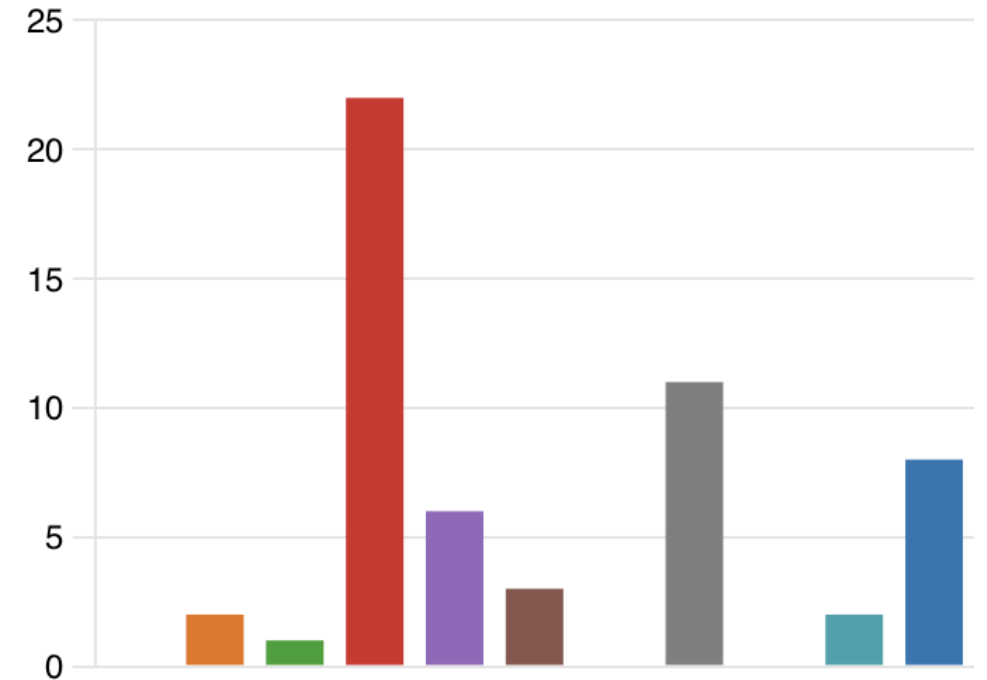


# Academic position








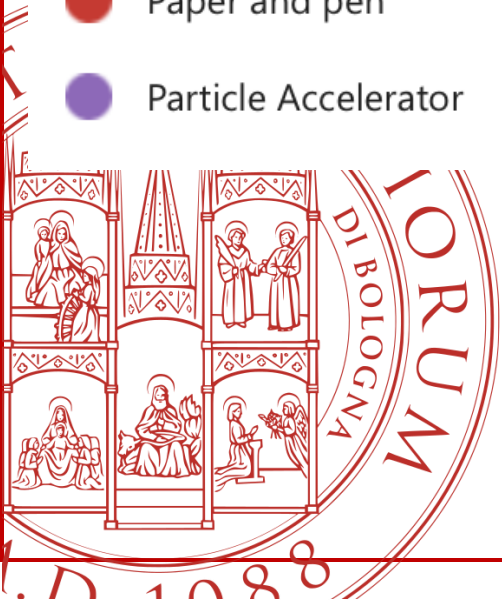
# Curriculum

	Astrophysics	0
	Nuclear Physics	2
	Subnuclear Physics	1
	BioMedical Physics	22
	Complex Systems	6
	Theoretical Physics	3
	Didactic Physics	0
	Material Physics	11
	GeoPhysics	0
	Climate and Atmosphere	2
	Computational Physics	8



# Expertise

	Microscope	7
	Telescope	0
	Computer	36
	Paper and pen	5
	Particle Accelerator	6



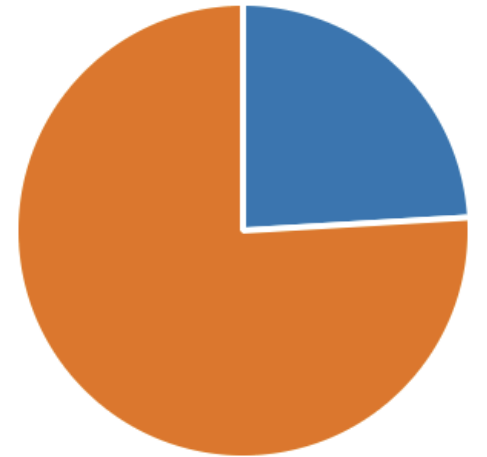
# The biggest dilemma!

 Tortellino

13

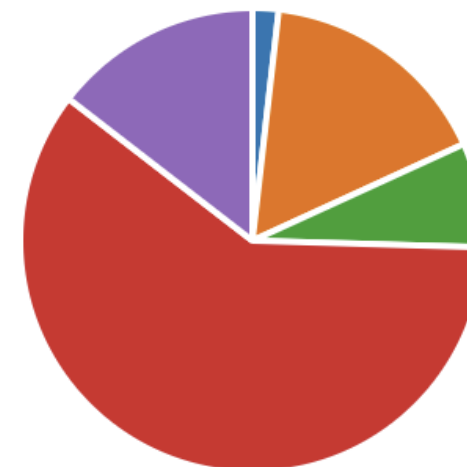
 Lasagna

41

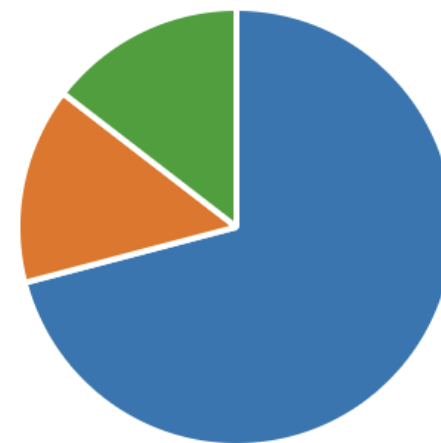
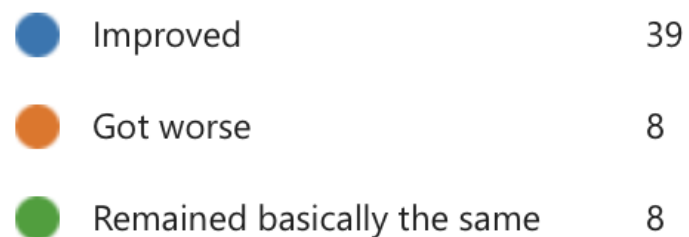


# Is AI better than us?

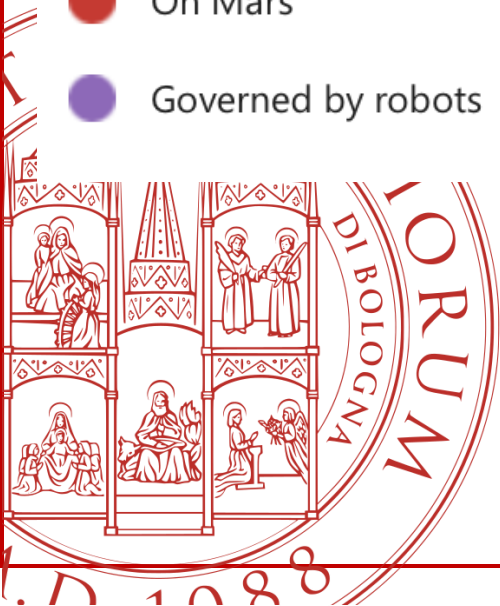
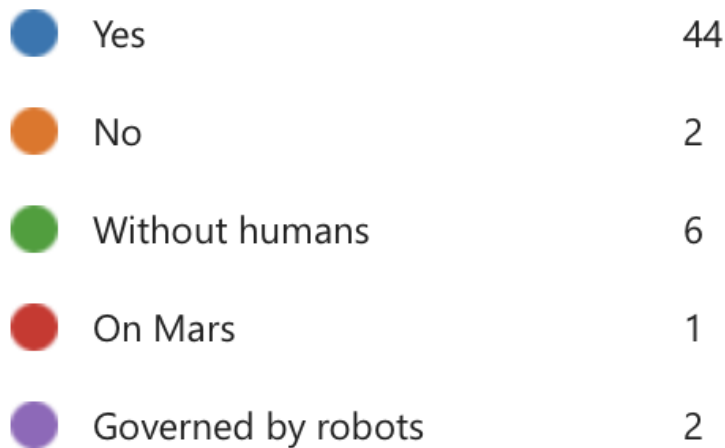
Yes	1
Yes but not for creative stuff	9
No	4
No but it can help us	33
I put yes because I fear that the...	8



# Has the world improved in the last 50 years?



# Do you believe in the possibility of a better planet

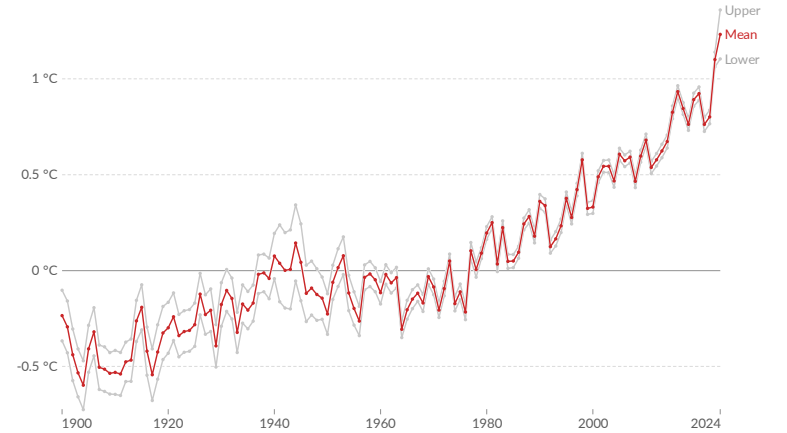




# Alert signs (for the planet)

## Average temperature anomaly, Global

Global average land-sea temperature anomaly relative to the 1961-1990 average temperature.



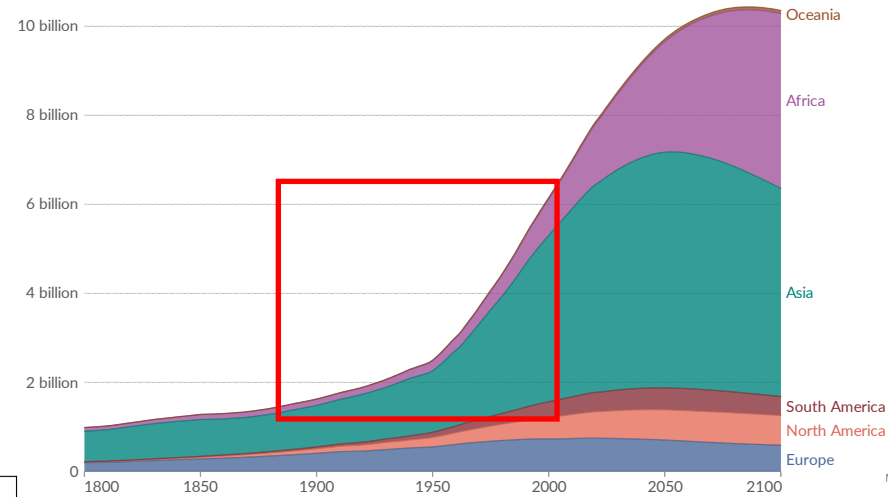
Data source: Met Office Hadley Centre (2024)

OurWorldInData.org/co2-and-greenhouse-gas-emissions | CC BY

Note: The gray lines represent the upper and lower bounds of the 95% confidence intervals.

## Population by world region

Historic estimates with future projections based on the UN medium-fertility scenario.

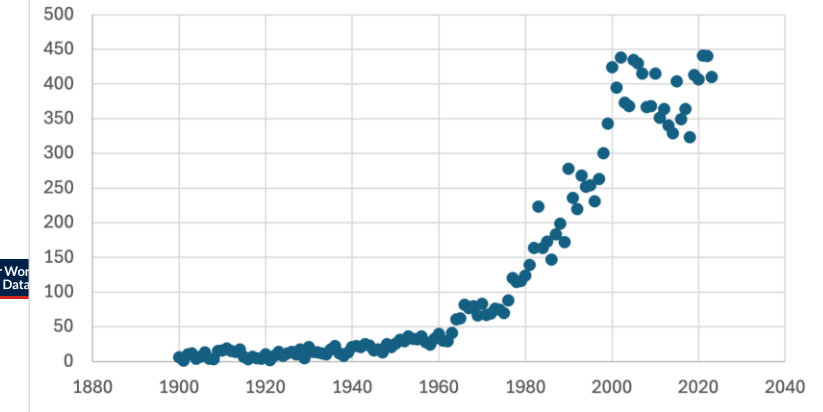


Data source: HYDE (2017); Gapminder (2023); UN (2022)

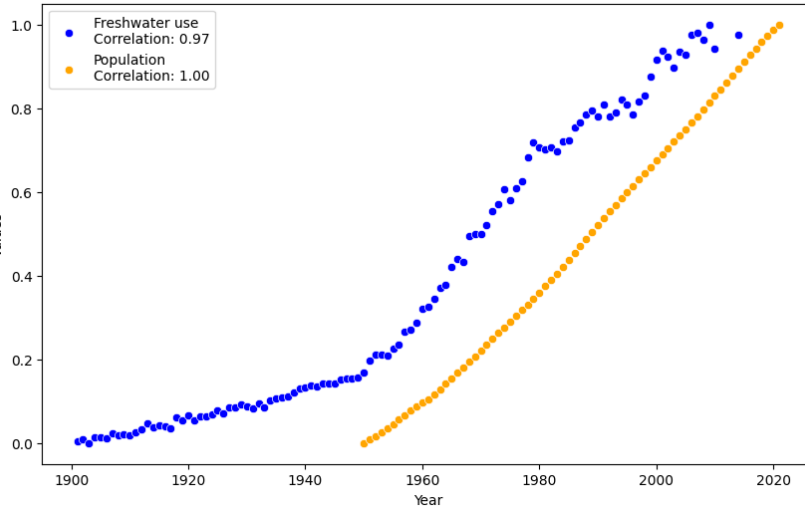
Note: Historical country data is shown based on today's geographical borders.

[OurWorldInData.org/population-growth](https://OurWorldInData.org/population-growth)

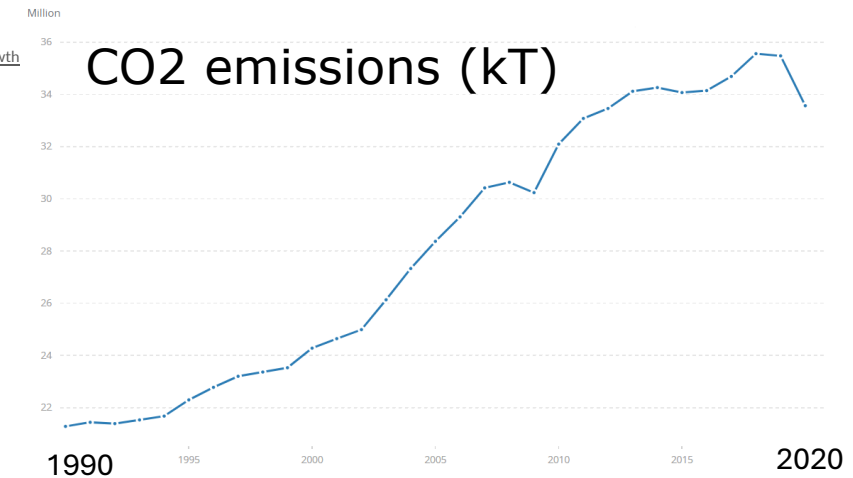
## Number of natural disasters



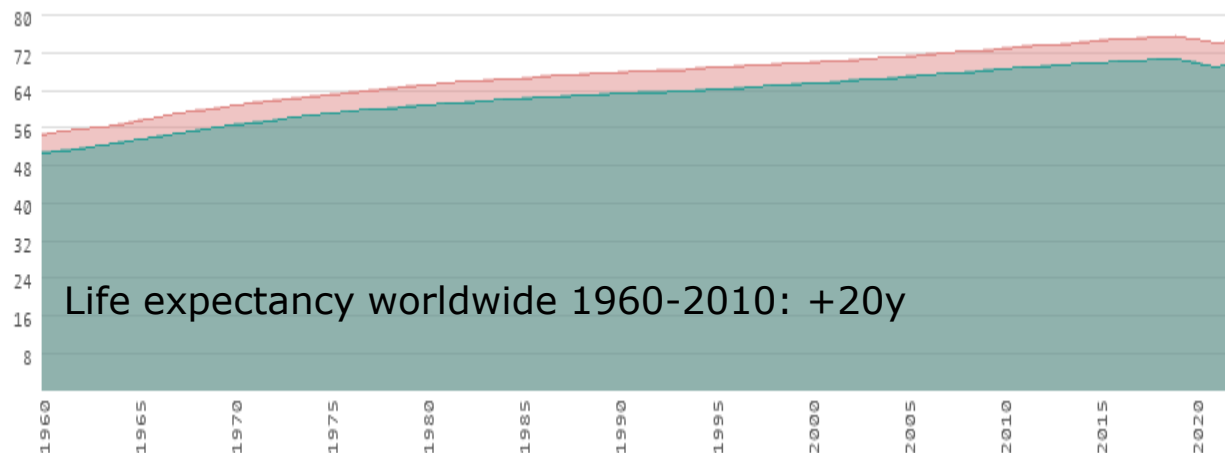
## Freshwater Use and Population over Years in the World



## CO2 emissions (kT)

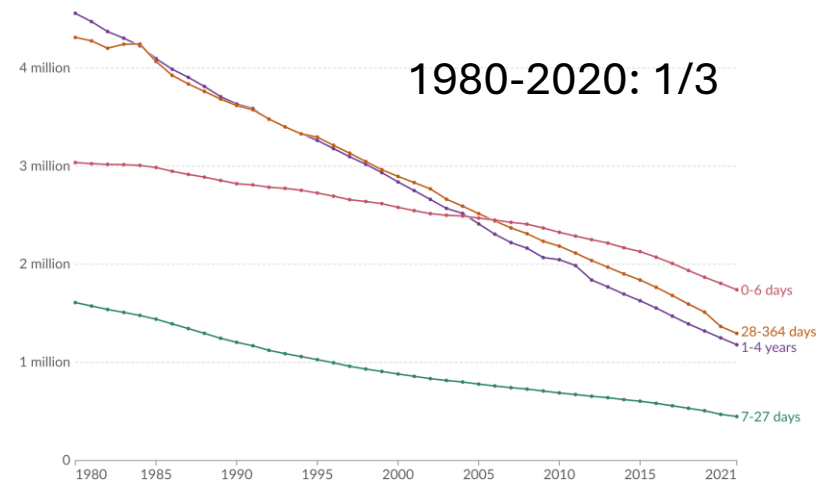


# Positive signs (for humans)



## Child deaths in the first five years of life by age group, World

Number of children who died before reaching the age of five. Shown by the time period in which they died.

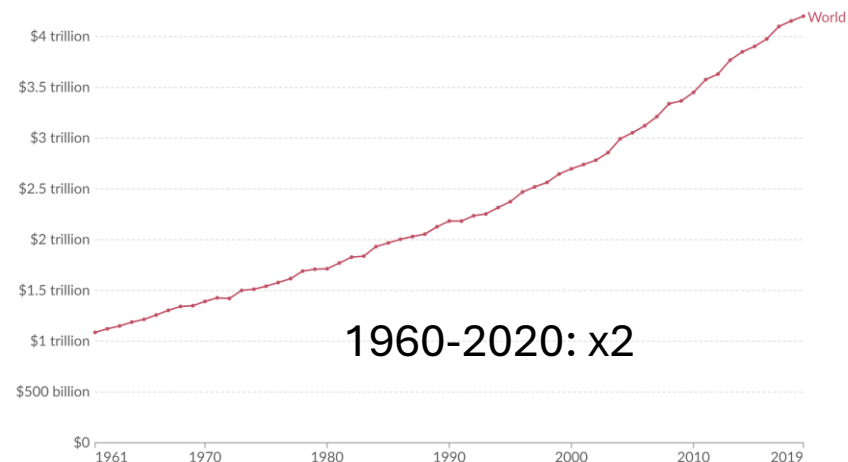


Data source: IHME, Global Burden of Disease (2024)

OurWorldInData.org/child-mortality | CC BY

## Agricultural output, 1961 to 2019

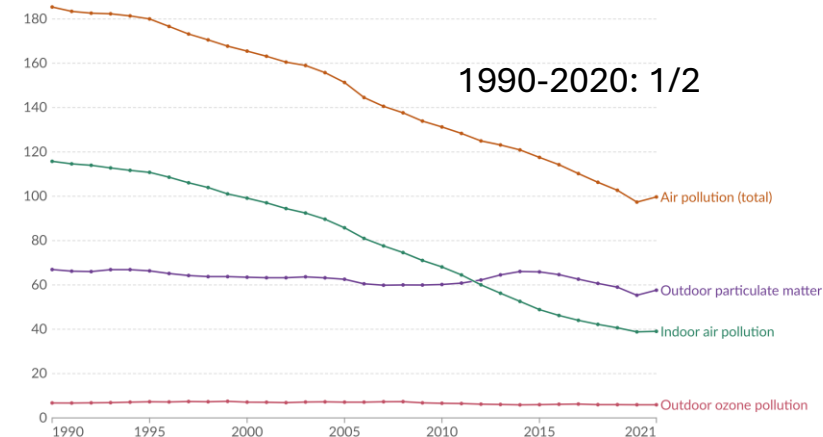
Total agricultural output is the sum of crop and livestock products. It is measured in constant 2015 US\$, which means it adjusts for inflation.



Data source: United States Department for Agriculture (USDA) Economic Research Service  
OurWorldInData.org/agricultural-production | CC BY

## Death rate from air pollution, World

Estimated number of deaths attributed to different types of air pollution per 100,000 population. Deaths can be attributed to multiple risk factors.



Data source: IHME, Global Burden of Disease (2024)

Note: To allow for comparisons between countries and over time, this metric is age-standardized<sup>1</sup>.

OurWorldInData.org/air-pollution | CC BY

1. Age standardization: Age standardization is an adjustment that makes it possible to compare populations with different age structures by standardizing them to a common reference population. [Read more: How does age standardization make health metrics comparable?](#)

Human population growth is an issue (finite space/resources)

What can we do as physicists?

- **Monitor** system state (by extracting good data)
- Identify most **impactful** interventions (eg on fresh water!)
- Find solutions to **reduce** "human impact on planet per capita"

How can we do that?

- Science & technology: energy sources, novel materials, food production & transport & irrigation optimization, climate & pathogen surveillance, but also simply increasing awareness!

# Some summer lectures

## **Artificial intelligence**

A brief history of artificial intelligence (Michael Woolridge)

Life 3.0 (Max Tegmark)

Fourth revolution (Luciano Floridi)

## **Social networks**

Hype machine (Sinan Aral)

Social physics (Alex Pentland)

## **Statistics & data analysis**

Drunkard's walk (Leonard Mlodinow)

The signal and the noise (Nate Silver)

Innumeracy (John Allen Paulos)

## **Complex systems & networks**

Chaos (James Gleick)

Nexus (Mark Buchanan)

Synchrony (Steven Strogatz)

## **Neuroscience & psychology**

Thinking fast and slow (Daniel Kahneman)

Moonwalking with Einstein: the art and science of remembering everything (Joshua Foer)



*You will receive the  
certificates of attendance  
automatically on your email*

