



16th Open Symposium

Science Winning the Race

AI, a fuel for the future?

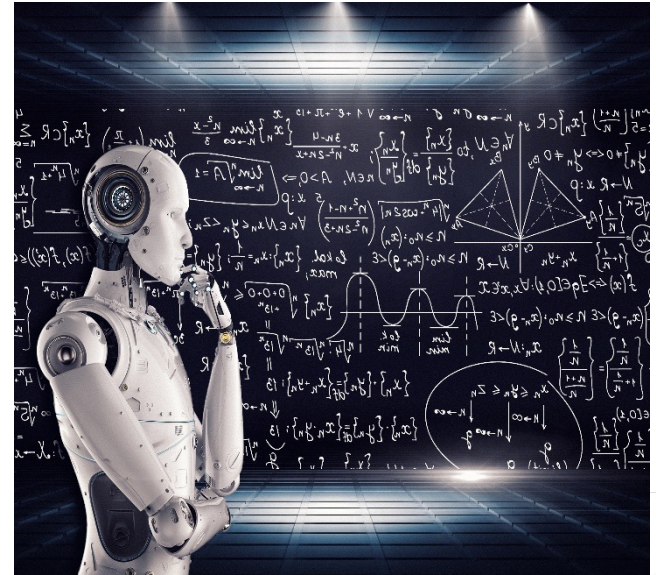
Matt Barfield, on behalf of the EBF

15-17 November 2023, Barcelona

Relevance and timeliness of the topic

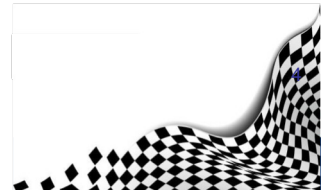
➤ The relevance and timeliness of the topic of Artificial Intelligence (AI) cannot be overstated. We are currently in an era where AI is rapidly evolving and becoming an integral part of various sectors:

- **Technological Advancements**
- **Large Datasets**
- **Widespread Application**
- **Economic Impact** – ≈\$15.7 trillion by 2030
- **Societal Impact** - address societal issues e.g. climate change/disease diagnosis. Raises concerns around job displacement, privacy, and security
- **Policy and Regulation:**



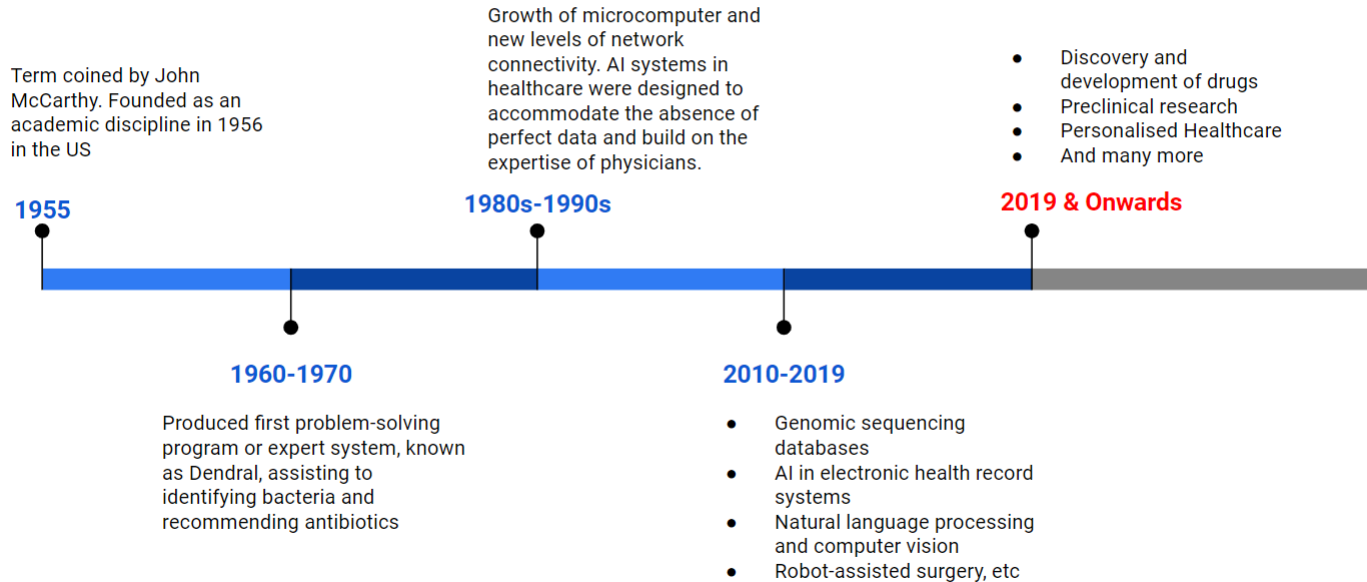
Society Impact example - climate change??

- **Climate Modeling and Prediction:** AI can analyze vast amounts of climate data to improve the accuracy of climate models and predictions. Machine learning algorithms can identify patterns and trends that can help predict future climate scenarios.
- **Monitoring Deforestation:** AI can analyze satellite images to monitor deforestation and changes in land use. This can help enforce policies aimed at preserving forests and reducing carbon emissions.
- **Energy Efficiency:** AI can optimize energy use in buildings, factories, and homes, reducing greenhouse gas emissions. For example, Google used AI to reduce the energy used for cooling its data centres by 40%.
- **Renewable Energy:** AI can optimize the generation and distribution of renewable energy. For example, it can predict wind patterns to optimize the operation of wind turbines, or it can manage the flow of electricity from solar panels into the grid.
- **Carbon Capture and Storage:** AI can optimize the process of carbon capture and storage, a technology that captures carbon dioxide emissions and stores them underground to prevent them from entering the atmosphere.
- **Climate Change Mitigation:** AI can help design and optimize strategies for climate change mitigation, such as reforestation efforts or carbon pricing policies.
- **Climate Change Adaptation:** AI can help communities adapt to climate change, for example by predicting extreme weather events or rising sea levels.

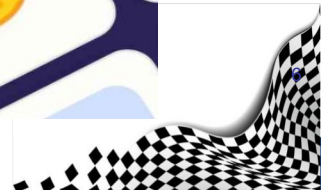
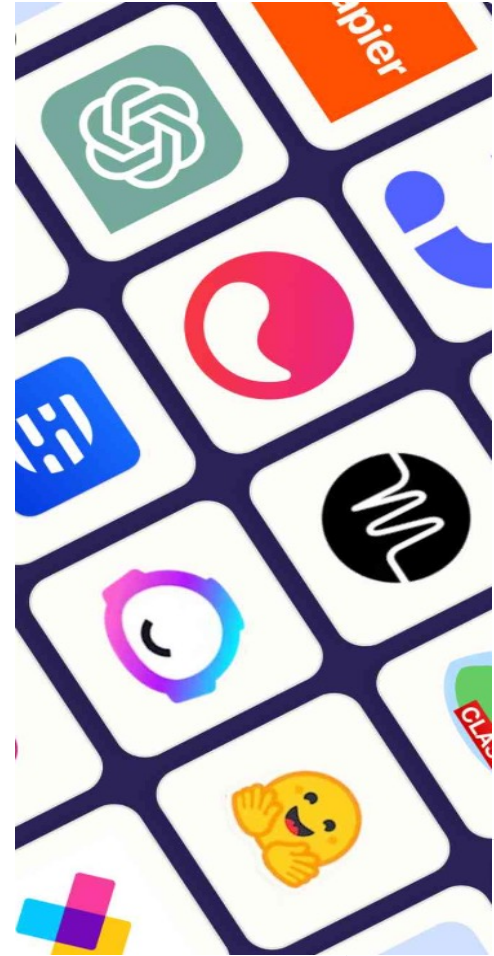
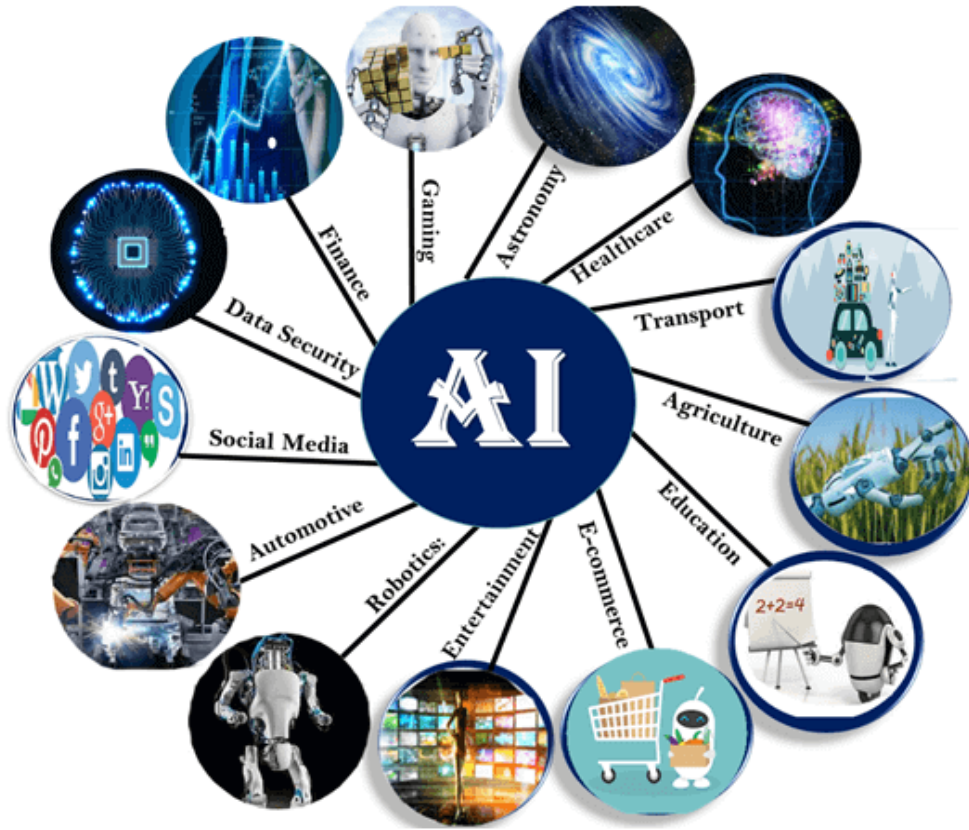


AI isn't new – what is new is the availability of data and the power to interpret and learn

Timeline of AI in health

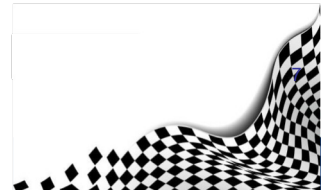


Today's reality



How about healthcare?

- 1. Disease Diagnosis and Prediction:** AI can analyze medical images to detect diseases and predict disease progression based on patient data.
- 2. Personalized Medicine:** AI can tailor treatment plans to individual patients based on their unique characteristics, improving treatment effectiveness.
- 3. Drug Discovery:** AI can accelerate drug discovery by predicting the effectiveness of compounds, reducing time and cost.
- 4. Telemedicine and Remote Monitoring:** AI enables remote diagnosis and treatment, and real-time health monitoring through wearable devices.
- 5. Robotic Surgery:** AI enhances precision in robotic surgery, guiding robots to perform complex procedures accurately.
- 6. Administrative Tasks:** AI can automate administrative tasks, freeing up healthcare providers to focus on patient care.
- 7. Mental Health:** AI-powered tools can provide mental health support and therapy techniques to users.

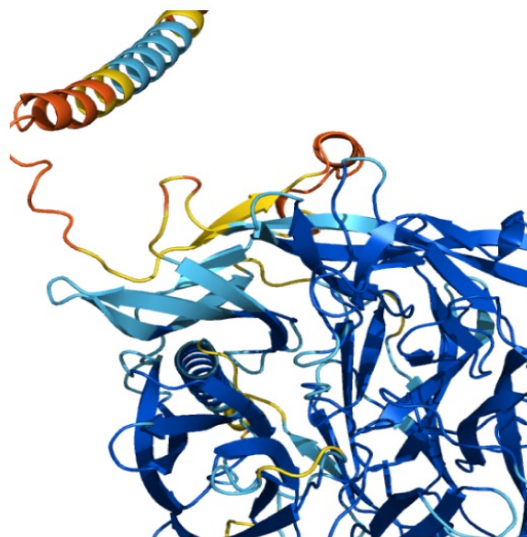


AlphaFold DB provides open access to over 200 million protein structure predictions to accelerate scientific research.

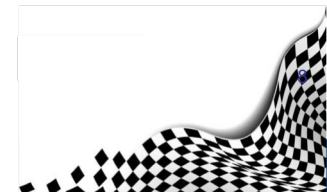
Background

AlphaFold is an AI system developed by **DeepMind** that predicts a protein's 3D structure from its amino acid sequence. It regularly achieves accuracy competitive with experiment.

DeepMind and EMBL's European Bioinformatics Institute (**EMBL-EBI**) have partnered to create AlphaFold DB to make these predictions freely available to the scientific community. The latest database release contains over 200 million entries, providing broad coverage of **UniProt** (the standard repository of protein sequences and annotations). We provide individual [downloads](#) for the human proteome and for the proteomes of 47 other key organisms important in research and global health. We also provide a download for the manually curated subset of UniProt (**Swiss-Prot**).



Q8I3H7: May protect the malaria parasite against attack by the immune system.
Mean pLDDT 85.57.



How can AI help us? the Bioanalytical community

- **Automation of Laboratory Processes:** AI can automate routine laboratory processes, increasing efficiency and reducing the potential for human error.
- **Any where that we follow rules and we have data**

- Data Analysis e.g. QC checking
- Report writing
- Assay development e.g. data mining
- Verifying Chromatography
- Capacity management
-

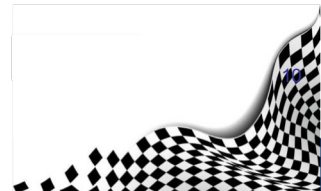


- **Clinical study's – Speed up recruitment, optimal sample size, adaptive study designs**



Is it all positive?

- **Data Privacy:** AI's use of large data volumes raises privacy and security concerns.
- **Job Displacement:** AI could replace human jobs, creating uncertainty about new roles.
- **Bias:** AI can perpetuate biases if trained on biased data.
- **Transparency:** AI decision-making processes can be complex and unclear.
- **Security:** AI systems can be vulnerable to attacks.
- **Regulation:** AI's rapid development has outpaced regulations, risking misuse.
- **Data Dependence:** AI requires large data amounts, which may be challenging to collect and process.
- **Skills Gap:** A skills gap in AI can hinder effective implementation



Job Displacement

In the US, the accounting sector has the highest potential displacement rate,

49%
by 2030

due to the adoption of automation technology



In China, around **72 million**

jobs in the services sector are in danger of being replaced by AI and related technologies by 2037



Predicting exact job losses to AI by 2030 is challenging. A 2017 McKinsey study estimated automation could displace 400-800 million jobs by 2030, but this includes all automation, not just AI. The impact will depend on various factors and new jobs may also be created.



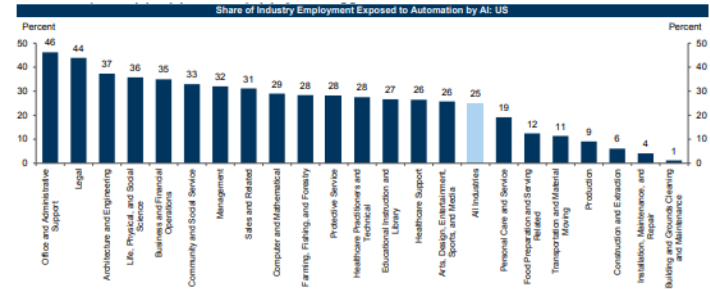
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AI will create as many jobs as it displaces - report

17 July 2018 · Comments

Goldman Sachs: Generative AI Could Replace 300 Million Jobs



Bias and potential to rewrite history



THE RISE OF AI

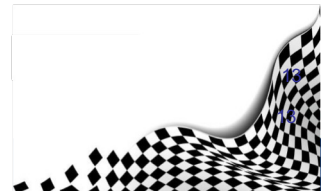
TikTok creators use AI to rewrite history

A viral trend imagines alternate timelines in which Western imperial nations never came to power.

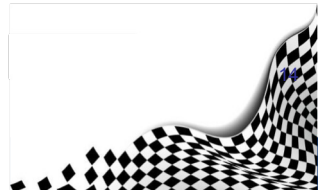
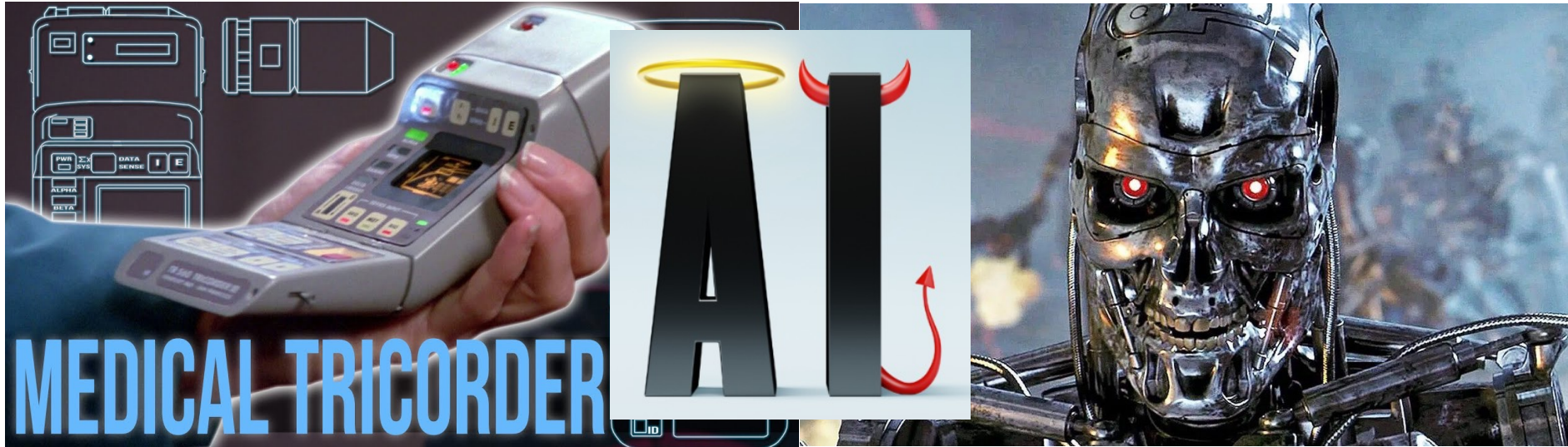


Is it all positive for our community?

- Could AI lead to critical errors?
- Could AI impact patient safety?
- What skills are required in the future?
- How do you test those skills – how do you examine future talent
- We typically have a community of slow adopters and non-believers, meaning we get left behind



AI, a fuel for the future?



THURSDAY



11:20 13:00

**In the chicane 3: AI in regulated bioanalysis - the future at our doorstep? - (Parallel)
In Eiffel/Sears/Pisa**

Session chair: Matthew Barfield, F. Hoffmann - La Roche, on behalf of the EBF

In this session, we follow up on the presentation from the opening session. AI is likely still far away for many of us, but the EBF feels this to be the right moment to openly think on the values and risks of AI in support of our work, from early discovery to filing and beyond. The session hopes to surface 'low hanging' fruit and identify how we should start embracing 'what is here to stay'. Don't expect solutions but bring your ideas.



Acknowledgements

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