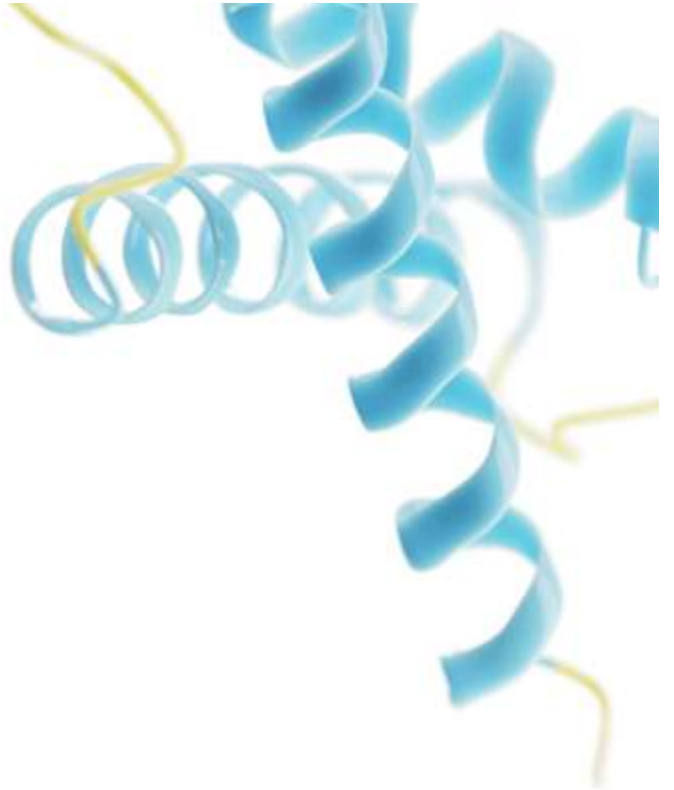
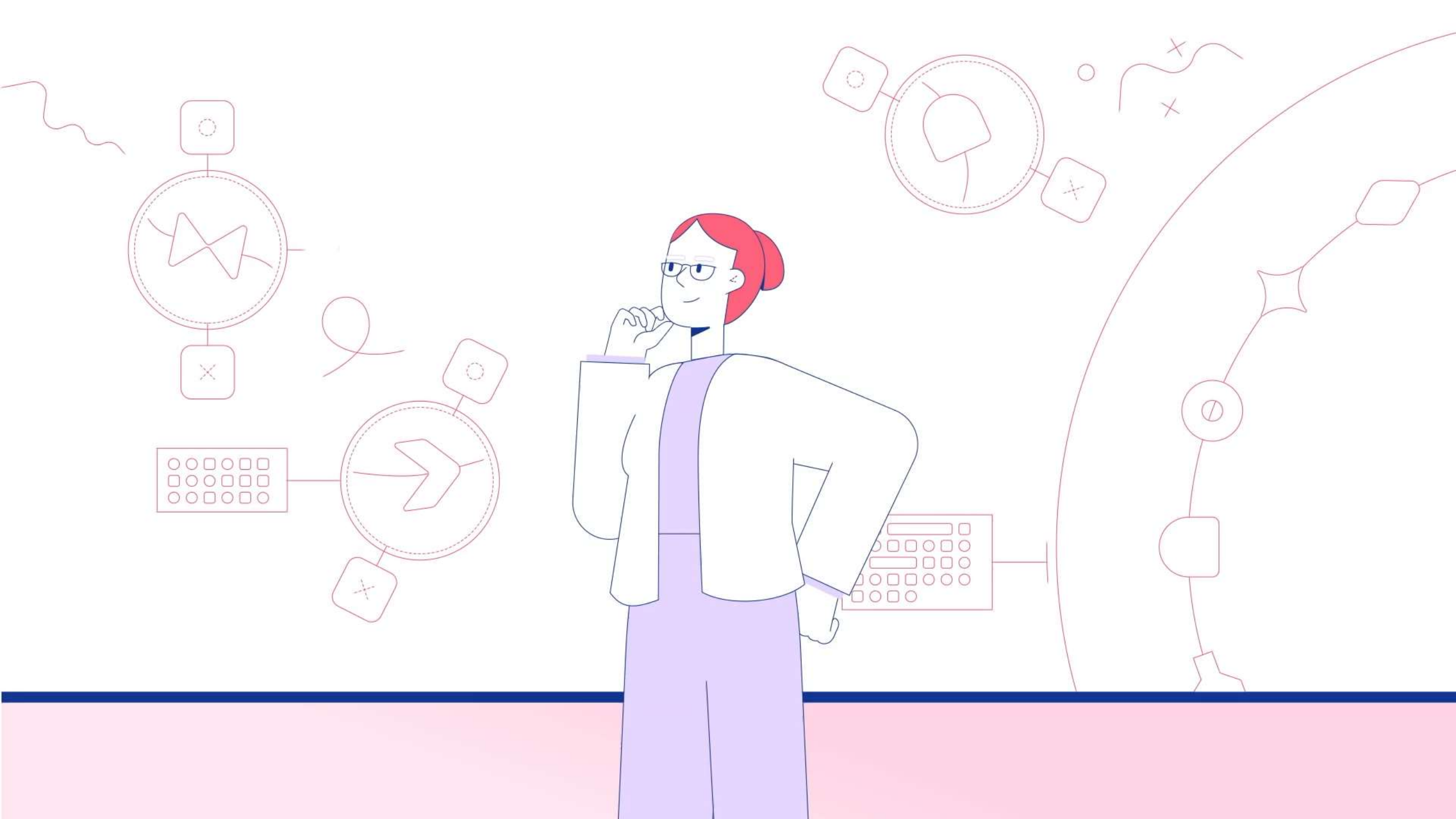
AlphaFold

Accelerating breakthroughs in biology with AI

A History of AI Presentation



Presented by: Hrishi & Harsha



Introduction to AlphaFold

- **What is AlphaFold?**

➢AlphaFold is an AI system developed by DeepMind (Google) in 2018.

➢It predicts the 3D structures of proteins from their amino acid sequences.

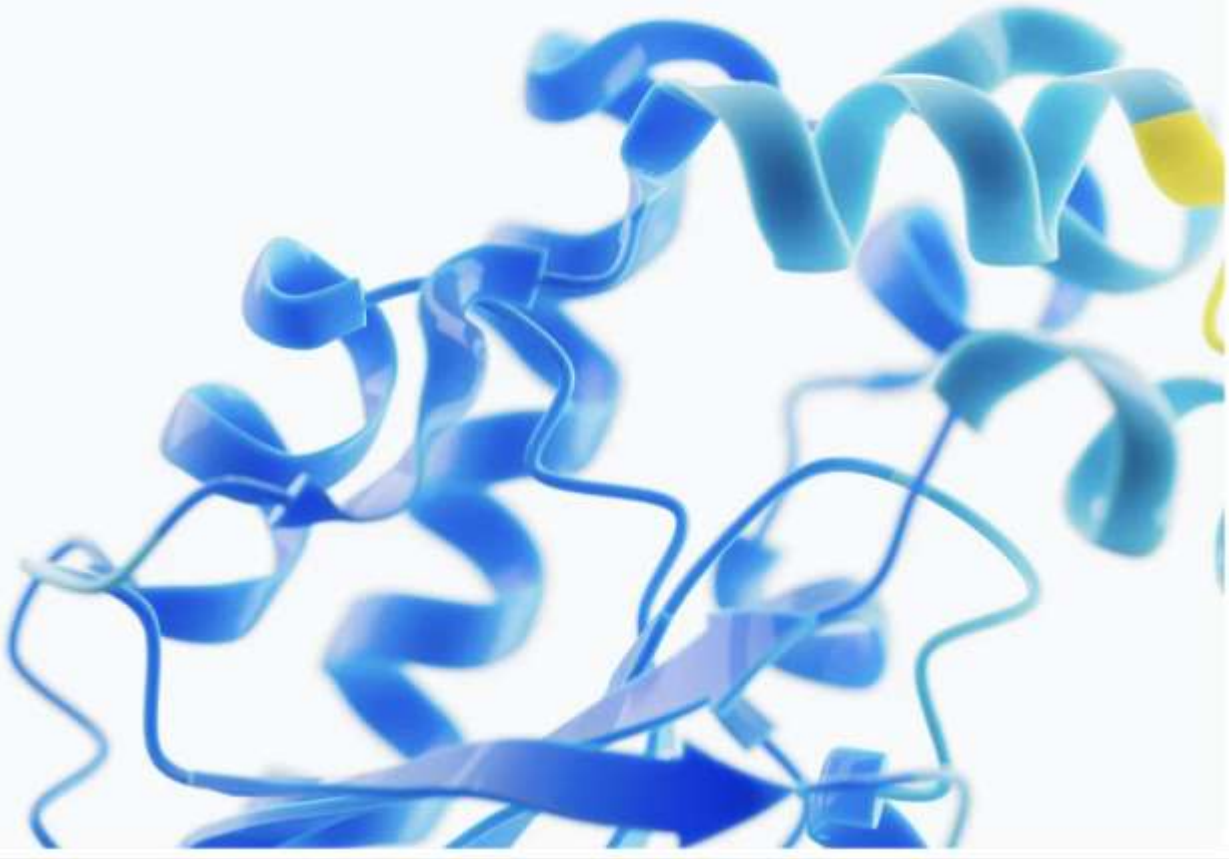
- **Why is this important?**

➢Understanding protein structures is crucial for drug discovery, biology, and understanding diseases.

“

It normally takes four years to identify and characterise one of these small proteins. With the help of AlphaFold we managed 23 in a few months.

PROFESSOR RENIER VAN DER HOORN
UNIVERSITY OF OXFORD



Importance of Protein Structure Prediction

- **Applications:**

➢ Drug discovery: Designing new treatments for diseases like Alzheimer's, cancer, etc.

➢ Understanding biological mechanisms: How proteins work in the human body.

➢ Biotechnology: Engineering new proteins for industrial purposes.

Innovation Behind AlphaFold

- **Why was AlphaFold Developed?**

➢ Existing methods were time-consuming and often inaccurate.

➢ AI offered a new approach to predict structures quickly and with high accuracy.

➢ AlphaFold was created to push scientific boundaries in biology and chemistry.

How Does AlphaFold Work?

- **Overview:**
  - Uses deep learning techniques to predict protein structures.
  - Trained on known protein data and uses evolutionary information.
  - Innovates by accurately predicting complex structures previously unsolvable.

AlphaFold: Impact stories

Scientists are using AlphaFold to accelerate research in nearly every field of biology.

Up to 1 billion

Research years saved by AlphaFold database structures

Over 600,000

Users in low and middle income countries

21%

Of papers citing AlphaFold are related to the study of disease

Practical Use Cases:

- **COVID-19 Research**: During the COVID-19 pandemic, AlphaFold was used to predict the structures of proteins associated with the SARS-CoV-2 virus.
- **Malaria Research**: Researchers used AlphaFold to study **Plasmodium falciparum**, the parasite responsible for malaria.
- **Drug Development**: Pharmaceutical companies are leveraging AlphaFold to speed up **drug discovery**

Conclusion:

❖Why is AlphaFold Important?

- AlphaFold 2 is a pioneering example of AI being used for real-world scientific advancement.
- Its predictions enable faster discovery in many fields, including healthcare and biotechnology.
- Demonstrates the transformative potential of AI in understanding life at the molecular level.

Thank You!

Scan this QR code to explore the AlphaFold Protein Structure Database.