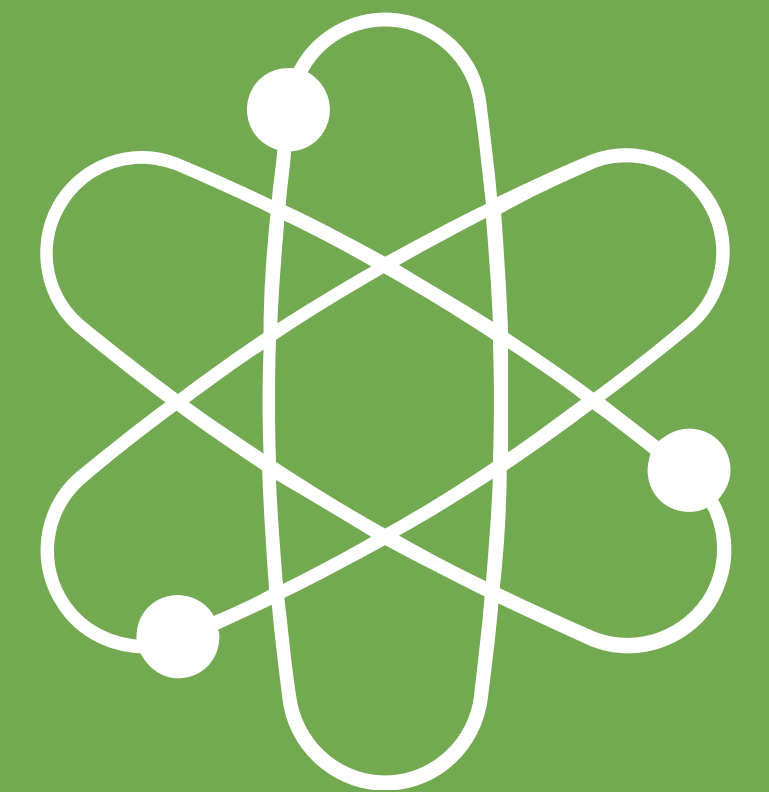


THE  
NOBEL  
PRIZE

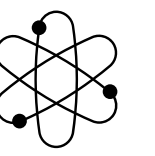
# PHYSICS PRIZE 2024

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## Discoveries behind AI

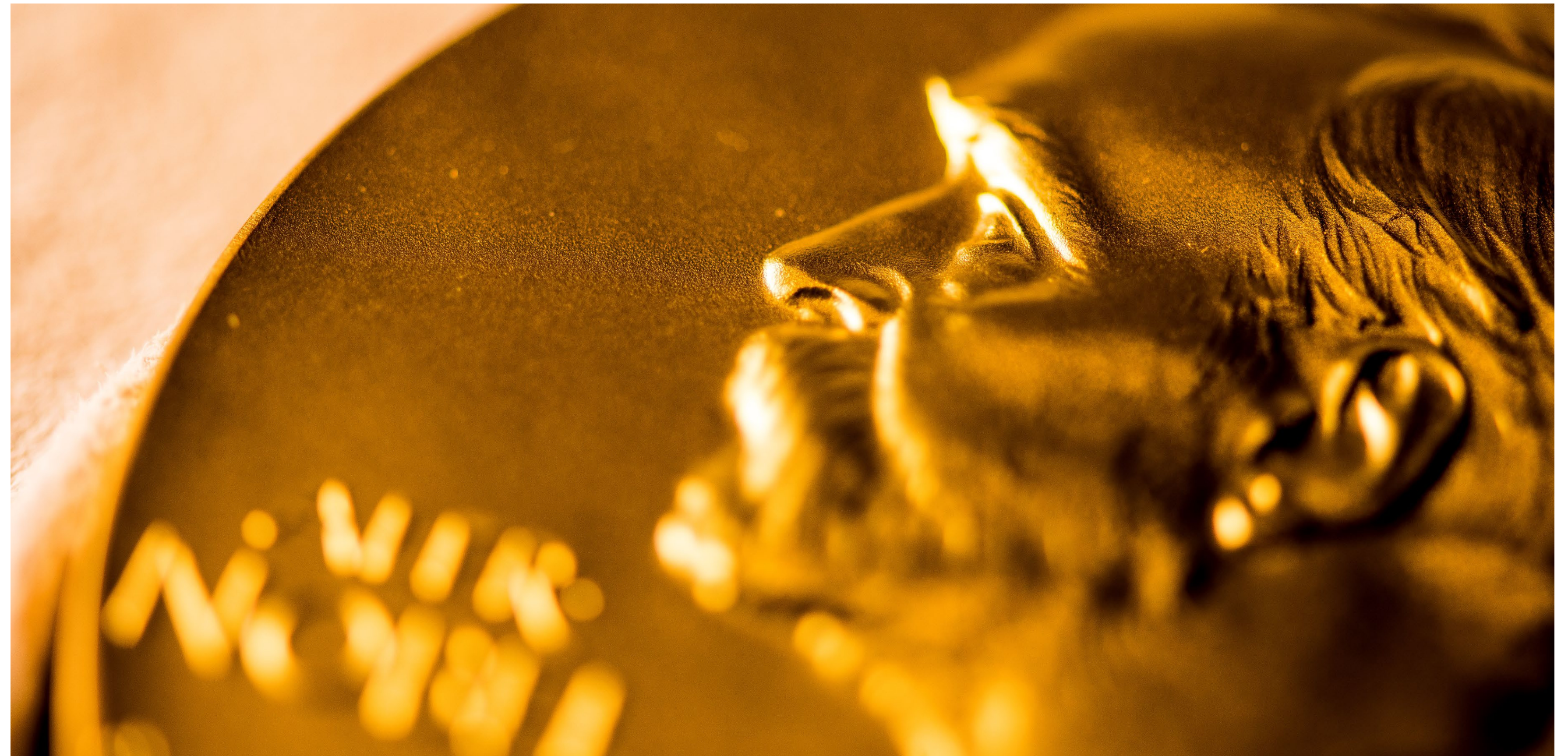


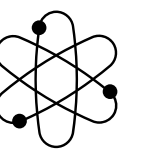
Nobel Prize lessons



# The Nobel Prize in Physics

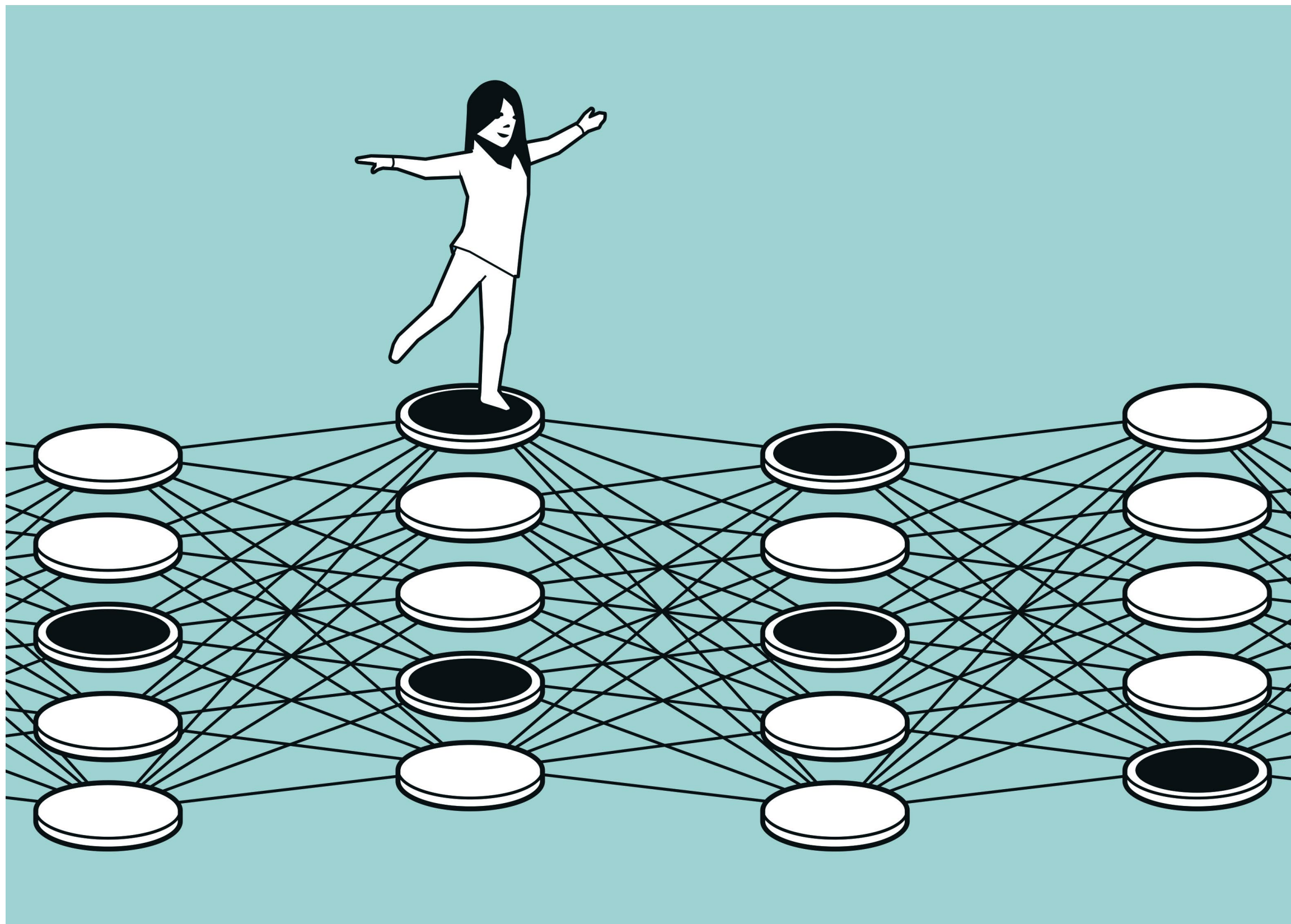
“to the person who made the most important discovery or invention in the field of physics”

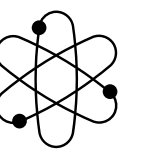




# The physics prize 2024

The Nobel Prize in Physics 2024 recognises methods that lay the foundation for the development of artificial intelligence (AI).





# The 2024 physics laureates

“for foundational discoveries and inventions that enable machine learning with artificial neural networks”



John Hopfield  
Born: 1933, USA



Geoffrey E. Hinton  
Born: 1947, UK

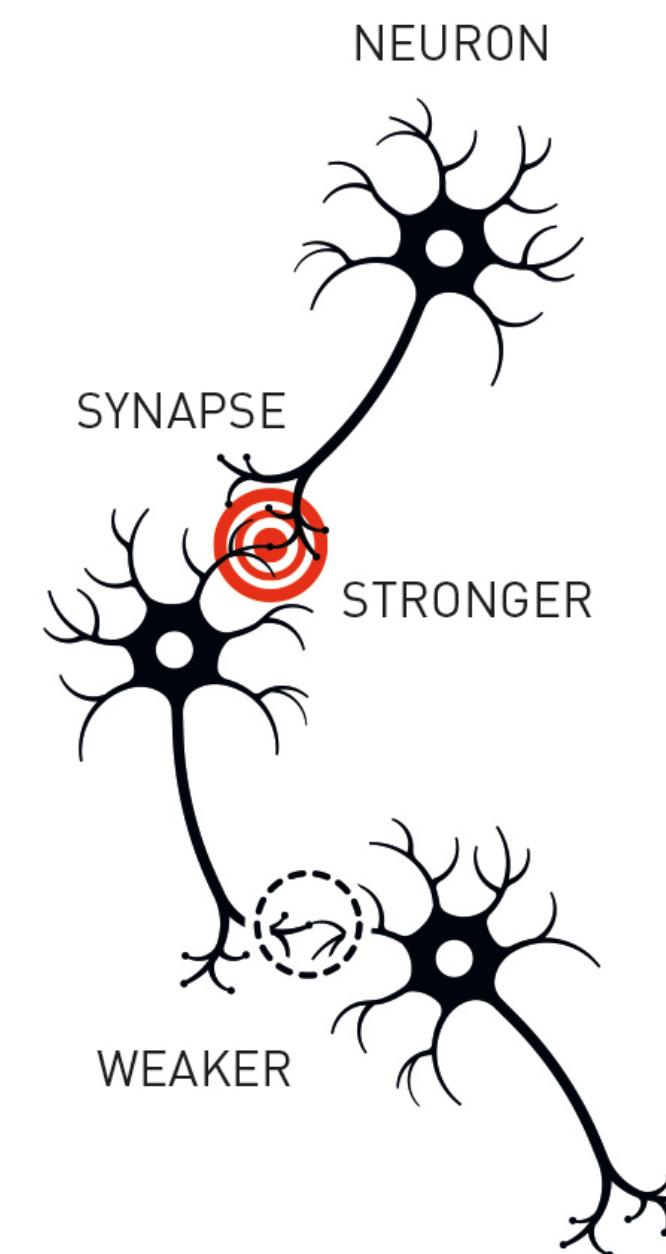
ILL. NIKLAS ELMHED © NOBEL PRIZE OUTREACH

# Natural and artificial neurons

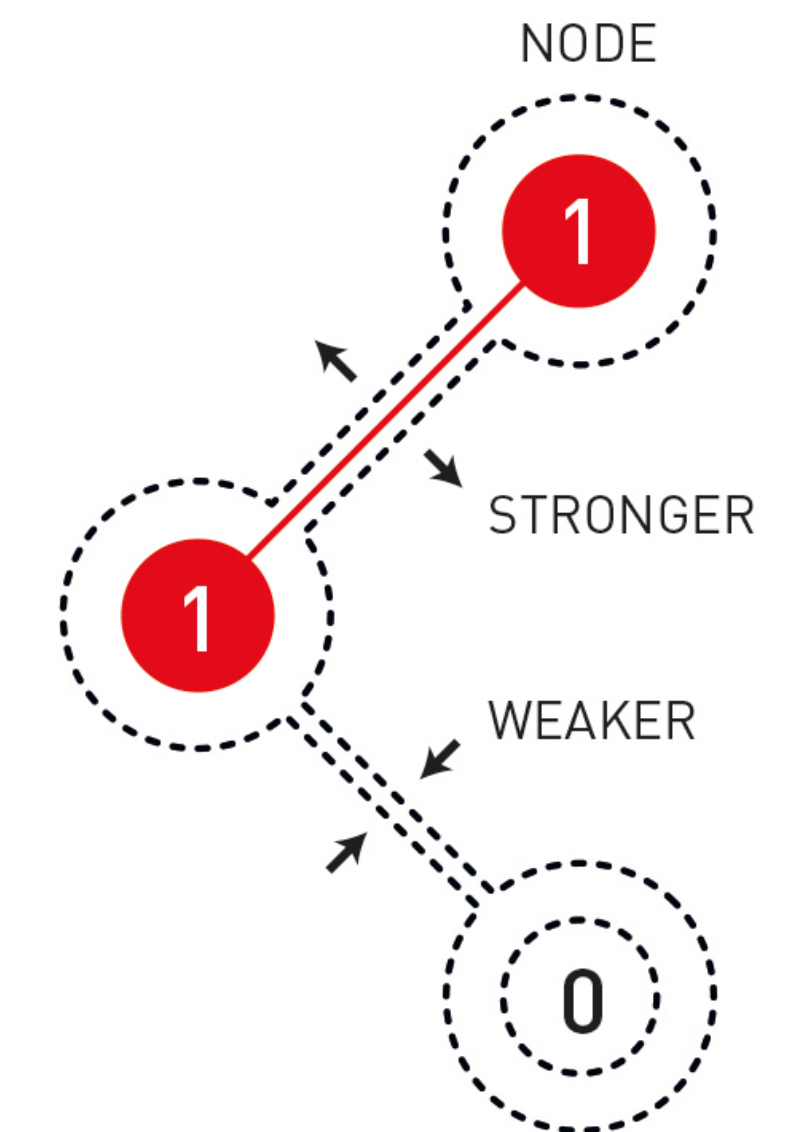
The technique is inspired by the structure of the brain.

Artificial neural networks are simulated inside of computers.

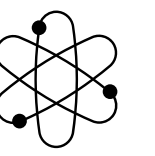
These networks can be trained by strengthening the links between nodes of the same value.



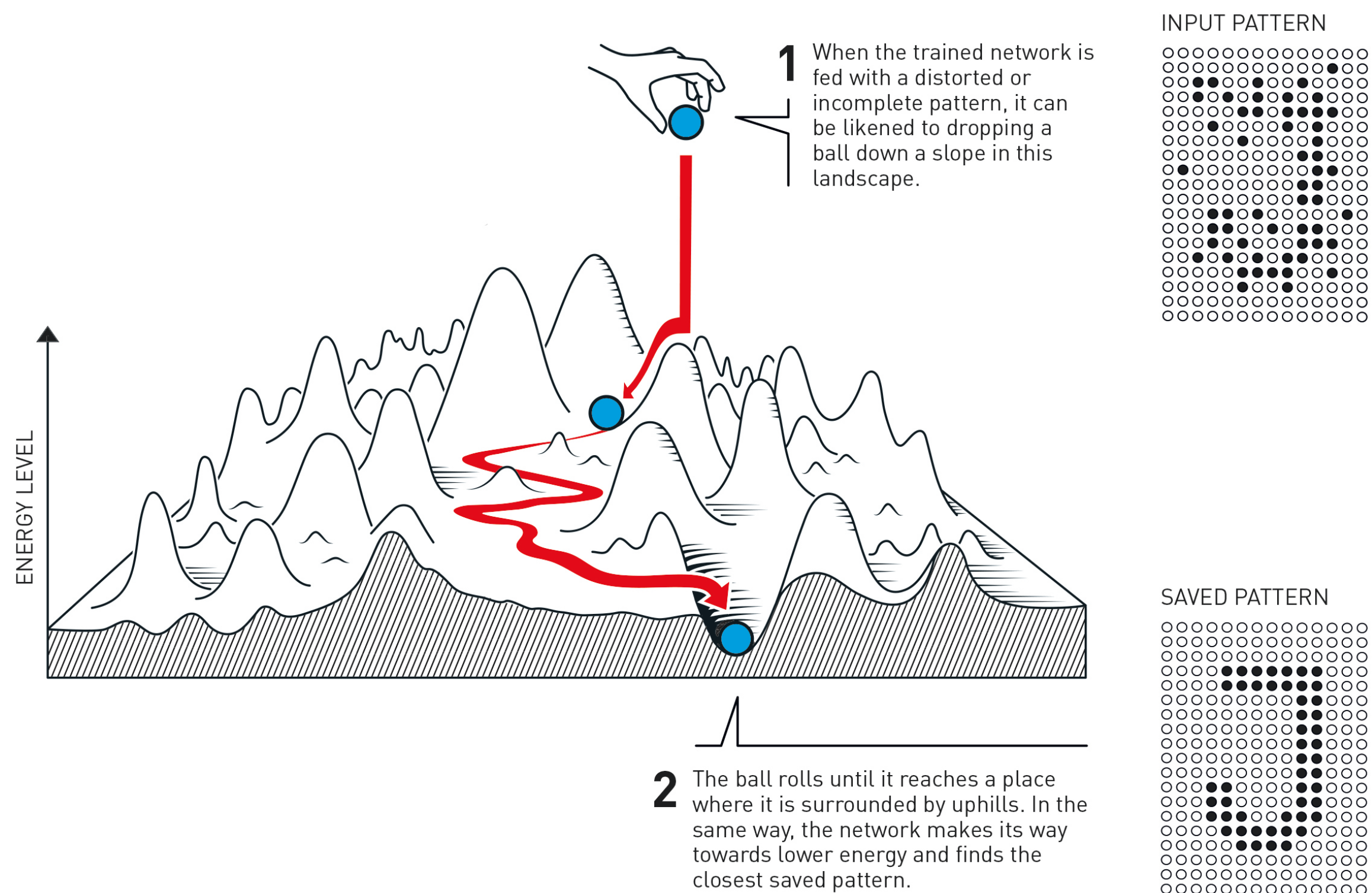
Natural neurons.



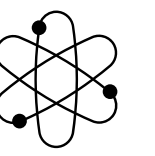
Artificial neurons.



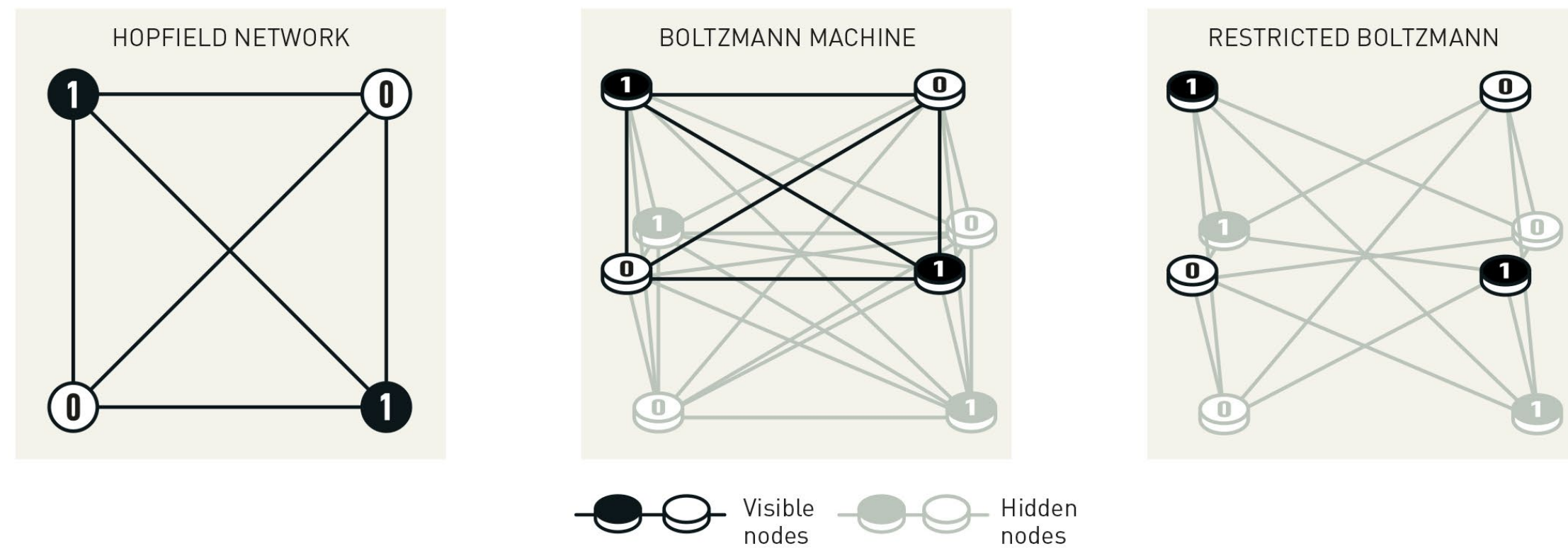
# Memories are stored in a landscape



John Hopfield invented a network that can save and recreate patterns. The function of a network can be likened to the formation of a landscape. When patterns are saved, valleys are formed in the landscape. When a distorted image is then fed into the network, the network tracks back to the saved pattern that is most similar to what was fed into it.

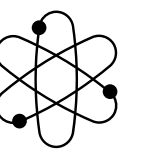


# Different kinds of networks



Geoffrey Hinton created a new network, the Boltzmann machine. It can be used to classify images or create new examples of the type of pattern on which it was trained.

The Boltzmann machine has two layers. One layer with "visible" nodes where the information is fed in and read out and one layer with "hidden" nodes, which affect how the network functions in its entirety.



# Machine learning today and tomorrow

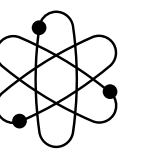


CREDITS: NASA GODDARD

Machine learning is used in many different areas today, including searching outer space for exoplanets.

In addition to providing us with valuable new tools, could AI also pose a threat to human values?





“I am someone who doesn’t really know what field he’s in but would like to understand how the brain works.”

Geoffrey Hinton, Nobel Prize in Physics 2024

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BENEFIT TO  
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