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## **C.L. de Carvalho-Heineken Prize for Cognitive Science 2014 awarded to James McClelland**

Ladies and gentlemen,

Throughout our history, people have tried to understand the brain by thinking of it as a machine. Our brains have been compared to clockwork, to steam engines and to telegraph networks. Since the 1980s it has become common to view the brain as a computer.

Cognitive scientists modelled the brain as a 'processor' that could retrieve information from a 'memory'. It would then use that information to perform calculations and save the results to some other type of memory once again.

These models of the brain formed the backdrop against which James McClelland and colleagues published a book on 'parallel distributed processing', or PDP, in 1986.

They were not the first to challenge the computer metaphor, but their approach was more comprehensive and persuasive. They presented a new, universal model for cognitive processing, and they showed how their model could be applied to all sorts of neuropsychological problems.

Parallel distributed processing was controversial at first, but since then it has conquered the world. Today, it is better known as 'connectionism'. Instead of computer chips and hard drives, it uses the anatomy of the brain itself to model its workings.

The brain is made up of nerve cells, billions of nodes in a network that resembles a web. In between the nodes are countless connections, and those connections change continuously. Parallel calculations are carried out throughout the brain. The outcomes are not saved to particular locations but reside in the state of the network, strengthening some connections and weakening others.

With PDP, McClelland and his colleagues not only changed the way we see the brain. They also gave us mathematical principles for cognitive research. Using these principles, scientists could tackle all sorts of problems, based on a clear hypothesis that could be tested.

James McClelland has been an influential advocate of PDP up to this day. Thanks in part to his persuasiveness, the model has inspired an entire generation of scientists, not just in cognitive science but in psychology and other adjacent fields.

Ladies and gentlemen,

Please join me in honouring James McClelland, winner of the 2014 Heineken Prize for Cognitive Science.