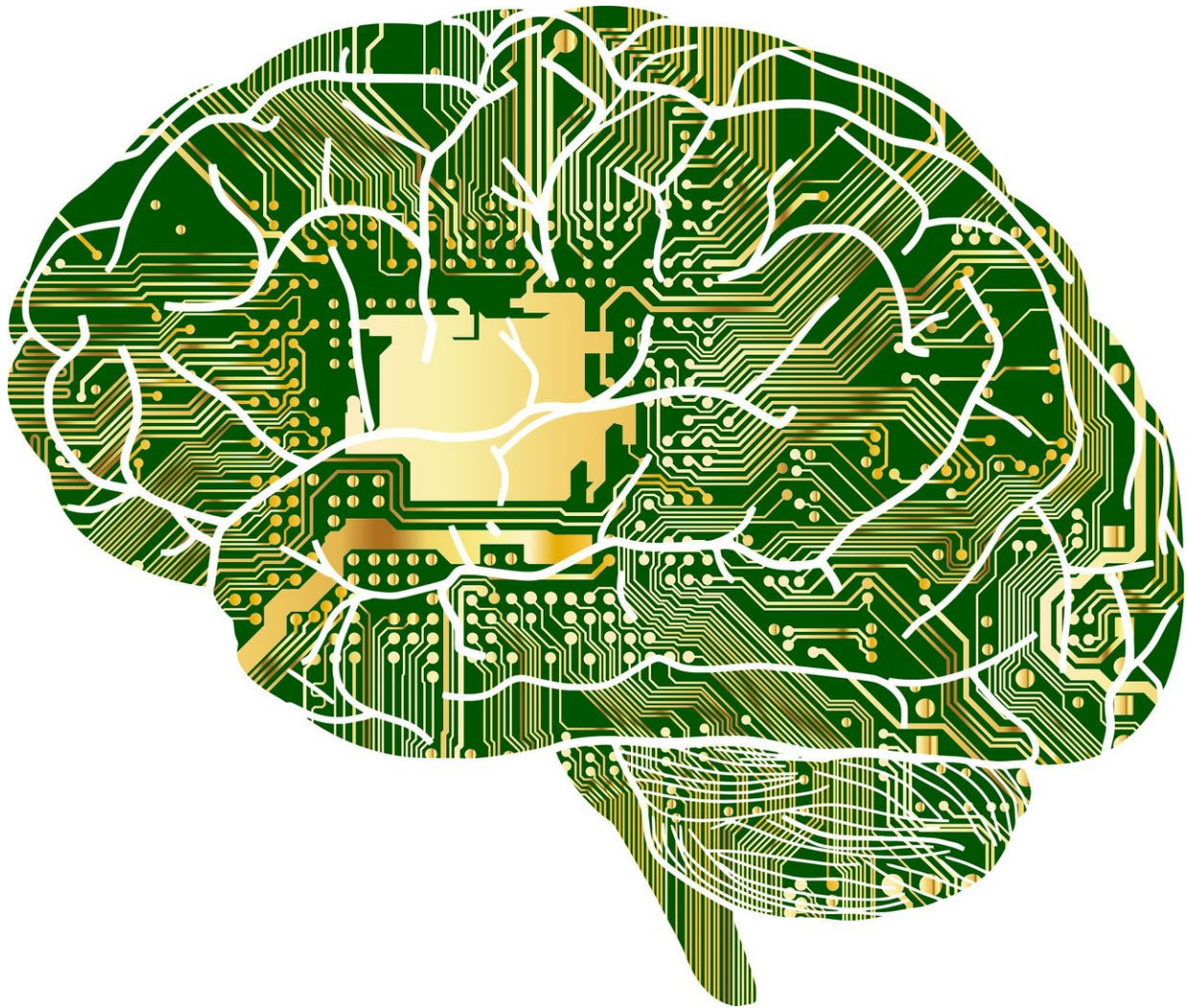


New research suggests our brains use quantum computation

October 19 2022



Credit: CC0 Public Domain

Scientists from Trinity College Dublin believe our brains could use quantum computation. Their discovery comes after they adapted an idea developed to prove the existence of quantum gravity to explore the human brain and its workings.

The brain functions measured were also correlated to short-term memory performance and conscious awareness, suggesting [quantum processes](#) are also part of cognitive and conscious brain functions.

If the team's results can be confirmed—likely requiring advanced multidisciplinary approaches—they would enhance our general understanding of how the brain works and potentially how it can be maintained or even healed. They may also help find [innovative technologies](#) and build even more advanced quantum computers.

Dr. Christian Kerskens, lead physicist at the Trinity College Institute of Neuroscience (TCIN), is the co-author of the research article that has just been published in the *Journal of Physics Communications*. He said, "We adapted an idea, developed for experiments to prove the existence of quantum gravity, whereby you take known [quantum systems](#), which interact with an unknown system. If the known systems entangle, then the unknown must be a quantum system, too. It circumvents the difficulties to find measuring devices for something we know nothing about.

"For our experiments we used proton spins of 'brain water' as the known system. 'Brain water' builds up naturally as fluid in our brains and the proton spins can be measured using MRI (Magnetic Resonance Imaging). Then, by using a specific MRI design to seek entangled spins, we found MRI signals that resemble heartbeat evoked potentials, a form of EEG signals. EEGs measure electrical brain currents, which some people may recognize from [personal experience](#) or simply from watching hospital dramas on TV."

Electrophysiological potentials like the heartbeat evoked potentials are normally not detectable with MRI and the scientists believe they could only observe them because the nuclear proton spins in the brain were entangled.

Dr. Kerskens added, "If entanglement is the only possible explanation here then that would mean that brain processes must have interacted with the nuclear spins, mediating the entanglement between the nuclear spins. As a result, we can deduce that those brain functions must be quantum.

"Because these brain functions were also correlated to short-term memory performance and conscious awareness, it is likely that those quantum processes are an important part of our cognitive and conscious brain functions.

"Quantum [brain](#) processes could explain why we can still outperform supercomputers when it comes to unforeseen circumstances, decision making, or learning something new. Our experiments, performed only 50 meters away from the lecture theater where Schrödinger presented his famous thoughts about life, may shed light on the mysteries of biology, and on consciousness which scientifically is even harder to grasp."

More information: Christian Matthias Kerskens et al, Experimental indications of non-classical brain functions, *Journal of Physics Communications* (2022). [DOI: 10.1088/2399-6528/ac94be](https://doi.org/10.1088/2399-6528/ac94be)

Provided by Trinity College Dublin

Citation: New research suggests our brains use quantum computation (2022, October 19) retrieved 1 May 2024 from <https://phys.org/news/2022-10-brains-quantum.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.