## OPPORTUNITY #34

WHAT IF OUR BRAINS WERE DIGITALLY IMMORTAL?

# PREPARE TO UPLOAD

Replicating and storing the memory, knowledge and thought processes of the human brain for the benefit of individuals and society

### WHY IT MATTERS TODAY

Less complex than a human brain, the fastest supercomputer at the time of writing is Japan's Fugaku at a speed of 442 petaflops,[347] or 1,000 trillion operations per second.[348]

By comparison, the brain contains 86 billion neurons, each connected to 7,000 other neurons in the body.[349] Impossible to precisely calculate, the highly interconnected brain is estimated to process information at up to 1 exaflop per second. One exaflop consists of 1,000 petaflops, or more than double Fugaku's computing capacity.[350]

While much remains unknown, remarkable progress is being achieved in neuroscience. A 'cellular atlas' of the brain is now being developed[351] underpinned by earlier research projects like the Blue Brain Project, set up in 2005, which created a digital replica of a mammalian brain.[352]

The Human Brain Project, launched in 2013, is building new research infrastructure where teams of experts can collaborate to advance understanding, technology and medical applications.[353]

The global market for the application of neuroscience through technologies such as brain imaging is projected to reach $37 billion by 2027, growing at a CAGR of 3% per year since 2020.[354] The rate of growth may accelerate over the next 30 years as neuroscientists evolve beyond understanding how neurons and electrical signals make the brain work to a deeper understanding of the mechanisms underlying higher-level cognition and real-time observation.[355] Advances in therapeutic neuroscience are expected along with greater application of its insights in, for example, education, consumer markets and the justice system.[356]

**SECTORS**

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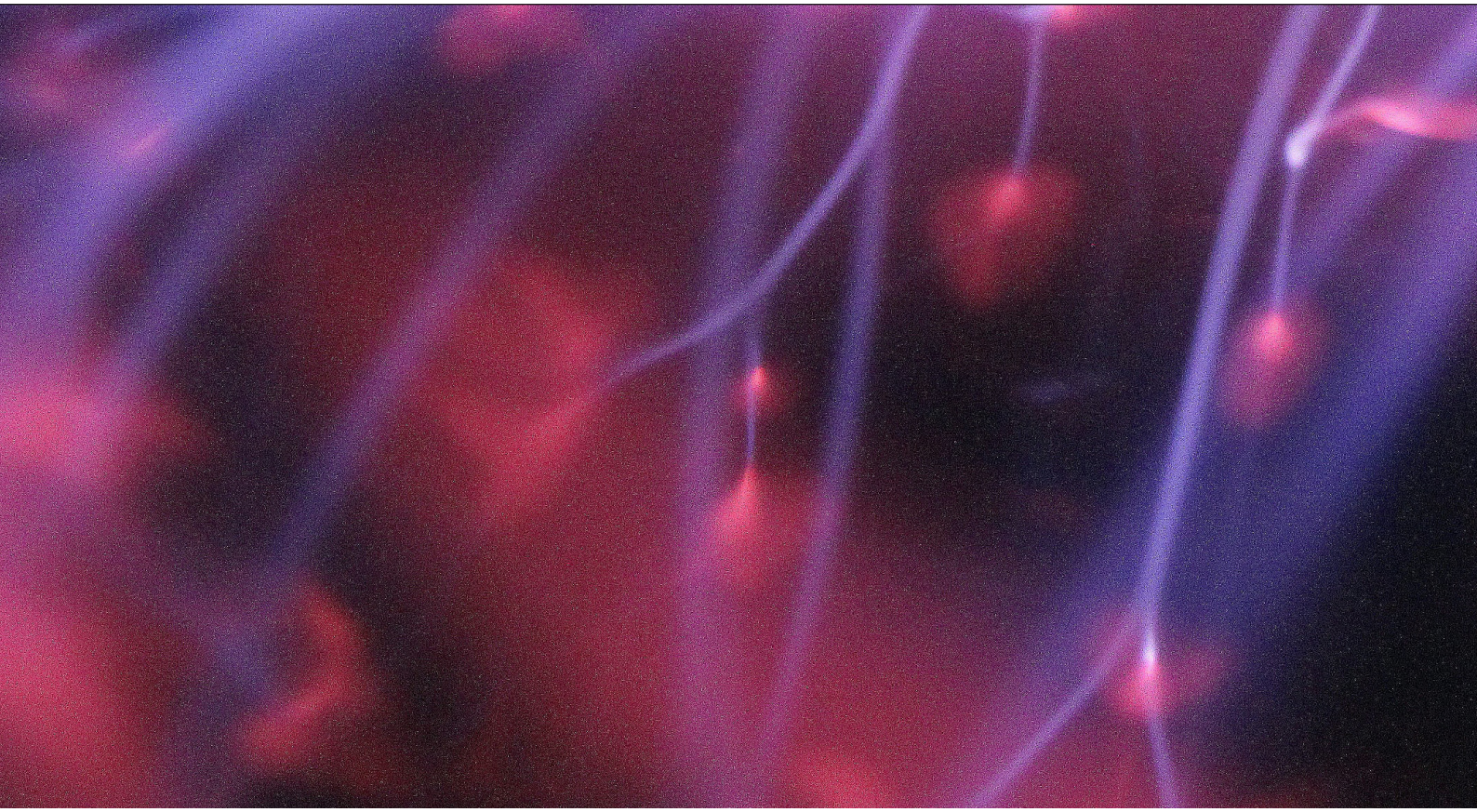


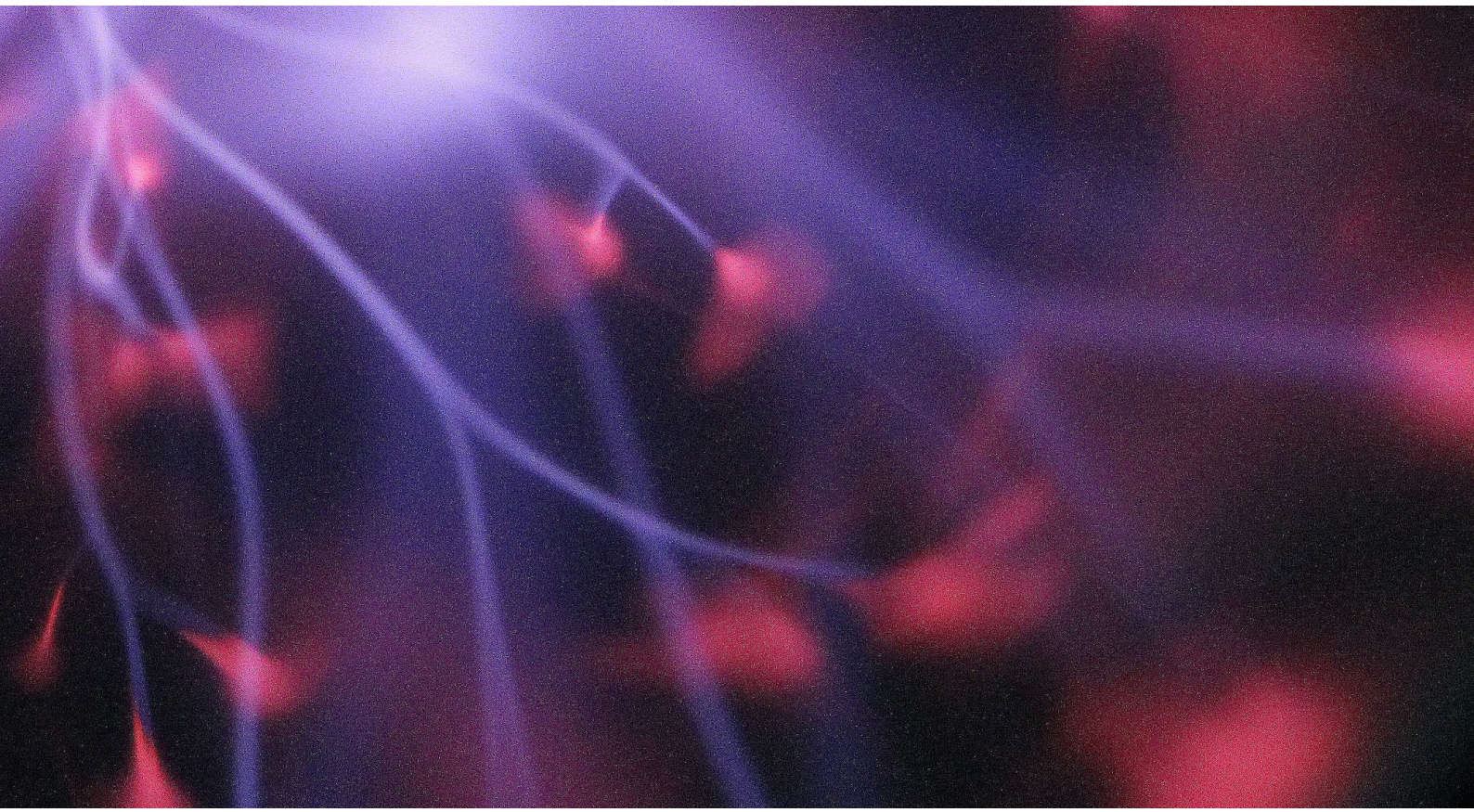
## THE OPPORTUNITY TOMORROW

As computing power and neuroscience both advance, new opportunities will emerge to harness and ultimately replicate the capacity of the brain through the use of technology. So-called 'whole brain emulation' (WBE) will then be possible. WBE entails physically scanning a brain, building a software model of it and eventually simulating its activity.[357]

Whole brain emulation means that memories and thought processes, of our choice, can be captured in real time and stored externally, potentially forever.

The value of such an application is considerable. Individuals can use it throughout life to safeguard and access their personal memories. At the societal level, whole brain emulation preserves skills or critical knowledge for future generations. The practice would potentially open up access to large areas of personal information and therefore legal and ethical frameworks need to evolve to manage how it would be used in courts, retail and other environments.

The time frame within which whole brain emulation might be available is currently uncertain. Some scientists have argued it might be possible by 2045.[358] With advances in brain–computer interfaces (BCI) and advanced intelligence, uploading and storing the contents of human brains might arrive sooner than that.



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## BENEFITS

Whole brain emulation can boost creativity and productivity as collective brainpower can be harnessed for problem-solving in all aspects of life and the economy, generating greater prosperity and well-being, particularly for those who have experienced loss of cognitive function, dementia or movement difficulties.

Our brainpower can also be made available to others with brain trauma or neurological disease. Whole brain emulation allows individuals and societies to safeguard knowledge and memories for posterity. Important skills and capacities can be transferred from generation to generation.

## RISKS

Risks to individuals include threats to personal data and privacy including unwanted and unacceptable thoughts which we might not want to publicly share. The risk of accidental data corruption or intentional harm, such as planting false memories or information, poses considerable challenges to the use of whole brain emulation in courts of law.