Imagine if you could connect your brain

to the internet.

You wouldn't need to type into a search engine,

you could just think your query

and download the relevant knowledge directly into your mind.

Such a world would involve

the biggest single upgrade in human intelligence

since our species evolved.

Seamless brain computer interfaces

are a long way off

but the melding of minds with machines

is already under way.

The implant goes directly into the motor control area

of the brain.

It's the neuro technology

that we've been developing for years

and it's designed to help restore

or replace function or enhance independence

for people who are paralyzed.

In a pioneering clinical trial

at Brown University,

volunteers have been given brain implants

that allow them to control devices using thought alone.

To date, this academic venture,

this pilot clinical trial

that we call Braingate

has enrolled 13 participants

and each of those has had the sensor placed

into the motor cortex and each of them

has been able to control cursor movement

on a screen.

Some of them have even been able

to control a prosthetic limb or a robotic limb

moving through space to reach and grab objects.

The sensors detect

the neural signals associated with the intent to move

and they're decoded by a computer in real time.

We're tapping into the native part of the brain

that controls movement naturally.

So, simply by imagining intuitive movements,

participants can immediately control a robotic device.

The technology could transform

the lives of people with disabilities

but it could go further,

enhancing the abilities

of the entire human race.

One problem is that current technology

can only record the activity of a couple of hundred neurons.

Our minds are generated by a bewildering network

of 85 billion neurons.

Listening to them all in real time

has proved an impossible challenge for neuroscientists.

But in 2013, their research gained powerful backing.

There's this enormous mystery

waiting to be unlocked

and the Brain Initiative will change that

by giving scientists

the tools they need to get a dynamic picture

of the brain in action

and better understand how we think

and how we learn and how we remember.

The Brain Initiative

is a six-billion dollar fund

to find new ways to map the activity

of an entire brain.

Leading neuroscientist Professor Rafael Yuste

was at the front of the queue for funding.

The goal of the Brain Initiative is precisely

to be a methods to read and manipulate

the activity of neuron circuits

so that we can eventually help patients

that have mental or neurological diseases.

In 2017, Professor Yuste's team

announced that they had successfully recorded

the activity from every neuron of an animal,

albeit a very simple one,

a tiny freshwater relative of the jellyfish

called a hydra.

In a way, you could argue that we're trying to read

the hydra's mind

because we can measure the activity

of every neuron in hydra

while the hydra is behaving.

And once you've learned to read neural code,

you can learn to write it too.

Can we input thoughts into a hydra,

can we write the patterns of activity

and change the behavior of the animal?

We're trying to do this in hydra

and we're trying to do this in mice.

We can imagine that you could do this

with humans in the future.

The human brain is vastly more complex

than the hydra

and converting the electrochemical signals

of the mind into the digital language of machines

remains a huge technological challenge.

But history has shown

that where there's a will and plenty of money,

there's a way.

That's one small step for man,

one giant leap for mankind.

I hope to achieve making neuroscience

the new rocket science.

We're not speaking publicly currently

about what we're building.

We will in time.

Tech entrepreneurs

are turning their minds

and their money to developing brain machine interfaces.

Bryan Johnson founded Kernel,

a neural interface startup

with $100 million of his own money.

Everyone's trying to find

how to go from where we're at now

and the next big jump

to where we're going to be

and in building Kernel,

my objective is to radically improve humans

in every imaginable and unimaginable way.

Bryan Johnson is not alone in this dream.

Elon Musk's latest company, Neuralink

aims to enhance humans by connecting them to computers.

DARPA, the research and development arm

of the American military

is also at the forefront of this technology.

Brain computer interfaces are coming.

But are we ready?

I think every day of the potential dangers

of building technology

without thinking carefully about the consequence

of this technology for society.

If we allow the internet into our minds,

what's to stop it reading the thoughts

we'd rather keep private?

We're not talking about data privacy.

This is much worse.

We're talking about the contents of your mind.

And if we discover

how to enhance our intelligence,

who gets to go first?

You need to ensure as a society

that there is equitable access to this technology

so that it doesn't end up in the hands

of a privileged few.

It's vital that ethical considerations

keep pace with advancing technology.

Melding our minds with machines

could radically transform society.

But some argue that the transformation

is already under way

and if we don't use machines to improve ourselves,

we risk being left behind.

Humans are the most intelligent species

on this Earth.

We are now giving birth to a new form of intelligence

in the form of AI.

At what point do we feel uncomfortable

within the delta between our own improvement

and that of our machines?

AI, the thing we need to contemplate very seriously,

for me, it's best that could ever have happened to us

and it's critical that we try to co-evolve

with this unbelievable powerful form of intelligence

that we're now building.

The matrix is not imminent

but enough research is now being done

on brain computer interfaces

that it's time to think hard

about their potential implications.

If superhuman intelligence is created in the future,

humanity could reap huge benefits

as long as it's handled with care.