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Theoretical physicist and author Michio Kaku discusses his new book, "The Future of the Mind," and why the United States and the world is entering the golden age of brain research.

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Dr. Michio Kaku on The Future of the Mind

DAVID GREGORY, anchor:
This is Press Pass. Your all-access pass to an extra Meet The Press conversation.
This week on Press Pass, we're taking a deep dive into the human brain with a theoretical physicist renowned for pushing the boundaries of science, DR. Michio Kaku, author of The Future of the Mind - The Scientific Quest to Understand and Enhance, Empower the Mind. Welcome, Doctor, it's great to have you here.

DR. MICHIO KAKU: Glad to be on the show.

GREGORY: So tell-- tell me about what we want to learn about the brain.
DR. KAKU: We are entering the golden age of brain research. Realize that just ten years ago, the brain was largely a black box. We didn't know how it was wired up and hooked together. We've learned more in the last ten, fifteen years than in all of human history combined. We can now connect the mind to a computer. Telepathy--reading minds; telekinesis--moving objects with the mind; recording memories; uploading memories. This is the stuff of science fiction and we do it, we do it regularly in the laboratory.

GREGORY: Wow.

DR. KAKU: And this is changing the entire medical landscape.

GREGORY: Well, so let's talk about that a little bit. To what end this-- what we know now that we didn't know, is leading to what?
DR. KAKU: Well, President Barack Obama, last year, stunned the country by saying that the Brain Initiative is going to change medicine. Like the Human Genome Project changed medicine in the last several decades, the Brain Initiative is going to change things in the future, starting with mental illness.

GREGORY: Mm-Hm.

DR. KAKU: Realize that it's one of the most ancient of all diseases, mentioned in the Bible. But we are
clueless until recently as to how the brain could be mis-wired. Now we can take schizophrenic patients, put them in a brain scan, and we can actually see that different parts of brain are not communicating well. And that's the origin of why they hear voices, for example. That's a short term. The long-term goal is to understand the mind itself.

GREGORY: And by better understanding the mind, does it go beyond pure illness? Can it get to matters of intention and so forth?

DR. KAKU: Beyond that in the future when you walk into a room, you will probably mentally turn on the lights, turn on the TV, mentally operate a typewriter, type memos, e-mails mentally, control your car, ask your car to come to you mentally and have the car take you to a destination mentally. All of that without ever touching a computer screen. And then when you use the internet--

GREGORY: Mm-Hm.

DR. KAKU: --you might have a brain-net. That is instead of sending text messages and putting little happy faces and squiggles, we will it be able to perhaps send emotions and feelings. Children will love it. Can you imagine Facebook, full of emotions and feelings ricocheting across the teenage world?

GREGORY: Well, the-- the good news is that you don't always say what you're thinking, if you-- if you lose that filter, maybe bad things can happen.

DR. KAKU: Well, definitely, we have that-- that filter right.

GREGORY: Well, but-- but these-- these are wow. These-- and that's my reaction to this. But what's the how? How does this happen? And I'll start by asking, you talk about the Genome Project; a question of scale. The federal government putting the kind of resources behind this sort of research. Does that-- does that overpower what's being done in the private sector today?

DR. KAKU: Well, very little is being done in the private sector right now because of the fact there's no immediate financial gain to be had.

DR. KAKU: However, we have this driving force. First of all, the European Union is putting a billion Euros, a billion Euros, to begin the mapping of the human brain. President Barack Obama tried to match it by putting in a hundred billion into the same pot. But it means that we're going to have a lot more research into understanding the human mind, to understand how it operates and how it goes haywire. And why the mind can do such fantastic things like have photographic memory, super mathematical geniuses arise simply by a blow on the head. How is that possible? These are mysteries that have been with us since ancient times and now we're unraveling them.

GREGORY: You-- I mean, you talk about mental illness-- illness. Other issues, Alzheimer's, right, Parkinson's. I think about, you know, the-- the more benign, relatively, you know, migraine headaches or even educational difficulties, right, intellectual difficulties. The full spectrum dia--- diagnostically, and then from a point of view of intervention, what's possible?

DR. KAKU: First of all, we'd would be able to record and upload memories. So we can do this now with animals on a very small scale. The short-term goal is to have a brain pacemaker for Alzheimer's patients so they'll just push a button and they'll know who they are, where they live, how to get home again.

Because we're going to have tens of millions of people with Alzheimer's disease perhaps wandering our streets. And then beyond that perhaps, who knows, workers may be able to push a button and upgrade
some of their skills. College students may be able to understand the courses they flunked when they were in college. So uploading memories is a possibility.

GREGORY: Mm-Hm.

DR. KAKU: And now the military is interested because of all the thousands of wounded warriors from Iraq and Afghanistan with injured spinal cords, missing a limb, an arm or a leg, we can now connect the human brain directly to a mechanical arm, which will give people the gift of mobility and life once again. People who are paralyzed like Stephen Hawking, my colleague, has already been hooked up now. Next time you see Stephen on TV, look at his right glass, and you'll see a chip that communicates between his brain and a laptop computer. And now the military is creating an exoskeleton right out of Iron Man comics, an exoskeleton, taking out wounded warriors, hooking their brain up so they can control a mechanical arm and a mechanical leg.

GREGORY: Wow. We're going to talk more about this. We'll take a break, be right back with DR. Michio Kaku right after this break.

We're back with DR. Michio Kaku, author of The Future of the Mind- The Scientific Quest to Understand, Enhance, and Empower the Mind. It's a fascinating area of exploration and potential. The President during his-- his trip to Asia, he was in Japan and he interacted with ASIMO, a humanoid robot, which was incredibly lifelike. How-- how-

AUTOMATED VOICE (Thursday): Mister President.

GREGORY: --as we're seeing this play out now, this kind of technology, how realistic is it today, where is it going, how important is it?

DR. KAKU: First of all, Japan makes about thirty percent of all commercial robots. They are the leaders in this field. And there's a danger that we're going to be left behind because we're not putting emphasis on these kinds of high-tech industries. I predict that in the future, the robotics industry could be bigger than Detroit. We're talking about an industry that is going to explode in the coming decades.

GREGORY: Mm-Hm.

DR. KAKU: A robotics industry. And we want to be part of it. But Japan has already staked out a huge chunk of it. And that's why ASIMO, one of our most advanced robots, is in Tokyo and not in Washington, DC. And I think that's shameful--

GREGORY: Right.

DR. KAKU: --that the United States is not putting the emphasis on these high-tech industries which are going to generate jobs, generate prosperity, generate income for the American people. But it's up for grabs.

GREGORY: And this is an issue of not making science and math a bigger emphasis in our own education system, right?

DR. KAKU: You pay the price for skimping on research, so why is the Large Hadron Collider in Geneva and not in Dallas, Texas?

GREGORY: Mm-Hm.

DR. KAKU: Because the United States refused to fund physics. And so the Vatican of physics is no longer in America. It's now in Europe, as a consequence. And why is the fusion reactor going to be built
in France and not in the United States?
GREGORY: Mm-Hm.
DR. KAKU: Again because United States has, I think, fumbled the ball, not funding these kinds of things. Now when it comes to the brain, here we have a chance of not fumbling the ball, we have a chance of being right there at the forefront of research because it's going to open up medicine, it's going to open up industry in a way that will change everything.
GREGORY: How-- how is the-- the medical industry now taking advantage of some of the advances that you're discovering, that you're seeing?
DR. KAKU: Well, the most immediate impact is called deep brain stimulation, whereby we put probes directly into the brain of somebody with Parkinson's, somebody with very deep depression, and we find overactive neurons. We identify that cluster, zap them with these-- with these electrodes and instantly, the tremors stop.
GREGORY: Mm-Hm.
DR. KAKU: So we know that there's a direct link between hyperactive neurons in the brain and tremors. And so we can actually treat Parkinson's disease this way by direct intervention into the human brain.
GREGORY: Is it widely accessible, though, yet? Is it mainstream as-- as treatment, some of the advances?
DR. KAKU: It will eventually become mainstream. But remember that initially, these ex-- these-- these things are expensive.
GREGORY: Mm-Hm.
DR. KAKU: But price goes down as the techniques are developed, as we have mass production of tools, as we have competition between different medical centers, then prices go down.
GREGORY: All right. We're going to leave it there. Fascinating to discuss the future of all of this with Michio Kaku, The Future of the Mind- The Scientific Quest to Understand, Enhance, and Empower the Mind, specifically with the-- the federal government behind you. Thanks so much for your time.
DR. KAKU: Right.
GREGORY: I appreciate it very much.
DR. KAKU: Thank you.