

# Minds Everywhere: 'Panpsychism' Takes Hold in Science

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SAN FRANCISCO — Are humans living in a simulation? Is consciousness nothing more than the firing of neurons in the brain? Or is consciousness a distinct entity that permeates every speck of matter in the universe?

Several experts grappled with those topics at a salon at the Victorian home of Susan MacTavish Best, a lifestyle guru who runs Living MacTavish, here on Feb. 16. The event was organized by "Closer to Truth," a public television series and online resource that features the world's leading thinkers exploring humanity's deepest questions.

The answer to the question "[what is consciousness](#)" could have implications for the future of [artificial intelligence](#) (AI) and far-out concepts like mind uploading and virtual immortality, said [Robert Lawrence Kuhn](#), the creator, writer and host of "Closer to Truth." [[Superintelligent Machines: 7 Robotic Futures](#)]

## Materialism to panpsychism

Philosophers have put forward many notions of consciousness. The materialist notion holds that consciousness can be fully explained by the firing of neurons in [the human brain](#), while mind-body dualism argues that the soul or mind is distinct from, and can potentially outlive, the body. Under the notion of panpsychism, a kind of re-boot of ancient animistic ideas, every speck of matter has a kind of proto-consciousness. When aggregated in particular ways, all this proto-consciousness turns into a sense of inner awareness. And other, Eastern philosophies have held that consciousness is the only real thing in the universe, Kuhn said.

Neuroscientists and many philosophers have typically planted themselves firmly on the materialist side. But a growing number of scientists now believe that materialism

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chief scientific officer of the Allen Institute for Brain Science in Seattle. At the event, he described a relatively recent formulation of consciousness called the [integrated information theory](#). The idea, put forward by University of Wisconsin-Madison neuroscientist and psychiatrist Giulio Tononi, argues that consciousness resides in an as-yet-unknown space in the universe.

Integrated information theory measures consciousness by a metric, called phi, which essentially translates to how much power over itself a being or object has.

"If a system has causal power upon itself, like the brain does, then it feels like something. If you have a lot of causal power upon yourself, then it feels like a lot to be you," Koch said.

The new theory implies a radical disconnect between intelligence and consciousness, Koch said. AI, which may already be intelligent enough to beat the best human player of the Go board game, may nevertheless be basically subconscious because it is not able to act upon itself. [\[Artificial Intelligence: Friendly or Frightening?\]](#)

One critic in the audience noted that there is currently no way to test this theory, and that integrated information theory [fails some common-sense tests when trying to deduce what things are conscious](#). (A thermostat, for instance, may have some low-level consciousness by this metric.) But Koch said he was not troubled by this notion. Many objects people think of as conscious may not be, while some that are considered inanimate may in fact have much greater consciousness than previously thought, Koch said.

### Implications for AI and virtual immortality

If Koch and others are correct that strict materialism can't explain consciousness, it has implications for how sentient a computer might be: A supercomputer that re-creates the [connectome](#), or all the myriad connections between neurons in the human brain, may be able to simulate all the behaviors of a human, but wouldn't be conscious.

"You can simulate the mass of the black hole at the center of our universe, but space-time will never twist around the computer itself," Koch said. "The supercomputer can



retaining all of the outward appearance of consciousness, but with no one home inside, Kuhn said. That implies that uploading one's mind to a computer in order to achieve virtual immortality may not work the way that many people anticipate, Kuhn added. [[The Singularity, Virtual Immortality and the Trouble with Consciousness \(Op-Ed \)](#)]

To create truly conscious AI, researchers may need to develop technologies that can act upon themselves, perhaps more akin to [neuromorphic computers](#), Koch said. (Such computers would operate without any pre-programmed code, instead somehow sensing and reacting to changes in their own physical states.)

If humans do somehow succeed in creating superintelligent AI, how can they ensure the technology matures in a way that betters humanity, rather than leading to its demise?

David Brin, a computer scientist and science fiction author, suggested that humans may need to look at their own lives to make sure AI doesn't make human existence worse, rather than better. For instance, humans have evolved a lengthy life span in part so that they can nurture children through their unprecedentedly long childhoods, Brin suggested.

So perhaps the safest way to raise our AI children is to take a blank-slate "proto AI and put it in a helpless body, and then let it experience the world under guidance," Brin said. "If that's the method by which we get AI, then perhaps we'll get a soft landing, because we know how to do that."

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