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## Future Talk



### The one thing you can predict about predictions is that there'll be a lot of them

**By Scott LaFee**

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The business of predicting is very difficult, said Niels Bohr, the 1922 Nobel laureate for discovering atomic theory, especially when it's about the future.

Yogi Berra pretty much said the same thing later, adding famously: "The future ain't what it used to be."

It never is.

The problem, of course, is that the universe has far too many moving parts to really know what to expect or predict for more than a few moments in advance. Every time scientists think they're on the verge of finding, say, a Theory of Everything, they find they really know very little at all.

Take the sun, which has always seemed a reliable sort. Astrophysicists thought they understood how it worked, the nature of its nuclear fusion glow. But recent measurements indicated the sun was emitting fewer neutrinos than expected.

Perplexed scientists came up with four possible answers:

- a) The sun didn't work like they thought.
- b) Nuclear reactions didn't work like they thought.
- c) Something was happening inside the sun they didn't know about.
- d) Neutrinos – subatomic particles so small that billions of them are passing through every square inch of space every

### Want to bet? Do you really?

Psychics and other public prognosticators are almost always wrong, but since most predictions are soon forgotten, people tend not to hold anyone accountable.

That may change with the creation of the Long Bets Foundation, which compels would-be futurists to put money where their predictions are, then promises to keep tabs on whether the forecasts hold up.

Long Bets is the 2002 creation of Stewart Brand, the founder of Well, a think tank, and Kevin Kelly, editor at large of Wired. They hope it will foster better understanding of how predictions are made, which kinds of truths are easiest - or hardest - to forecast and what kinds of people are more often right or wrong.

The foundation has already logged

second, usually without hitting anything else – violate one or more laws of the Standard Model, a semi-sacrosanct explanation of fundamental particle reactions.

The answer is D, according to new research by solar physicists at Louisiana State University. They found that neutrinos can apparently change from one type to another, something everybody said they couldn't do.

"It would be as if you looked at your pet and determined it was a cat at breakfast, but when lunch rolled around, you noticed it had become a dog. Then at dinner it was again a cat," said LSU physicist Bob Svoboda.

several dozen bets involving a variety of scientists, entrepreneurs, inventors, writers and society watchers. The wagers range from \$2,000 (the minimum) to \$20,000 and cover time periods of a couple of years to several decades. Winning wages are donated to the charity of the winner's choice.

Anyone is welcome to place a bet as long as they are also willing to put up the money. For more information, or to see what bets are on the table, [visit the Long Bets Foundation web site.](#)

- SCOTT LAFEE

To be sure, being wrong is part of doing science. It happens a lot. And wrongly predicting the course of science or technology happens more often than not. For example, in 1903 *The New York Times* opined that human flight was impossible. One week later, the Wright Brothers flew at Kitty Hawk. Frank MacFarlane Burnet, a Nobel Prize-winning immunologist, once suggested nothing of practical use would come from molecular biology. *Popular Mechanics* in 1949 optimistically declared that future computers "may weigh no more than 1.5 tons." And Bill Gates suggested in 1981 that "640K of memory ought to be enough for anyone."

As far as anyone can tell, Lao Tzu, a sixth-century B.C. Chinese philosopher, didn't make predictions. But he did note that "those who have knowledge don't predict. Those who predict don't have knowledge."

This is not entirely fair or accurate. Many of the predictions below have been made by persons widely believed to possess above-average intelligence. Whether their predictions are accurate is an altogether different matter, and remains to be seen.

**Know and tell** Every year since 1985, the editors of *The Futurist* have published a list of their prognostications for the near and distant future. By their own count, they divined the emergence of the Internet, virtual reality and the end of the Cold War.

Here's what they see looming on the technology timeline: confessions to artificial intelligence "priests" in 2004; insect-sized robots pollinating crops in 2012; bionic Olympics in 2030; and a village on the moon by 2040.

*By 2010, more than half of the books sold worldwide will be printed on demand at the point of sale.*

**– Jason Epstein, former editorial director of Random House**

*By 2070, at least six countries will have officially implemented a four-day working week.*

**– Christophe Cuvy, founder, The Thinking Box, London**

*At least one human born in the year 2000 will still be alive in 2150.*

– **Peter Schwartz, co-founder, Global Business Network**

### **Hark Clarke**

Arthur C. Clarke, the author of "2001: A Space Odyssey," enjoys a reputation as a man of farsighted imagination. In 1945, for example, he invented the geosynchronous communications satellite. Later, he wrote about intelligent, if troublesome, interactive computers and the possibility of cold fusion.

Among his more recent predictions:

In 2006, the last coal mine will close.

In 2009, a city in a Third World country will be devastated by an atomic bomb. Later that year, all nuclear weapons will be destroyed.

In 2011, space flights will become available to the public. Prince Harry of England will fly in space two years later. Clarke, on his 100th birthday, will be a guest aboard a space orbiter.

In 2021, the first humans will land on Mars. Clarke predicts they will discover an "unpleasant surprise," but fails to elaborate.

In 2023, a dinosaur zoo will open with specimens cloned from DNA fragments.

In 2040, the concept of human "work" will be phased out. Twenty-one years later, hunter-gatherer societies will be re-created.

*My prediction is it will probably be done by someone in the next three to five years, that is the teleportation of a single atom.*

– **Ping Koy Lam, physicist, Australian National University**

*Due to slowing of population growth, societies will begin demanding an increase in the birthrate within the next 20 years.*

– **Glen Hiemstra, founder, Futurist.com**

*By the year 2020, solar electricity will be as cheap or cheaper than that produced by fossil fuels.*

– **Robert A. Freling, executive director, Solar Electric Light Fund**

### **Batelle's all**

Batelle is a private, Columbus, Ohio-based company that specializes in assisting industry and government develop new technologies, manage laboratories and market new inventions.

According to corporate materials, Batelle employs 7,500 scientists and engineers, 48 of whom recently got together to predict the top 10 innovations in home comfort and convenience in 2012:

1. Universal controls for all home appliances. In other words, a single remote controlling your car, garage door, coffee maker, TV and thermostat.

2. Circulatory, heart and kidney testing will become as easy as home pregnancy tests. You take them at home, then transmit the results over the Internet. Your doctor will e-mail appropriate medical

treatment instructions or, if necessary, send an ambulance.

3. Homes will become airtight, with powerful filters and fans to create an air quality hundreds of times better than outdoors.

4. Television, telephones and computers will become totally integrated and exceedingly common, found and used throughout the 21st-century home.

5. Voice recognition devices will actually work.

6. Miniature fuel cells will replace traditional batteries, providing portable power that lasts for years.

7. Houses will be increasingly made from organic materials, such as genetically engineered trees.

8. Homes will contain devices to compact solid waste and pretreat waste water, thus reducing the amount of garbage sent to landfills or sewage treatment facilities.

9. Personalized biochips containing your health and medical history will be contained in jewelry or directly implanted under your skin.

10. Homes of the future will be heated or cooled room-by-room, depending on who is occupying the space. Similarly, lights will turn on and off automatically as you enter and leave.

*In 15 years, we'll have sex tourism in space, because that's what will make money. Early adoption of technology has always been about sex. Space will be no different.*

**– James Dator, director, Hawaii Research Center for Future Studies**

*Commercial airline passengers will routinely fly in pilotless planes by 2030.*

**– Craig Mundie, chief technical officer, Microsoft**

*By 2050, a synthetic computer or machine intelligence will become truly self-aware (ie. will become conscious).*

**– Louie R. Orbeta, inventor and entrepreneur**

### **The long view**

In his book, "Human Knowledge: Foundations and Limits," Brian Holtz isn't afraid to ask the Big Questions, such as why is there something rather than nothing. Nor is he afraid to use really big words.

"My book asserts a synthesis of metaphysical naturalism, ontological materialism, epistemological empiricism and positivism, mental functionalism, theological atheism, axiological extropianism, political libertarianism, economic capitalism, constitutional federalism, biological evolutionism, evolutionary psychology, and technological optimism."

Holtz, a computer programmer, is equally undaunted in offering a timeline for the future of humanity and the universe, one that stretches trillions upon trillions of years.

"Human Knowledge" can be read in its entirety online and free at <http://home.attbi.com/~brianholtz>

[/Thoughts/](#). Below are some selected predictions:

2030 – Radio astronomers hear signals from extraterrestrial intelligence.

2075 – The vertical takeoff and landing aircraft (VTOL) is as common as today's RV; and hydrogen fuel cells replace the internal combustion engine.

2300 – The Earth's population will stabilize at 20 billion.

3000 – English is the native language of 90 percent of the world; an artificial species is created.

5000 – Humans mass-produce intravenous liquid food.

10,000 – Mars is terraformed, and a new ice age begins on Earth.

100,000 – The majority of persons descended from *Homo sapiens* live somewhere other than Earth.

50 million – Plate tectonics will have shoved Africa into Europe, closing the Mediterranean Sea. California will be a part of Alaska.

1 billion – Earth probes have explored every star system in the Milky Way.

6 billion – The sun ends its main-sequence life, ballooning to red giant status and engulfing the Earth.

$10^{14}$  – Almost all stars in the universe have become brown or white dwarfs. Little or no life remains.

$10^1$  – The last black hole evaporates, emitting the cold dark universe's final flash of visible light.

*The first discovery of extraterrestrial life will be someplace other than on a planet or on a satellite of a planet.*

– **Freeman J. Dyson, astrophysicist and author**

*The universe will eventually stop expanding.*

– **Danny Hillis, chief technical officer, Applied Minds**

*A disease or virus will kill significant portions of the global population. Don't think that things will always get better. They can just get worse, and then you'll die.*

– **Gerald Celente, director, Trends Research Institute**

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