Anybody can make guesses about the future. What makes Brin a little different from the rest of us is that his predictions actually come true.

BY DAVID KUSNER PHOTOGRAPH BY BRIGITTE SIRE

David Brin works out of his home office in San Diego County, but he spends much of his day in invisible worlds—ones hidden from us because we can’t perceive them or because they don’t even exist yet. For the past three decades, the Hugo Award-winning author has been mapping out his vision of the future in dozens of works, both non-fiction and sci-fi. His 1998 book, *The Transparent Society*, explores how technological innovations force us to choose between privacy and security, foreshadowing the era of YouTube and ubiquitous surveillance cameras. His 1990 novel, *Earth*, anticipates so many of today’s trends—from the World Wide Web to global warming—that there is a Web site devoted entirely to its prognostications.

How did this 56-year-old father of three, who lives mostly outside of academia, get so adept at parsing the future? By keeping his journeys of imagination grounded in the real world. After getting a master’s in electrical engineering at the University of California at San Diego, Brin completed a Ph.D. in space physics and worked as a postdoc at the Jet Propulsion Laboratory. Today, in addition to churning out novels that chart his fictional Uplift universe, he continues to work closely with the people developing technologies that will transform our lives.

Why do you have such a good track record as a prognosticator?
When prediction serves as polemic, it nearly always fails. Our prefrontal lobes can probe the future only when they aren’t leashed by dogma. The worst enemy of agile anticipation is our human propensity for comply self-delusion.

Peering ahead is mostly art. We all have tricks. One of mine is to look for “honeypot ideas” drawing lots of fat attention. Whatever’s fashionable, try to poke at it. Maybe 1 percent of the time you’ll find a trend or possibility that’s been missed. Another method is even simpler: Respect the masses. Nearly all futuristic movies and novels—even sober business forecasts—seem to wallow in the same smug assumption that most people are fools. This stereotype led content owners to envision the Internet as a delivery conduit for old movies to passive couch potatoes. Even today, many of the social-net and virtual-world companies treat their users like giggling 13-year-olds incapable of expressing more than a sentence at a time of actual discourse.

A contrarian trick that has served me well is to ponder a coming technology and then imagine, What if everybody gets to use it? In really smart ways? Most of those imaginings have come true.

What’s the biggest trend you’ve failed to spot or the biggest prediction you think you got wrong? Back in 1999, I forecast that people would shrug off the future shock when the big millennium rolled around. At first it seemed that way, as people blissfully went about their routines. Now I suspect there really was
a 21st-century trauma. Romantic nostalgia is rampant. You find very little interest in the modernist agenda of confident problem solving. Robert Heinlein predicted this, but I didn't. I also expected a few technologies that never came. For example, lie detection based on involuntary eye movements, a method that ought to work even during a televised interview or press conference. A potential nightmare for deceitful politicians! But I was misled by hope. Other disappointed forecasts include rapid understanding of the immune system and big advances in computerized teaching.

At the other end, some trends exceeded anticipation. I did not expect the “age of amateurs” to progress so far, so fast. Fifty million hobbyists are demanding that professionals, from doctors to scientists to movie directors, accept a new world where expertise is not limited to the licensed.

You have said that science’s ability to look beyond the familiar is subject to our psychological, as well as physical, ability to perceive. What do you mean?

There is a famous, but much-debated, anthropological myth that the Carib Indians were unable to perceive the first European ships offshore until one of their shamans sat and contemplated for a while and then explained it to them. I think the people are smarter than that, but as an oversimplifying metaphor, it does point out that what we are able to see depends upon a variety of things. Let me give you a real way to put it into perspective. In the 16th century we got the printing press. Printing is a way of augmenting human memory. Printing not only vastly expanded the ability to convey human knowledge and memory to other people but also made more robust.

People tend to assume that when things like this happen, it automatically results in an improved humanity. This is what you're hearing from the techno-transcendentalists on the Internet. It is a religious statement that what we’re seeing on the Internet today is improving discourse and improving democracy and improving markets. I’m very skeptical of that because at the beginning of any of these revolutions, always what is empowered is demagoguery. The immediate outcome of the printing press was the Thirty Years War. The immediate outcome of radio was the empowerment of demagogues like Huey Long and especially Adolf Hitler. It always takes a while for the people to learn how to use the new media critically, to be able to perceive the good from the bad.

Now we have computing and databases, expanded memory, television and mass media. We’re headed toward the day the databases become a knowledge mesh; we’re going to have super memory and super vision. But what is going to enable us to perceive better?

Are there some examples of how science is helping us perceive better right now?

There is the basic, ever-increasing power of Instrumentalities. You have electron microscopes, which are involved in the cutting edge of nanotechnology, for instance. You’re able to measure the field of individual atoms. You are able to come up with wonderful crackpot notions like Will McCracken’s concept of Programmable Matter—that if you were to adjust the electrons on the surface of a sheet of silicon and control them through simple voltages, you could effectively make that surface of silicon behave like iron. We wouldn’t have been able to imagine this concept without the ability to operate on an atom-by-atom level.

But the rate at which we are seeing better with telescopes is probing better with microscopes is not where the real action is. Sure, every year we can see smaller, sure, every year we can see farther, but the real breakthroughs are coming in our ability to make more of these observations and do it faster. For instance, look at the recent use of the Cosmic Evolution Survey, using the Hubble Space Telescope to study gravitational lensing [in which the gravitational pull of galaxies and dark matter bends the light from more distant objects] in an area of the sky nine times the apparent surface area of the full moon. To be able to take a patch of sky and unleash computers to find so many gravitational lenses you could then make a three-dimensional depth map billions of light-years deep so you can find the patchiness of dark matter—that is very impressive. That’s the difference between seeing a pixel and deriving information about things that are far away from that pixel. That’s a matter of perception.

What is the biggest change you see coming?

I believe that the real breakthrough is connected to something referred to in The Transparent Society, and that’s the distribution of power. For example, low-cost screening methods will lead to personalized diagnostic therapy. People are talking about inexpensive methods to screen for millions of biomolecules. Try to imagine what it will be like when cyberneticists do to their room-size laboratories what others did to the room-size computers of the past. And of
course, it's going to pose a great many problems to us. Because when pimples-faced teenage hackers can't mess up just your Web site but they can also synthesize any known or unknown organic compound and then go to work at a fast-food joint, are you gonna eat fast food under those circumstances? The fundamental thing that's always made a difference in every revolution is the distribution of power. That's my main theme—it's not about fast-paced changes in how small or big or penetrating we can see individually. What's very fast-paced is the spreading of seeing in parallel. It's happening in biochemistry. It's happening in astronomy. It's happening in almost every source of perception.

How will the distribution of power help expand our understanding of the world?
Consider that NASA can't continue to find killer asteroids as they were commanded to do because they don't have the budget. Within five years, amateurs will take over this task. You are going to have asteroid surveys in 10,000 backyards with incredibly sophisticated CCD cameras that feed into loyal robots that are searching the sky in order to make their owner famous. It is the distribution of instrumental power that is driving our new ability to see.

Take a petallop [1 quadrillion calculations per second] computer. Some years ago I was at the first petallop conference where they were discussing what uses people might have for such powerful devices when we finally get them. Now we've got them. One way to visualize what a petallop computer can do is to put a ball on a narrow pedestal in the middle of the desert and take all the light coming in at that ball from every angle. It takes a petallop to perceive light coming in simultaneously from all those angles. It is one of those things that computers can do that we can't. The fovea of our eye sees only a tiny bit, and then the brain stitches together a mosaic—a marvelous, illusory mosaic—that we are actually looking out at, maybe, a hundred degrees. But a petallop computer can take in and process photons from every direction at once. We are going to reach the point where no part

Do you worry about the loss of privacy as both the government and amateurs have more and more access to surveillance?
I got some of my nicest letters based on Chapter 9 of The Transparent Society, because I really disassemble my own theory, and I talk about all sorts of ways a transparent society could go wrong. You could have a really nasty version of majority rules. I believe that Ray Bradbury shows that in Fahrenheit 451. The thing I use to counterbalance that is this: If you look at the last 50 years, whenever the public learns more about some eccentric group, it judges that group on one criterion, and this is always the one it uses: Is this group mean? Are they harmful and oppressive to others? When the answer is yes, the more you learn about the group, the less they're tolerated. If the answer is no, the more you learn about the group, the more they're tolerated.

If that's true and if it holds in the future—if people continue to defend other people's eccentricities because a) they think it's cool to live in a world of harmless eccentrics and b) for the sake of their own protection—then you would likely see a 51 percent or 60 percent or 70 percent dictatorship by a majority that insists on crushing intolerance. Now, that is a group-think majority-imposed will, but it's probably the least harmful one you can imagine. As far as privacy itself is concerned, I have a simple answer to that. Human beings want it. We naturally are built to want some privacy. If we remain a free and knowing people, then sovereign citizens will demand a little privacy, though we'll redefine the term for changing times.

The question really boils down to: Will tomorrow's citizens be free and knowing? Will new technologies empower us to exert reciprocal accountability, even upon the mighty? It may seem ironic, but for privacy and freedom to survive, we'll need a civilization that is mostly open and transparent, so that each of us may catch the would-be voyeurs and Big Brothers.

What does the enormous expansion of human perception imply about our future?
The theological implications are profound. As Einstein said, "There is no reason to believe that the laws of nature have to be so beautiful or so easily comprehended." He thought we were intended to engage in conversation with the Creator, if there is one, and become apprentices. The notion of a humanity of apprentice Creators is implicit in everything that's going on right now. That's why you see scientists assiduously avoiding any discussion of what we're doing as being an apprentice Creation, even though it's blatantly obvious. It's right there in front of us, but we cannot see it—just like the Carib could not see the ships.

Would you rather be living 100 years from now, when we'll presumably have access to so many more answers?
Is it better to sow then to reap? Jonas Salk said our top job is to be "good ancestors." If in this era meet the challenges of our time, then our heirs may have powers that would seem godlike to us—the way we take for granted miracles like flying through the sky or witnessing events far across the globe. If those descendants do turn out to be better, wiser people than us, will they marvel that primitive beings managed so well, the same way we're awed by the best of our ancestors? I hope so. It's poignant consolation for not getting to be a demigod.

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