

# Synthesis

A review of emerging ideas in the media



## Generation Robot

How to manage the proliferation of artificial intelligence in our lives by Jimmy Guterman

Sit down with some big thinkers of technology and it won't be long before you hear them talk about "the Singularity," the allegedly imminent moment when our technology outsmarts us and takes over. It's sort of a Rapture for nerds, and it's been popularized in everything from the *Matrix* films to inventor Ray Kurzweil's book *The Singularity Is Near*. Think the robot armies in *Star Wars* are fanciful? Right now there are more than 12,000 robots working for the U.S. military. Google has computer-driven cars out on the road. And we all know about Watson, the IBM computer that dominated its human competitors on *Jeopardy*.

Workplace drones are coming, too. Terry Gou, CEO of the Chinese megamanufacturer Foxconn, says he plans to replace many low-skilled employees with robots by the end of this year. On the other end of the skills spectrum, artificial intelligence and automation are taking on tasks that used to be the province of scientists, doctors, pharmacists, lawyers, and even bloggers, as described in the *Slate* series "Will Robots Steal Your Job?" and in *Race Against the Machine: How the Digital Revolution Is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, a strong e-book on automation from the MIT researchers Erik Brynjolfsson and Andrew McAfee. And, in a nod to how dramatically robots are changing the way we get work done, three California Polytechnic State University academics recently published *Robot Ethics: The Ethical and Social Implications of Robotics*. We're a long way from the Singularity, but there's no question that as the 21st century progresses, artificial intelligence will play a more prominent role.

So what does this mean for management? Bosses will need to get better at weighing human capital against high-tech replacements, and at understanding and using the latter. They will have to make technological fluency an important criterion in hiring their staffs and developing their businesses. Workers will also have to keep themselves employable by



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building skills no robot can (yet) match. For thoughts on that topic, consider *The Most Human Human: What Talking with Computers Teaches Us About What It Means to Be Alive*, in which the philosopher and computer scientist Brian Christian identifies the gap that still exists between us and technology, and the soon-to-be-published *The Voice in the Machine: Building Computers That Understand Speech*, by Roberto Pieraccini, director of Berkeley's International Computer Science Institute, who asks why, in 2012, we still don't have artificial intelligence capable of conversation.

Others argue for a more proactive approach to staying competitive in a robot-filled workplace: What if the secret to surviving and thriving amidst artificial intelligence is to become more robotic ourselves—to head toward a state that designers call "transhuman," where we and the machines are linked? Before you dismiss that notion as mere fantasy, put down your iPhone, if you can, and think about it.

Many of us now have trouble functioning without various gadgets to feed us information, remind us to perform certain tasks, and instruct us on how to do them. Then there are the devices inside our bodies: Increasing numbers of people rely on physical interventions to keep them alive and productive. Our insulin pumps and pacemakers may not be as readily visible as the Borg implant in *Star Trek: The Next Generation*, but many people have been augmented in profound ways by technology. Some futurists think there's much more to come.

Michael Chorost, author of *World Wide Mind: The Coming Integration of Humans*

and *Machines*, describes himself as "part computer" because he has a cochlear implant that allows him to hear—and to perform his work at a level he couldn't otherwise. He sees this as a small step toward a future in which inserted DNA, implanted nanowire, and wireless connections between brains will allow people to beam their thoughts to one another.

**"I feel an intense calling to embrace the opportunities that freeing our brains from the limits of our terrestrial bodies will bring to our species."**

Miguel Nicolelis, *Beyond Boundaries*


A less lofty take comes from Duke University's Miguel Nicolelis, whose *Beyond Boundaries: The New Neuroscience of Connecting Brains with Machines—and How It Will Change Our Lives* explains how we can actively off-load more work—driving, communicating, thinking—to devices that will sense what we want more clearly and efficiently than we do ourselves because they're connected to our brain signals. After all, he got a lab monkey to control a robotic arm without physically touching it, via an animal-machine interface that involved electrode implants in the monkey's brain. Humans could be next, and Nicolelis suggests that we need to consciously manage the connections.

The idea that humans might be able to guide their own evolution into the transhuman is the message of *Homo Evolutis*:

*Please Meet the Next Human Species*, an e-book in which Juan Enriquez and Steve Gullans, researchers, entrepreneurs, and TEDizens, discuss the potential positive impact of dozens of advances in the life sciences, from performance-enhancing tendon replacement therapy to robotic prosthetics that users operate by thinking about it, just as Nicolelis's monkey did. All these books have different, nuanced arguments, but all come down firmly in favor of preparing for the integration of human and machine that the authors consider to be not only inevitable but already in progress.

At a time when hiring is rare, automation is on the rise, and workers who still have jobs are under increasing pressure to do more, faster and better, it's easy to see why humans might submit to a bit of body-hacking to keep up. The tools at their disposal—technological, surgical, or pharmacological—are already a lot more powerful than a venti espresso. Some future interventions may be useful; others may be dangerous. But it's a relief to find academics and journalists trying to understand and bridge the human-computer relationship, rather than telling us all to beware of it.

With a few outlier exceptions, technology is neither good nor bad; it simply is. It's up to us as humans to choose what we want to do with it and what we don't, what we can manage and what we must set aside. ♥

 **Jimmy Guterman** is president of The Vineyard Group and a former senior editor of HBR.



**The Most Human Human: What Talking with Computers Teaches Us About What It Means to Be Alive**  
Brian Christian  
Doubleday, 2011



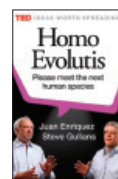
**The Voice in the Machine: Building Computers That Understand Speech**  
Roberto Pieraccini  
MIT Press, 2012



**World Wide Mind: The Coming Integration of Humanity, Machines and the Internet**  
Michael Chorost  
Free Press, 2011



**Beyond Boundaries: The New Neuroscience of Connecting Brains with Machines—and How It Will Change Our Lives**  
Miguel Nicolelis  
St. Martin's Griffin, 2012



**Homo Evolutis: Please Meet the Next Human Species**  
Juan Enriquez and Steve Gullans  
TED Books, 2011