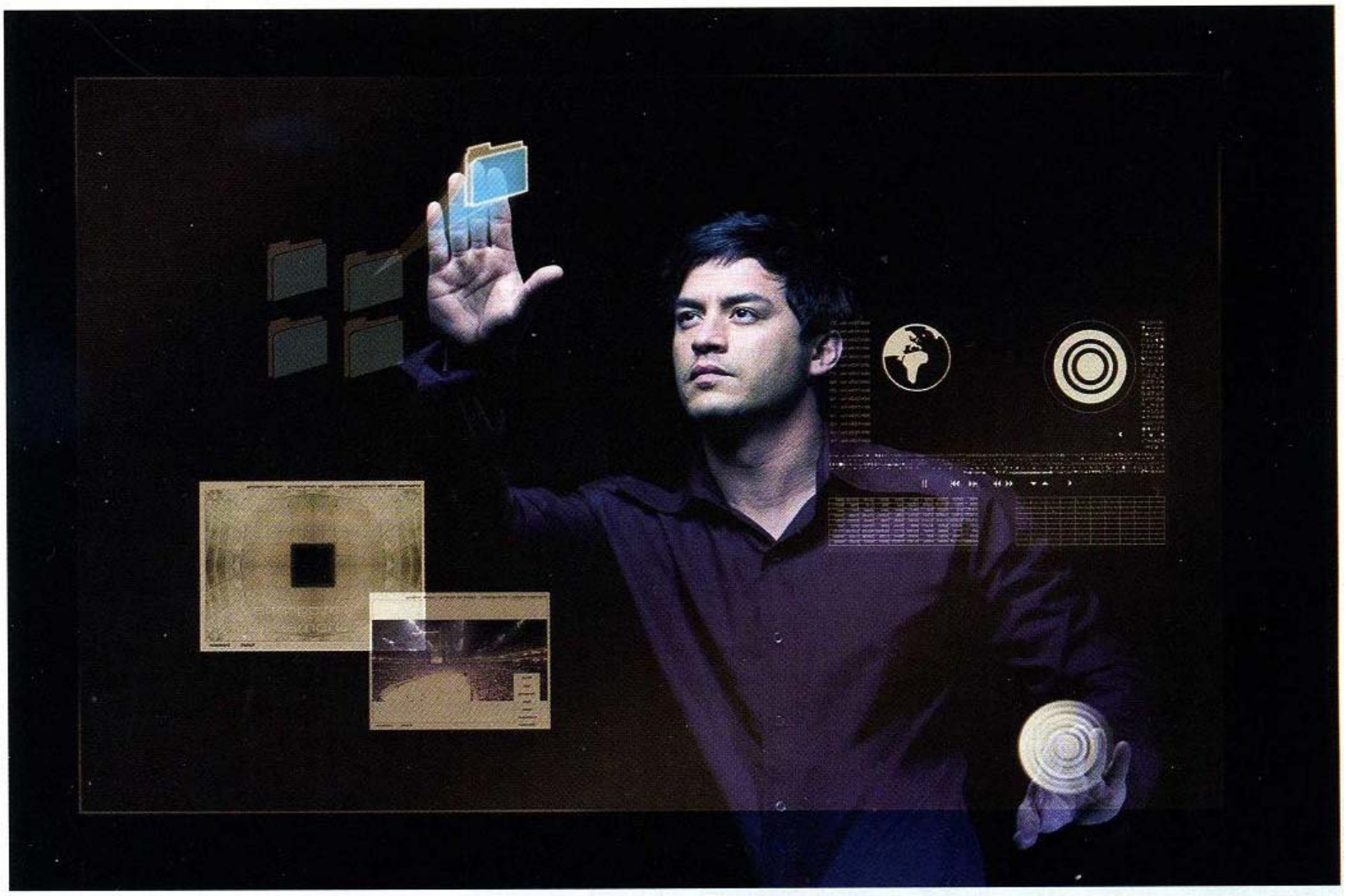
2008 Technology Advances

Winners and Losers

IEEE Spectrum January 2009 Issue

The Trouble With Touch Screen

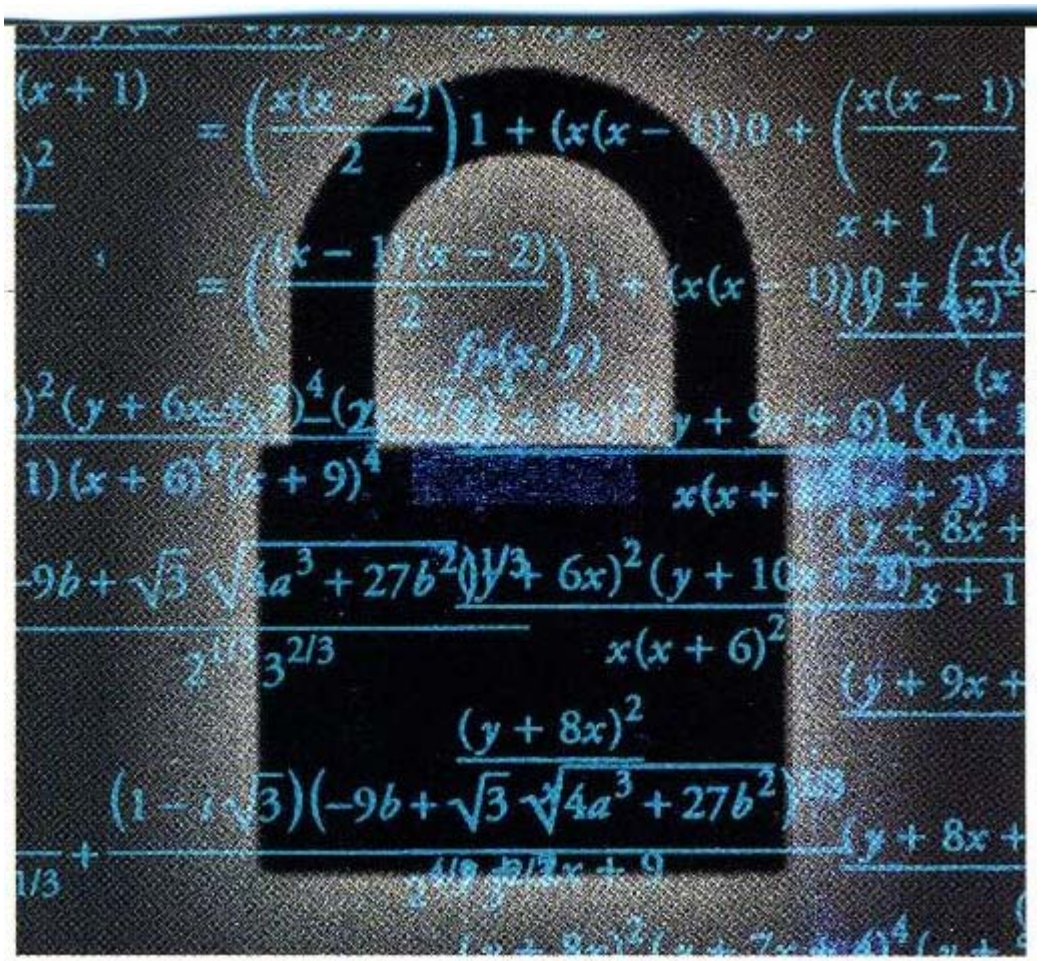


The Trouble With Touch Screen

- **Scientists search for a replacement for indium-tin oxide, a transparent conductor that's vanishing fast.**

- **The price of the metal has shot up from around US $100 per kilogram to nearly US $1000 in the past six years.**

Cryptographers Take on Quantum Computers



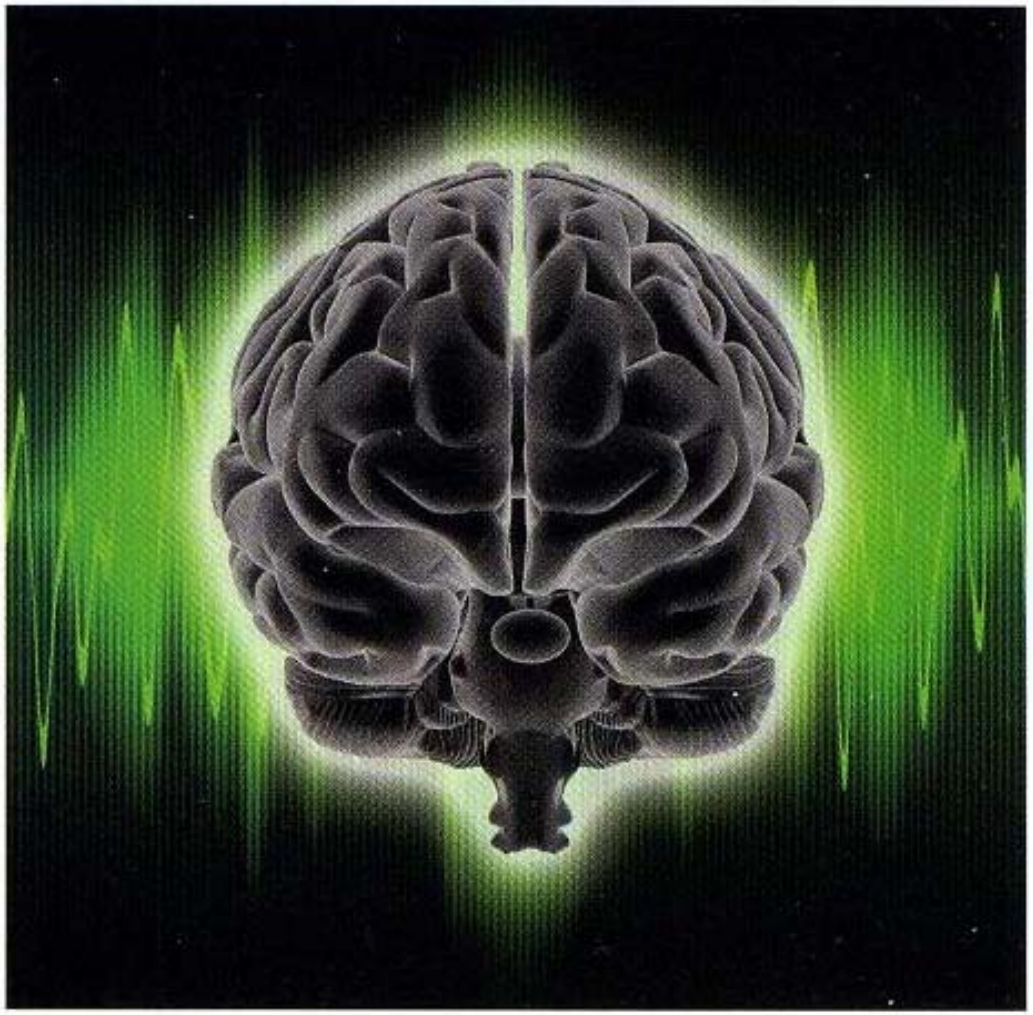
Cryptographers Take on Quantum Computers

- **Software updates, e-mail, online banking, and the entire realm of public-key cryptography and digital signatures rely on just two cryptography schemes to keep them secure – RSA and Elliptic-Curve Cryptography (ECC).**

- **The reason that quantum computers are such a threat to RSA and ECC is that such machines compute using quantum physics.**

Unlike a classical computer, in which a bit can represent either *1* or *0*, in a quantum computer a bit can represent *1* or *0* or a mixture of the two at the same time, letting the computer perform many computations simultaneously. That would shorten the time needed to break a strong *1024*-bit RSA code from billions of years to a matter of minutes.

Sound Waves For Brain Waves



Sound Waves For Brain Waves

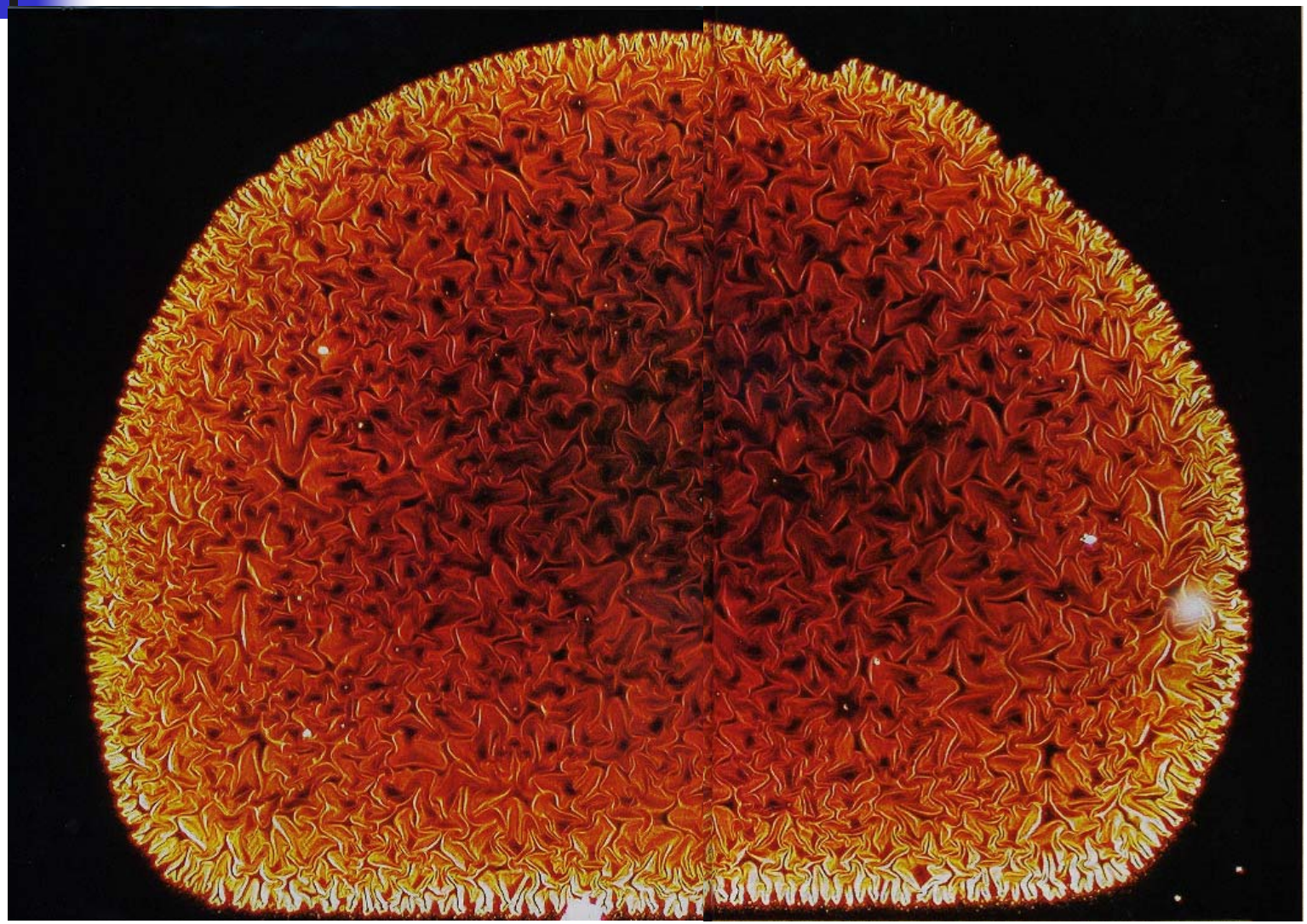
- **Researchers at Arizona State University at Tempe have developed a new use for *ultrasound* –**

to control brain activity from outside the skull.

- **Ultrasound will someday allow physicians to substitute neural implants with external devices.**

- William J. Tyler, Assistant Prof, Ariz. State Univ.

Carbon in Bloom



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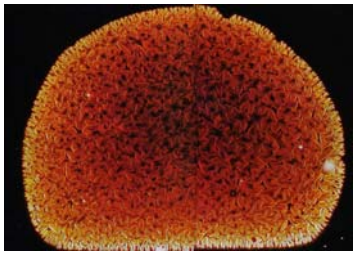
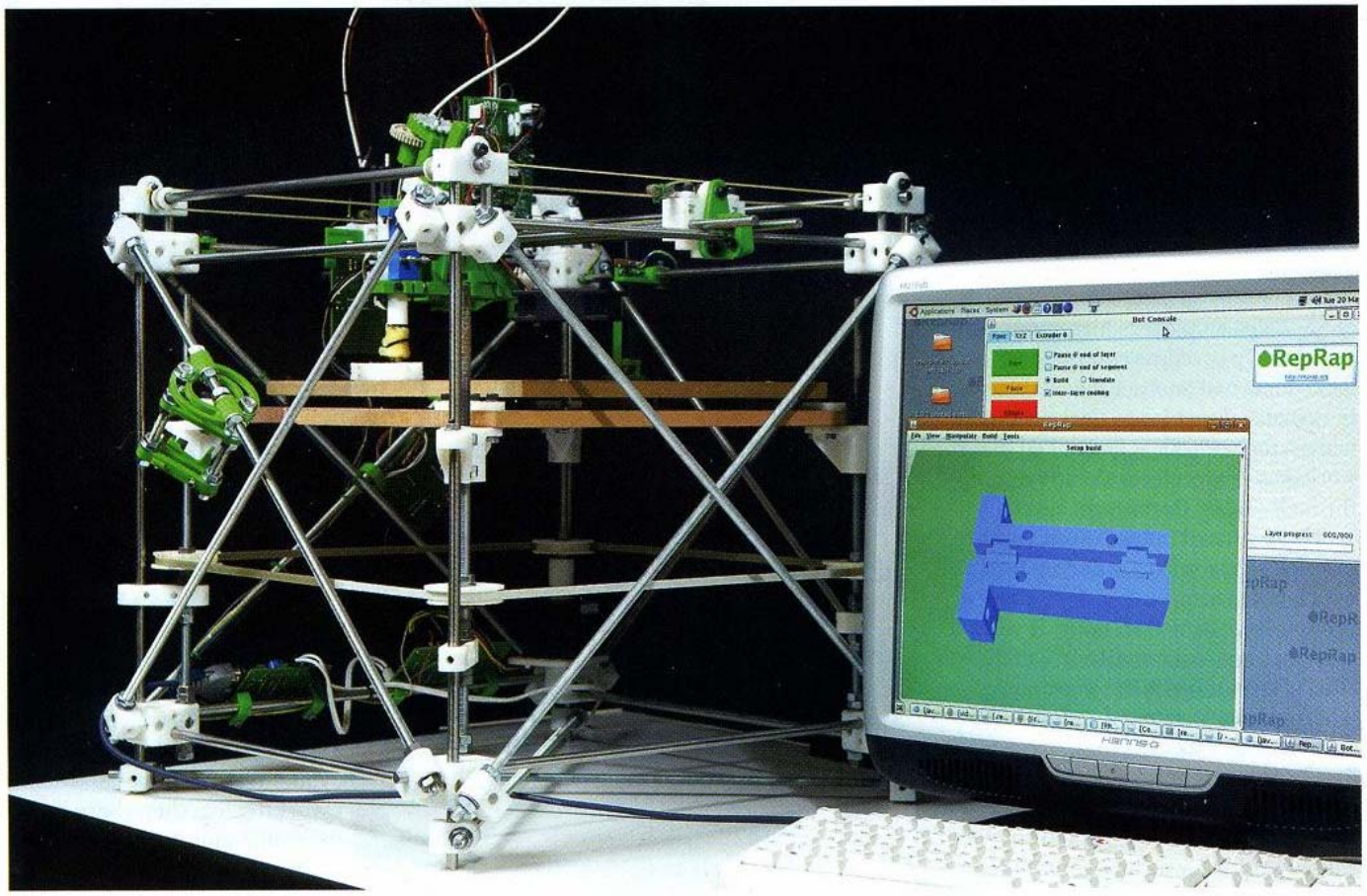


- Although a single nanotube is too tiny for a 30X stereo microscope to resolve, particles that make up the forest canopy are visible in the photo.

- They are in a slightly liquid state, giving off, energy – and a special microscope attachment – is responsible for the way patters, the balloonlike shape, and the bright glowing colors.

A Self-made Machine



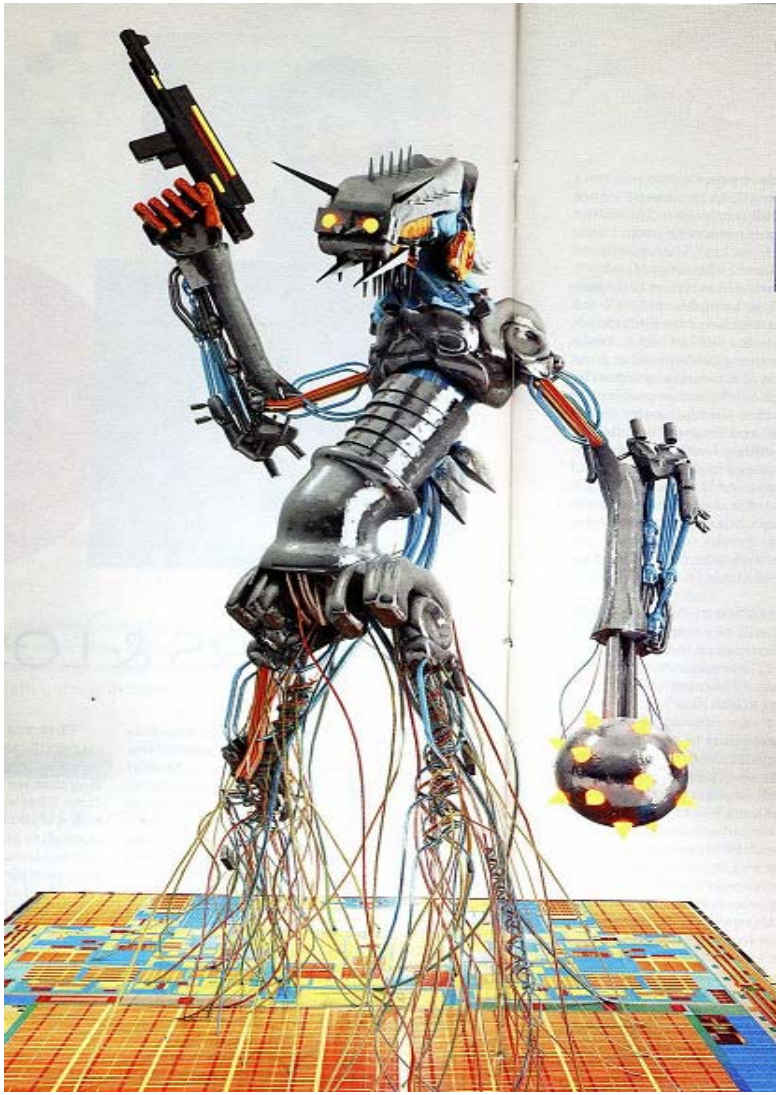
***RepRap*, a new open-source hardware project, goes a long way toward fulfilling the dream of self-replicating machines.**

Multicore Made Simple

Intel's

Larrabee

is a chip every designer already knows how to program.



Mental Block

Emotive says its game controller works at the speed of thought, but it doesn't.

The Revolution will be Prosthetized

***DARPA*'s prosthetic arm gives amputees new hope.**

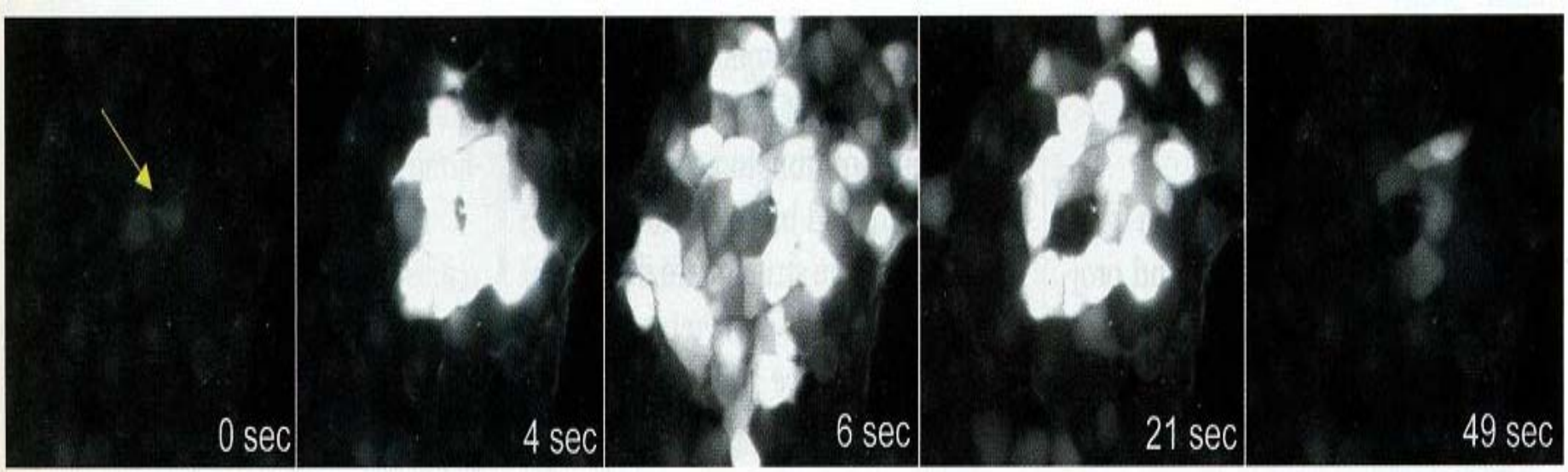
That Sinking Feeling

In the teeth of a global recession, an aquatic-car company ramps up to enter a market that's never made money.

Brew, Baby, Brew

A backyard still that turns sugar into Ethanol fuel may look sweet, but under scrutiny it turns sour.

Living Machines



In an experiment on cell-to-cell communication conducted by Tadashi Nakano and colleagues at Caltech, a mechanically induced calcium wave propagates through several cells. The networked cells, behaving much like nodes on a LAN, propagate signals in all directions.

Attacking Keyboards

- ***"Keyboards are not safe for transmit information."***

– Swiss security researchers developed *four attacks* that can detect what a person is typing on a keyboard by analyzing the signals produced by keystrokes.

- **The researchers used a radio antenna to 'fully or partially recover keystrokes" by *spotting the electromagnetic radiation* emitted when the keys were pressed.**

Human or Not

- ***"Am I conversing with a human or a computer?"***

– In 1950, Alan M. Turing suggested that a computer could be said to be thinking if, in a text-based conversation, its responses are indistinguishable from a human's.

His prediction was that by the end of the 20th century, computers would have a 30% chance of being mistaken for a human in a five-minute text-based conversation.

- **In the 18th Loebner Prize competition, *ELBOT*, one of six programs, nearly passed the Turing test, tricking 25% of judges into believing that it was human. Each of the six programs fooled at least one judge.**