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TECHNOLOGY

REVIEW

BUSINESS • OPPORTUNITY • IMPACT

MIGUEL DE ICAZA

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HOW A LEGENDARY HACKER GOT NOVELL TO BUY INTO OPEN SOURCE
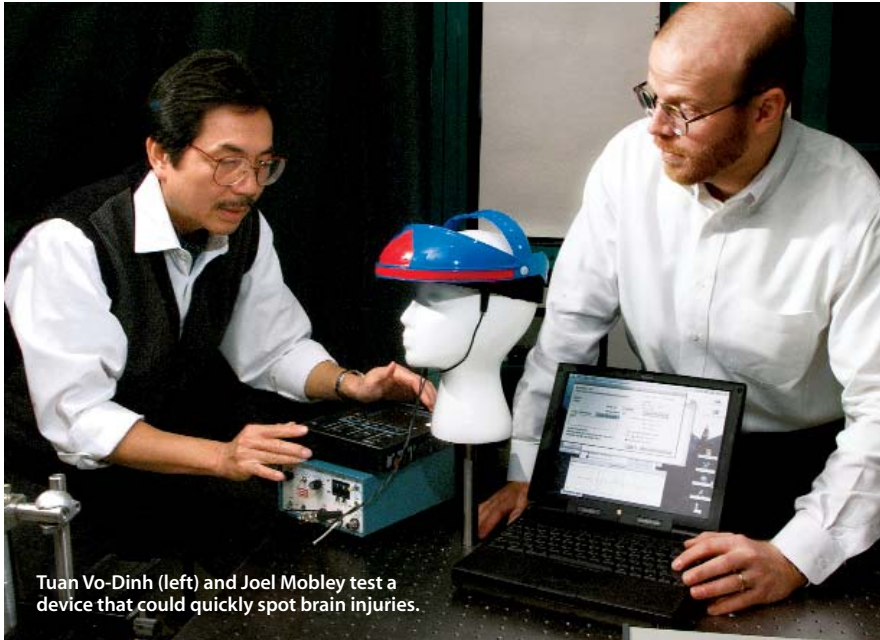
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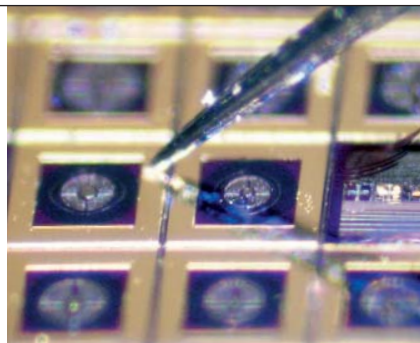Miguel de Icaza, vice president of product technology, Novell

Tuan Vo-Dinh (left) and Joel Mobley test a device that could quickly spot brain injuries.

HEAD CHECK

ACCIDENT VICTIMS COULD BENEFIT FROM A NEW TECHNOLOGY THAT HELPS paramedics assess brain injury during the crucial first minutes after a blow to the head. Researchers at the Oak Ridge National Laboratory have developed a portable, non-invasive device that uses ultrasound to detect bleeding in the brain. Existing ultrasound technologies produce high-resolution images but require expensive equipment and highly trained personnel. This device, in contrast, doesn't produce an image at all: it simply compares how each side of the brain reflects ultrasound waves and alerts the operator if there are asymmetries or abnormal signals. "We're not trying to replace fancy imaging at hospitals," says Joel Mobley, a researcher who helped develop the technology and now works at the U.S. Army Research Laboratory in Adelphi, MD. "We want to give first responders critical information on what's going on inside the head, so they know where the patient should be taken." Oak Ridge's Tuan Vo-Dinh estimates that it will take one to three years to get the technology licensed and earn U.S. Food and Drug Administration approval.

LIGHT BOOSTER

A NEW DEVICE DESIGNED BY GARRETT Cole and Qi Chen at the University of California, Santa Barbara, could help bring fiber-optic connections—and the massive doses of bandwidth they provide—to home Internet users. The device is an inexpensive amplifier that could be used to boost data signals in the critical "last mile" of fiber-optic cable running between a home or neighborhood and the telecom backbone. One of the major hurdles in

Cheap, tunable optical amplifiers like these could help bring fiber-optic connections home.

telecommunications has been the cost of existing amplifiers, such as the sophisticated devices used in the backbone. But the new amplifier can be fabricated the same way computer chips are, without any mechanical assembly, so it promises to be much cheaper. What's more, it's tunable, like a radio dial, so it can compensate for changes in light frequency that confound other inexpensive amplifiers. If a company were to show interest, says Cole, it should take only a few years to develop a commercial device.

INSPECTOR BOT

AN AUTONOMOUS ROBOT COULD SOON save businesses millions of dollars in the inspection of pipelines. Houston-based itRobotics is developing a robot that can travel tether-free, without operator intervention, for kilometers inside tubing and small-diameter pipes, making inspections cheaper and easier and detecting some flaws that aren't detectable from the outside. The trainlike prototype, designed for pipes five to six centimeters across, pulls one or more carts loaded with sensors that detect changes in, for example, magnetic flux, which can indicate wall thinning or cracks. The robot's proprietary locomotion system and onboard computer allow it to decide whether to proceed, slow down, stop, or even reverse. The company plans to introduce its first inspection robot, for the oil and gas industry, this fall. Future versions could inspect plant equipment such as the boilers and heat exchangers found in refineries, chemical plants, and desalinization plants.

This robot inspects pipes and tubes from the inside.
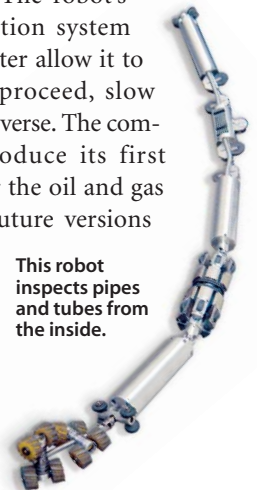
AUTOMATIC HIGHLIGHTS

Don't have time to watch your favorite team? At Microsoft Research Asia in Beijing, China, computer scientists Hongjiang Zhang, Yufei Ma, and Gu Xu have developed software that automatically generates highlight reels from video of sports programs. Import the video onto a PC, and computer vision algorithms recognize objects on the screen, like balls or people. The software then identifies key events, such as the ball going through a basketball hoop or into a soccer goal. "Sport has grammar," says Zhang, and the computer can use that grammar to organize its summary of a game's important plays. Related software can also edit TV programs into segments of interest, such as news and weather forecasts, so the viewer doesn't have to watch an entire broadcast. It's all still being tested, but Zhang says these features could be part of Microsoft home entertainment software within a few years—in time, perhaps, for the 2008 Olympics. Look out, ESPN.