



# TECHNO

THE BIG IDEAS THAT  
ARE CHANGING EVERYTHING

# TRENDS

## VOICE RECOGNITION TAKES OFF

BY DANIEL BURRUS, CEO OF BURRUS RESEARCH



For the past 25 years, I have been writing about, and predicting the future of, voice recognition technology. I'm happy to report that, as predicted, the past two years have seen a 100% growth rate in the market for voice recognition, which now represents over \$1 billion in annual sales. Server-based voice recognition used to automate call centers has grown to \$600 million, and speech technology embedded in items such as cell phones and dashboards (could the iPod be next?) is already running at \$125 million a year.

But you haven't seen anything yet! With ever increasing processing power, new software algorithms and better microphones being built into a wide variety of electronic devices including computers and cell phones, accuracy rates are already close to 100%. In addition, cell phone companies are quickly rolling out 3G networks, which provide the bandwidth that enables users to access powerful software from a server instead of trying to store sophisticated software packages on their phone.

### BEYOND THE LAPTOP

A company called Nuance recently launched voice recognition software that allows users

*Continued on page 2*

---

MARCH 2007

VOL. XXIII, NO. 3

---

- Cars Of The Future
- Electricity From Heat
- Plastic Wrap Identifies Food Contaminants
- Fingerprint Security For Your Home
- Virus Washer
- Teeth From Stem Cells
- Super-Small Endoscope
- Oral Cancer Test
- Self-Sterilizing Fabric
- Portable Scanner
- Commercially Viable Quantum Computer

---

VISIT [TECHNOTRENDS.COM](http://TECHNOTRENDS.COM)

For an easy solution to keep up on the rapidly changing world of science and technology, visit our new updated web site [Technotrends.com](http://Technotrends.com)

SIGN UP FOR OUR FREE VIDEO E-BRIEFING

Visit our web site [www.Burrus.com](http://www.Burrus.com) and sign up on our home page to receive our free Video e-Briefing featuring highlights of our monthly Consumer Intentions and Actions Survey.

PUBLISHED BY: **burrus**  
research

800-827-6770

[www.burrus.com](http://www.burrus.com)

## VOICE RECOGNITION *(continued from page 1)*

to dictate on their mobile device with amazing accuracy. Google is working on technology that will enable users of cell phones and other mobile devices to search by voice. Combine that with applications such as dictating e-mail or short letters, and you begin to see the possibilities. VoiceBox Technologies software on mobile devices can analyze the context of a word within a sentence so that words with double meanings are defined in the correct way based on the intent of the user. Will speech recognition supplant typing, taping, texting and touching? Not totally, but it will free our fingers and help us keep our eyes on the road!

### **TECHNOLOGY NEWS HIGHLIGHTS**

## CARS OF THE FUTURE

As predicted, we are beginning to see auto makers embrace alternative technologies in their own unique ways:

Tesla Motors is planning to begin delivery of their electric roadster by the fall of this year, with a price tag of \$80,000 to \$120,000. This supercharged vehicle will have the look and feel of a high-end sports car with top speeds of 130 miles per hour and the ability to go from 0 to 60 in about 4 seconds. The 185kW electric motor is powered by a lithium ion battery, which will run up to 250 miles on a single charge.

*For information: Tesla Motors, 1050 Bing Street, San Carlos, CA 94070; phone: 650-413-4000; Web site: [www.teslamotors.com](http://www.teslamotors.com)*

Next year, 100 BMW luxury cars will be getting a new hydrogen/gasoline internal combustion engine. The company plans to give them to high-profile politicians and celebrities to promote the benefits of hydrogen as a viable fuel alternative. The engine can generate 260 horsepower and has sophisticated control systems to optimize performance, but fuel storage is still an issue. The storage tank weighs nearly 370 pounds and occupies half the trunk space. In spite of being well insulated, the liquid hydrogen evaporates so quickly that, even when the vehicle is not driven, a half-tank of fuel will pretty much disappear over the course of several days. Until a better solution can be worked out, they are recommending that the cars should not be parked in enclosed garages.

*For information: BMW of North America, 5650 Arcturus Avenue, Oxnard, CA 93033; phone: 805-271-2400; Web site: [www.bmwusa.com](http://www.bmwusa.com)*

## ELECTRICITY FROM HEAT

It has been estimated that for every 10 watts of electricity generated by current methods, another 15 watts is wasted as heat. Converting even a fraction of that heat energy could have a major impact on meeting the world's future energy needs. In their search for new, environmentally friendly ways to generate electricity, scientists at Berkeley Lab are looking backward – nearly two hundred years! The Seebeck Effect (discovered in 1821 by a German physicist) is a property of matter in which temperature differences are converted directly into electric voltage. Until now, the process has been considered too inefficient to be practical, but recent advances in the ability to measure this phenomenon could lead to a whole new field of thermoelectrics for low-cost power production. Using a scanning tunnel microscope with a gold stylus that tapers off to a single atom at the tip, the researchers have been able to measure the thermoelectric efficiency of various molecules. Over time, they hope to fine-tune the properties of the organic structures to come up with an inexpensive and easily processed molecule for widespread application.

*For information: Arun Majumdar, Lawrence Berkeley National Laboratory, 1 Cyclotron Drive, Mail Stop ETCHEVERRY, Berkeley, CA 94720; phone: 510-643-8199; fax: 510-642-6163; email: [amajumdar@lbl.gov](mailto:amajumdar@lbl.gov); Web site: [www.lbl.gov](http://www.lbl.gov)*

## PLASTIC WRAP IDENTIFIES FOOD CONTAMINANTS

In the U.S. alone, food poisoning accounts for tens of thousands of hospitalizations and more than a thousand deaths each year. But a recently developed plastic wrap called Toxin Guard® can identify whether food has been contaminated before it is removed from the package. Toxin Guard uses diagnostic antibodies printed directly onto plastic food wrapping film. When the film comes into contact with a targeted toxin, a visual signal alerts the customer, retailer or inspector. The technology can detect the presence of bacteria from spoilage, pathogens (such as E. coli, Listeria and Salmonella),

pesticides, and even genetic modification markers. In addition to avoiding food poisoning, Toxin Guard will eliminate the need for massive recalls, and there may also be applications for the product in fighting bioterrorism. It is currently awaiting FDA approval.

*For information: Toxin Alert, Inc., 1 Marmac Drive, Toronto, Ontario, Canada M9W 1E7; phone: 416-213-0990; fax: 416-213-9239; Web site: [www.toxinalert.com](http://www.toxinalert.com)*

## FINGERPRINT SECURITY FOR YOUR HOME

Tired of fumbling for your house key? A new deadbolt design that scans your finger to grant access will soon be commercially available. The SmartScan system incorporates radio-frequency technology to scan fingerprints as well as patterns below the skin, so it's not affected by dirt or dry skin. It stores up to 55 fingerprints and can be programmed for three levels of access. For example, you can set the lock to let in your cleaning lady only on her scheduled days. Look for SmartScan to hit stores this spring.

*For information: Kwikset Corporation, Consumer Service, 19701 DaVinci, Lake Forest, CA 92610; phone: 800-327-5625; Web site: [www.kwikset.com](http://www.kwikset.com)*

## VIRUS WASHER

Recent studies have confirmed that a proprietary electrolyzed water technology is 99 percent effective at suppressing certain viruses in heating, ventilating and air conditioning systems. Although the latest tests were conducted using Feline Calicivirus (which causes a type of stomach influenza in cats), earlier tests also confirmed its ability to combat human viruses, including the highly pathogenic avian flu. The method works by dissolving proteins on the virus cells so that they cannot attach to receptors in the body. The "virus washer" has been used previously for water-based applications such as pools and washing machines, but this represents the first successful application in air purification systems.

*For information: Sanyo Electric Co., Ltd., 5-5, Keihan-Hondori 2-chome, Moriguchi City, Osaka 570-8677, Japan; phone: +81-3-6414-8615; fax: +81-3-6414-8720; [www.global-sanyo.com](http://www.global-sanyo.com)*

## TEETH FROM STEM CELLS

Researchers have found a way to regenerate teeth using stem cells. In studies on mice, they were able to extract two types of cells from mouse embryos – epithelial, which form the outer enamel, and mesenchymal, which form the blood vessels and connective tissue. The cells were placed into a culture of collagen gel where they interacted to form a tooth bud. From there, the bud was transplanted into an adult mouse liver where the abundant supply of blood enabled the tooth to form further. When it was finally transplanted into a mouse's mouth, it grew to full size with the same structure as a normal tooth. The new method may provide an easier and healthier option for people requiring dentures or dental implants. The approach may also have applications for regenerating other ectodermal organs such as hair.

*For information: Takashi Tsuji, Tokyo University of Science, 1-3 Kagurazaka, Shinjyuku-ku, Tokyo 162-8601, Japan; phone: +81-3-5228-8276; Web site: [www.sut.ac.jp/en](http://www.sut.ac.jp/en)*

## SUPER-SMALL ENDOSCOPE

A team of researchers at Harvard Medical School has designed an endoscope that is only 350 micrometers wide, yet produces three-dimensional images that are as clear as current cameras measuring several millimeters in width. The system transmits white light through the optical fiber to the tip, where a diffraction grating refracts it into a rainbow of colors. As the light hits the tissue, each color is transmitted back as a single pixel of information. The spectrometer then compares the reflected light with a reference to create a 3D image. In studies on mice, the super-thin endoscope was able to detect tumors as small as 100 micrometers in diameter. Such fine resolution could someday enable clinicians to diagnose cancers at a much earlier stage or perform new types of brain or fetal surgery.

*For information: Guillermo Tearney, Massachusetts General Hospital, Bar 703, 55 Fruit Street, Boston, MA 02114; phone: 617-724-2979; fax: 617-726-4103; email: [gtearney@partners.org](mailto:gtearney@partners.org); Web site: [www.hms.harvard.edu](http://www.hms.harvard.edu)*

## ORAL CANCER TEST

Oral cancer affects an estimated 30,000 Americans each year, and approximately 50 percent of those diagnosed will die within five years. Current means of detecting this deadly disease are limited to visual signs – a lesion or discoloration in the mouth. But a simple new spit test could soon become the standard of practice for earlier detection of oral cancers. The saliva RNA test analyzes a sample for four oral cancer biomarkers. In pilot tests on 100 patients, it identified oral cancer correctly 82 percent of the time. A larger multi-center clinical trial will soon be under way.

*For information: David Wong, University of California at Los Angeles, Den-Oral Biology & Medicine/DR1; Box 951668, 73-017B CHS, Los Angeles, CA 90095-1668; phone: 310-206-3048; email: dtww@ucla.edu; Web site: [www.ucla.edu](http://www.ucla.edu)*

## SELF-STERILIZING FABRIC

Antibiotic-resistant microbes are a growing problem in healthcare environments, but a breakthrough in textile technology may help eradicate the spread of dangerous pathogens. A North Carolina researcher has discovered a way to coat ordinary cotton, nylon and polyester with a thin layer of light-absorbing dye. When exposed to light, the dye absorbs oxygen and converts it into a highly oxidizing form that is toxic to viruses and some bacteria. In less than one hour it can kill up to 99.9 percent of the germs tested. The technique currently requires relatively high-intensity light; however, the goal is to develop fabrics that will work effectively in a well-lit operating room. Applications for the new technology include self-sterilizing sheets, masks, and upholstery fabrics for waiting rooms.

*For information: Dr. Stephen Michielsen, Textile and Apparel Technology and Management, North Carolina State University, Raleigh, NC; phone: 919-515-1414; fax: 919-515-3733; email: stephen\_michielsen@ncsu.edu ; Web site: [www.ncsu.edu](http://www.ncsu.edu)*

## PORTABLE SCANNER

The ZScanner 700 makes it possible to scan virtually any object, and create a three-dimensional image of it in real time. The handheld device (which resembles a Viewmaster) is connected to a computer via FireWire™. Reflective targets are placed on the object to be scanned and the ZScan software generates a polygon mesh profile of the surface, which can be output to a 3-D printer or software program. The technology can be used in a variety of applications including ergonomic engineering, packaging, restoration and reconstruction, and custom-designed medical orthotics.

*For information: Z Corporation, 32 Second Avenue, Burlington, MA 01803; phone: 781-852-5005; fax: 781-852-5100; Web site: [www.zcorp.com](http://www.zcorp.com)*

## COMMERCIALLY VIABLE QUANTUM COMPUTER

Last month marked the first demonstration of a commercially viable quantum computer. In the first of three examples of the 16-qubit Orion supercomputer's capabilities, it matched a known drug compound with a database of molecules. It also used compatible and incompatible characteristics of a sampling of guests to compute the optimum seating chart for an event, and solved a Sudoku puzzle in record time. Orion uses a new type of analog processor that is based on quantum physics, allowing multiple computations to be made simultaneously, at rates exponentially faster than traditional digital processors. Long considered to be the "holy grail" of computing, quantum devices will be able to deliver precise answers to many complex problems that have otherwise been impossible to solve in a reasonable period of time due to the sheer volume of data involved. Technological breakthroughs such as this could revolutionize research and development in biotechnology, pharmaceuticals, finance, and a host of other industries.

*For information: Georgie Rose, D-Wave Systems, Inc., 110-4401 Still Creek Drive, Burnaby, British Columbia, Canada V5C 6G9; phone: 604-630-1428; fax: 604-630-1434; Web site: [www.dwavesys.com](http://www.dwavesys.com)*

---

Technotrends is published 12 times a year by Burrus Research, Inc., a research and consulting firm that monitors global advancements in science and technology and their direct impact on business and consumers. Patti Thomsen, Editor P.O. Box 47, Hartland, WI 53029-0047. To subscribe, call 800-827-6770, or email [office@burrus.com](mailto:office@burrus.com). © 2007 Burrus Research, Inc.