



# TECHNO

THE BIG IDEAS THAT  
ARE CHANGING EVERYTHING

# TRENDS

## THE POWER OF CERTAINTY

BY DANIEL BURRUS, CEO OF BURRUS RESEARCH



In my new book *Flash Foresight*, I share seven principles that can make invisible opportunities visible. One of my favorite principles is using the power of certainty.

In times of unprecedented change and uncertainty, we need to ask ourselves, "What are we certain about?" Strategies based on uncertainty equal high levels of risk. Strategies based on certainty dramatically reduce risk and produce superior results.

Here's an example of certainty. As I write this, it is winter in the northern hemisphere. Next will be spring, followed by summer. I am certain of that! There is a science of cycles. In fact, there are over 300 cycles—business cycles, biological cycles, weather cycles—that allow you to accurately anticipate the future. Frankly, you understand cyclical change and use it often even if you are not consciously aware of it.

In today's technology driven world of accelerated change, it is important to understand another type of change. If you don't, your job, your business, and even your industry can vanish quickly. I call it Linear Change; once this type of change happens, you will not go back. For example, if you have an MP3 player, a smart phone, or a flat-panel TV, are you going back to what you used before? No way! This is a one-way, non-cyclical change that is quite profound in its impact. *continued on page 2*

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A NEW YORK TIMES BESTSELLER...

*Flash Foresight* has already been named a New York Times, Wall Street Journal and USA Today Bestseller. Daniel Burrus' new book was also #1 in hardcover and Kindle sales on Amazon.com You can get your hardcover or digital version of *Flash Foresight* at [www.FlashForesight.com](http://www.FlashForesight.com)

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## THE POWER OF CERTAINTY *(continued from page 1)*

### ANTICIPATE

Knowing this, what if you could predict the challenges your organization will face and stop them from occurring? Short of having a reliable crystal ball, most people believe that's impossible. In reality, you can solve many of tomorrow's problems...today. It's all a matter of knowing what you're certain about.

For example, what do GM, Lehman Brothers, and all the millions of speculative homebuyers have in common? Four words: Didn't See It Coming. In hindsight though, all the signs were there in plain sight long before the fall. Don't follow in their footsteps! Instead, use the following points to solve tomorrow's problems before they occur.

### STOP, LOOK, AND LISTEN

**Stop:** As change accelerates and the pressure to keep up intensifies, the natural tendency is to try to speed up with it. But rather than try to speed up even more, we need to slow down, stop, and think. Put aside all your current problems for a moment. Make the decision to devote a little time, on a regular basis, to become an anticipatory organization.

**Look:** Make a list of Cyclical and Linear changes you can see and ask yourself, "What are the problems I'm about to have?" What are the problems you are not having today, but will have in the next three to six months? The next one to three years? Those are the problems you need to solve. To get ahead of the curve, shift your focus from solving only today's problems to solving tomorrow's problems before they happen so that you never have them in the first place.

**Listen:** What is certainty telling you about those future problems and ways you might approach them? Listen to clues that might be lying just outside your field of expertise or industry. As you learn more about how to use certainty and foresight, solutions will start to appear to you almost the moment you look for them.

When I talk with clients about becoming anticipatory, they often say, "That sounds fascinating—but we don't have time to sit around thinking about three years from now. We're too busy dealing with what's on our plates right now!"

Of course they're too busy. We're all too busy. There will never be a time when we're not too busy—which is exactly why most of us keep flailing about in our uncertainties.

The only way it will happen is if you understand that you will spend the rest of your life in the future. When you make the time to actively shape a positive future for yourself and others, you will more likely accomplish your goals. Therefore, make an appointment; put it on the calendar. It will take one hour per week of your time. You will find it to be time well spent!

## TECHNOLOGY NEWS HIGHLIGHTS

### 100 MPG, 2-STROKE ENGINE

A new engine has been developed that can enable full-size cars to achieve 100 miles per gallon. The opposed-piston opposed-cylinder (OPOC™) design offers the simplicity of a two-cycle engine, the efficiency of a four-cycle engine, and will run on a variety of fuels including gasoline, diesel and ethanol. The proprietary engine structure consists of two opposing cylinders with a crankshaft between them, each with two pistons moving in opposite directions. By eliminating the cylinder-head and valve train components, size and weight can be reduced. With 50 percent fewer parts than traditional engines, it's less expensive to manufacture. The use of an electric turbocharger also improves efficiency and minimizes emissions. The design has been supported in part by Bill Gates and Khosia Venture.

*For information: EcoMotors International, 17000 Federal Drive, Suite 200, Allen Park, MI 48101; fax: 313-982-1935; Web site: [www.ecomotors.com](http://www.ecomotors.com)*

### VIRUS BOOSTS BATTERY LIFE

A new type of lithium-ion battery has been developed that uses electrodes synthesized from the tobacco mosaic virus (TMV). The result is a tenfold increase in energy capacity and a more efficient fabrication process. TMV was selected because of its natural affinity to bond to metals as well as its ability to reproduce quickly. By altering its genetic structure, researchers

were able to coat the virus with metals. The modified viruses were then grown on metal plates, coating them with a highly conductive surface that has ten times the area of a typical plated surface. The process is more efficient than conventional battery production methods because it requires no fixatives. It's also highly scalable and suitable for many types of batteries, including nanoscale power sources for sensors and implanted devices.

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## FORGED COMPOSITES

Because of its high strength-to-weight ratio, carbon fiber has been touted as one solution for reducing vehicle weight and increasing fuel efficiency. But as a mainstream substitute in automotive parts, the cost is currently prohibitive – more than twenty times that of steel. Recently a new carbon-based material was developed that offers both strength and lightweight construction at a fraction of the cost. Known as a forged composite, it was originally developed for high performance golf clubs but is now being tested in other areas including Lamborghini's Sesto Elemento concept car. The process begins with short carbon threads suspended in a vinyl-ester resin to create a viscous slurry that can be injection-molded. The resin is then heat-cured under approximately six tons of pressure. While a typical carbon fiber chassis would require about six hours to construct, the forged composite counterpart can be made in as little as eight minutes.

*For information: Callaway Golf Company, 2180 Rutherford Road, Carlsbad, CA 92008; phone: 760-931-1771; Web site: [www.callawaygolf.com](http://www.callawaygolf.com)*

## FIBER OPTIC NERVE STIMULATOR

A new field of medicine called optogenetics combines fiber optics with genetically modified viruses to greatly improve the precision with which physicians can target nerves for stimulation. Viruses that have been engineered to respond to light are injected into the brain. A fiber optic cable and electrode are then implanted which send light into the brain and trigger the viruses to stimulate specific neurons. The method has been successfully tested on rodents and monkeys. DARPA hopes to begin studying the technique to help veterans with brain injuries and much more.

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## WIND PREDICTION

In an effort to boost the efficiency of small, vertical-axis wind generators, engineers are looking at ways to predict when wind gusts will occur. It's estimated that 30 to 40 percent of total wind energy is only available in short gusts that last minutes or even seconds. And since smaller turbines are typically placed in urban and industrial settings where wind velocities are not consistent, it is more important than ever to reach optimal speed quickly. The software-based algorithm utilizes a system called Gust Tracking which models the weather conditions for each turbine's location. Using an ultrasonic anemometer, it measures wind speed electronically and uses that data to reduce the load. This allows the wind energy to accelerate the turbine speed as quickly as possible. Over time, recorded wind data is used to construct a picture of probable weather patterns and even predict when a gust is coming.

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## METALLIC GLASS

Glass is known to be a very strong material – that is, it can withstand a large amount of force. But when it comes to toughness – the capacity to resist fracturing – it rates much lower than metals. In fact, it's very difficult to produce a substance that is both strong and tough, but researchers recently discovered a way to make a material that has both properties. A combination of palladium, silver and other metalloids, the new class of materials is known as metallic glass because the atoms are arranged in an amorphous pattern. Since these materials lack the crystalline structure that gives metal its strength, it was assumed that they would never be able to match the toughness of something like

steel, however, the real breakthrough came when they observed what happens to these materials as they fracture. Like glass, shear bands form under stress, but in the new palladium alloy, so many of them form that they interact, creating a network that actually blocks the propagation of cracks and makes it extremely resistant to fractures. Because the noble metals used are chemically inert, corrosion resistant, and biologically compatible, early applications for these materials will likely include biomedical and dental implants.

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## ANTIMICROBIAL PAPER

A new process for coating paper could be used to combat food-borne diseases. It uses high frequency (ultrasonic) sound waves to deposit silver nanoparticles onto a paper substrate, forming a sturdy and highly stable coating. The antimicrobial properties of silver are already widely known and silver is used in ointments, kitchen and bath surfaces, and even fabrics to fight bacteria. As a packaging coating, "killer paper" could present an alternative to other methods of food preservation, (including radiation, heat treatment, or additives) by fighting the bacteria that cause spoilage. In laboratory tests, the paper was demonstrated to be effective in killing E. coli and S. aureus in a matter of only three hours.

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## POWERSUIT

Currently under development for the U.S. Army to enhance strength and endurance, robotic exoskeletons (XOS) combine structures, sensors, actuators and controllers with high pressure hydraulics, allowing an operator to do the work of two or three people and freeing up personnel for more tactical activities. A person wearing an XOS can lift 200 pounds without tiring or repeatedly punch through three inches of wood. A second generation prototype (the XOS2) is now being tested that is lighter and faster than its predecessor, giving operators the agility to kick a soccer ball or climb stairs easily. Another key design feature is that it uses 50 percent less power, although it still needs to be plugged in to operate. The goal is to further reduce the power requirements so that the power supply can be integrated, but such a version will not likely be available for several years.

*For information: Raytheon Company, 870 Winter Street, Waltham, MA 02451; phone: 781-522-3000; Web site: [www.raytheon.com](http://www.raytheon.com)*

## SPIDER SILK FROM SILKWORMS

Researchers recently found a way to generate large quantities of super-strong spider silk by genetically altering silkworms. While spiders don't take well to commercial "farming" methods, their silk is highly sought after because of its high tensile strength and elasticity. By incorporating spider DNA into silkworms, it is possible to spin larger amounts for use in ballistic clothing, medical bandages, and even as scaffolds for tendon and ligament repair. The artificial silk is three times as tough as Kevlar and far superior to threads produced by non-transgenic silkworms.

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## F-CELL MERCEDES

The Mercedes B Class F-Cell combines lithium ion battery technology with a fuel cell stack for generating power to make sustainable mobility a reality. The electric motor provides 136 horsepower and 215 foot-pounds of torque to deliver the driving performance of a conventional car along with all the amenities such as AC and mobile office applications. It made its debut at the Los Angeles Auto Show in January

*For information: Mercedes-Benz USA LLC, 3 Mercedes Drive, Montvale, NJ 07645; phone: 800-367-6372; Web site: [www.MBUSA.com](http://www.MBUSA.com)*

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