

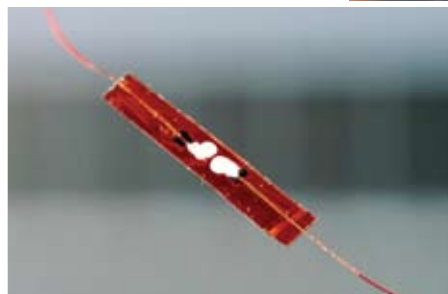
Stretching wire generates current

Researchers have developed a new type of electric power generator able to produce ac current through cyclical stretching and releasing of zinc oxide wires. The new “flexible charge pump” generator is the fourth generation of devices designed to produce electrical current by using the piezoelectric properties of zinc oxide structures to harvest mechanical energy from the environment.

“The flexible charge pump offers yet another option for converting mechanical energy into electrical energy,” says Zhong Lin Wang, director of the Center for Nanostructure Characterization at the Georgia Institute of Technology. The generator can produce an oscillating output voltage of up to 45 millivolts. To boost the current produced, arrays of the flexible charge pumps could be constructed and connected in series. Multiple layers of the generators could also be stacked to form modules that could be implanted in the human body to power blood pressure sensors or other devices.

When the modules are mechanically stretched and released, the zinc oxide material generates a piezoelectric potential that alternately builds up and then is released. The wires are encapsulated in a flexible plastic substrate with two bonded ends; a Schottky barrier controls the alternating flow of electrons, and the piezoelectric potential is the driving force of the charge

pump. To measure generated electric energy in tests, researchers subjected the substrate and attached zinc oxide wires to periodic mechanical bending created by a motor-driven mechanical arm. Bend-



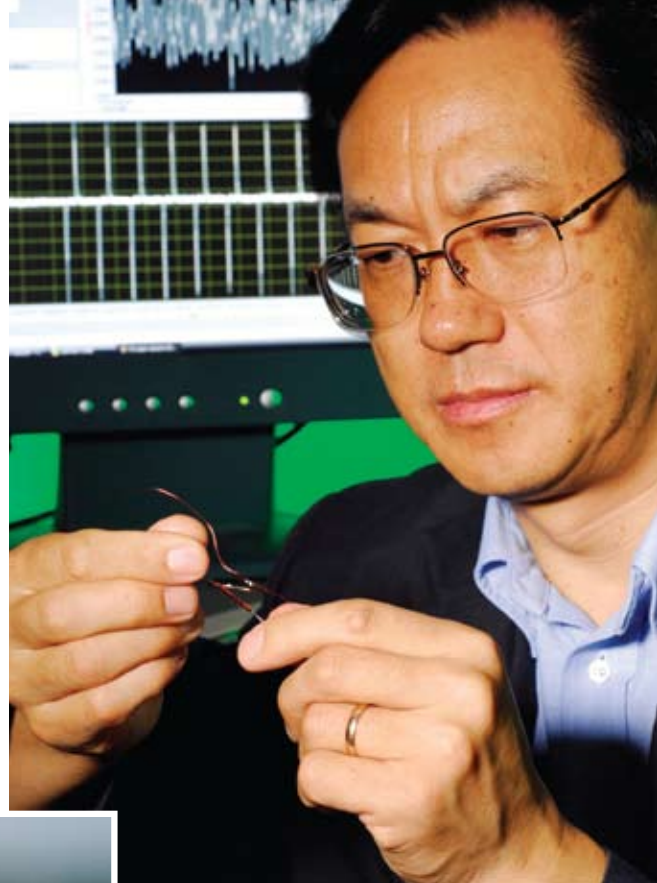
ing induces tensile strain, which creates a piezoelectric potential field along the laterally packaged wires. That in turn drives a flow of electrons into an external circuit, creating the alternating charge and discharge cycle – and corresponding current flow. Wang envisions a family of small-scale generators enabling development of a new class of self-powered wireless sensing systems that could gather, store, and transmit information without an external power source.

Patent advances maglev technology

MagneMotion Inc., Acton, Mass., a developer and manufacturer of linear synchronous motor (LSM) products and sys-

tems, was awarded U.S. Patent No. 7,448,327 related to development of magnetic levitation (maglev) systems. The patent builds on Patent No. 6,983,701, which recognizes the company's use of a single magnetic structure to provide suspension, guidance, and propulsion of vehicles on a guideway, eliminating a level of complexity and costs found in other maglev systems.

The new patent expands on the initial patent in two main ways. First, the magnets in the single magnetic structure are offset, thereby providing lateral stability; second, control coils are wrapped around these offset magnets to stabilize and maintain the magnetic gap when the vehicle is levitated. Together the inventions improve ride quality, reduce vehicle and guideway cost, and simplify the control



Georgia Tech Professor Zhong Lin Wang holds a prototype flexible charge pump. The device generates alternating current as zinc oxide wires are stretched and released. *Images courtesy of Georgia Tech, Gary Meek*

system. In applications where small vehicles can be deployed, the new invention may also eliminate the need for a secondary suspension to provide lateral damping. A secondary suspension adds weight and cost to the vehicle, and likely increases the vehicle's height and raises its center of gravity, all of which have negative consequences.

The new technology will be used on MagneMotion's current development project, which is a cooperative effort with the Federal Transit Administration (FTA) and Old Dominion University (ODU). During Phase I, a 160-foot track will be constructed and tested at the company's headquarters in Devens, Mass. During Phase II, a 500-foot track will be built on an existing maglev guideway structure at ODU in Norfolk, Va. The company's design envisions maglev vehicles that are the size of vans or small busses and can accelerate quickly to about 100 miles per hour. The smaller-sized vehicles do not limit ridership; in fact, numerous vehicles in operation simultaneously (under constant, accurate control) could accommodate large ridership in specific applications. The maglev test system will be operational at MagneMotion's facility beginning in summer 2009. For more information, visit www.magnemotion.com.

Collars, couplings on sale

A list of overstock shaft collars and couplings at 40% off is now available at www.collarsandcouplings.com. It is accessible from the "Clearance

Items" button on the home page and is updated regularly. Authorized distributors can log in for prices and to order, while wholesalers who are not authorized distributors can view a list without prices.

Collars and Couplings, which does not sell direct, refers end users to its authorized distributors who are primarily power transmission, industrial supply, and fastener distributors.

The company stocks 1,133 varieties, including setscrew, single split, double split, and threaded collars. Single and double-split couplings come in steel and stainless steel with and without keyways. Machinable couplings come without a keyway.

To learn more, call (800) 593-2323 or visit www.collarsandcouplings.com.

Win a high-speed video camera

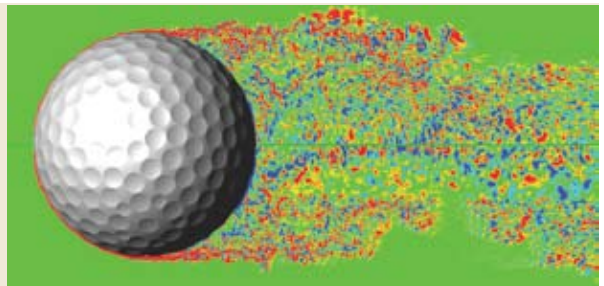
How would you use a high-speed camera in your business? Southern Vision Systems Inc. wants to know – in 100 words or so – how you'd use their StreamView LR Portable high-speed camera (valued at \$5,950) to impact your company's bottom line. If your answer is best (as determined by *Motion System Design* magazine editors) you'll win the camera.

Not to be confused with machine vision, high-speed digital video cameras are used to troubleshoot machinery, optimize automation, and to study shock, vibration, and drop tests. Digital video recorded at high speeds slows down motion and allows detailed frame-by-frame analysis

InSights

Fly farther

This image shows the flow around a golf ball traveling at speeds up to 100 mph.



The computations are among the largest direct numerical simulations of complex flows ever performed, involving billions of grid points. The aim is to pinpoint how dimples dramatically reduce the drag force on a golf ball. Although the United States Golf Association (USGA) regulates golf ball design, including size and weight, the dimple pattern is not standardized. Up to now, sporting goods companies designed dimple patterns by trial and error, testing prototypes against one another. The new study looks at how to design dimple size and pattern based on mathematical equations that model the physics of a golf ball in flight. The project is a collaboration between Dr. E. Balaras from the University of Maryland, Dr. K. Squires from Arizona State University, and Masaya Tsunoda of Sumitomo Rubber Industries.

What's New

of events. Especially for service technicians, this tool can help to quickly identify the source of the problem and dramatically reduce downtime.

Visit www.southernvisionsystems.com/winSV to submit your essay, which should describe how you would use the camera to save money or improve efficiency. The winner will be announced at ATX West, to be held Feb. 10 to 12 in Anaheim, Calif.



Back to school: Automation classes

During economic downturns, machine designers, operators, and maintenance personnel can improve their marketability by taking training courses. Omron University, Schaumburg, Ill., offers industrial automation courses that develop proficiency in the design and use of systems that incorporate motion control, programmable logic controllers (PLCs), communications networks, and human-machine interfaces (HMIs). The course schedule for first quarter 2009 has been announced for training offered at Omron Electronics, LLC headquarters in Schaumburg. To reduce travel costs, students can complete two courses in one week and achieve proficiency in basic and advanced PLC programming or learn the essentials of both PLC programming and HMI project design.

Hands-on courses with small class sizes focus on techniques to solve real application problems that help optimize the results from a company's automation investment. Students are tested for proficiency at the end of each course and a certificate is granted for successful completion. For more information, visit www.omron247.com.

New features enhance Powerlink V.1.1.0

The Ethernet Powerlink Standardization Group (EPSG) has released the Powerlink specification V.1.1.0. New features have been added by using reserved bits. Improvements include com-

Biz bits

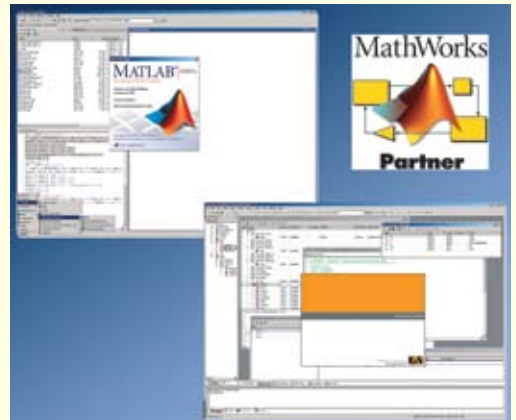
Moog acquires California Linear Devices

Moog Inc., Blacksburg, Va., has acquired California Linear Devices Inc. (CLD), Carlsbad, Calif., a privately held company specializing in high performance linear servomotors for motion control applications. CLD provides motion solutions to industrial applications like factory automation, material testing, packaging, pumping, and tufting. These high-force linear motors are used in equipment where fast and accurate moves under heavy loads are required. This brushless, direct-drive technology provides an alternative to hydraulic and pneumatic sources for linear motion control. Moog has acquired the intellectual property and other assets of the company.

Moog Inc. is a designer, manufacturer, and integrator of precision control components and systems. The company's high performance systems control military and commercial aircraft, satellites and space vehicles, launch vehicles, missiles, automated industrial machinery, marine, and medical equipment. For more information, visit www.moog.com/components.

B&R partners with The MathWorks

B&R Industrial Automation Corp., Roswell, Ga., is expanding its collaboration with The MathWorks, Natick, Mass., by entering the company's "Connections Program," which supports third-party suppliers in development of products relating to MATLAB and Simulink. Program initiatives include promoting innovation, achieving the best use of shared interfaces, and ensuring compatibility with future versions. For example, B&R has developed system-compatible expansions that ensure seamless interaction between MATLAB/Simulink and B&R's development environment, Automation Studio. For more information, visit www.br-automation.com.



Festo and LeekSeek enter agreement

Festo AG & Co. KG, Germany, and LeekSeek International Ltd., England, have signed a global cooperation agreement. The two companies will pool their expertise in efficient compressed air applications, enabling them to offer an extensive service package for reducing air consumption. They will provide operators of pneumatic systems with improved methods to identify and optimize compressed air savings options and to enjoy substantial savings, according to company sources. Leaky compressed air components are

plete integration of high availability functionality and greater bandwidth for the asynchronous phase. Until now, users implemented high-availability Powerlink networks by modifying the protocol's address management through in-house developments, allowing for on-the-fly address changes to redundant control systems. The 1.1.0 version now supports the integration of redundant Managing Nodes

(RMN) by default. What's more, the current specification extends the asynchronous phase. This part of the cycle transfers non-time-critical data, as opposed to the isochronous phase, which is used for time-critical process data transfers that consume the bulk of the cycle. Until now, only one frame could be transferred during the asynchronous phase; the new specification allows for the transfer of several frames.

potential sources of energy waste, as well as financial waste. LeekSeek will detect and document leaks in production systems, while Festo will eliminate the leaks, optimize systems, and then offer condition monitoring and diagnostic services to keep processes running efficiently. For more information, visit www.festo.com or www.leekseek.com.

Heinz-Dieter Schunk honored



Heinz-Dieter Schunk, CEO of SCHUNK Inc., was awarded the German Machine Development Prize on October 14, 2008 during the German Machine Development Summit in Berlin, for his lifetime efforts. Under his management, a small garage business in Germany has been transformed into "an innovation hotbed of clamping technology and automation" with 1,800 employees, according to industry sources. Heinz-Dieter Schunk was 22 when he joined his father, Friedrich Schunk, at the company in 1964. Founded in 1945, today SCHUNK manufactures toolholding systems, stationary clamping systems, lathe chucks and jaws, special hydraulic expansion holding devices, grippers, rotary and linear modules, and robot accessories.

The company will hold its popular **Service Robotics Expert Days** on Feb. 18 to 19 in Germany. The international forum brings together experts from around the world, featuring presentations in English that will include an overview of the current market and future possibilities for the service robotics industry. For more information, visit www.schunk.com.

Omron picks EtherCAT as motion bus

Eiji Ikeno, general manager, Motion Control Division of Omron Corp., announces that the company has selected EtherCAT as its next motion bus system. Omron has also decided to take an active role in the EtherCAT Technology Group within the Japanese and Asian markets to help customers there transition to EtherCAT. Ikeno says that Omron will pursue the adoption of EtherCAT as a national Japanese standard and will also establish an EtherCAT conformance and interoperability test lab in Japan. According to Ikeno, Omron intends to develop EtherCAT-based servomotors and inverters as well as motion controllers by summer 2009.

Danaher Motion names Thomson president

Ron Meyer has been appointed president of Thomson, a Danaher Motion company, Wood Dale, Ill. Thomson produces ball bushing and profile rail bearings, case shafting, ground and rolled ballscrews, linear actuators, linear systems, and related accessories. Meyer will oversee the strategy and management of Thomson's facilities in North America, Europe, and Asia. He joined Danaher Corp. in 1997 as president of Qualitrol, where he will maintain his leadership responsibilities. Meyer has a BA and MBA from the University of Minnesota.

