

LABSNAP™

JUL 2007

A Fast Read on the Latest in Lab Automation

Enlightenment From The Lab Man

Spotlight on Putting Lab Automation to Work

The recent ALA survey on Industrial Laboratory Automation indicated that the challenge has shifted from simply implementing fast, reliable automation tools to the complexities of doing new and better science with those tools. This month The Lab Man speaks with ALA President Reinhold Schaefer about the new ALA Spotlight Series, designed specifically to shine a "spotlight" on the evolving challenge of putting automation to work to do science. [Podcast](#); [Blog](#).

Cross-Industry News

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- Can Labs Go Green?
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ALA News

New ALA Spotlight Series Offers FREE Scientific Programs
Putting automation to work is the focus of the new **ALA Spotlight Series** launching this Fall. Created in partnership with Symyx Technologies, Inc. and Thermo Fisher Scientific, the Series is a **free** one-day scientific, results-based program open to ALA members and non-members alike. Join your peers in either Boston, Princeton, San Diego or San Francisco.



What's so funny? [Click here](#) for this month's *The New Yorker* cartoon.

ALA Launches "Segway to Success Campaign" Giveaway

Imagine yourself tooling around on the innovative and futuristic Segway PT—it could be yours! To be eligible to win a Segway PT simply submit an abstract or poster for **LabAutomation2008**, or a manuscript to **JALA**. You can win the Segway PT regardless of whether or not you are selected for presentation or publication. See campaign guidelines.

ALA Strategic Alliance Elevates International Initiatives

BioAlps Switzerland has formed a strategic alliance with ALA to further develop and grow **Innovation AveNew**—the cost-sensitive ALA program that offers start-up companies in laboratory automation and technology a venue for interaction and exposure for their products in the Exhibit Hall at **LabAutomation2008**. Eight start-up companies from around the world will be selected.

LabAutomation2008 Features Three World Renowned Plenary Speakers

Attend **LabAutomation2008** and meet leading minds. 2001 Nobel Prize Winner for Chemistry K. Barry Sharpless, Ph.D., is joined by Henry William Chesbrough, Ph.D., author of *Open Innovation: The Imperative for Creating and Profiting from Technology*, and FIRST Executive Director Paul Gudonis as the conference's Plenary Speakers.

Register Today for Early-Bird Discount to LabAutomation2008

Registration, housing and travel is open! Register today and join your peers at **LabAutomation2008**, Palm Springs, CA, January 26-30. Discounts are available.

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LabAutomation 2008

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PVH Introduces \$1.2M Lab Automation System

Coloradoan (07/08/07) Ferrier, Pat

A cutting-edge, \$1.2 million lab automation system has been introduced in Colorado's Poudre Valley Hospital (PVH) to make the testing of bodily fluid specimens more accurate and efficient by transitioning specimen preparation and processing from a manual to a fully automated procedure. PVH lab director Rob Carpenter said the system will offer significant help in meeting the hospital's ever-increasing test volume, and it will, in turn, generate cost savings.

Over 1 million blood and bodily fluid specimens are tested by the PVH lab per year. The lab handles testing for PVH as well as the Medical Center of the Rockies (MCR) in Loveland. The lab is one of 300 facilities to deploy the system throughout the United States. "This is incredibly advanced technology that will help health care in our region continue to be outstanding," declared PVH President and CEO Kevin Unger.

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Electronic Evidence Guidance Released to Police

ComputerWeekly.com (07/06/2007) Thomson, Rebecca

A revised version of the Good Practice Guide for Computer-Based Electronic Evidence that accounts for recent changes in computer forensic investigation methods has been issued by the Association of Chief Police Officers (ACPO). The guide was produced with 7Safe, an information security services company, and launched at APCO's e-crime conference. The new edition features instructions for working with inconsistent electronic data and the extraction of data from live systems and networks. "The Guide is recognized as the definitive rule book for digital forensic investigations," stated 7Safe managing director Alan Phillips. "In addition to criminal cases, any type of contentious incident in the workplace is almost certain to involve large amounts of electronic evidence, and dealing with this data in the appropriate way can prevent far-reaching problems."

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Robotic Orange Picker Is Job Threat

Washington Times (06/30/07) P. C9 ; Reed, Fred

Vision Robotics is designing an eight-limbed fruit-picking robot that could solve a lot of headaches for citrus growers whose livelihood depends on the availability of immigrant labor, notes Fred Reed. Such a machine requires the ability to visualize the fruit--specifically, oranges--through solid-state cameras, locate it in three dimensions, and pick it in the most efficient manner without damaging the fruit or the tree. The computing power for such a device is attainable through commodity chips, while technological innovation and falling costs are also contributing to the automation of many human tasks, Vision Robotics believes. The migrant workers that represent the bulk of the citrus industry workforce could find themselves unemployed if cheap fruit-picking robots are widely adopted, Reed writes. "Can the economy somehow generate work for those whose jobs are automated?" he asks. "For the reasonably educated, probably. For the utterly unskilled, I don't see how, but maybe."

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Israeli Scientists Invent Smallest Robot to Deliver Drugs Through Blood Vessels

Xinhua General News Service (06/27/07) Yanyang, Zhang

Researchers at Technion University and the College of Judea and Samaria in Israel have made the smallest miniature robot to move through a patient's blood to distribute drugs during minimally invasive surgery or cancer treatment. The robot measures 1 millimeter in diameter and 4 millimeters in length; a robot measuring 1 centimeter in diameter produced by Kyoto University researchers is the second smallest ever made. The robot developed by the Israeli scientists uses an external magnetic field to create the vibrations that enable it to move through the blood stream, and the outside energy source means there is no limit as to how long it can be controlled. "The big advantage of this design is that there is almost no limit to narrowing the size of the robot," says Oded Salomon of Technion University.

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Flexible and Fearless, Seeking Rescue Work

New York Times (06/25/07) P. A12 ; Blumenthal, Ralph

Texas A&M University's Texas Engineering Extension Service operates a 52-acre "Disaster City" where fire fighters and other emergency responders from across the globe can participate in training exercises. The site was recently the scene of a robotics exercise sponsored by the Department of Homeland Security's Science and Technology Directorate and the Commerce Department's National Institute of Standards and Technology. Several varieties of rescue robots participated in the exercise, which included obstacle courses based on mock set-ups of the Oklahoma City bombing, 1993 World Trade Center bombing, and Mexico City earthquake. The robots included a 30-foot, snake-like optic robot that slinks through crevasses and holes while providing images of its discoveries. That robot, produced by university researchers in Japan, is attached to the operator's body, unlike most robots, which are operated via consoles or laptops. One Texas A&M official predicted that robots will soon become a regular part of rescue work.

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DOD Seeks Builder for Shape-Shifting Military Robot

Computerworld (06/25/07) Songini, Marc L.

The U.S. Defense Advanced Research Projects Agency (DARPA) has released a request for proposals for a "Chemical Robot" that is capable of shrinking and radically changing its shape while squeezing through narrow openings. Once through the opening, the robot should then be able to morph back into its normal shape and height, DARPA says. As described, the robot evokes comparisons to the liquid-based evil cyborg from the Terminator 2 movie. Scientists have until July 2 to submit their proposals to DARPA, which has suggested that the robot be composed of gels, fluids, and shape memory materials. The Chemical Robot would be used in battlefield-like situations to "safely and covertly gain access to denied or hostile areas and perform useful tasks," including support for soldiers. DARPA states that the robot should be able to "rapidly traverse arbitrary size/shape openings whose dimensions are much smaller than the robot itself and are not known a-priori." The robot could be modeled after an insect or octopus, DARPA said.

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More Rapid Detection of Unwanted Microbes in Food Promised

Food Week Online (06/25/07)

Recent advances in genomic research and technology shows promising progress in the fight against foodborne illnesses. Scientists monitoring food quality can now analyze microbes and possible toxins on the DNA level and thus prevent and prevent them from reaching the public. Improved gene imaging technology now allows researchers to sequence a 3-4MB genome in under three days, an undertaking that once would have involved years of work. University of Amsterdam professor Stanley Brul notes, "The quantum leap forward came with the automation of the sequencing reaction that preceded this development. Thus, it is also possible to see whether a strain which had never previously shown toxin production is in principle capable of producing toxin." With these advances scientists can quickly detect and combat possible new toxins, reducing response time in case of a health crisis.

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Genes Won't Work Round the Clock

New Scientist (06/23/07) Mackenzie, Debora

Andrey Ptitsyn of Colorado State University has found evidence that gene expression is controlled by the 24-hour circadian cycle, indicating a major shift in the scientific community's understanding of how genes operate. Ptitsyn and colleagues used lab-on-a-chip microarrays to observe 20,000 mouse genes over a two-day period. According to Ptitsyn, "We could not find a single gene that did not oscillate." This discovery was illustrated most clearly in the genes responsible for energy metabolism. The findings imply that changing the body's circadian rhythm could significantly influence health, particularly in terms of immunity, growth, and mood. In future studies on how genes function, Ptitsyn recommends that researchers monitor particular genes over an extended period of time, rather than studying discrete moments of activity.

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Needling Cells

Science News (06/23/07) Vol. 171 , No. 25 , P. 388 ; Goho, Alexandra

Researchers have found success with an innovative technique that may eventually allow doctors to direct the growth of stem cells into viable heart muscles. University of California Prof. Peidong Yang and Bruce Conklin from the Glandstone Institute of Cardiovascular Disease used gold-tipped, silicon nanowires to send electrical impulses to mouse stem cells that had started becoming heart muscles. Not only did the stem cells survive, but they continued to multiply and sustain a beat for up to a month. Yang and Conklin also had some success in using the nanowires to introduce DNA into human embryonic kidney cells. With these promising techniques researchers hope to be able to use the nanowires to control and encourage the growth of stem cells into specific tissues. The researchers report their findings in the *Journal of the American Chemical Society*.

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Metastasis on a Microchip

The Engineer (06/18/07) P. 10

Researchers at the Netherlands' Twente University have introduced a lab-on-a-chip module for analyzing the cycle of a cell's death. Cancer cells break away from health cells to migrate to other body tissues via metastasis, so Dr. Floor Wolbers of the MESA+ Institute for Nanotechnology created the microfluidic chip as a drug-screening process. Wolbers said, "We wanted to look to see if the mechanism of apoptosis is changed, for example between normal cells or cancer cells, and how they respond in the presence of different drugs." The chip detects the apoptotic behavior of cells when a drug is introduced, using only a few of the patient's cells. The process is tracked in real-time and can generate statistics. Researchers are slated to use biopsied cells from patients for further testing. The chip is being improved for more sophisticated testing, as Wolbers notes that a micro flow cytometer for the chip and growing cells on nanowires are future projects. The chip has not yet been tested with human patients.

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Genome Project Turns Up Evolutionary Surprises

Nature (06/14/07) Vol. 447 , No. 7146 , P. 760 ; Check, Erika

A study from the ENCODE Project Consortium featured in the June 14 issue of *Nature* and a recent themed issue of *Genome Research* reveals some surprising findings. The project involved gathering data on 1 percent of the human genome, with experimental biologists examining the data to pinpoint the functional parts of the genome and computational biologists looking for portions of the non-coding DNA of humans and more than two dozen other mammals that have not changed much during the process of evolution. Of the constrained ENCODE regions of genomes studied, 40 percent were deemed non-functional. The study also shows that approximately 50 percent of functional regions of non-coding DNA were not constrained. The research has caused experts to question the long-held belief that biological function is dependent on evolutionary constraint, with those involved in the ENCODE project indicating that frequent genetic changes must be neutral. However, University of Queensland's John Mattick thinks scientists have incorrectly calculated the baseline evolutionary rate of mammals and underestimated the amount of functional genome elements.

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Guessing Robots Predict Their Environments, Navigate Better

Purdue University News (06/12/07) Venere, Emil

Purdue University engineers are developing robots capable of predicting the layout of unfamiliar surroundings. The robots use P-SLAM, a new software algorithm that allows them to create maps to predict what lies ahead as they travel through a new environment. Purdue University professor of electrical and computer engineering C.S. George Lee says the more repetitive the environment, the more accurate the robots predictions will be. "For example, it's going to be easier to navigate a parking garage using this map because every floor is the same or very similar, and the same could be said for some office buildings," Lee says. The algorithm modifies an approach developed in the 1980s called simultaneous localization and mapping (SLAM) that uses data from sensors to orient a robot by drawing maps of the immediate environment. The new method has been named P-SLAM because of its ability to predict what lies ahead. Potential applications for P-SLAM robots include domestic robots and military and law enforcement robots that search buildings and other environments. A simulation of a robot using the algorithm found that the robot was able to navigate a virtual maze while exploring 33 percent less of the environment than would normally be required. "Its effectiveness depends on the presence of repeated features, similar shapes and symmetric structures, such as straight walls, right-angle corners and a layout that contains similar rooms," Lee says. Future research will focus on robots working as a team as well as "object-based prediction" that can recognize objects such as doors and chairs.

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Can Labs Go Green?

Scientist (06/01/2007) Vol. 21 , No. 6 , P. 27 ; Grant, Bob

There are but a handful of green labs among U.S. research facilities, but a trend toward green lab buildings is expected to increase in momentum, says Dan Amon, national energy manager for the Environmental Protection Agency. "It's like a freight train coming down the tracks, and you've got to get on board," he says. At present, only 1 percent to 3 percent of U.S. labs are being designed with green in mind, Amon says. A handful of factors are expected to fuel the trend toward green labs, among them that green buildings are capable of saving institutions money. Due to their specialized requirements, research labs tend to consume large amounts of energy and water, and they also produce harmful waste. Until now, the managers and owners of research facilities had been hesitant to turn toward green measures due to the erroneous perception that energy efficiency and safety are at odds, says Dale Sartor of the Lawrence Berkeley National Laboratory.

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Microfluidics Is Becoming a Key Technology Integrated in Most of Life Science Companies' Development Roadmap

Pharma Investments, Ventures & Law Weekly (07/01/07)

Microfluidics products are valuable research tools, but experts predict the diagnostic market is where microfluidics technologies will experience double-digit growth. The primary benefit of microfluidics is its capacity for increasing analysis throughput while diminishing analysis time and expense. Incorporated in cartridges and commercialized by big companies, microfluidics products are becoming part of the "gold standard" devices employed in research applications. However, microfluidics have a powerful competitive edge in the diagnostic market, as they facilitate analysis automation and decentralization, as well as assisting in the molecular diagnostic emergence and success. Currently, a low volume of microfluidics products are manufactured, but most diagnostic firms have designated microfluidics as a vital technology in their growth strategies.

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*"Sometimes I wonder if there's more to life than
unlocking the mysteries of the universe."*