

# LABSNAP™

AUG 2007

## A Fast Read on the Latest in Lab Automation

### Enlightenment From The Lab Man

#### Is Your Industry Going Hollywood?

The Lab Man discusses a recent article published in The Scientist which proposes that the future business model for Pharma should be patterned after the movie industry. Together with Charles R. Powell, Chief Commercial Officer of Aurora Biotechnologies, The Lab Man ponders the effect such a business model might have on laboratory automation. [Podcast](#); [Blog](#).



### Cross-Industry News

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### ALA News

#### myALA Conference Planner Comes to LabAutomation2008

Plan to make the most of your **LabAutomation2008** experience with the new myALA Conference Planner. Connect with other attendees, set appointments with peers and exhibitors, schedule your sessions—you now have a great way to organize your own itinerary. This easy-to-use online tool launches in September. More details to come.



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

#### [Innovation Ave/NEW is Dream Opportunity for Start-Ups](#)

Innovation Ave/NEW offers start-up, entrepreneurial companies in the laboratory automation and technology field a one-of-a-kind opportunity to reach the industry. This venue, which is part of the annual LabAutomation conference, enables positive, collaborative interaction and exposure for your product and/or service concept – at no cost. Only a select few start-up companies are chosen to participate each year. The application deadline is September 28.

#### [Abstract Deadline is September 10 – Submit Now!](#)

Submit an abstract for **LabAutomation2008** by September 10, posters by November 9, or a manuscript for *JALA* by January 25 and you may win an innovative and futuristic Segway PT! ALA's Segway to Success Campaign offers you the chance to win regardless of whether or not you are selected for presentation or publication.

#### [New ALA Spotlight Series Coming to a Location Near You](#)

San Francisco, Boston, San Diego, and Princeton are host cities to the new ALA Spotlight Series, a **FREE** one-day scientific, results-based program created in partnership with Symyx Technologies, Inc. and Thermo Fisher Scientific. The series, with its focus on putting automation to work, is open to ALA members and non-members alike.

#### [Register Today for LabAutomation2008 and Receive Early-Bird Discount](#)

Registration, housing, and travel is open! Make your plans today to join your peers at **LabAutomation2008**, Palm Springs, CA, January 26-30. Student, member, and early-bird discounts are available.

## LabAutomation 2008

Where Science, Technology and Industry Come Together

### JALA World News Online

Reference a growing collection of product news, technical application notes and event listings.

- Application and Technical Notes
- Company News
- Meetings and Events
- Product News

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[amazon.com](#)

### ? Query of the Month ?

?What are your thoughts about Pharma going Hollywood?

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## **The Long Road to Molecular Electronics Could Be Paved With DNA**

*Nanowerk.com (08/06/07) Berger, Michael*

Researchers in Germany have proven that nanoscale items of varying sizes can be placed site-selectively and simultaneously onto DNA-displaying surfaces. The technique, which is based on sequence-specific DNA-DNA duplex formation, is a breakthrough in molecular electronics, as scientists have had trouble positioning molecules on a surface with nanometer precision. Clemens Richert of the University of Karlsruhe built on earlier DNA-based nanostructuring efforts and created a biomolecule-driven nanostructuring procedure that uses dip-pen nanolithography to achieve sub-micrometer spatial resolution. After treating different areas of a gold surface with lanes of DNA, each lane drew a different nanoparticle population, illustrating DNA-based nanoparticle self-sorting. The group's long-term aim is to figure out a way to assemble circuits on the molecular electronic level, though nanoscale assembly processes based on biomacromolecule interactions are currently unreliable and low-yielding.

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## **HPLC/Chip MS Used to Develop Protein Database**

*Laboratory Talk (UK) (08/03/07)*

The Institute of Cancer Research's Center for Bioinformatic and Clinical Proteins Web site contains a database containing information about 4,244 human proteins. The proteomics tool will abet researchers in their analysis of protein patterns related to cancer. Specifically, the database focuses on proteins related to liver and colon cancers, melanoma, and various forms of leukemia. Proteins related to breast and lung cancer are slated for future addition to the database. Tools used to assess the database proteins include Agilent's 1100 series LC system, XCT-Ultra ion trap MS with Chip-Cube-ESI, and Spectrum Mill MS Proteomics Workbench software. Christopher Gerner, ICR associate professor and principal investigator of the proteomics research team, said the HPLC-Chip/MS system "tremendously improved" the researchers' work and credits its 24/7 function as a crucial factor in reliability and efficiency. The HPLC-Chip integrates sample enrichment and separation capability of nanoflow LC system with the same technology used in electrospray mass spectrometry. As such, the technique eliminates 50 percent of the fittings and connections required in an LC/MS system so that the potential for leaks and dead volumes is reduced. The overall reliability of analysis is improved by such technology, allowing for greater productivity and a reduced margin of error.

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## **Taming the Anthrax Threat**

*Science Daily (08/02/07)*

Researchers at the University of Michigan (U-M) Medical School have developed the first complete picture of how anthrax-causing bacteria survive and grow inside immune cells called macrophages. They also identified gene candidates to pursue as possible anthrax drug targets. The researchers forecast that the methods they used to detect the microbe's activities could become important new tools for other scientists. The overall aim was to discover more effective treatments compared to those available now to treat victims of anthrax outbreaks, says U-M scientist Nicholas H. Bergman, the lead author of the study, which appears in the July edition of *Infection and Immunity*. Drugs given to people within a day of exposure, before symptoms develop, can prevent illness and death. The U-M scientists used mouse studies involving DNA microarray technology to track which genes and enzymes play key roles in the bacterium that causes anthrax as it penetrates inside macrophages—the immune system's first-responder cells in the lungs. The scientists closely studied a gene in the MarR family that possibly regulates transcription. When they infected mouse cells with a *Bacillus anthracis* strain altered to lack the gene, they found the bacteria were significantly less able to cause disease.

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## **Petrochemicals and Laboratory Automation**

*Engineer Live (08/03/07)*

Petrochemical laboratories can benefit in many ways from implementing a Laboratory Information Management System (LIMS). By adopting a LIMS solution, companies can automate laboratory procedures, thereby saving time and labor. In addition, LIMS eradicates retyping errors and assures the data's integrity to a large extent. Bottlenecks can be spotted more quickly thanks to the automatic monitoring of instrument calibration records. Profits can be increased, as automated specification-checking allows firms to sell their products at the highest price point. Indeed, LIMS standardization produced a 40 percent decrease in total cost of ownership per laboratory, according to a 2004 study run by IDC. The study also found that the LIMS solution elicited annual cost benefits of roughly \$300,000 per laboratory. Moreover, LIMS acts as an integrated platform able to support enterprise systems and facilitate the flow of accurate data between the organization and the laboratory. After implementing SampleManager LIMS, Brazil's leading energy company, Petrobras, decreased time spent on laboratory analysis by 27 percent. In addition, the level of satisfaction soared from 68 percent to 99 percent among the laboratory's customers after the launch of SampleManager LIMS.

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## **Robots Move to the Mainstream**

*Design News (07/25/07) Maloney, Lawrence D.*

Robots are being used in an expanding number of sectors as they become more sophisticated, says Donald Vincent, the recently retired leader of the Robotics Industry Association. He says that in the future, some of the most rapidly expanding areas for robot installations will be in laboratory automation, the food industry, and consumer goods. Some robots are now capable of small parts assembly, while those equipped with vision capabilities can go to select specific components from receptacles, says Vincent. At the same time, users no longer feel threatened by robots and instead view the technology as boosting productivity. The highest number of robots is in Japan, with 373,500 installed units, followed by Europe, with 297,400 units, according to the International Federation of Robotics. North America has 139,600 units. Vincent notes that future robots will be even safer as a result of built-in sensors, vision technology, and complex control systems. Other innovations include software-based robot limiting systems and synchronized robot arms guided by a single controller, he says.

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## **FDA Says No New Labeling for Nanotech Products**

*Reuters (07/25/07) Dixon, Kim*

The U.S. Food and Drug Administration (FDA) has concluded that products made via nanotechnology do not need supplementary labeling or regulations, as nanotechnology does not significantly differ from technologies like irradiation or biotechnology. However, some fear that the miniscule particles could have unanticipated health consequences. Consumer groups fear that the particles, because they may differ from bigger particles both chemically and physically, are unpredictable and potentially toxic. The FDA addressed such concerns by noting that no scientific evidence exists regarding substantial safety risks. The technology is now used to make at least 300 consumer products, including shampoo and sunscreen, and is being harnessed in medicine and the food industry, as well. Currently, products generated with nanotechnology must be proved to be safe and effective by parent companies before the products can be sold. However, consumer advocates note that some product categories are not regulated by the FDA; those categories include foods, dietary supplements, and cosmetics.

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## **Fingerprints May Soon Yield Gender Clues**

*ScienceDaily (08/03/07)*

British researchers have developed a novel fingerprinting technique that generates chemical clues regarding the suspected criminal's gender and diet, according to research published in *Analytical Chemistry*. Gel tapes lift the prints, which are then examined in a spectroscopic microscope. Infrared rays irradiate the sample to produce a comprehensive chemical composition. An infrared array detector then processes the chemical structure. The chemical clues could suggest whether the suspect was a meat-eater or a vegetarian, and may distinguish traces of handled items, such as narcotics, gunpowder, and chemical or biological weapons.

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## **Biology Proves a Natural for Robotic Design**

*Bend Weekly (07/27/07) LaFee, Scott*

Designers of robotics technology are being inspired by biology, basing machines and their functions on "fundamental physical principles," says Vassar College professor John Long. Under development at Carnegie Mellon University is the HeartLander, a minuscule medical robot designed to perform delicate heart operations—measurement readings, drug delivery, device installation, etc.—via remote control while moving like an inchworm on suction cups, obviating the need for invasive surgery. Another biologically inspired machine is Clemson University's OCTOR (sOfT robotic manipulaTORs), a robot with a flexible tubular appendage that mimics the grasping abilities of an elephant's trunk to manipulate objects; the appendage is driven by compressed air and outfitted with sensors and a camera. The Defense Advanced Research Projects Agency, which is funding OCTOR, is also interested in BigDog, a quadrupedal, semi-autonomous robot that has potential as a tool for carrying supplies for troops. Vassar researchers have developed Madeleine, a robot that swims using remote-controlled polyurethane flippers modeled after those of a marine reptile. The robot, which is also equipped with sonar, cameras, an accelerometer, and an altimeter, has been used in experiments to determine whether two-flipper or four-flipper locomotion is more efficient. Other robots patterned after organisms include arthropod-inspired six-legged machines that can run, leap over obstacles, negotiate stairs, and scale walls and trees, while University of Southern California researchers are working on a system of modular robots that can link up like hive insects into cooperative machines capable of standing, crawling, wiggling, climbing, rolling, and flying.

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## **New Grants Bolster Efforts to Generate Faster and Cheaper Tools for DNA Sequencing**

*NIH News Release (08/01/07)*

The National Human Genome Research Institute (NHGRI) has awarded \$15 million in grants to foster the development of technology that would reduce the current costs of DNA sequencing. NHGRI Director Dr. Francis S. Collins said, "Innovative sequencing technologies are critical to our efforts to move advances in genomic knowledge into the clinic." Although costs associated with DNA sequencing have dropped more than 50 percent over the past decade, the sequencing of 3 billion base pairs--the amount of DNA found in genomes of humans—costs \$5 million. Eight researchers will be funded as part of the NHGRI's sponsorship, for projects that would reduce the cost of sequencing genomes to \$1,000. Some of the projects include extending the read length and using droplet-based microfluidics via sequencing-by-synthesis; developing molecular wires that would allow high-accuracy sequencing; modifying key components of the ribosome; developing solid-state, nanopore-based force spectroscopy; and creating biochemical and algorithmic methods for sequencing by hybridization.

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## **A Robotic Helping Hand**

*Ethanol Producer Magazine (08/07) McElroy, Anduin Kirkbride*

The partnership between U.S. Department of Agriculture Research Molecular Biologist Stephen Hughes and Hudson Control Group Inc. expects to develop a unified robotic platform to help identify xylose-utilization genes through high-throughput strategies in an effort to improve yeast strains used in the production of ethanol. Hughes, who works in the Agricultural Research Service National Center for Agricultural Utilization Research in Illinois, hopes to modify existing microorganisms to foster industrial fermentation of lignocellulosic materials to generate fuel and other products. The robot aims to help Hughes screen thousands of tests for improvements made their directed evolution and gene shuffling techniques. This process of high-throughput screening has been used in the pharmaceutical industry for several years in drug manufacturing; Hughes continues to use his knowledge of the process to tweak the robot and fully automate the ethanol-producing microorganism search. The robot extracts DNA, copies it, clones it, creates DNA libraries of the plasmid clones, and extract those with favorable responses to given nucleotide base sequences. Hughes notes the system is used to discover those yeast clones with cellulase F genes that have improve pH and higher temperature stabilities, which will then by used in ethanol production. It took the team two years to develop the parts, and the combined technology now has an estimated worth of \$1 billion.

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### **Microfluidic Chip May Soon Automate Conception**

*Zee News (07/26/07)*

University of Tokyo scientists aim to create an artificial uterus in which an egg and sperm become fertilized and an early embryo is produced for implantation into a female patient. The researchers continue to study the ability of science to automate the fertilization process to improve the success rates of in vitro fertilization. The microfluidic chip would allow up to 20 eggs to be fertilized and grow on the chip with the help of endometrial cells—found in the uterus—until they are ready to be implanted, which reduce the chances that pH and temperature of embryos would change when they are moved. Studies reveal 44 percent of embryos grown in the microfluidic chip develop into healthy fetuses once implanted in mice, compared to just 40 percent of embryos grown through microdrop in vitro fertilization. Scientists hope to test the automated technique on human embryos later on in the year.

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### **Antique Engines Inspire Nano Chip**

*BBC News (07/24/07) Fildes, Jonathan*

U.S. researchers have designed a nano computer that casts aside modern high-speed silicon chips in favor of a computing idea that was first proposed nearly 200 years ago. In a paper published in the *New Journal of Physics*, the scientists said the mechanical computer would be built from nanometer-sized components and could be used in places that would damage silicon components. "What we are proposing is a new type of computing architecture that is only based on nano mechanical elements," says University of Wisconsin-Madison professor Robert Blick, one of the authors of the paper. "We are not going to compete with high-speed silicon, but where we are competitive is for all those mundane applications where you need microprocessors which can be slow and cheap as well." The tiny, hypothetical computer could be built out of ultra-hard material such as diamond or piezoelectric material, which changes shape when exposed to an electrical current. Unlike current computers, which use the movement of electrons on circuits to solve problems, the nano mechanical computer would use the push and pull of tiny parts to perform calculations. The military is interested in a nano mechanical computer because, unlike electronic silicon computers, nano mechanical devices would not be vulnerable to electromagnetic pulses that would disable traditional computing systems. The researchers also believe that nano mechanical chips would be better at maintaining Moore's law than silicon chips because they run much cooler than silicon. The University of Southampton's Michael Kraft says nano mechanical research may lead to hybrid chips because nano mechanics consume less power, which is becoming increasingly important for mobile devices. "The battery is the big bottleneck, so anything that reduces the power consumption is a real advantage," Kraft says.

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### **New Proteomics Research Promises to Revolutionize Biomedical Discovery**

*LabCanada (07/19/07)*

The scientific community's present understanding of individual human protein function will be significantly affected by new research published in the July 2007 issue of *Molecular Journal*. Researchers employed advanced proteomics procedures and computational algorithms to distinguish the interaction partners of numerous proteins of established function. By doing so, the research team delineated a network of 805 high-confidence interactions that link 436 discrete proteins. Based on their association, many proteins of previously unidentified function can now be concluded to have specific functions. Among other notable proteins discovered, the researchers found a long-sought enzyme that governs the stability of small but important RNA molecules; the enzyme has been named MePCE, says lead researcher Benoit Coulombe.

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## Robots Go Under the Seas

*Boston Globe (07/16/07) Bray, Hiawatha*

In Massachusetts, both Hydroid LLC and Bluefin Robotics Corp. manufacture undersea robots, most of which are used by the U.S. Navy to detect and dismantle mines planted under the water. Hydroid's REMUS (Remote Environmental Measuring UnitS) utilizes research from the Woods Hole Oceanographic Institution, while Bluefin's robot was created using research from the Massachusetts Institute of Technology. The inability for radio signals or extensive sonar commands to reach undersea robots means these autonomous underwater vehicles are self-guided for the most part, navigating the path to their destinations and either moving to the surface or requesting pick up when their missions are complete. Among other things, REMUS is equipped with inertial navigation, wireless Internet, and GPS satellite and Iridium satellite connections, which are packaged in such a way that they do not get wet. The inside of the Bluefin robot, however, comes into contact with water, but the electrical components are not damaged because they are sealed and surrounded with liquids that are not conductors.

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## Software Testing Gets Virtualized

*Application Development Trends (07/11/07) Waters, John K.*

VMware's Lab Manager 2.5 and Borland Software's SilkCentral Test Manager have been integrated for the purposes of virtual lab automation. By merging the two applications, it is now possible to conduct tests across numerous configurations and platforms—a task that once required multiple, separate test labs and a great deal of time and money. The integration creates a single platform to run and manage test systems. According to Voke founder Theresa Lanowitz, "Virtual lab automation is a rare, real, breakthrough use of technology revolutionizing the computing industry and the enterprise."

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## Faster Still and Faster

*Nature (07/05/07) Vol. 448, No. 7149, P. 10; Check, Erica*

The newest sequencing equipment is boosting the speed at which DNA is analyzed, enabling research such as epigenetic studies that would have been impassible using old technologies. Epigenetic refers to observing alterations to the genome that control its expression. This new generation of machines identifies the DNA associated with a particular marker, such as one of the histone proteins. Rather than compare each component of DNA with the collection of earlier identified sequences, scientists now sequence everything. This is possible through technology marketed by a company called Solexa, which in 2007 merged with Illumina. "The amount of DNA sequence being produced by these machines is staggering," asserts Steve Jones, associate director of the Genome Sciences Centre at the British Columbia Cancer Agency. A Solexa 1G machine is capable of increasing by three-fold the overall volume of DNA sequence held in the GenBank database within just 12 months. Jones' group focused on histone modifications that oversee which areas of DNA can be read, while researchers at the Broad Institute and Massachusetts General Hospital relied on a Solexa machine to assess two kinds of histone changes in mouse cells.

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*"Can I call you back? We're in the middle of transitioning from tree-frog allergies to bioterrorism."*