



OCT 19 2006

A Fast Read on the Latest in Lab Automation

Enlightenment From The Lab Man

This month's Lab Man Question is: **Microfluidics:** Hits and Misses – What's the state of evolution of this technology? [Go here](#) to get The Lab Man's insights on microfluidics or download and [listen](#) to his monthly Podcast.

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ALA News

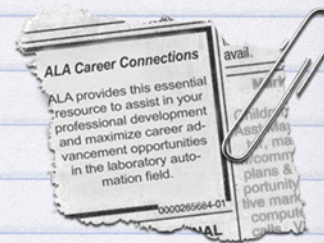
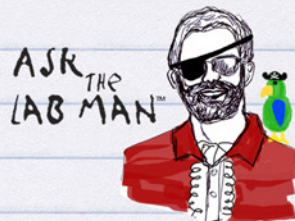
[ALA Board Candidate Applications Due November 3](#) – Candidates seeking to participate in the ALA Board of Directors election must submit their nomination applications no later than midnight, Friday, November 3 (US Central). [Go here](#) for guidelines, information and applications.

[Meet the LabAutomation2007 Closing Plenary Speaker](#) – Daniel H. Wilson recently earned a Ph.D. from the Robotics Institute of Carnegie Mellon University, where he also received masters degrees in robotics and data mining. *How to Survive a Robot Uprising* is his first book. Join your peers from around the world Wednesday, January 31, for lunch and learn first-hand how to defend yourself against a robot rebellion.

[Symyx Teams With ALA to Establish Medal of Excellence Award](#) – To recognize scientific excellence in the field, the ALA Medal of Excellence Award sponsored by Symyx Technologies has been established. Based on merit and being awarded as a \$15,000 cash prize to the recipient's academic chemistry department of choice, this year's winner will be recognized at **LabAutomation2007**. Watch the [LabAutomation2007](#) web site for more details on this exclusive award.

["Illuminate Yourself Membership Campaign" Under Way](#) – The "Illuminate Yourself Membership Campaign" is under way. The goal is simple – upgrade as many Associate Members as possible to full member status. If you are an Associate Member, [go here](#) and upgrade your membership today. It's easy – and you'll immediately begin to receive benefits such as this e-newsletter on a monthly basis, JALA bi-monthly, and direct access to The Lab Man 365-24-7.

[Career Connections Unveils Vital Work Force Development Programs](#) – Offering sessions in career development and information on trends in the biopharma, lab automation, and nanotechnology job markets, the ALA Career Center and Workforce Development Day at **LabAutomation2007** offer a plethora of one-to-one consultations and practical sessions, respectively.



LabAutomation 2007

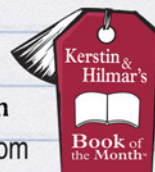
Where laboratory technologies emerge and merge

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

Kerstin & Hilmar's Book of the Month



[amazon.com](#)

? Query of the Month ?

What is the biggest challenge you face in automating laboratory workflow:

- 1) Software
- 2) Hardware
- 3) Chemistry
- 4) Scientific Staff
- 5) Technical Staff

Comments & Testimonials

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Big Growth in Small Things

Chemical Engineering (09/06) Vol. 113, No. 9, P. 23; Butcher, Charles

The global nanotechnology industry is expanding, and nanomaterials are being explored for a variety of applications, despite lingering health concerns. A study by BCC Research projects that the global nanotechnology industry will increase at an annual growth rate of 19 percent, from \$9.4 billion in 2005 to \$25.2 billion by 2011. Chemical process companies are claiming a significant portion of the profits brought in by nanomaterials, which account for more than 86 percent of the nanotechnology market. The most popular use for nanotechnology last year was environmental remediation, though electronic and biomedical applications are predicted to experience high growth rates over the next five years. Companies are experimenting with everything from engineered polyester to petroleum-derived diamondoids to hollow gold atom clusters for trapping other atoms, while increasingly finding ways to apply discoveries to the real world, such as using SAMMS technology to remove metals from water without creating hazardous byproducts. However, some in the scientific community fret that nanoparticles may have detrimental health effects both on the consumers who use nanotechnology products and the workers who are involved with the products' manufacture. Recent research has shown that 74 percent of multi-walled carbon nanotubes are permanently absorbed by cancer cells within 15 minutes, while other research found that carbon-based nanotubes can be toxic under certain circumstances. Some scientists are attempting to use the absorptive properties of nanotubes for good by trying to find a way for nanotubes to deliver inhaled drugs without causing lung inflammation, while others are combating the industry's health concerns by attempting to craft safety guidelines.

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Tagging Based on Molecular Logic

Chemical & Engineering News (09/11/06) P. 11; Freemantle, Michael

Researchers at Queen's University, Belfast, and Avecia in Manchester, England, have discovered a way to tag nano- and microscale objects using fluorescence-based molecular logic gates. The researchers used fluorescent dyes that work as molecular logic gates to tag polymer beads about 100 micrometers in diameter. Each of the dyes has one chemical input—either a logical 0 or 1—and one fluorescence output that is also a logical 0 or 1. Using different combinations of logic types, different chemical inputs, and different excitation and observation wavelengths, it is possible to create millions of distinguishable tags. "The only requirement is that the beads can be 'washed and watched,'" says lead researcher A. Prasanna de Silva. "This paper shows that molecular computation can indeed find real applications today," says chemistry professor Vincenzo Balzani of the University of Bologna, Italy.

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Nanotech's Big Issue

Nature (09/14/06) Vol. 443, No. 7108, P. 137; Gewin, Virginia

As the nanotechnology industry grows and begins sending products into the marketplace, fears are mounting over the sector's lack of regulation and risk research. No longer just a hot marketing buzzword, consumers and potential investors now want to know what nanotechnology is and what its risks and benefits are. The government has yet to catch up with the pace of nanotechnology, resulting in the absence of guidelines and regulations, while the companies themselves are still trying to figure out what oversights are necessary. Currently, some products that contain nanotechnology will fall under the jurisdiction of the Environmental Protection Agency or the Food and Drug Administration, but no one is certain what forms future applications will take. More funding for risk research is needed, as are broad industry regulations.

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Quick Diagnosis of Flu Strains Is Possible With a New Microchip Test

Health & Medicine Week (09/18/06) P. 779

The FluChip developed by University of Colorado at Boulder researchers and the U.S. Centers for Disease Control and Prevention (CDC) is a microchip-based test found to accurately identify 72 strains of influenza. The CDC is among the few labs worldwide with high-level biosafety facilities that can perform extensive tests to identify the geographic origin of a virus and any genetic changes that have occurred, but the FluChip could open up such testing to lower-level biosafety facilities. Gene chips like the FluChip are developed with the help of robotic arms that place DNA or RNA probes on microscope slides for comparison to gene sequences of sample bacteria and viruses. "The ability to quickly and accurately identify strains of influenza would be invaluable to international flu surveillance efforts," said Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases.

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Sequencers Step Up to the Speed Challenge

Nature (09/21/06) Vol. 443 , No. 7109 , P. 258 ; Dalton, Rex

In the race to see which technology will dominate the future of fast and inexpensive patient DNA analysis, as many as 40 new ideas on DNA sequencing have emerged from the scientific community. Leading the charge is relative newcomer 454 Life Sciences, which produced a table-top DNA sequencing machine that runs 100 times faster than that of its closest competitor, industry stalwart Applied Biosystems. However, research has concluded that rather than one company's machine rendering the other obsolete, the two machines complement each other and, when used together, sequence more efficiently than when used separately. This is because while Applied Biosystems uses the Sanger method, 454 does not need to clone DNA fragments before sequencing, which not only speeds up the process but allows 454 to analyze degraded materials that other machines are unable to. On the other hand, 454's individual "reads" only contain 100 base pairs, whereas Applied Biosystems' reads had 800 base pairs. Competition in the marketplace is spurring enormous creative growth. Applied Biosystems is branching out by buying other sequencing companies, and 454 is working on increasing its read lengths to 500 base pairs.

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Does Virtualization Drive the Future?

EDN (09/28/06) Vol. 51, No. 20, P. 124; Wilson, Ron

The simulation of reality by electronic systems—virtualization—adds intelligence, but it is theorized that it could also make such systems self-generating. To be virtualized, a system must be isolated from its environment by a boundary; modeled through the identification by designers of the inputs and outputs that cross the boundary, as well as the transforms that generate the outputs; and represented by an electronic system with a functionally equivalent block. Virtualization can come to encompass not just physical devices, but also storage, computing resources in a network, and applications. Systems-on-chips with diverse computing sites may become viable in real applications via virtualization. Virtualization could enhance electronic gaming by offering advantages over conventional animation, which would be a tremendous boon to game architects. Microsoft's Robotics Studio is developing a virtualized environment for the programming and ultimate design of robots, hoping to offer industrial developers a cheap development and testing platform for programs, and secondary schools an affordable virtual robot to attract U.S. engineering and mathematics students. Virtualization could perhaps ultimately lead to electronic systems capable of environmental sensing, modeling, and prediction.

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Firm Expands Spinach Testing

Washington Post (09/29/06) P. D2; Shin, Annys

Natural Selection Foods LLC, which produced the recalled bagged fresh spinach, announced that it would begin testing the spinach in its fields for E. coli bacteria. About nine of the 12 fields in California's Salinas Valley have been cited as the origin of the tainted spinach sold to Natural Selection, which washes and packs the spinach for up to 30 brands. The California Department of Health Services reported that all of the E. coli victims received the bacteria from spinach under the Dole-brand name. However, spinach was placed back on shelves recently as the U.S. Food and Drug Administration cleared spinach growing in Monterey, San Benito, and Santa Clara. Frozen and canned spinach were not affected by the recent recall, and Natural Selections plants have been cleared by tests seeking E. coli; none has been found. Despite the test results from the plants, state officials would not rule out the factories as the source of the bacterium.

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New Web Tool May Speed Drug Discovery

Boston Globe (09/29/06) Cook, Gareth

Scientists at the Broad Institute of Harvard University and Massachusetts Institute of Technology have created a new tool to help researchers quickly and inexpensively identify potential new compounds to treat different diseases, potentially revolutionizing the way drugs are discovered and prescribed. The "connectivity map" is a free, Web-based search engine that sifts through an enormous database of specially designed genetic signatures for a variety of drugs and diseases. The database identifies treatments and diseases that have opposing effects on some of the genes in a human cell, so that a match could, for example, indicate that the medication might counteract the effects of the condition. Although the tool still needs further study, during initial testing it already identified a drug that could help fight leukemia, and researchers will soon begin testing this suggestion. The scientists are currently working to expand the size of the database, and they hope that researchers from laboratories all over the world will add their data to the system in order to eventually create a resource as vast as the Human Genome Project. "I imagine a world, five years from now," said Eric S. Lander, director of the Broad Institute, "where everyone who is working on a potential drug will, as the first thing they do, quickly look it up" to see what diseases it may affect. Research regarding the new database is published in three papers in the journals Science and Cancer Cell.

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'Dirty Bomb' Effects to Be Studied at U of U

KUTV (10/02/2006)

The National Institute of Allergy and Infectious Diseases has awarded the University of Utah a grant of \$665,000 to study ways to counteract the detrimental health effects caused by a dirty bomb terrorist attack. Specifically, the university will seek to identify ways to eliminate radioactive atoms from the human body and develop products based on these methods. The university already owns patents to several drugs that have shown promise in this regard. The next step is for the university to examine the types of materials that could be used in a dirty bomb and "determine how effective our drugs are against these other materials and a broader range of metals," a university spokesman said. Several other universities and labs, including the Pacific Northwest National Laboratory, received grants from the institute. The grants are part of the "Project Bioshield" program.

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NIH to Build Neuroimaging Informatics Tools and Resources Clearinghouse

NIH News Release (10/05/2006)

The U.S. National Institutes of Health (NIH) has awarded a five-year, \$3.8 million contract to Turner Consulting Group to establish a Web-based clearinghouse for neuroimaging tools, vocabularies, and databases. The aim is to create a “coordinated, coherent resource for the neuroimaging research community” that facilitates the use of new tools, collaboration, training, and other resources, says NIH Director Elias A. Zerhouni. The clearinghouse will help increase utilization of neuroimaging tools and databases such as functional magnetic resonance imaging, which is used to determine the different brain regions that become active during particular cognitive or motor tasks. Roderic I. Pettigrew, the director of the National Institute of Biomedical Imaging and Bioengineering (NIBIB), says the clearinghouse “will ensure that neuroimaging informatics tools and resources are well characterized, documented, and adoptable by the extended research community.” The clearinghouse is part of the overall NIH Blueprint for Neuroscience Research, which offers a framework through which 15 NIH agencies can cooperate. The new contract will be overseen by NIBIB on behalf of the blueprint consortium.

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Police to Pilot New Forensics Weapon

This is Bradford and District (UK) (10/05/06) Wright, Steve

In the United Kingdom, Operation Recall—a successful two-year-old investigation into West Yorkshire’s unsolved rape and murder cases—recently received a huge boost when county police were one of four forces selected to pilot a cutting-edge DNA analysis program. The Forensic Science Service says that DNAboost, a computer-based analysis system, will help police identify 15 percent more offenders, and West Yorkshire police hope to use the program to solve 40 percent more cold cases. DNAboost allows investigators to make identifications in cases where more than one person has touched a surface or when a sample is small or of a low quality. Over the next few weeks, police will use the program to re-examine cases that were unsuccessfully analyzed during Operation Recall to see if DNAboost can make a match where the old technology failed.

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Evolving Bioweapon Threats Require New Countermeasures

Chronicle of Higher Education (10/06/06) Vol. 53, No. 7, P. 18; Purkitt, Helen; Wells, Virgen

The United States should collaborate with other nations to boost transparency of civilian biotechnology laboratories as a means of keeping tabs on bioweapon research and identifying covert biowarfare-weapons projects, assert U.S. Naval Academy political science professor Helen Purkitt and microbiologist Virgen Wells, formerly of the American Association for the Advancement of Science. The authors note that numerous fungi and other naturally occurring pathogens can be used to create bioweapons, and new technologies have made it possible for mobile Biosafety Level 3 laboratories to be set up in remote locales in a matter of days. Though the nations that make up the Australia Group instituted export restrictions on small fermenters and other laboratory equipment four years ago, Purkitt and Wells say these products can be purchased on the Internet. In addition to categorizing countries based on their threat levels and monitoring them accordingly, Purkitt and Wells suggest making both public and private laboratories adhere to Good Laboratory Practice guidelines and safety standards and imposing restrictions on the dissemination of research that could be useful in developing bioweapons.

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Farming on the Cutting Edge

Milwaukee Journal Sentinel (10/06/06) P. D1; Barrett, Rick

Attendees of the World Dairy Expo currently being held in Madison, Wis., can view robotic milking systems. Automation is expected to help short-staffed small and midsize dairy farms, allowing the cows to determine for themselves when they will be milked. Located in the center of the barn, laser-guided robotic milkers scan the computer chip in the cow's neck tag, attach the milking cups, and monitor each cow's milk production. Though popular in Europe, the \$160,000 robots have not yet caught on in the United States. Ohio-based dairy farmer Charlie Knigge says both farmers and cows need time to learn how the systems work. "It's not just a matter of turning on the milkers and leaving the barn," explains Knigge, who says farmers still need to take note of the herd's health.

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UK Biobank Implements Nautilus LIMS

LIMSource.com (10/09/06)

UK Biobank, one of the largest medical research projects ever conducted, is using Thermo Electron Corp.'s Nautilus LIMS. As part of the effort, researchers will follow 500,000 volunteers between the ages of 40 and 69 years for up to three decades. An automated system will collect the samples, fraction them into vessels for testing, analysis, and storage, and then monitor and store the relevant data. The LIMS system will supply daily updates and management reports on the project.

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Engineering Foods at Level of Molecules

New York Times (10/10/06) Feder, Barnaby J.

By using nanotechnology, researchers hope to improve the taste and function of food, packing materials, and other substances people use everyday. For example, a start-up called OilFresh is unveiling an apparatus that helps keep frying oil fresher. The company crushes a mineral called zeolite into beads measuring roughly 20 nanometers across and covers them with an unnamed material; the beads are then packed into a niche inside the fryer and slow down the processes that degrade the oil or lead to hydrocarbon masses. U.K. research firm Cientifica estimates that commercial uses of nanotechnology now constitutes up to a \$410 million portion of the \$3 trillion worldwide food market, and anticipates that figure will increase to \$5.8 billion by 2012. On October 10, meanwhile, the U.S. Food and Drug Administration (FDA) heard its first public hearing on nanotechnology regulation, with a part of the program devoted to foodstuffs. "To their credit, the FDA is trying to get a handle on what's out there," says scientist Michael K. Hansen at Consumers Union, one of 30 organizations that signed up to speak at the hearing. But a former FDA official, Michael R. Taylor, says the agency does not have the resources or the legal power necessary to safeguard consumers while furthering innovation. The Consumers Union is advising the FDA that it should automatically label all new nanoscale food ingredients, even those described as safe in larger sizes, as new additives, but the agency says such a move would be burdensome for it because of a lack of uniform testing standards.

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Viral Nanoelectronics

Scientific American (10/06) Vol. 295, No. 4, P. 53; Ross, Philip E.

Researcher Angela M. Belcher's first foray into training smaller creatures to manufacture things for humans involved the abalone, which manufactures proteins that cause calcium carbonate molecules to adopt two different crystalline forms, one of which is fast-growing and one of which is strong. Since then, she has experimented extensively with a virus called the M13 phage, whose proteins can be engineered to create individual phages with very specific chemical affinities. Biologists, for example, are able to identify unknown samples via the use of M13 phages that bind to specific organic substances. Belcher became the first to demonstrate that the virus can tag and manipulate inorganic materials such as metals and semiconductors. A process of directed evolution is used to get phages with the right affinities. "We throw our billion possibilities into a beaker with some material, wash it off, and see what sticks at the material," Belcher says. Belcher has also experimented with other organisms, such as yeast cells that she was able to get to fix gold, but the very large length-to-width ratio makes the M13 phage particularly suitable for assembling into complex shapes. Belcher is currently working with Yet-Ming Chiang, Paula Hammond, and Ki Tae Nam at MIT in a U.S. Army-funded project to develop M13-based sheets less than a micron thick that can serve as electrodes for an ultra-light lithium-ion battery. It appears that there are no elements and compounds that the phages are unable to distinguish from one another.

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