

Increasing Production and Quality in Oil and Gas Exploration and Production

Engineer Live (07/09/08) Thurston, Colin ; Smith, Kevin

Increased competition for natural resources is forcing many large oil and gas companies to explore harsh, isolated areas. Companies are also trying to remain competitive by becoming more efficient, making strong data management even more important. A comprehensive laboratory information management system (LIMS) can help oil and gas companies analyze exploration data and comply with industrial and environmental regulations. The integration of LIMS that can effectively capture, store, and distribute data can change the way oil and gas laboratories operate. Integration of LIMS with existing systems can replace existing procedures with automatic data transfers that eliminates error and provides decision makers with more data in less time. This can help companies identify trends and monitor quality more quickly, improving overall quality. Implementing an enterprise-wide LIMS also allows a company to centralize and consolidate its IT and technical support, resulting in lower costs.

[Back to the list](#)

Thermo Fisher to Increase Some Prices Starting Aug. 1

Boston Globe (07/09/08)

Thermo Fisher Scientific Inc. has announced a 5.3 percent price increase effective August 1 for certain laboratory products it manufactures, such as specialty laboratory plastic ware and liquid-handling products. The company cited rising costs of raw materials and energy for the increase. "We have, and continue to have, programs in place that are designed to help us mitigate these inflationary pressures and prevent us from passing added cost on to our customers," said Verner Andersen, president of the company's laboratory consumables business.

[Back to the list](#)

Microspheres Read DNA Microarrays

Chemical & Engineering News (07/07/08) Vol. 86 , No. 27 , P. 9 ; Arnaud, Celia

It may become easier to use DNA microarrays, which are devices used to measure gene expression. Researchers at the University of California, Berkeley, led by chemistry professor Jay T. Groves have developed an innovative readout method based on electrostatic repulsion. The approach uses negative charged silica microspheres to identify double-stranded DNA on microarrays that have been hybridized from single-stranded DNA. "We're throwing millions of particles on the sample and letting the particles scan the surface randomly by Brownian motion," Groves says. "By doing a statistical analysis of their motion, we're able to determine with high precision what the charge on the surface is." The researchers used a glass surface with aminosilanes to achieve a positive charge, then manipulated the charge to make single-stranded DNA about neutral or slightly positive. DNA that is added to the surface after hybridizing would feature an overall negative charge at that site. After a solution of negatively charged microspheres flows over the surface, the beads migrate away from the surface at the negatively charged sites. The position of the spheres is tracked using optical methods like reflection interference contrast microscopy or darkfield or brightfield microscopy.

[Back to the list](#)

FDA Food Protection Plan Makes Progress

Occupational Health & Safety (07/06/08)

The U.S. Food and Drug Administration's (FDA's) Food Protection Plan has made headway since its November 2007 rollout, as indicated in FDA's recently released Food Protection Plan Progress Report. The agency has been working to carry out a number of action steps outlined by the plan in collaboration with federal, state, and local partners. Intervention efforts include FDA's collaboration with the New Mexico State University to devise a prototype system for enhancing electronic screening, using open-source intelligence, of imported goods offered for entry into the United States; the system's assessment has been completed and the final pilot evaluation document is under review. The agency has also developed a rapid detection technique to spot E. coli and salmonella in food using flow cytometry, and the system is being employed in poultry processing facilities to identify and prevent bacterial contamination during food processing. Projects in the response domain include joint initiatives between FDA and state, local, tribal, and foreign governments and industry to deliver the science and tools to better understand the food supply's risks and to develop new detection technologies and improved response systems that react swiftly to food safety threats. The FDA also released a request for applications for funding to create Rapid Response Teams to probe outbreaks of foodborne illness, execute trace backs of implicated foods, and rate data from investigations to identify trends.

[Back to the list](#)

Billion-Dollar Cancer Mapping Project Steps Forward
Science (07/04/08) Vol. 321 , No. 5885 , P. 26 ; Kaiser, Jocelyn

Broad Institute researcher Eric Lander's proposal for the \$1.5 billion The Cancer Genome Atlas project, whose goal is to find all common mutations in the major human cancers within a decade, prompted the National Cancer Institute and the Broad Institute to launch a three-year, \$100 million pilot project to study three cancer types for such mutations using gene sequencing. Lander recently told NCI's Board of Scientific Advisors that the project has yielded a successful search for mutations in glioblastoma, confirming five already known mutated genes as well as discovering three new ones. Neurosurgeon Cameron Brennan of New York City's Memorial Sloan-Kettering Cancer Center reported that the results suggest that glioblastoma patients could be categorized by clinicians according to their tumor types, enabling therapies to be tailored to the most relevant genes or pathways.

[Back to the list](#)

Test Can Find Tiny Tumor Level in Blood
Boston Globe (07/03/08) Smith, Stephen

A small microchip developed at Massachusetts General Hospital can analyze a cancer patient's blood for stray cells emanating from tumors, study their genetic patterns to ascertain the most effective drug for a patient whose cancer has already begun proliferating, and reveal whether a medication has lost its effectiveness. The device, known as a CTC-chip, has tens of thousands of embedded columns to snare cancer cells, and coating each column is a glue-like material designed to adhere to circulating tumor cells. "It's like a pinball machine--the blood has to flow through all of these columns to get to the other side," says director of the Mass. General Hospital Cancer Center Dr. Daniel Haber. "All the normal blood cells flow right through, but the very, very rare cancer cells stick to the columns." If the chip registers a lower reading of cancer cells in the blood, then it can be concluded that the tumor is shrinking and the treatment is working; conversely, a higher reading would indicate that the cancer is spreading and a new treatment may be needed. The chip could help yield improved treatments with less side effects, and a report posted online by the New England Journal of Medicine indicated that the device was successful in identifying migrating cancer cells in lung cancer patients and noticed key genetic characteristics in those cells. Traditional biopsies carry considerable risks, especially for lung cancer patients for whom biopsies could result in infection, bleeding, lung collapse, and shortness of breath, according to Johns Hopkins University cancer specialist Dr. Charles Rudin.

[Back to the list](#)

European Research Creates Lab-On-Chip to Detect Deadly Bacteria in Food
DailyTech (07/03/08) Mick, Jason

A prototype lab-on-a-chip system designed to test food on-site for campylobacter and salmonella in less than 60 minutes has been developed by European researchers working under the auspices of the European Union-funded OptoLabCard project. The test chip employs microelectromechanical systems that include sensors, optical components, and fluid channels, and it differs from earlier lab-on-a-chip projects in that it jettisons specialized materials and forms most of its components from a single thick negative photoresist layer, allowing the device to be produced more easily and at less cost. The chip can also replicate bacterial DNA thousands of times using magnetophoresis and the polymerase chain reaction (PCR) method. "By using PCR for sample preparation we can create more concentrated bacteria samples, and because it works with DNA it means that the same device can be used to detect many different types of bacteria and diseases," says Jesus M. Ruano-Lopez, coordinator of the OptoLabCard project at Ikerlan-IK4 in Spain. Campylobacter is one of the most common bacteria in poultry, so it makes sense that the chip's initial field test will involve its deployment at Danish poultry farms. Dang Duong Bang with the Danish Institute for Food and Veterinary Research notes that campylobacter infections cause nearly \$1 billion in treatment costs in the United States and \$300 million in England annually, and significant cost savings could be realized by using field tests to lower the number of infected animals reaching the market. The goals of the OptoLabCard initiative include detecting pathogens in the food supply, developing chips to detect pathogens and contaminants in water supplies, and devising chips to test human blood for cancer, HIV, flu, and hepatitis.

[Back to the list](#)

Nanotechnology to Help Diagnose, Treat and Monitor Cancer

AZoNano.com (07/02/08)

Representatives from the Massachusetts Institute of Technology (MIT) and other organizations recently discussed the potential for using nanotechnology in fighting cancer. The event, held on June 27, was a yearly symposium hosted by the David M. Koch Institute for Integrative Cancer Research at MIT. MIT professors Robert Langer and Sangeeta Bhatia addressed the development of nanodevices that can diagnose tumors, deliver drugs, and monitor the progress of treatment—all in a single device. Another MIT professor, Paula Hammond, talked about the polymers her lab is working on that send cancer drugs directly into malignant cells. She relies on self-assembling polymers that have certain molecules that enable nanoparticles to locate and attach to tumor cells. "We've been able to design these systems so they can act as very specific targeting vehicles for drug delivery," said Hammond. Ralph Weissleder, director of the Center for Systems Biology at Massachusetts General Hospital, also discussed different kinds of cancer-detecting nanoparticles.

[Back to the list](#)

Agency to Unveil TB Test That Speeds Detection

Wall Street Journal (07/01/08) P. D2 ; Chase, Marilyn

The World Health Organization (WHO) and the UNITAID funding coalition have announced a plan to launch a \$26.1 million program to circulate a new gene-based test that identifies multidrug-resistant tuberculosis (MDR-TB) two days rather than weeks or months after analysis in 16 developing countries over a four-year period. The line-probe assay test spots genes connected to resistance to two first-line TB drugs, isoniazid and rifampin, using polymerase chain reaction technology, and the information yielded by this method will allow doctors to commence treatment faster. Mario Raviglione with the WHO's Stop TB Department said the line-probe assay test was approved by the agency as being equally or more accurate than currently used culture tests, while Richard O'Brien with the Foundation for Innovative New Diagnostics said all countries should consider the new method. According to WHO estimates, just 2 percent of MDR-TB cases are being suitably diagnosed and treated due to deficient lab facilities, and expanding the new test will extend diagnostic capacity to 15 percent. Raviglione noted, however, that \$170 million is required to construct adequate lab capacity. Several research groups are working on a test to detect more extensively drug-resistant TB, according to WHO officials.

[Back to the list](#)

Group Makes Advances Toward 'Biosensing Pill'

Tech-On! (07/01/08) Ooshita, Junichi

The fusion of semiconductor technology and biotechnology into a capsule-type biosensor or "biosensing pill" that, when integrated with memory and a wireless circuit, can facilitate the detection, storage, and wireless transmission of biological information on multiple issues, is the goal of a joint project between Hiroshima University, Elpida Memory, Satake, and the Research Institute of Biomolecule Metrology. The project members hope to develop the biosensing system by 2015, and they unveiled research achievements that include sensor, wireless circuit, and 3D packaging technologies at a June 27 symposium. "Fiscal 2008 missions" that project members are focusing on include exploration of a new material and a new theory for highly integrated memory applications, and interfacial control technology for silicon-organic materials aimed at a biosensor that uses semiconductor circuits, according to Hiroshima University professor and project leader Atsushi Iwata. A protein that stably unifies silicon and an organic material has been developed for the latter mission, and project members have prototyped a semiconductor circuit-based biosensor utilizing this protein and verified its basic operation. Hiroshima University set up the Research Institute for Nanodevice and Bio Systems two months ago to meld semiconductor and integration science technologies.

[Back to the list](#)

Quick Diagnoses of Drug-Resistant TB Crucial: Experts

Reuters (06/23/08) Lyn, Tan Ee

Participants at a recent infectious disease conference in Kuala Lumpur called for greater and more sophisticated resources to test for drug-resistant tuberculosis (TB). Experts noted that in some countries, it could take as long as five months for patients to receive their TB test results. "Delayed diagnoses mean they (patients) transmit more to other people and 60 percent of your patients are dead by the time the MDR-TB (multidrug-resistant TB) results are back," said David Moore, an infectious disease expert at Cayetano University in Peru. Up to 6 percent of TB cases in some parts of Peru are drug-resistant. Quicker diagnoses are also needed in Africa, said Roxana Rustomjee, head of the Medical Research Council's TB Unit in Durban, South Africa. She noted that most patients with extensively drug-resistant TB do not live to see their test results. There were more than 489,000 cases of MDR-TB worldwide in 2006, with 72.4 percent in Asia, primarily India and China.

[Back to the list](#)

Swarm Robotics: Debugged Naturally for 120 Million Years

Control Engineering (06/20/08)

At the recent Sensors Expo, keynote speaker MIT roboticist James McLurkin noted that software for swarm robotics has been debugged naturally for 120 million years and outlined three objectives engineers should strive to accomplish. McLurkin told attendees that they should work to help young people understand that engineering is cool by describing what they do and by getting involved in engineering-related activities for young people. McLurkin also said the United States is not creating enough engineers. Engineers and companies should donate time, hardware, or software to educational institutions. For example, he said the Eclipse open-source programming toolkit has been very useful at universities. Finally, McLurkin said that engineers can help find a way out of global warming by working on it themselves and inspiring the next generation of engineers to solve the problem. McLurkin said he is working with MIT Computer Science and Artificial Intelligence Laboratory professor Leslie Kaelbling on distributed algorithms for swarms of mobile robots in an effort to understand how to use local interactions among nearby robots to produce large-scale group behaviors from the entire swarm. Small, swarm robots could search through rubble after an earthquake or other disasters to find survivors, relaying information back to medium-sized robots that analyze the data and direct larger robots to remove the rubble.

[Back to the list](#)

Boon to Drug Discovery: Interactions Within Membrane Complexes Can Be Maintained in Vacuum of Mass Spectrometer

Science Daily (06/13/08)

Researchers at the University of Cambridge and the University of Bristol have discovered that interactions within cell membrane complexes can remain intact within the vacuum of the mass spectrometer. Scientists had originally assumed that membrane complexes would not survive inside the mass spectrometer. For the purposes of the experiment, reported in Science Express, researchers maintained abnormally high levels of the detergent used to protect the protein in solution once outside its natural membrane. The researchers then intentionally destroyed the detergent layer once in the gas phase, allowing them to isolate the intact assembly. Scientists are hopeful this discovery will open new avenues for pharmaceutical development, as approximately 60 percent of all drug targets are membrane proteins.

[Back to the list](#)

The Silicon Chip That Picks Out Cancer Cells

New Scientist (06/13/08) Vol. 198, No. 2659, P. 28; Robson, David

Princeton University and Boston University researchers have developed a silicon wafer that could perhaps filter out cancer cells by directing streams of cells in a liquid and separating them by size. The chip is studded with rows of minuscule columns through which a particle-laden liquid is made to flow, and friction causes the liquid to flow more slowly close to the columns than midway between them. Particles of a certain size tend to pass close to the columns and are deflected, and different sizes of particle can be collected into streams following divergent paths via the employment of columns with an offset from one row to the next. The wafer should be capable of filtering out the contents of single cells, easing the isolation and sequencing of genes and proteins, which could be especially helpful when studying abnormal cells such as metastatic cancer cells. Furthermore, the researchers have developed a silicon "lens" that can focus particles of a certain size into one stream, which could aid in the isolation of particles that occur at low concentrations. "As a platform, it could pave the way for a wide variety of technologies in the future," notes University of Glasgow professor Jon Cooper.

[Back to the list](#)

The Future Is Now for the Robot Revolution

IndustryWeek (06/01/08) Teresko, John

Industrial robots have become commonplace in auto manufacturing in the past 50 years, but new generations of robots, some of which are very humanoid in design, promise a revolution in the use of robots in both industrial and non-industrial capacities. Robotic Industries Association (RIA) Executive Vice President Jeffrey A. Burnstein sees substantial growth potential for robotics, even in the factory automation roles where first-generation robots have become commonplace. Robot functions are becoming integrated with other equipment, such as the pallet truck; Seegrid Corp.'s GP8 robotic pallet truck is able to transport and position pallets automatically, using stereo cameras to build a 3D map of the environment and then navigating on its own. "It enables warehouse operators to maintain their hard-learned and hard-earned best practices while giving them a new tool to address the challenges they face today—labor shortages, ergonomic and safety issues and cost reduction," says Seegrid CEO Scott Friedman. Yaskawa Electric Corp.'s Motoman Inc. division has introduced a humanoid robot called the Motoman-SDA10 that has two arms and several axes of movement, creating the potential for personal robotics, according to Motoman COO Craig Jennings. Jennings predicts a future for the Motoman in the third world, where it could substitute for women in unpleasant work environments: "The design goal in creating the two-arm robot was to create the form, fit and function of a woman that would typically be performing various assembly tasks. The result: a design matching an average woman's height, size and slimness."

[Back to the list](#)

Digital Image Forensics

Scientific American (06/01/08) Vol. 298 , No. 6 , P. 66 ; Farid, Hany

The field of digital image forensics has grown around commercial software that allows photographs to be convincingly doctored, writes Dartmouth College professor Hany Farid, who, with his team, has developed a number of tools designed to identify signs of digital image manipulation by understanding what statistical or geometric characteristics of an image are disturbed by tampering. One common image manipulation strategy is the copying and pasting of a region of an image, a technique known as cloning. To spot cloning, Farid's team has developed a method that works with small blocks of pixels, using an algorithm to compute a quantity that represents the colors of the pixels in the block, which it then applies to order all the blocks in a sequence that has identical and very similar blocks in close proximity. The program then searches for identical blocks and tries to "grow" larger identical regions from them block by block. Another technique developed by Farid's team looks for subtle differences in lighting conditions that may be characteristic of composite images by estimating the direction of the light source for each object or person through measurement of the brightness and orientation along several points on a contour. A third method to uncover evidence of digital doctoring focuses on the specular highlights of people's eyes, which can be measured to make deductions about lighting and image authenticity. The algorithm estimates the orientation of a person's eyes from the shape of the irises in the image, and uses this data and the position of the specular highlights to estimate the direction to the light. Farid notes that several state and federal rulings have determined that juries should not be asked to ascertain the authenticity of digital images because of the sophistication of computer-generated images.

[Back to the list](#)

New Standard to Aid ID Processes

Health Data Management (06/08) Vol. 16 , No. 16 , P. 6

The American National Standards Institute has approved the first portion of a new data standard that encompasses such technologies as bar codes, radio frequency identification, and two-dimensional symbol technologies. The standard describes how these technologies can be used to positively identify patients, drugs, and devices. According to a 239-page document that describes the standard, the technologies will be used in conjunction with "employee badges, patient wristbands, non-IV medications, IV-medications and smart infusion pumps, and device license plate labeling for intelligent devices." The document also says that even though all hospitals do not have robust infrastructure, the standard "accommodates a data set rich enough to implement a medication administration record system even in the absence of such connectivity." Furthermore, the standard features a dictionary of compulsory and optional data elements for each area of use as well as descriptions of how the data is to be arranged. The specification also mentions other possibilities for areas of use. For example, data contained in IV and non-IV drug specifications could be used by inventory and electronic medication record systems.

[Back to the list](#)

Tech Challenges Faced by Labs

Express Healthcare (06/08) Velu, G.S.K

Lab automation is continuing to progress as suppliers proliferate in the market and lab workers decline in number. Globally, some 300 laboratories have installed completely automated lab systems that can handle all parts of the testing process in the fields of chemistry, immunochemistry, and hematology. Many labs have automated one or more sections of the lab. Automation is vital for achieving such long-term benefits as higher quality reports, cost savings, enhanced turnaround time, and reducing pre-analytical mistakes. The biggest hurdles for automation are high costs and manpower expenses. Full lab automation is desirable for facilities with a typical workload of 2 million samples annually. Diagnostic centers can utilize such lab techniques as molecular diagnostics, nanotechnology, and multiplex assays using microarrays. Automation can be used for such lab segments as pre-analytics, bar code generation, processing, testing, and final reporting.

[Back to the list](#)

© Copyright 2008 INFORMATION, INC.



© The New Yorker Collection 1940 John Ruge from cartoonbank.com.
All Rights Reserved.

“Sometimes I feel I’d like to get right in there and fight!”