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also inside

standards

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COVER STORY: LAB SPOTLIGHT

There's only one in Canada and it's world-renowned: Go inside Canada's only Containment Level 4 lab at Winnipeg's Canadian Science Centre for Human and Animal Health.

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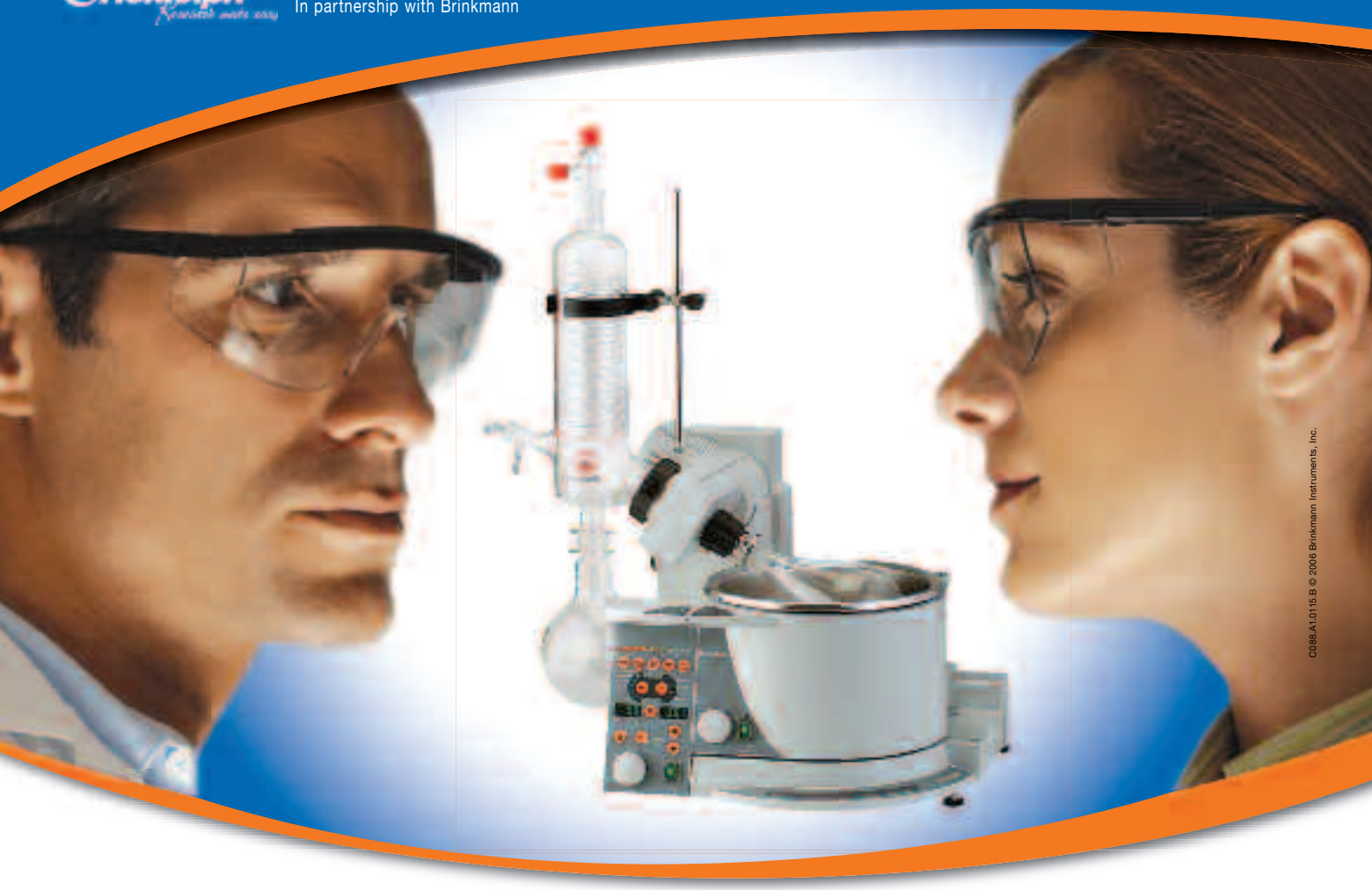

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Calculated Risks

My husband and I were looking at new cars recently. Our main concern: we wanted a small, fuel-efficient second car. We wanted folding seats and lots of storage. We didn't even think to look at safety. We assumed everything was as it should be. We shrugged our shoulders at the optional side curtain airbags.

Since driving the car home, we've parked in the farthest spots at the mall lest we get a scratch, whereas we can never get close enough to the door with our old car. We observe the speed limit religiously, avoid the streets with major construction, and are basically extremely careful. In short, we do everything we can to avoid getting the car dirty, scratched, in an accident or ticketed—everything we don't do in our other car. Don't get me wrong. We are both careful, courteous drivers, but we've become comfortable in our other car. We know its capabilities and its deficiencies and we know it wears its battle scars of the road with pride. What would a few more matter?

This got me thinking while putting together this annual safety issue: What if researchers acted the same way? What if they only wanted that shiny new piece of equipment and didn't question its safety features or record? What if they got a little too comfortable and cut a corner, just this once?

Thankfully, that's not the case. Safety is top-of-mind for the researchers and others you'll read about in this issue.

And we're here to help. Beginning with this issue, *LAB Business* is running a new column called Safety Zone. It's written by Dr. James A. Kaufman, Founder and President of The Laboratory Safety Institute (LSI), an international, non-profit centre for safety in science and science education. Even if you find the tips are common sense, it never hurts to be reminded every now and then. Just in case you've become too comfortable.

You'll also want to read our story on building, managing and working in high-containment labs (p. 24); our profile of Newalta, which is finding new ways to manage labpack waste (p. 28); and of course, our feature on Canada's only Containment Level 4 laboratory (p. 18).

I am reminded now as I hope you are too: The safest risk is always the one you didn't take.

Theresa Rogers
trogers@jesmar.com

Be sure to check out our story on LIMS on page 14. For even more information, visit our Web site at **www.labbusinessmag.com** for our special LIMS Webcast.

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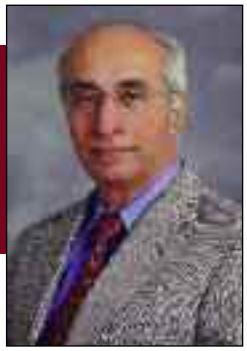
UPDATE

Canada's Pathologists Unveil Action Plan

Kurt Davis, Executive Director of the Canadian Society for Medical Laboratory Science



Dr. Jagdish Butany, President of the Canadian Association of Pathologists

The Canadian Association of Pathologists (CAP) wrapped up its annual meeting in Ottawa in July with the release of a five-point plan to improve laboratory testing in Canada and to support pathologists and laboratory technologists. The plan calls for:

- Mandatory certification for all prognostic and predictive tests done by medical laboratories.
- Verification of test results from any given laboratory by an independent external laboratory.
- Use of the Canadian National Checklist—a quality assurance system for laboratories that includes test validation, staff training and assessment, standardization of operating procedures and equipment maintenance—for diagnostic immunohistochemistry.
- Development of a national non-government body to accredit all medical laboratories in Canada.
- Support from federal, provincial and territorial governments to address workforce and resource shortages threatening laboratory medicine.

"What we are proposing is the creation of an appropriately resourced national system to promote excellence in the laboratory medicine in Canada," said Dr. Jagdish Butany, President of the CAP, in a press release. "The plan is ready, we now look to our political leaders to step forward with the support needed to get it up and running."

Kurt Davis, Executive Director of the Canadian Society for Medical Laboratory Science (CSMLS), was unable to comment on the plan as he is awaiting more detailed information and clarification from the CAP on these points.

Pandemic Research Receives Funding Boost

Dr. Mark Loeb, McMaster University

With a $1.6 million boost in funding, McMaster University's Dr. Mark Loeb and his research team are setting out to better understand the transmission of pandemic disease. Loeb, an internationally recognized expert in infectious disease epidemiology, will be working with isolated Hutterite communities in western Canada to examine the transmission of flu viruses from human to human, and from pig to human.

"Hutterite communities are uniquely well-suited to this sort of research," says Loeb, "because they are active swine farmers and because they live in isolation from mainstream society."

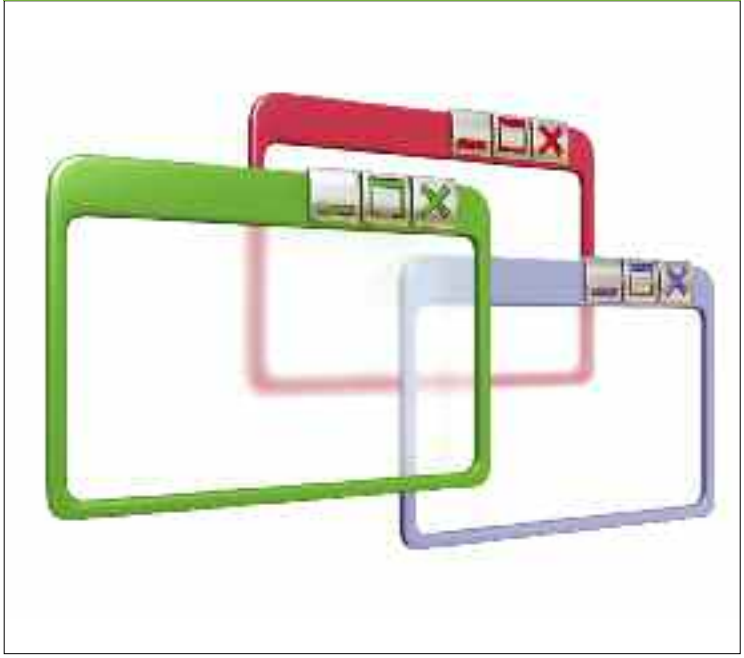
Loeb hopes to identify migratory trends in disease, and from this, better means of prevention.

The funding comes from the Rx&D Health Research Foundation (HRF), the Canadian Institutes of Health Research (CIHR) and the Canadian Food Inspection Agency (CFIA).

"This is a critical study," says Peter George, President of McMaster University, "and we're particularly pleased to see Dr. Loeb's innovative work given well-deserved recognition with this grant."

To read more about pandemic research, go to page 18.

Thermo Fisher Scientific Wins Award for Informatics Solution



Thermo Fisher Scientific and AstraZeneca are the latest recipients of the Microsoft Corporation Pharmaceutical and Life Sciences Innovation Award in the Discovery and Product Innovation category.

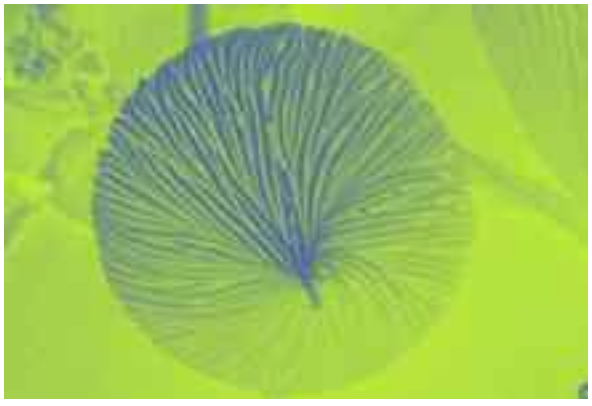
Announced at the Drug Information Association's 44th annual conference in July, the companies have been recognized for their development and implementation of the Thermo Scientific Nautilus Laboratory Information Management System (LIMS).

Built on the Microsoft Visual Studio .Net platform, one of the qualifying factors for the award, the Thermo Scientific and AstraZeneca application was able to streamline the early phase discovery process and greatly accelerate decision-making in drug discovery and delivery by centralizing all research and development information—increasing laboratory efficiency by 180 per cent within six months.

"The winners demonstrated solutions that help streamline clinical trial and discovery processes and improve collaboration, bridging the gap between research, discovery and drug delivery," said Michael Naimoli, Director of U.S. life sciences industry solutions at Microsoft, in a release.

To read more about LIMS, go to page 14.

World's Top Microbe Experts Gather in Halifax



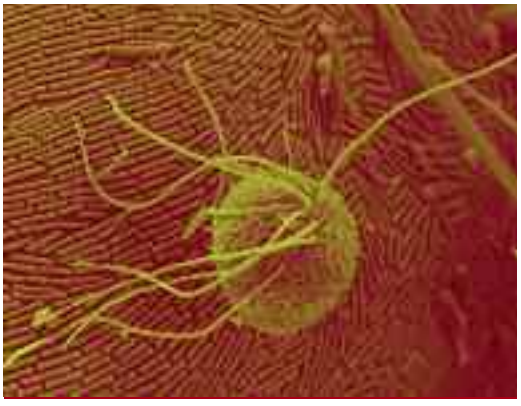


Photo credit: Kevin Carpenter and Patrick Keeling

The two micro-organisms at left, called protists, work together to help wood-eating insects such as termites and cockroaches digest their food.

The Canadian Institute for Advanced Research (CIFAR) and the Tula Foundation recently hosted a bustling collaboration zone for microbe experts. More than 50 leading researchers from Japan, Scotland, Switzerland, Australia, France, the Czech Republic, Russia and across Canada attended to discuss a scientific project dubbed "The Tree of Life."

The Tree of Life is a massive, publicly accessible Web-based repository for all scientific knowledge about the diversity, evolutionary history and characteristics of every species and significant group of organisms on Earth, living and extinct. This information is designed to create a grand understanding of all life on the planet.

The Halifax workshop focused specifically on complex microbial organisms called "protists," which play key roles in biological growth and decay, health and sickness, and ecosystem maintenance and destruction.

To explore the Tree of Life, go to www.tolweb.org/tree.

WITec Microscope Wins 2008 R&D 100 Award

WITec microscope technology has been selected as a winner of the 2008 R&D 100 Award. It honours the automated Confocal Raman and Atomic Force Microscope combination alpha500 as one of the 100 most technologically significant innovations of the year.

The alpha500 combines Confocal Raman Microscopy for chemical 3-D imaging and Atomic Force Microscopy for structural surface imaging in an automated system for large samples. It enables the automated execution of predefined measurement sequences on an arbitrary, user-defined number of sample positions for the most comprehensive, nondestructive and rapid sample analysis without any online process control by an operator.

The internationally recognized R&D 100 Award is selected annually by an independent panel of judges as well as the editors of *R&D Magazine*. The judges choose breakthrough products or processes that can change people's lives or leapfrog current technology.

Government Invests in Vancouver's Fuel Cell Industry

The federal government announced a $13.6 million investment in the National Research Council's (NRC) Vancouver-based fuel cell and hydrogen industry and officially opened the Hydrogen and Fuel Cell Gateway—a technology demonstration and exhibit centre showcasing Canada's world-leading fuel cell and hydrogen industry.

This investment is part of a larger $118 million investment in six NRC technology cluster initiatives—Fuel Cell and Hydrogen Technologies in Vancouver; Nanotechnology in Edmonton; Plants for Health and Wellness in Saskatoon; Biomedical Technologies in Winnipeg; Photonics in Ottawa and Aluminum Transformation in the Saguenay-Lac-Saint-Jean region.

The Canadian Laboratory Suppliers Association held its annual golf tournament in June at the Royal Ontario Golf Club in Milton, Ont. Chris Forbes (left), Publisher, *LAB Business* and *Bio Business* magazines, presented trophies to the winning foursome: Martyn Calderbank, Tom Coclough, Bob Wilson and Frank Golden.

Canada's Research-based Pharmaceutical Companies Invested More Than $1 Billion in R&D in 2007

Canada's Research-Based Pharmaceutical Companies President Russell Williams issued the following statement from BIO 2008 in reaction to the release of the Patented Medicine Prices Review Board's (PMPRB) Annual Report on R&D-to-sales ratio in the pharmaceutical industry:

"It is clear that the competition to attract biopharmaceutical investments is fierce. The federal government has taken steps to improve its competitiveness through initiatives such as data protection and the Science and Technology Strategy. Provincial governments, including Quebec, Ontario, Alberta and B.C., have shown their commitment in leveraging the potential for biopharmaceutical investments through initiatives to support pharmaceutical innovation. But further steps must be taken, namely to ensure patients can access more innovative medicines through their provincial drug plans and by guaranteeing stability and predictability in the intellectual property regime.

"As the manufacturing sector is experiencing severe challenges in Canada, the biopharmaceutical sector offers potential for further growth. According to the latest PMPRB report, our members invested $1.18 billion in R&D of new medicines in 2007, a 25 per cent growth from 2006.

"Furthermore, innovative medicines and vaccines remain one of the most cost-effective medical interventions to treat patients. According to a recent study from the Fraser Institute, brand name medicines in Canada were priced 53 per cent lower than in the U.S. in 2007, while patients here at home were paying 112 per cent more for their generic drugs compared to patients in the U.S."

10 Joint Science and Technology Initiatives Announced Between Canadian and Indian Companies

International Science and Technology Partnerships Canada Inc. (ISTPCanada) recently announced 10 joint research and development (R&D) initiatives involving Canadian and Indian companies and researchers valued at more than $17 million.

Eight of the initiatives are joint research projects while the other two initiatives are Partnership Development Activities (PDA). ISTPCanada's PDA initiatives foster joint activities aimed at generating new or expanded research and technology-based partnerships between countries and may include activities such as scientific seminars, conferences, symposia and workshops, and activities that involve exchanges of scientists, technical experts and academics.

All the projects are co-funded by the federal government's International Science and Technology Partnerships Program, which is delivered through ISTPCanada and its counterpart in India, the Global Innovation and Technology Alliance (GITA). ISTPCanada and its Canadian partners are awarding $3.82 million to co-fund the Canadian side of these projects. The remaining funding is provided by India and the companies involved.

Mathematicians Develop Solutions to Real-life Problems

Math Students Meet for Numbers Boot Camp

30 undergraduate students from Canada, the United States, Hong Kong, China, Germany and Mexico will spend four weeks at Simon Fraser University at the Industrial Math Summer School developing solutions to real-life issues being experienced by Canadian companies.

From developing new tools to detect explosive devices in conflict areas to modeling energy consumption of high-rise buildings to improve efficiencies, the participants of the workshop—organized by MITACS, a national math research network that brings together researchers and companies in a collaborative effort to solve problems of key importance to society and industry—were selected from more than 95 applicants worldwide based on their academic record and keen interest in industrial mathematics.

"For the majority of the students, this workshop will be the first time when they get hands-on experience applying their math skills to actual company challenges to develop solutions that will likely be implemented by the different businesses. This workshop takes math out of the lab and into the real-world," says Dr. J.F. Williams, Assistant Professor of Mathematics at Simon Fraser University and organizer of the summer school.

Using Numbers to Fight HIV, Malaria

2 of Canada's top mathematicians are heading to Botswana to teach 25 Canadian and African grad students how to control the spread of infectious diseases using equations and formulas.

The Canadian mathematicians—Dr. Abba Gumel, Professor of Mathematics at the University of Manitoba in Winnipeg and Dr. Troy Day, Associate Professor of Mathematics, Statistics and Biology, from Queen's University in Kingston—are members of MITACS, a national math research network that brings together researchers, companies and governments in a collaborative effort to solve problems of key importance to society and industry.

Gumel and Day will link up with colleagues from Makerere University in Uganda, the National University of Science and Technology in Zimbabwe and University of Botswana, to lead the grad students through an intense two-week workshop that will teach them the latest math tools and techniques to help predict outbreaks of diseases such as malaria and tuberculosis and control their spread.

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Getting Organized

While working for Dow Chemical Company in the 70s, Dr. James A. Kaufman wrote *Laboratory Safety Guidelines* in an attempt to share with schools, colleges, and universities what he was learning about lab safety. Those first guidelines have since been expanded and updated used all over the United States. Since then, Dr. Kaufman has trained more than 50,000 science educators and scientists. His brand of safety training is a unique blend of technical information, practical and inexpensive solutions, humour, and accounts of accidents drawn from a collection of more than 4,000 examples.

Exclusive to Canada, *LAB Business* will be bringing you practical safety tips from Dr. Kaufman in upcoming issues.

By Dr. James A. Kaufman

Dr. James A. Kaufman is the founder and president of The Laboratory Safety Institute (LSI) www.labsafetyinstitute.org—an international, non-profit centre for safety in science and science education. LSI provides workshops, seminars, on-site training programs, lab safety program development consultations, facilities inspections and regulatory compliance assistance. Contact LSI with all your lab safety questions: (508) 647-1900 or info@labsafety.org.

Establish a written safety policy

This is the cornerstone of a good safety program. It's a statement endorsed and supported by the administration that speaks to the fundamental responsibilities for health and safety in the company.

For example: "It is the responsibility of our company and its employees to ensure that our business activities and other activities protect and promote the health and safety of our customers, our employees, and the environment."

Your department may want to draft a sample policy statement for recommendation to your administration. It is virtually impossible to have an excellent safety program without their support. Your written safety policy will provide the foundation of your safety program.

Policy statements of this type need to be signed by the highest-ranking official of the organization, dated, laminated, and mounted in the entrance of every building.

Organize a safety committee

Your department should have a safety committee. The committee should consist of employees, supervisors, staff and administration.

The committee should meet regularly to discuss safety, health and environmental problems and to seek solutions to them. The committee should help to see that the safety policy is implemented. The committee can help to promote an interest and concern for health and safety issues. They might be the group responsible for conducting regular inspections, reviewing accident reports and developing recommended safety procedures.

One type of safety committee is the central safety committee. It is chaired by the highest-ranking on-site official. The members of the committee are his or her direct reports. In this way, senior management/administration is involved and providing leadership in the safety program. LB

LIMS Primer

Laboratory Information Management Systems Evolve into Enterprise-wide Systems Driving Business Decisions

By Dave Champagne

One of the key challenges faced by organizations today is their inability to turn the vast amount of laboratory data that is generated into useful information that enables them to make timely and effective decisions. In the nearly 30 years that have passed since the first introduction of what we now know as Laboratory Information Management Systems (LIMS), the evolution of LIMS has gone from individualized laboratory computing solutions that stored and provided access to data, to the more recent and essential integrated enterprise-wide systems that drive modern day business decisions. Today's LIMS deliver realtime analysis and reports, monitor regulatory compliance and product quality, integrate with a company's broader Enterprise Resource Planning (ERP) network, all while providing secure access to data throughout the organization and delivering much more essential functionality than merely storing and retrieving results data.

The benefits of purpose-built LIMS

Because historically most standard LIMS have only delivered 30 per cent to 40 per cent of a user's needs, extensive customization has been required to make that LIMS function in a particular setting. Unfortunately, such customization is commonly only possible through the use of proprietary programming languages that are developed and provided by the LIMS vendor. According to the *2008 Strategic Analysis of the U.S. Laboratory Information Management Systems Market*, produced by Frost & Sullivan, the market growth indicators are focused on providing customers with not only purpose-built LIMS that are fully integrated with other laboratory equipment, but also LIMS that easily align with global enterprise solutions. In addition, preconfigured solutions with test methods for specified industries will drive the growth across all markets.

The challenges facing today's global industries can be ideally addressed using purpose-built solutions that provide as much application-specific functionality as

Dave Champagne, Vice-President and General Manager, Informatics, Thermo Fisher Scientific

possible—out-of-the box—to meet the particular needs of various laboratories. When the required functionality is built into the base system as standard, it eliminates the need for user-specific customizations during implementation. This, in turn, results in reduced validation time, shortened deployment and easier ongoing support. It's important to remember that purpose-built LIMS can also be flexible and configurable. Making LIMS easily configurable means final adjustments to the lab-specific usability of the software can be done by laboratory personnel, without the time and expense of involving the IT department or proprietary vendor programmers.

Configurability can be accomplished easily by non-programmers when graphical configuration tools are built into the product. Finally, global deployments now are more consistent and more rapid. Purpose-built LIMS allow the customer to experience more simplified system upgrades, minimized project risks, and enhanced compliance. Furthermore, purpose-built solutions facilitate enterprise-wide application and training. These multifaceted benefits help lower the total cost of ownership of the solution, which is critical for industries under ever-increasing pressures to contain costs and increase efficiency, in part through global harmonization of business processes.

The laboratory needs of the food and beverage industry

Laboratories in the food and beverage industry are becoming more and more tightly controlled by regulations similar to those applied to pharmaceuticals. Regulatory bodies such as the U.S. Food and Drug Administration (FDA) now require food products to be tracked throughout manufacture and distribution. This, in turn, is driving the introduction of laboratory information management systems in an industry that has formerly been run via manual processes.

The division between process industries—which include food and beverages as well as petrochemicals and agriculture—and bioscience is largely historical. The food and beverages industry is still a high-volume industry dominated by multinational companies that work in, and export to, multiple markets. Developing tools that allow the most stringent safety requirements to be imposed seamlessly in a high-volume industry and in a diverse international environment is a challenge for the companies that develop these tools. Companies have met that challenge by developing LIMS that take into consideration all of the various regulatory protocols across national borders.

Thermo Fisher's food and beverage clients illustrate the diversity of the industry. In Canada, they include: Unilever, The Canadian Food Inspection Agency, the Liquor Control Board of Ontario and the Department of Fisheries and Oceans. For these customers, Thermo Scientific SampleManager LIMS, designed to be used in both manufacturing and regulatory environments, provides a centralized system to enable management to access data and extract information, allowing them to more effectively manage their laboratory operations. SampleManager LIMS also provides evidence and documentation that these organizations are in ISO 17025 compliance, an increasingly critical component in laboratories performing food safety testing, as ISO 17025 governs, in part, the requirements for tests and calibrations, which affects the tests that are performed and the calibration of the instruments used in performing those tests. In fact, the European Commission has recently determined that any company performing food safety testing in Europe must be ISO 17025 certified in order to perform certain tests. But international standardization does not tell the whole story. Different standards still apply in different markets. Where the consumer is based determines the conditions that the producer has to adhere to. Therefore, even a single factory may have to apply different regulations if it exports to different countries. SampleManager LIMS can apply multiple analytical standards to the same prod-

uct if it is destined for multiple markets.

Food companies themselves also work from multiple locations, often in several countries, and seek networked solutions that will allow the same software to be used in each location.

LIMS as a strategic decision-making tool

The strategic and business importance of the laboratory has evolved tremendously since the introduction of LIMS. Laboratory workers have shifted their expertise from manual and time-consuming activities to more sophisticated data analyses that drive business-critical decisions. And the increased role of the laboratory in achieving strategic corporate objectives (such as decreasing product time to market and ensuring regulatory compliance) is an indicator of how integral the laboratory has become to the overall operations of the business.

One of the most important areas of change can be illustrated in the way people work with each other, whether it involves scientists in the same laboratory or in remote parts of the world. The evolution of collaborative methods has been enhanced by the technologies available, giving the field of informatics a new role to play in bringing scientists together. And as instrumentation has become more sophisticated, the amount of data that can be generated is tremendous, giving today's scientist a new challenge—managing all that data.

Informatics is now a critical part of the process of increasing the productivity of the laboratory. Compared to earlier years when instruments and databases were primarily standalone installations with their own distinct purposes and workflows, today there is increasing pressure on the laboratory to automate and integrate systems in order to harmonize processes and make use of all the data being generated. It is now more important for scientists to be able to share data and collaborate on findings.

Today, the growing need to partner and outsource work both domestically and abroad has never been more important. To make this possible, LIMS providers are forming partnerships with vendors such as Microsoft, Oracle and others to ensure that information sharing through the LIMS is on a global scale, and occurs across both multiple locations and disciplines. LIMS is now a critical part of this collaborative process. LIMS data will, in the future, be part of the informatics landscape of every laboratory-oriented business, and used to enable faster and more informed business decisions across the enterprise. LB

Dave Champagne is Vice-President and General Manager, Informatics at Thermo Fisher Scientific. He joined Thermo Fisher Scientific in April 2003 and has led informatics since April 2005.

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Inside Canada's Only Level 4 Lab

Canada Takes Leadership Position in Study of Human and Animal Health

By Theresa Rogers

Ebola. SARS. BSE. They may be household names but referring to these pathogens is enough to strike fear in the hearts of anyone within earshot.

Unless, of course, it happens to be a researcher from the Canadian Science Centre for Human and Animal Health (CSCHAH), a state-of-the-art laboratory complex in Winnipeg operated jointly by the Public Health Agency of Canada (PHAC) and the Canadian Food Inspection Agency (CFIA). It houses the CFIA's National Centre for Foreign Animal Disease as well as the PHAC's National Microbiology Laboratory. Here, the diseases create excitement.

Dr. Frank Plummer, Chief Scientific Advisor, PHAC and Scientific Director General, National Microbiology Laboratory, and his counterpart, Dr. Paul Kitching, Director, National Centre for Foreign Animal Disease, say their teams are kept busy by these diseases and other things you read in the newspapers, such as bioterrorism.

"Whether it's getting ready for a pandemic of influenza, dealing with existing problems with West Nile or problems with E.coli and Salmonella, anti-microbial resistance in hospitals—things like C.difficile and the superbugs—all those things are day-to-day business," says Plummer. "What keeps us the busiest at any given time varies based on what's going on. In addition to the research we're doing, we have a key role in responding to these problems."

CSCHAH Facts

- Sixty-one per cent of laboratory space is devoted to Containment Level 2, while 35% is dedicated to Containment Level 3 laboratories. The CL 4 laboratories represent less than 4% of the laboratory area.
- Approximately 500 Government of Canada employees work at the complex.
- CL 3 and 4 laboratory areas contain airtight rooms and ductwork, and feature interlocking and airtight bio-seal doors and damper systems. Air-locks for entry and exit maintain negative air pressures to direct air inward, ensuring organisms being studied remain in the laboratory.
- Air exiting the laboratories is filtered using High Efficiency Particulate Air (HEPA) filtration. HEPA filters can filter out particles 85 times smaller than the smallest known disease-causing agent.
- Solid and liquid waste sterilization is accomplished in part through a 20,000 litre liquid sterilization system and a specially-designed autoclave to heat and break down solid waste.
- Three 1000-kilowatt generators handle emergency power back-up to all heating, ventilation and air conditioning systems, and to essential life safety systems.

According to Kitching, when the CSCHAH was built, it was underutilized for the first couple of years. The first labs started operationg in 1998 surrounded by criticism. Then came a flurry of worldwide incidents that left everybody scared.

"Come 9/11, SARS, BSE, avian influenza, if Canada hadn't had a facility like this, it would really have been severely compromised," he says, adding the country would have been much more dependent on help from abroad, making it vulnerable.

Kitching's seen it before. He came from the United Kingdom where he was in charge of diagnostics during the outbreak of Foot and Mouth Disease in 2001, when the virus spread from the UK to France, Holland and Ireland, countries who had traditionally depended on the UK for support. Suddenly they found they weren't receiving the support they needed because the UK was busy looking after itself. "If Canada was dependent on the United States for all its support and something happened which affected the U.S. and Canada, well, you don't have to be a brain surgeon to figure out what their preference would be," he says.

Plummer agrees it's fortuitous the lab opened when it did. "If they hadn't made that decision to build the lab, I don't think we'd be in a very good place right now."

Kitching says bringing the human and animal aspects of research together under one roof not only makes sense, it's essential to the world in which we now live.

"If you look historically at where emerging diseases have come for humans, they've come from animals," he says adding approximately 70 per cent of them in the last 20 years have come from wildlife reservoirs. "Pathogens don't distinguish necessarily between human and animals. For us, the distinction between us and pigs is quite major but as far as a pathogen is concerned, the difference isn't that obvious."

In addition, climate change and increased air travel have literally changed the way viruses grow and travel.

Working together and being housed in the same facility was unheard of until Canada opened the CSCHAH. The facility is a coup for Canada. It houses Canada's only Containment Level 4 laboratories, providing the capability to work safely with the most serious human and animal diseases. It is also the first facility in the world to combine labs for human and animal disease research at the highest level of biocontaiment, providing a unique environment in which researchers can collaborate as they study established, emerging and re-emerging diseases.

Yet it came to be for less lofty reasons than working together on things of common interest, leveraging one another's work and eliminating bureaucracy. It was for practical reasons such as saving money, Kitching says, but "The reality is, it turned out to be an extremely good idea and now everyone else in the world is looking at this model and saying, 'Well, what an obvious thing to do. Why haven't we done it?'"

The lab's Winnipeg location is ideal, says Kitching, because it's in the middle of the country, on a site suited for major construction. "We don't have problems with major weather issues, we don't have seismic activities, we don't have anything which would likely affect the integrity of the building," he adds, all of which are important considerations for a high-containment facility.

International acclaim

Aside from garnering fame due to the very nature of its setup, the centre has made some big discoveries and worked on high-profile research projects.

"I think the biggest breakthrough is that we have developed very, very promising candidate vaccines for Ebola and Marburg and Lassa Fever viruses that I believe are the best candidates out there," says Plummer. "It puts Canada in a leadership position in this field. It highlights the capabilities of Canadian science and shows that we are at the cutting edge."

Kitching agrees. "The lab is on the international map more and more, appearing in international literature, referring not only to the research work we do, but also the management of the place where we've got human and animal researchers working together."

Challenges

This brings more opportunities for funding, a serious roadblock for many researchers. Most of the CSCHAH's funding comes from the federal government, with some grants from both the Canadian and U.S. governments thrown in.

The specialized nature of the CSCHAH's research also brings funding opportunities. With so much to be done on the diseases and so few facilities capable of doing the work, there's a lot of opportunity for scientists to quickly become established in a particular area of expertise and to work closely with labs abroad. This makes for little competition. "It's a very nice atmosphere to be working in where you're not looking over your shoulder all the time," says Kitching. "We can actually co-ordinate our work… and pool our results." In other words, Canada can put in $200,000 and yet it can benefit from $1 million being invested by other labs around the world.

In the beginning, the most obvious challenge the researchers at CSCHAH faced was winning over the people of Winnipeg, many of whom were fearful of what they saw as a dangerous neighbour in their midst. A Community Liaison Committee (CLC) was the key to success. Committee members represent a wide range of community groups including residents, healthcare professionals, agricultural representatives, business leaders and community educators. All three levels of government are also represented. The CLC monitors safety issues and actively seeks and provides information to the community as it deems necessary. It regularly receives briefings on the CSCHAH and is free to question staff on any aspect of their activities.

Most people are concerned about something escaping from the lab. "'Do I hold my breath when I drive past the laboratory,' things like that," says Kitching. "We reassure them.

"Everything that goes on in this lab is made public and we now have the trust of the local community," he says. "Any accidents which happen—somebody sticks themselves with a needle or drops a flask or something like that—they're automatically informed, no matter what level of containment the accident occured in. We have regular meetings with them. It's more transparent here than it would be in your local hospital, for instance."

A recent public information session held by the CLC brought out approximately 65 people over two sessions. "People were say-

Levels of Containment

The laboratories in the Canadian Science Centre for Human and Animal Health (CSCHAH) are classified by the safety requirements needed for the organisms to be manipulated as well as the type of work to be done in the lab. They range from Containment Level 2 (the lowest and requiring the least safety requirements) to Containment Level 4 (the highest and requiring the most safety restrictions).

Level 2: The majority of space in the facility is dedicated to Level 2 labs, which are designed for work involving pathogens that can cause human or animal disease but, under normal circumstances, are unlikely to be a serious hazard to laboratory workers, the community, livestock or the environment. Laboratory exposures rarely cause infection leading to serious disease and risk of spread is limited. Effective treatment and preventive measures are available.

Level 3: This designation is applicable to facilities where work is done with agents which can cause serious human or animal disease or can result in serious economic consequences. These are diseases that do not ordinarily spread by casual contact from one individual to another, or that can be treated by antimicrobial agents. When entering a Level 3 area, staff must change into laboratory clothing and leave their personal clothing outside the area. As an extra precaution, they must shower out of most areas.

Level 4: This area is designed for work with dangerous and exotic agents that usually produce very serious and often untreatable diseases. These pathogens may be readily transmitted from one individual to another or from animal to human. In addition to following the same entry and exit protocols as Level 3 workers, staff trained to work here must wear positive air pressure protective suits connected to filtered air lines. The suits are chemically treated after each session.

ing how proud they were to have [the CSCHAH] in their environment," says Kitching.

The CSCHAH invests a lot of money in cutting-edge equipment and Plummer worries about keeping up with it all. "We've built up a world-class institution with capabilities that are as good as or better than anywhere else in the world," he says. "Keeping that at the cutting edge is an ongoing challenge."

Plummer says the lab has "one of the few new-generation DNA sequencing technologies, called pyrosequencing. I think we're one of only two in the country."

Kitching's focus revolves around safety. "Virtually everybody on the staff is cleared to Secret security level; you've got to be able not only to trust your staff, you've got to have good staff," he says. "You can have all the regulations and all the rules in place but if the staff doesn't follow them, then you've got a risk." CSCHAH staff recognize the importance of the rules and regulations, as well as the building construction, engineering controls and safety equipment, but they know it is all secondary to training, technique, skill and experience.

To this end, he appreciates that the centre has a clear funding source for facility maintenance. "There can't be a conflict between 'Can I do my day-to-day job or should I invest in maintaining the integrity of the facility?' Without that clear priority to make sure everything is safe, you can run into trouble… There's no compromise made in terms of 'Can we get away with this? Is this safe?' If it's not safe, we don't do it and that's all there is to it."

With the 10th anniversary of the official opening approaching in June 2009, Kitching says the CSCHAH staff feel a modest pride. "We're not going to have processions down the street or anything like that," he says. "It's business as usual. We see evidence of our success in the scientific publications and the scientific press that we've established ourselves as one of the leading labs in the world.

"This site is the best laboratory of its times in the world and the potential opportunities for this lab are just huge. I think this whole facility was just an amazing act of foresight to have built it and created what we have here and Canadians should be very proud of it." LB

Lab-in-a-Suitcase

Unique Mobile Laboratory Ready to Deploy

The National Microbiology Lab (NML) and the Public Health Agency of Canada (PHAC) have a mobile laboratory capacity that is prepared to deploy on very short notice to assist around the world in public health crises.

At the request of the World Health Organization's (WHO) Global Outbreak and Response Network (GOARN), teams of two to four PHAC scientists are deployed with the mobile lab. The PHAC teams work closely with the WHO, as well as the government of the affected country and other partners responding to the situation. The mobile lab can also be used within Canada when laboratory support is needed in remote areas or under special circumstances.

PHAC has two complete mobile labs available for deployment at all times, and all of the items required for the lab are designed to be easily and safely transported. The situation at hand will dictate the types of equipment the team brings with them to the site, particularly the type of diagnostic tests that will be required and the services and infrastructure that will be available locally. Each mobile lab includes an isolator, a microscope, various test kits, a real-time polymerase chain reaction (RT PCR) unit for rapid virus detection, a generator, a laptop computer, and a satellite phone.

PHAC's scientists have extensive field experience working in the most remote areas of the world. The team is well versed in the appropriate safety measures for handling potentially infected materials and are able to work safely in the most high-risk situations. Each member receives all appropriate immunizations and their health is monitored according to a prearranged plan following the mission.

In the past, the mobile lab has been called on to respond to outbreaks such as SARS in China and Hong Kong, Marburg virus in Angola, Ebola in the Democratic Republic of Congo and Nipah in Bangladesh.

To read about the construction considerations for the CSCHAH, go to page 24.

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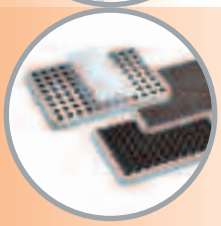

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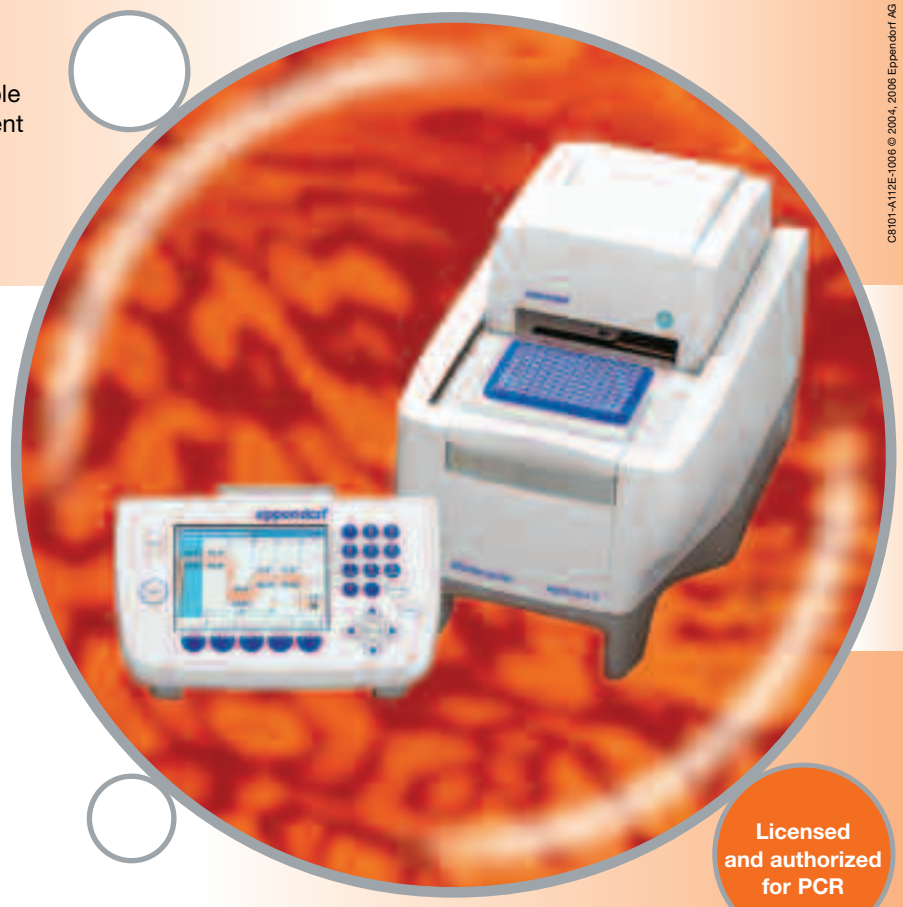

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Risky Business

Building, managing, and working in high-containment laboratories

By Erica Tennenhouse

A view of the "Scientist's Walk" and cafeteria at the Canadian Science Centre for Human and Animal Health.

Safety is undoubtedly an important aspect of any laboratory, whether dealing with radiation, toxic chemicals, or dangerous machinery. The need to stay safe becomes all the more apparent for people working with infectious agents that can cause severe diseases.

In recent years, there has been a global increase in demand for high-containment labs. The proliferation of these labs is based on the need to fight infectious disease, says Dr. Stefen Wagener, Scientific Director of Biorisk Management at the Public Health Agency of Canada's (PHAC) National Microbiology Laboratory, stating the number of high-containment facilities in North America has almost tripled since 2001.

There are currently two labs in Canada which boast the highest level of biosafety—Level 4: the Canadian Food Inspection Agency's National Centre for Foreign Animal Disease and the PHAC's National Microbiology Laboratory, both housed within the Canadian Science Centre for Human and Animal Health (CSCHAH). Level 4 labs deal with dangerous agents that pose a high risk of being transmitted via aerosol in the lab, cause severe or fatal disease, and for which vaccines and treatments are not available. In contrast, biosafety level 1, 2 and 3 facilities deal with agents of low, moderate, and high potential hazards, respectively, but for which vaccines and treatments do exist.

Everything in a high-containment facility, down to the design of the building itself, must be planned with safety in mind.

Scott Stirton, CEO of Smith Carter Architects, which designed the CSCHAH and is the leading design firm for high-containment labs globally, believes the convergence between the world witnessing the emergence of infectious diseases such as Severe Acute Respiratory Syndrome (SARS) and concern over bioterrorism post-9/11, has led to a new awareness and concern about infectious diseases, and a need for more research, requiring new facilities to be built.

Level 4 labs must be specially designed and engineered to prevent dangerous micro-organisms from being released into the environment, while keeping the researchers inside safe. This means all entrances and exits must be equipped with showers,

vacuum rooms, and various other means of destroying any traces of micro-organisms. To ensure only one door is open at a time, electronic airlocks are required. Along with the water treatment systems and air filtration systems needed to decontaminate water and air flowing in and out of the labs, the researchers, who must wear positive-pressure suits while in the lab, require self-contained breathing systems.

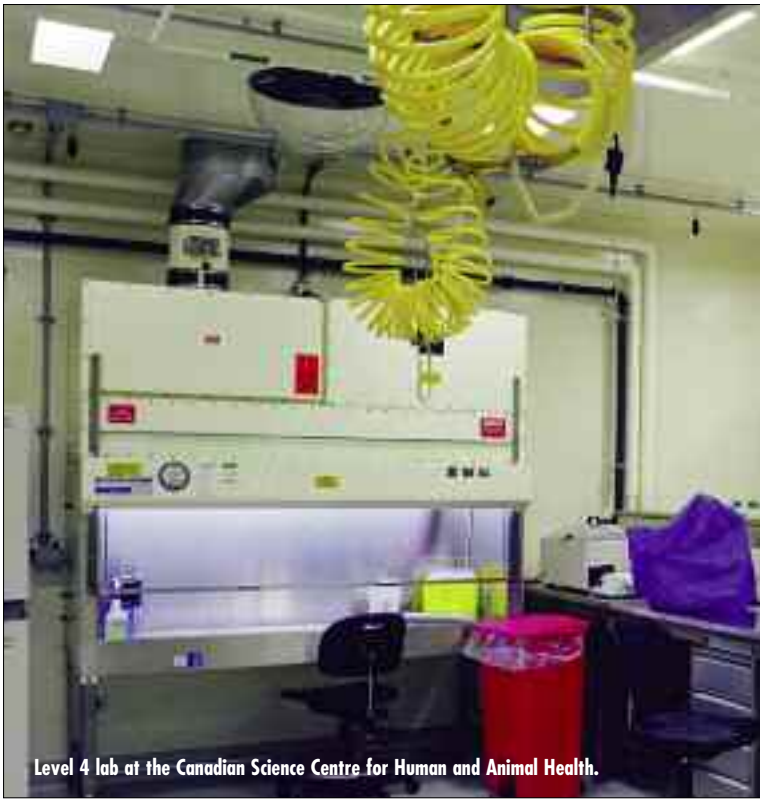
Everything in a high-containment facility, down to the design of the building itself, must be planned with safety in mind. "Probably the biggest driver for designing these [high-containment labs] is understanding the nature of the research and the nature of the biological agents that clients are intending to work with," says Stirton. This means knowing the facility's containment level, whether the work will be diagnostic or research-based, whether animals will be involved in the research, and if so, which species, and understanding the risk classification of the pathogens—whether they are transmitted through air, or if their transmission requires direct contact.

Being very technically demanding environments, it is also necessary to understand what type of engineering system tech-

nology is appropriate for a given facility. The engineering solutions and the approach to facility operations may vary according to the technical capacity of the region or country in which the facility is being built, says Stirton. "Certainly in North America it's fairly standardized, but outside of that there may be variations." Then there is security, which is emerging as a key design issue. This is especially true for the U.S., where techniques such as blast-proofing are applied to the buildings for added security.

Smith Carter Architects' designers believe an important consideration for life sciences facilities is the human aspect. In addition to the technical considerations and the engineering demands, Stirton points out, "These are places for people to do research." With this mindset comes the need to design the labs ergonomically, which becomes especially challenging in Level 4 facilities where positive pressure suits worn by lab workers are inflated larger than body size. "Normal things like sharp corners, which are not an issue for a regular lab, become safety concerns for people who are wearing these suits and are tethered to a breathing apparatus," he says.

With a large number of facilities being built, the pace of development has reached and may surpass the pace of training of scientific professionals who work in these environments. Training for positions within these facilities is intense and it can take many



Level 4 lab at the Canadian Science Centre for Human and Animal Health.

"The biggest biohazard risk [in high-containment labs] is actually the people, not the organisms."

months to a year before a person is qualified to work with infectious agents in a laboratory setting. This training is primarily done in-house so that if a lab worker wants to work with a particular agent, the training program specifically addresses how to safely work with that organism. Surprisingly, unlike Canada, many countries do not have any specific training requirements outlined for work in high-containment labs.

In 2002, Dr. Stefen Wagener and some colleagues at the PHAC began offering a number of training courses at the CSCHAH, for people interested in working in or around high-containment labs. Rather than providing scientific training, these courses provide hands-on biosafety training. "We will train the managers, the operation people, the maintenance people—all those people that are extremely important in supporting a containment facility," says Wagener. One of the most popular courses run by the CSCHAH is the annual International High Containment Workshop, which attracts people from all over the world.

"The biggest biohazard risk [in high-containment labs] is actually the people, not the organisms," says Wagener, emphasizing the need for thorough training of all lab personnel. "The organism by itself doesn't do anything," he explains. "It just sits in a tube and it will stay there unless we take it out and manipulate it." However, once manipulated, certain pathogens pose a greater

BSE lab in Edmonton's Neil Crawford Centre.

threat than others. Of greatest concern to lab workers are some of the very infectious diseases such as Ebola and the Marburg viruses, which cause hemorrhagic fever. These diseases are not currently treatable, and they are associated with a high mortality rate, which is why they are so dangerous for people working at the facilities, and equally why it is so necessary to investigate them.

Over the years, there have been initiatives put forth to stan-

dardize approaches for managing and assuring safety in high-containment facilities. The international community, with the help of the PHAC, has developed the first international standard that can be used to govern these facilities, and specifically addresses biorisk management. The terminology here is important—the word biorisk combines two ideas: biosafety and biosecurity. While lab biosafety is often discussed, biosecurity, which refers to the need to ensure infectious agents stay in the laboratory and do not get stolen or misused, is of increasing concern.

The standard framework that has been developed on laboratory biorisk management is a voluntary standard. However, Wagener explains, "with those voluntary standards, the more they get used, the more people like them." For example, there are no regulatory requirements to implement ISO standards. But becoming ISO-certified has become a competitive advantage. First a few companies become certified and eventually every company must get certified because the customers prefer it. "It almost takes a life on its own," Wagener comments, "which is nice because it allows people to manage biosafety and biosecurity in a very efficient way, making the laboratory operation safe for everybody." LB

To read more about the research being done at the CSCHAH, go back to page 18.

Newalta

Toronto facility gives a new face to industrial waste management and steps up the level of service to laboratory customers

By Bernadette Johnson

In June, Newalta unveiled a $3-million state-of-the-art labpack processing operation at its Toronto facility. Pictured left to right are Tim Mastin, Branch Manager; Brad Cooke, Labpack Technical Supervisor; and Harry Wells, Eastern Division Vice-President, demonstrating the labpack de-packing process.

Not long ago, industrial waste management meant trucks hauling waste to incinerators or landfills. But that is changing thanks to a shifting regulatory environment that emphasizes worker health and safety, and higher environmental standards.

Newalta Corporation—one of Canada's largest industrial waste management and environmental services providers—has spent more than a decade seeking better ways to manage waste streams.

Over the last several years, the company—which boasts more than 80 facilities across Canada and 2,000 employees—has focused on maximizing the value inherent in industrial waste through the recovery of saleable products and recycling. Where byproduct recovery isn't possible, it finds ways to reduce the production of waste at the source. Throughout this process, Newalta has grown 30 per cent each year. (The company has annual revenues of close to a half-billion dollars and a market capitalization of nearly $1 billion.)

Large-scale efforts—like the recent launch of its state-of-the-art labpack waste processing facility in Toronto—are evidence of Newalta's push from simple waste disposal to high-tech recycling and reuse.

"The new facility allows us to provide an unparalleled level of service, safety and environmental responsibility to our laboratory, institutional and industrial customers in handling and processing their labpacks," says Harry Wells, Vice-President of Newalta's Eastern Division.

The company's new facility—valued at more than $3 million—is one of the most sophisticated labpack processing operations in North America. It specializes in the receipt and management of labpacks—consolidated drummed wastes comprised of small quantities or containers of chemical waste, typically from the pharmaceutical industry, laboratories, research facilities, institutions and industrial businesses. Using an automated procedure that improves safety and reduces the amount of operator exposure and physical handling required of labpack wastes, the operation will serve laboratory, institutional and industrial customers across Canada, with specific emphasis on Ontario and Quebec.

Newalta's labpacking service involves a complete, single-source solution for a customer's labpack waste—including on-site classification, segregation and packaging of material by fully trained field technicians and transportation to the licensed Newalta Toronto facility in full compliance with all government transportation and environmental regulations. Newalta provides the customer with a complete inventory list and tracking record and often assists with hazardous waste regulatory filing requirements.

"Formerly, labpacks came out of labs, specifically—university or medical labs, for example. Today the term labpack remains but the actual waste comes from all segments of the industry—you can have paint materials packed into drums; batteries; process chemicals or solvents; cleaners or etching solutions," says Tim Mastin, Branch Manager at the Toronto facility.

"The common theme is that they need to be divided into compatibility groups

Photo credit: Newalta/Ric Kokotovich

and packaged properly, and transported safely. It takes a lot of knowledge and training to identify materials, pack and depack safely. It's really specialized. That's why we decided to automate [parts of] the process to take over a bigger segment of the market. [This new facility] is a significant improvement in health and safety and environmental handling as well as operator safety and throughput," he continues.

Once the labpack arrives at the Toronto facility, it is placed on a turntable that tilts and rotates. This offers the operator a significant ergonomic benefit to be able to lean in and pull the containers out without having to lean directly over the drum and reach to the bottom, says Mastin. The new depacking process involves the use of two separate monitored reaction vessels for organic and inorganic waste—the inorganic portion of which is temperature-controlled. The operation also incorporates an automated crusher and plastics shredder to manage the original labpack waste containers, which provides a physical barrier to protect technicians from the reaction area. The entire operation is ergonomically designed to provide maximum utility and comfort for operators.

"The really keen thing about this is that it actually removes the operator from the point of co-mingling of the materials. Typically—no matter how advanced a labpack system is—someone must stand over a reaction vessel and manually pour containers into the vessel. The problem with that is obvious: if something is going to go wrong—like an incompatibility reaction—it happens right there," says Mastin.

"In our situation, all of the actual crushing and shredding, and mixing of materials is done away from the operator—behind two steel plates," he says. "All pressure is directed away from the technician."

Detectors throughout the operation determine explosive levels—they also hook up to a plant-wide alarm system. To minimize air emissions from collection vessels, process vapours are handled through either activated carbon absorbers or a two-stage scrubbing system.

In keeping with Newalta's overall focus on finding solutions that transform what would otherwise be considered wasted into valuable products, the process materials are reused or recycled whenever possible as a preferred first option, says Mastin.

"We go to a great deal of effort to direct everything we can for reclamation or reuse," he says. "Because we are doing acids and bases—rather than purchase them, we will use the waste acids to neutralize the bases, etc. The solvents all go to fuel blending and alternate fuel reuse; any oils go for oil recycling; any paints gets recycled into used paint products. The very small amount that doesn't get some kind of reuse will be directed for off-site disposal (incineration or landfill, as appropriate)."

The new state-of-the-art facility should provide customers with the comfort of proper environmental compliance, he says, adding the company encourages customers and others interested to see for themselves by arranging a tour. "Newalta really does walk the walk. We are trying to raise the profile and the image of the waste management industry. Wherever possible, we really divert materials away from disposal and into reuse—we've really put our money where our mouth is."

Aside from the significant environmental benefits, as well as the health and safety of the technicians doing the job, the value proposition of Newalta's Toronto labpack facility is volume, says Mastin. "We're anticipating the ability to process without difficulty 25,000 labpacks per year through this setup. And honestly we're feeling we may be able to go much higher. That's a lot.

"Not only are we fast," he adds, "but we're also less expensive in a lot of cases. We really appeal to the whole profile of the marketplace." LB

Product/Services Portfolio

* Labpack processing, including waste sampling and identification; material packaging; compliant transport; treatment of material; waste tracking; assistance with regulatory requirements
* Industrial wastewater treatment
* Recovery, consolidation, processing and recycling of industrial wastes

NEWALTA AT A GLANCE

Name: Newalta Corporation

Employees: 2,000 total

Employees at the Toronto Labpack Facility: 45

Core Competency: Industrial waste management and environmental services—key focus on maximizing the value inherent in industrial waste through the recovery of saleable products and recycling.

Key Markets: Laboratory, institutional and industrial customers across Canada and U.S.—serves customers in the automotive, forestry, manufacturing, mining, oil and gas, lead, pertrochemical, pulp and paper, steel and transportation service industries.

Contact Info: 1-800-263-8602

Web Site: www.newalta.com

Filing For Patent Pr

When should you start the patenting process?

By Arnold Ceballos

Thousands of researchers and scientists in Canada work every day to create, develop and ultimately, bring to market new and innovative products. These forms of intellectual property are often the most valuable asset owned by a life sciences firm, which may have invested millions of dollars in developing them. In many cases, patent protection is sought in order to protect these valuable assets. However, intellectual property rights vary from country to country and it is vital for those in the life sciences field to understand the processes for obtaining such protection. Among the important considerations one must bear in mind are issues surrounding when to file patent applications.

Patents provide an exclusive time-limited right to make, use and sell inventions. They cover new inventions (which include processes, machines, manufactures, and compositions of matter) as well as useful improvements on existing inventions. In the life sciences area, patentable inventions cover a wide range of fields, from pharmaceutical formulations to agricultural applications to biotechnology. The monopoly granted to the patent owner is thus extremely useful, whether the owner will be producing the invention itself or licensing their rights to others.

For an invention to be patentable in Canada, it must be novel (that is, not publicly disclosed anywhere in the world before the filing date of the first patent application), non-obvious (there has to be some ingenuity, such that that it would not be obvious to a person skilled in that particular art) and useful (it has to have specific utility and be operative). In order to obtain patent protection, an application must be filed which sets out the invention in great detail. The process to the issuance of a patent is usually quite long and involved.

Once a patent is issued, an invention in Canada is protected for a period of 20 years from the filing date. Generally, a patent is granted under the law of each country and the term is governed by each nation's specific law, which for many countries is 20 years from the filing date of the application, like Canada. Generally speaking, patent rights are granted to the first person to file a patent application, assuming they are the inventor or have obtained rights to the invention. Thus, if an inventor can prove that they were the first to have conceived of the invention, they would not be able to obtain a patent if another inventor had filed an earlier application. The United States is a notable exception to this principle, although patent reform being con-

otection

sidered in the United States may be changing this in the near future. The United States' approach is currently based on granting protection to the first to invent, rather than the first to file. Other jurisdictions, such as Japan and Europe, follow the first to file principle, as does Canada.

Since Canada is a first to file jurisdiction, it is recommended that an application be filed as soon as possible, in order to obtain priority over someone else filing an application for the same invention. In addition, since patent protection will only be granted to an invention that is novel, i.e. not previously publicly disclosed, an applicant must consider filing a patent application early, in order to avoid defeating it through prior public disclosure of their own invention. Public disclosure generally includes such things as presenting details of the invention at a conference or publishing it in an academic journal.

In addition to prior public disclosure of the invention by the applicant themselves, the novelty of an invention can be challenged based on any information that is publicly available at the earliest filing date. Thus, from a practical perspective, the later an application is filed, the more information possibly becomes available which can be used to challenge the novelty of the invention.

Canada and the United States do provide a one-year grace period, which permits the applicant to file their patent application within one year of making a public disclosure of their information, without the public disclosure being considered "prior art" that could defeat the application. For those interested in the Canadian and United States markets, the grace period provided in these two countries does provide a window for the inventor to determine the marketability of their invention before having to spend money on preparing and filing patent applications. However, other jurisdictions such as Europe and Japan do not provide such a grace period, meaning that previous public disclosure can be used against the applicant as prior art.

If protection will be sought in several countries and, since most countries outside Canada and the United States require absolute worldwide novelty, this will affect decisions as to when and where the first application will be filed and when any public disclosure can occur. It is a good idea to seek advice from a patent lawyer with respect to issues such as what constitutes public disclosure, as well as to help develop a strategy regarding which countries to file in.

Patent protection is often most useful for those who wish to obtain a monopoly on products that are easy to copy or reverse engineer. An alternative to patent protection which can also be considered is reliance on trade secrets. These comprise knowledge that provides a company with a competitive advantage as a result of that knowledge being secret. This strategy can be considered for such things as processes that cannot easily be reverse engineered. However, this protection only lasts as long as the secrecy is maintained, and this can be very difficult to do for a long period of time, often leaving patents as the preferred route.

Whether for an established multinational corporation or a start-up, developing a successful corporate strategy that recognizes the importance and value of intellectual property is essential to success. As the National Research Council in the United States noted, the growth of biotechnology in the United States is due largely to the link between industry and academic science, facilitated by the availability of biotechnology patents. And key to this is an appreciation by the inventor as to when they must kick off the patenting process. LB

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Putting Safety First

A safe laboratory environment consists of the development and implementation of standard practices and procedures, trained personnel, and equipment that emphasizes safety and protection.

As in any industry, the introduction of new technologies, tools or equipment can sometimes change work processes and bring added risk to workers without adequate training. However, when workers are properly trained and safety equipment is properly used, it is vital in minimizing exposure to dangerous substances, avoiding accidental spills, and protecting those both inside and outside the lab.

Following are some examples of recent advances in safety equipment.

Lead-lined laboratory furniture provides radiation protection

MarShield manufactures a wide range of custom-designed lead-lined laboratory cabinets made to the exact specifications of its customers. The company works with architects, engineers, and contractors to ensure the final design is functional and harmonious with its laboratory surroundings. MarShield can manufacture standard designs or custom solutions, and offers many types of lead radiation protection from lead bricks and lead drywall to lead glass. A fully qualified design team provides attention to detail through every step of the process.

Each lead-lined cabinet is manufactured from A36 or 44W carbon steel, and is lead-filled or lined only with 99.94 per cent pure lead—ASTM B-29. All lead is fully encapsulated with no exposure. All hardware from heavy-duty hinges, to drawer glides to rollers is of the highest quality. Available in the Lead Equivalency that the customer requires, the cabinets combine effective radiation protection and durability in a rugged, attractive and versatile line. Options include lockable doors and drawers, stainless steel worktops and backsplashes, adjustable legs and a variety of colours.

Ductless fume hoods can be positioned over sink or benchtop apparatus

The new Purair 5 Ductless Fume Hoods from Air Science USA feature a high level of operator protection where routine work is being carried out. The units exceed OSHA, ANSI and all relevant international standards. The ductless design eliminates installation costs and allows the unit to be positioned over a sink or benchtop apparatus. The units operate at low noise levels and because they recirculate, they do not exhaust expensive conditioned and/or heated air into the atmosphere. Buyers have a choice of 24-, 36- or 48-inch widths.

A face velocity of 100 fpm ensures containment of fumes and particulates for operator protection. An alarm alerts the operator when the airflow falls to an unacceptable level.

The unit can be placed on any benchtop and an optional polypropylene spillage tray can be provided when required. The rear of the unit has lighting to illuminate the work surface. All mechanisms in the head section are on the clean side of the filter, with the switches and electrical components being isolated from any contamination. The patented filter clamping mechanism means the filter can be easily installed and ensures an even seal at the filter face at all times to prevent bypass leakage. The main filter can be chosen from 14 different types of carbon, which include specialty media for vapours of organics, solvents, acids, mercury and formaldehyde. HEPA filters for particulate filtration are also available to suit various application needs.

Workstation spilltray and drying rack eliminates spills

Control Company's Workstation Spilltray and Drying Rack eliminates spills with a chemical-resistant, maintenance-free, polyethylene containment tray. Use one at each workstation or fume hood to safely handle chemicals and liquids while pipetting, measuring, or mixing. Holds 1-1/4 litres of spilled liquid. It's easy to clean: simply lift off the white grid and empty.

The low-profile design is perfect for drying glassware and delicate items, and the plastic grid cushions and protects against breakage and scratches. The grid cuts drying time in half by permitting air circulation. The entire unit is dishwasher-safe and weighs one pound.

New 12-inch glove provides added splash protection

Kimberly-Clark Professional has added to its popular line of Kimtech Science Sterling Nitrile Exam Gloves with a new 12-inch glove that provides added splash protection at the cuff.

These new latex-free gloves provide the protection of nitrile with the sensitivity of latex. The ambidextrous gloves are 3.5 mils thick and are available in extra-small through extra-large sizes. Their textured fingertips offer excellent tactile sensitivity for easy handling of delicate instruments. They are also static dissipative in use.

With 100 per cent more gloves in each box than with traditional 12-inch gloves, purchasing Kimtech Science Sterling Nitrile-XTRA Exam Gloves helps labs increase storage space and reduce waste. The additional gloves in each box can also help labs stockpile the gloves for emergency use. For information on how much space and waste users can save, visit www.kimtech.com/GreenProject.

The gloves are also available in a 9.5-inch length.

New mop for critical and controlled environments

Fisher Safety has partnered with Contec to offer faster, more effective cleaning products. Designed specifically for critical and controlled environments, Contec's EasyCurve mop consists of a flat, fabric-laminated mop head attached to a curved, stainless steel frame to provide superior performance, ease-of-use, and effectiveness compared to any other all-surface cleaning system.

The disposable mop head securely attaches to the curved frame by a unique system of latching tabs. The absorbent and non-dripping mop head conforms to the curvature of the frame to offer true "lift-and-pull" surface cleaning action. The combination of the curved mop face and the pivoting connector results in effortless surface contact and outstanding maneuverability, making the EasyCurve an ideal cleaning tool for ceilings, walls and floors.

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Contact Jesmar Communications Inc. email: general@jesmar.com Toll Free: **1.800.613.6353**

Passed on June 4th, 2007, the Chase McEachern Act (Bill 171) protects rescuers and owners from liability.

Reach-in controlled environment chambers
Conviron has designed a versatile, robust controlled environment chamber that adapts the entire unit and does not need to be replaced when research needs change. The Adaptis line features two models. The A1000 is compatible with four different kits which each accommodate a specific area of research. Its interchangeable concept provides an efficient, cost-effective solution to the inevitability of evolving research demands. The A350 is a multi-purpose, 350-litre chamber that facilitates broad research of tissue culturing, incubation, plant growth and insect rearing. Both models feature Conviron's new CMP6000 Series Control System. With program sequencing, visual and audible alarms and on-screen help, it facilitates simple and efficient control. Like all Conviron products, the Adaptis line is fully certified to CSA/NRTL safety and quality standards, and is CE-compliant for European clients.

Digital slide scanning solution
Carl Zeiss MicroImaging, Inc. introduced the MIRAX MICRO digital slide scanner. The MIRAX MICRO offers a workflow-centric software solution developed to meet the specific requirements of pathologists and enables users to create digital slides with unprecedented image quality and resolution when using a Zeiss high-end microscope system. Users have the option of selecting objectives based on specific project needs, as well as the option to enable the random access slide loader to scan up to 50 slides automatically. The MIRAX MICRO combines full microscope functionality and flexibility with digital slide technology to produce a scalable modular design to incorporate future upgrades. It is also capable of live remote control robotic telepathology and is well-suited for scanning, including glass slide viewing at magnifications up to 100 times. The MIRAX MICRO is suitable for a variety of applications including routine pathology, routine cytology, telepathology, teleconsultation and second opinion, as well as histology and cytology- based research applications.

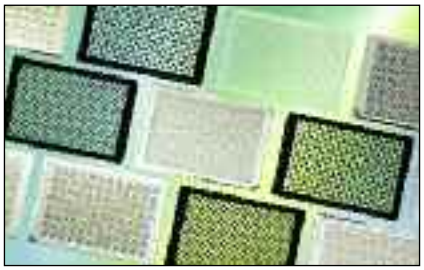
Ductless fume hoods provide maximum operator protection

Air Science USA introduced a range of ductless fume hoods with sophisticated airflow, filter alarms and advanced safety features. These units are available from two to eight feet and have been designed to provide maximum operator protection when using hazardous substances. A face velocity at 100 fpm ensures containment of fumes and an alarm will alert the operator when the airflow falls to an unacceptable level. All mechanisms in the head section of the Purair are on the clean side of the filter, preventing contamination. Switches and electrical components are totally isolated from the dirty airflow and away from any contamination. The work area has a removable spillage tray that can be easily cleaned. Optional integral lighting is available. The main filter can be chosen from 14 different types of carbon, which include specialty media for vapours of organics, solvents, acids, mercury and formaldehyde. HEPA filters for particulate filtration are also available to suit application needs. Clean air is recirculated into the laboratory as not to exhaust conditioned and/or heated air into the atmosphere.

Turntables for inoculation of petri dishes
WLD-TEC Gmbh has introduced the Sensorturn and Sensorturn pro. These new turntables are designed for inoculation of petri dishes up to 150 mm in diameter. They use touch-free IR-Sensor technology, which guarantees extremely simple operation with the movements of the hand, or they can be operated with an optional foot pedal. These units offer flexible start-stop functions or the second timer control with variable rotational periods from one to 25 seconds. For longer applications, the time can be extended to 125 seconds. The Sensorturn features a continuously variable rotational speed control with a range of 14 to 110 rpm. The Sensorturn pro range is 14 to 210 rpm. Stainless steel construction and flame-sterilizability ensure sterility.

Highly sensitive protein kit

Agilent Technologies Inc. has introduced the Agilent High Sensitivity Protein 250 Kit for the Agilent 2100 bioanalyzer, which delivers more sensitivity than silver-stained SDS-polyacrylamide gel electrophoresis (SDS-PAGE). The new kit also provides quantitation capability along with the other advantages of a microfluidic lab-on-a-chip based kit. The kit detects proteins as small as 1 pg/ul and features a dynamic range of four orders of magnitude for quantitation and covers a sizing range from 10 to 250 kDa. For QA/QC applications, users can detect a 0.05 per cent impurity while visualizing the main target with reliable quantitation. The new kit features a direct labeling reaction that is highly reproducible. Separation, quantitation and purity measurements can be performed in a single step, and typical throughput for QA/QC is 10 samples per hour. Each kit can be used to analyze 100 samples and includes labeling dye and reagents, 10 microfluidic chips (each capable of running 10 samples), bioanalyzer separation reagents, and user documentation.



Microplate technology for high-throughput screening

PerkinElmer Life and Analytical Sciences announced the launch of 20 new high-throughput microplates, which have been designed to augment the company's instrumentation and assay platforms. An exclusive feature is an innovative plate height designed for 1536-well microplates. The unique design has the same dimensions as 96- and 384-well plates, provides a single automation protocol, and can significantly reduce error. With the new 1536-well microplate models, there is no recalculation and height adjustment required when 96- and 384-well plates are changed to 1536-well plates. The new plates also have a wider gripping area, which enables more optimal robotic operations. The new light-grey AlphaPlate, which was designed specifically for AlphaScreen and AlphaLISA biomarker detection assays, has been shown to significantly reduce crosstalk when compared to standard white 1536-well microplates. This results in enhanced precision and greater sensitivity and signal amplification.

High-performance wax column for GC and GC/MS analysis of polar compounds

Varian Inc. announced the VF-WAXms, the new wax column for the analysis of polar compounds by GC/MS. VF-WAXms is the first ultra-low bleed wax column, plus the first high-performance wax GC column designed to be used with mass spectrometry. VF-WAXms is ideal for trace analysis as the ultra-low bleed provides better signal to noise ratios. A polyethylene glycol (PEG) coated phase provides high selectivity and the VF-WAXms features an operating range of 20 C to 250 C for maximum flexibility. The VF-WAXms is manufactured for food, beverage, flavour, FAME, acid, alcohol, aromatic and fragrance applications, especially where trace analysis is needed. Lower limits of detection enable the accurate separation of polar compounds. The column's ultra-low bleed increases sensitivity, extends column life and improves accuracy, even at higher temperatures. In addition, VF-WAXms columns are suitable for use with MS detectors, as the ultra-low bleed eliminates interferences and permits more sensitive detection. Advanced coating technology means the VF-WAXms columns are highly inert, resulting in better chromatograms and enhancing critical pair separation.

Data loggers show temperature and humidity conditions

Dickson Company unveils its Graph-at-a-Glance data loggers, paperless chart recorders that provide a digital graph enabling researchers to immediately visualize environmental trends that have potentially affected test results. Researchers tracking temperature or humidity conditions now have the convenience of both realtime data and the ability to download data for further analysis. Features of the redesigned Graph-at-a Glance data loggers include: 36 per cent greater data resolution in a jumbo 4.5" x 3.4" (114.3 mm x 86.36mm) display screen; Flash memory card data transfer capability; USB-enabled triple speed downloading; user-defined display settings; 32 Kb storage; and audio/visual alarms.

Doug Bonn

UBC Physicists Develop "Impossible" Technique to Study and Develop Superconductors

Never believe something is impossible until you have investigated it yourself. Such is the lesson that can be taken from a **University of British Columbia** (UBC) research team's groundbreaking research into the nature of superconductors.

Early this year, Prof. Doug Bonn and Prof. Walter Hardy grew some of the purest ever samples of **yttrium barium copper oxide**, and began working with Prof. Andrea Damascelli to better understand the chaotic state of surface atoms in superconductors.

What came from this was not only a better understanding of how these surfaces work, but a technique for controlling them at an atomic level.

Until now it has been unclear whether or not **superconductors** are actually metals—they are—or whether it was even possible to determine this fact. In the past, research has focused on the interaction between two oxides, making it extremely difficult to gather any useful information due to the limited space between the two objects.

The **UBC team** created a vacuum, so the superconductor could openly interface with the vacuum itself. They were now able, for the first time, to observe the **electrons** on the surface of a superconductor.

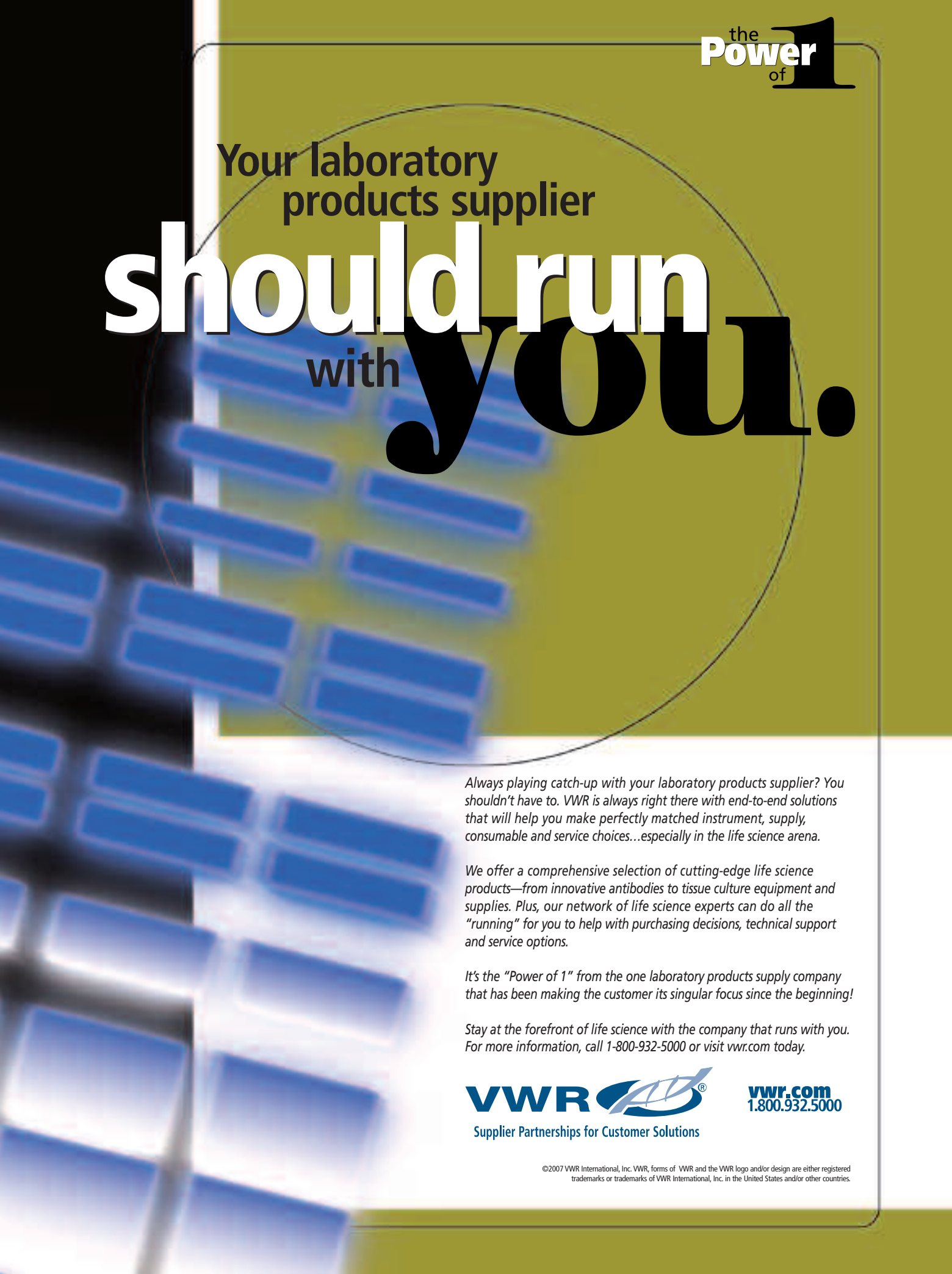
"The surface atoms are in a situation they're not comfortable with. The atoms will actually move around because they're uncomfortable," explains Bonn.

Researchers manipulated the material's surface **density** by putting down **potassium**, which donated electrons to the surface. The result was a stable, visible surface that could be studied in detail, and, in time, may change the **world of electronics**.

"It could completely change how things are operating," says Bonn.

Superconductors are theorized to be a central factor in developing quantum computers, powerful fuel cells and lossless power lines, among other things. "The basic idea is out there," says Bonn. "Now people are going to take all sorts of materials and see what they can do with these surfaces. This may help come up with better ways of **fabricating** materials, or new materials altogether.

"Obviously," says Bonn, "**this wasn't impossible**." LB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[FINDINGS]
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