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February/March 2011 Volume 6 • Number 2

CONFIDENT?

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THIRD ANNUAL INVESTMENT CONFIDENCE REPORT REVEALS OPTIMISM WITHIN SPECIFIC MARKET SECTORS – NOT ACROSS THE BOARD

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RUDOLPH RESEARCH ANALYTICAL

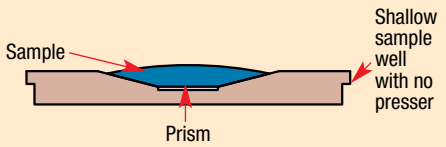
The Rudolph Advantage

Below are a few of the reasons customers replaced their old refractometer with a J-Series from Rudolph

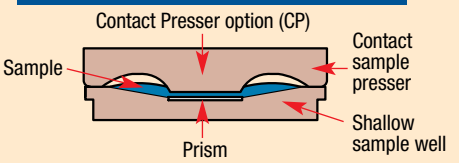
Problem	Solution
 **You are tired of arguments over shadowline interpretation on your Abbe Refractometer.** One person says the material is on specification, one person says it's not. In addition, **scratches on the glass** prism make visual interpretation even more difficult.	**J-Series Internal Reflection Refractometers use scratch proof artificial sapphire prisms** that measure the reflected light not the transmitted light, like the Abbe, so dark samples measure as easily as clear samples. Just put a drop of sample on the prism, press measure and walk away. No shadow line, no manual balancing or interpretation.
 **Waterbath maintenance is costly and time consuming.** Theoretically it should be easy – just top it off with water every week, clean it out and add new algaecide once a month. So why does the bath always seem to be low on water and covered with green slime?	**The J-Series has an electronic peltier temperature control solution that is right for you.** Select your temperature through the touch screen and watch the instrument quickly come to temperature and make a measurement all in one easy step.
 Your old refractometer was great when you bought it but now it is being **repaired more and more often while measurement instability wastes time and money.**	Our customers say it best: ***"This instrument has greatly reduced our sample time and improved our accuracy. Calibration of the instrument is easy and rarely required. We have had no problems or issues with the two instruments that we currently have in service...*** ***I would highly recommend the Rudolph J57HA Refractometer over any other brand of refractometer that I have used or tested throughout my many years working in the sugar industry."***

Why switch to a Rudolph Research Refractometer? Superior temperature control and easy to clean prism

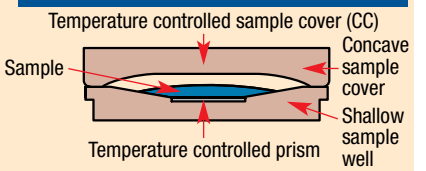
For samples close to ambient select a model without a presser



For semi-solid and highly evaporative samples more than 10° from ambient select a model with a contact presser (CP option)



For most samples 10° from ambient select J Series standard temperature controlled sample cover (CC option)



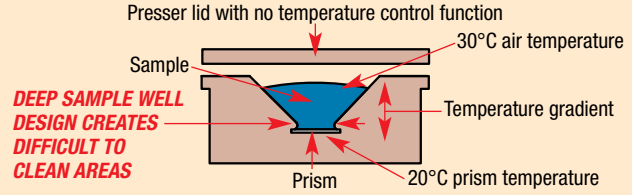
Rudolph's dual temperature control system

Rudolph Research Analytical is the only refractometer manufacturer to offer **electronic temperature control from both prism and presser surfaces.** The requirements of an electronically temperature controlled refractometer operating close to ambient air temperature are very different from the temperature control requirements of a refractometer operating more than 10°C from ambient air temperature. Only the Rudolph J Series is designed to be the perfect refractometer for both applications.

Measuring RI or Brix close to ambient air temperature

The J57's shallow sample well and presserless design makes cleaning easier than deep well prism designs while still maintaining accuracy. The deep sample well of competing refractometers is not needed when there is less than a 10°C difference between the prism temperature and air temperature because the temperature gradient across the sample is small.

Other manufacturers at all temperatures



Measuring RI or Brix far from ambient air temperature

The J157/257/357 shallow well with temperature control from the sample presser and prism surface offers **superior temperature control while still maintaining ease of cleaning.** Rudolph's temperature controlled presser creates a mini temperature controlled environment where the entire sample is held at the measurement temperature. This design **minimizes the inaccuracies** created by temperature gradients across the sample as deep well prisms fight to control temperature from the prism surface while the air and upper part of the sample have widely divergent temperatures. (See Figure lower left)

Other manufacturer's compromise

From the pictures below one can see that **other manufacturers have to make a compromise with the depth and angle of sample well.** Since these manufacturers use one sample well and cover design for both temperature applications, they end up with a **sample well that is too narrow and deep. The deep sample well makes cleaning needlessly hard** at ambient temperature while failing to provide ideal temperature control when the sample and air temperature are more than 10°C from the desired measurement temperature.

Rudolph

Manufacturer 1

Manufacturer 2

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February/March 2011
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Holding Steady

The takeaway message from this year's confidence report is neither good nor bad. But while things have not gotten worse in the past year, there remains the sense that labs have lowered their expectations, accepted a belt-tightening mentality for the time being and are just waiting it out. There are slight differences within specific markets, however, with the microbiology sector showing the highest level of confidence and the clinical sector showing the lowest. But across all sectors, the survey revealed a barely one percent improvement in overall confidence from last year. Rafael Leniz, laboratory director of the Coachella Valley Water District in California: "I think 2011 will be even worse." Wanda Ingersoll, Mississippi Public Health Laboratory's division director: "We are unable to fund any salary increases or add any new positions." Serena McCoy, a research technologist at the University of Nebraska-Lincoln: "Grants are becoming much more competitive as everyone is looking for money." I think you get the picture.

Adding to this less-than-cheery outlook is the forensic lab sector, which faces its own unique challenges. "With substantive regulatory changes slated for 2011, [forensic] labs may soon experience alterations in how they are accredited and managed, how their staffers are trained and certified, and how they are funded and paid for their services," says Bernard Tulsi in this month's Perspective On: Forensic Labs article on page 64.

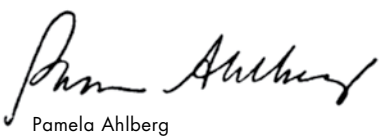
But despite current economic difficulties, labs still need to compete, and that requires buying new equipment. But what if your lab has no capital budget available or your existing bank lines are insufficient? What if your company is new in business or venture backed without revenue? The answer may be a capital lease or rental of the equipment. Dean Stolberg, in this month's Business Management article, "Rent, Lease or Buy," helps readers determine when they should consider financing, basic equipment financing types, and how to choose the right finance provider. Turn to page 90 to learn more.

Refuting what your mother might have told you when you were a kid—that nobody likes a showoff—is John Borchardt's Leadership & Staffing article, "Showing Off Your Lab," (page 28). If you're managing a lab that could benefit from more business, better customer and public relations, more streamlined inspections, and greater appeal to prospective employees, a good show off strategy might be just what you need. "Laboratory visits can be the seed for joint development programs of new products that can help your own and your visitors' companies grow. Lab visits can help dissolve an "us versus them" attitude—on your staff members' and the customer's part," says Borchardt.

Alan Edwards echoes that message in this month's Science Matters column saying, "Labs of all sizes... operate within an outdated business model that provides no opportunity to stand out in the crowd, even as personnel may feel confident in their ability to solve a customer's problems. This dilemma demonstrates the need for modern laboratories, now more than ever, to adapt to the new marketing reality. As is true for most businesses, scientific labs will flourish if they stop competing on services and instead learn how to compete on best customer outcomes."

In addition to these important and timely articles, our February/March issue devotes 18 pages to the new products you'll be seeing at this year's Pittcon (March 13 – 18, Atlanta, GA). If you will not be attending, let this be your virtual "walking the floor." If you will be in Atlanta next month, please stop by the Lab Manager Magazine/LabX Booth 847 and say hello.

I'll see you there.



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CONFIDENT?

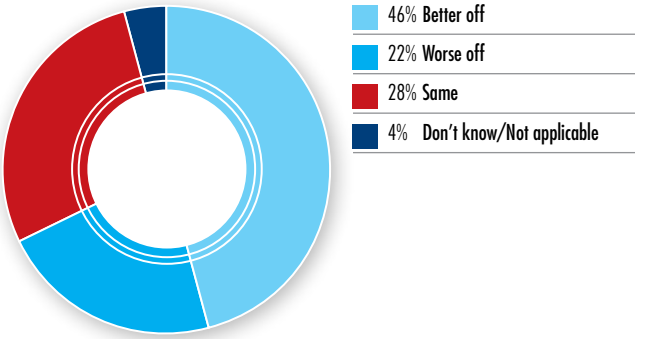
THIRD ANNUAL INVESTMENT CONFIDENCE REPORT REVEALS OPTIMISM WITHIN SPECIFIC MARKET SECTORS—NOT ACROSS THE BOARD

by Sara Goudarzi

For the past couple of years, like many other sectors, the laboratory industry has been challenged by the world's precarious economy. Account deficits and lack of research funding has forced many labs to downsize, cut back on research, and be unable to upgrade their apparatus or invest in new equipment. The start of 2011 is, however, starting to show signs of hope for the economy, which may brighten the outlook for the laboratory market.

Our third annual confidence survey revealed that survey participants—ranging from technicians to corporate management—believe their research organizations will be just slightly better off financially than they were a year ago and that business conditions in their market sectors will somewhat improve to support or attract significant research investments.

WOULD YOU SAY THAT YOUR RESEARCH ORGANIZATION IS BETTER OR WORSE OFF FINANCIALLY THAN IT WAS A YEAR AGO?



The year 2010 did not take the nosedives that the previous year took; therefore, laboratories that were not able to recover were at least able to keep their heads above water. Some had to close down branches and streamline their work, and many looked for innovative solutions to keep business going. The new year inspires new expectations of not just sustaining operations but even improving funding and acquiring additional staff and new technology. This year, as opposed to last year, shows that slightly more survey participants believe that overall the upcoming year will be better than the previous. However, most participants seem to believe that their business will still suffer from the fragile economy.

> "Organizations will be just slightly better off financially than they were a year ago."

Confidence

With the economy more stable than in the previous two years, the overall confidence level of the survey participants was up from 50 percent in 2009 to 51 percent in 2010. This indicates that the new year shows promise of being a better period for the laboratory industry.

More than half of the 379 participants believe that business conditions in their market sectors will improve to support or attract significant research investments, that their organizations will be better off financially to fund existing and new research projects, that there will be sufficient funds to expand and maintain the proper work space and work environment in the lab, and that as a whole their organizations will make appropriate investments to fund new and existing research projects within the next five years.

Of the different sectors—examples of which include food & beverage, clinical, energy and petroleum, and

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forensic—the microbiology sector shows the highest level of confidence that 2011 will be a better year than 2010, while survey participants from the clinical sector show the lowest level of confidence in the new year. This shows that each sector is dependent on a specific aspect of the economy and that not all the labs face similar challenges.

Rafael Leniz, laboratory director of the Coachella Valley Water District in California, feels that until the economy and, specifically, the housing market improve, there won't be much positive change at his organization.

"The business of my company is to provide quality water to customers," he says. "The amount of money that customers pay for the service does not cover the costs of providing them with water, so the company has kept solvent thanks to the revenues generated by new customers, that is, new housing developments—building sewage lines, potable water lines, water meters, etc.—and unfortunately the housing development in the area came to a screeching halt due to the housing calamity of the last couple of years.

> "The microbiology sector shows the highest level of confidence that 2011 will be a better year than 2010."

"Consequently, the revenues of the district took a dramatic drop and the district is eating its reserves," he adds. "There are no signs that house construction will start anytime soon, and there are enormous political pressures not to raise the water bills. Therefore, I do not see any light at the end of this tunnel. Unless housing construction gets a jump-start in the next couple of months, I think 2011 will be even worse, since most of our reserves are already gone."

With regard to research and development, survey participants showed that confidence is up this year. Going into 2010, 42.4 percent of the participants were confident that their

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market sector was going to be robust enough to support or attract significant research and development investments. Going into 2011, this number increased to 51.4 percent.

These results indicate that while overall confidence hasn't risen drastically yet, there are some areas where the participants have hope for improvement.

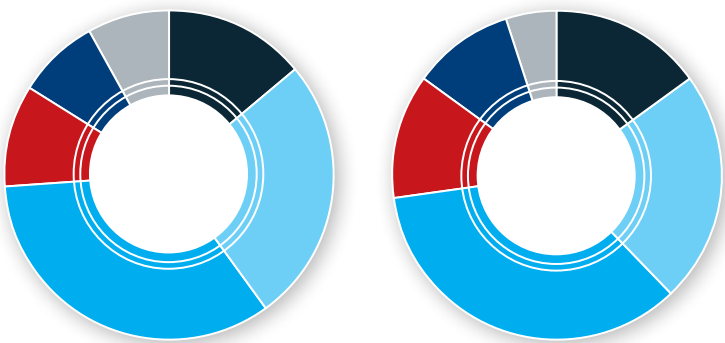
Research budgets

Most survey participants believe that investments in existing research projects will remain about the same. This percentage is down by 5 points from last year. However, about 30 percent of the participants believe that investment in existing research will increase slightly—up from last year's 22 percent—while there seem to be fewer folks in this year's survey who believe that investments in research projects will decrease.

The perception that there will be slightly more funding for new research projects is also faring better, at 34 percent this year as opposed to last year's 23 percent. However, in this year's survey, fewer folks believe that there will be significantly more funding for new research projects than last year.

Overall, it seems that with regard to the research budgets, the survey participants are just slightly, if at all, more optimistic than last year. This, of course, depends on the sector that a person is in.

OVERALL BUDGET COMPARISONS BETWEEN THIS YEAR AND LAST



2011 / 2010	2010 / 2009
14% Increased significantly	15% Increased significantly
26% Increased slightly	23% Increased slightly
34% Remained the same	35% Remained the same
10% Decreased slightly	12% Decreased slightly
8% Decreased significantly	10% Decreased significantly
8% Don't know	5% Don't know

Serena McCoy, a research technologist at the University of Nebraska-Lincoln, believes that in terms of research, her lab was in worse condition at the end of 2010 compared to the end of 2009. The funding for McCoy's lab comes from research grants and the State of Nebraska.

"We are a university lab, so we do public service-related research," she says. "Our focus is developing dry beans (kidney, black, etc.) that are resistant to fungal diseases, so growers do not have to invest in pesticides. Our research benefits growers in the U.S. as well as in countries like the Dominican Republic, Haiti, etc."

Research is always an area of cutbacks because "they say we can get grants to make up for what we've lost," McCoy says.

"Each sector is dependent on a specific aspect of the economy and that not all the labs face similar challenges."

Staff compensation and hiring

Around 37 percent of survey participants believe that in the coming year management and staff compensation and benefits will remain the same as 2010, while 24 percent believe that they will increase slightly. Overall, the opinion on this issue hasn't changed significantly from last year to this year.

In addition, most participants believe that hiring additional and replacement staff and education, including meetings, classes and training, will also remain the same as last year. While it's good news that staff hiring and compensation haven't gotten worse in the past year, the prospect of not being able to fund additional personnel or reward the ones taking on the bulk of the work is taking a toll on many labs.

"I am seeing a decrease in the morale of my analysts," says Wanda Ingersoll, the Mississippi Public Health Laboratory's division director. "We have not had layoffs, but there have been no salary increases for over two years. We are unable to fund any salary increases or add any new positions. Workers feel trapped and unappreciated."

Additionally, some labs are and will remain short staffed, at least in the near future.

"At the beginning of 2009, our department had enough money for technicians to be three-quarters state money and a quarter grant," says McCoy of the University of Nebraska-Lincoln. "Due to cutbacks we are now half state and half grant. Grants are becoming much more competitive as everyone is looking for money, so you are less likely to get a grant. We currently are short a virologist in our department and will not be filling that position anytime soon."

Rafael Leniz, laboratory director of the Coachella Valley Water District, also feels that staffing for his lab will suffer in the next year or so. "We have been on a hiring freeze for over two years now, and that will continue unless the economy makes a dramatic turnaround."

Lab equipment and facilities

About 32 percent of this year's survey participants believe that there

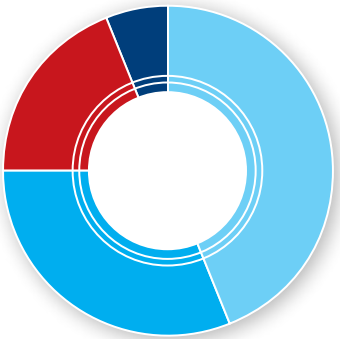
will be no change in 2011's budget to modernize an existing lab facility, for example, with new furniture, while 25 percent of participants believe that the budget will increase slightly—this is up by only 1 percent since last year's survey.

On the whole, most participants believe that budgets for setting up a new lab facility and investing in new and pre-owned lab technology will remain the same as last year. Similarly, most participants believe that budgets for raw materials and for commodity and consumable products will remain unchanged compared to the previous year.

Most of the survey participants believe that in the coming year the budget for lab equipment will remain the same across the board—this includes analytical instruments such as particle analyzers, chromatographs and spectrophotometers; basic lab equipment such as shakers, incubators and glove boxes; lab automation equipment such as automated liquid handling and robotic systems; supplies such as glassware and plasticware, furniture, software, chemicals and biochemicals, antibodies, microarrays, and assays; etc.

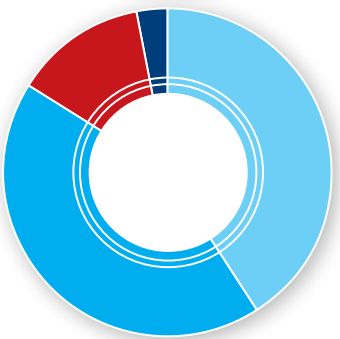
These responses are very similar to last year's and show that the economy has a direct influence on purchasing choices.

COMPARISON IN ANALYTICAL INSTRUMENT/SEPARATION EQUIPMENT PURCHASES BETWEEN THIS YEAR AND LAST



2011 / 2010

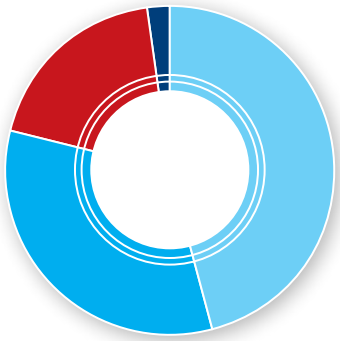
- 44% Increase
- 31% No change
- 19% Decrease
- 6% Don't know



2010/2009

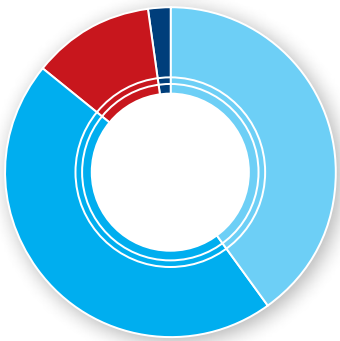
- 41% Increase
- 43% No change
- 13% Decrease
- 3% Don't know

COMPARISON IN BASIC LAB EQUIPMENT PURCHASES BETWEEN THIS YEAR AND LAST



2011 / 2010

- 46% Increase
- 33% No change
- 19% Decrease
- 2% Don't know



2010/2009

- 40% Increase
- 46% No change
- 12% Decrease
- 2% Don't know

Matthew Chandler is the quality manager at ILPEA Industries Inc. in Scottsburg, IN—a company that manufactures gaskets that seal refrigerators, freezers, wine coolers, washers, dryers and home doors. The laboratory at ILPEA tests the raw materials that the company manufactures and uses in the production of these gaskets.

> "The perception that there will be slightly more funding for new research projects is also faring better."

Chandler believes that although the economy may affect purchasing decisions, when labs start focusing on the quality of the materials they manufacture, having the tools necessary to test and approve the product is a must.

"All laboratories have to do whatever is required to properly test whatever they are producing or testing for,"

he says. "In order to do this, laboratories must continue to purchase and upgrade the equipment needed to keep up with the changes and improvements that are required to stay ahead in today's economy."

In order to achieve its goals, ILPEA Industries Inc. closed two of its North American facilities and transferred the production from these to other plants. This gave the company the ability to focus its attention on improving process efficiency as well as product quality.

Wanda Ingersoll, the Mississippi Public Health Laboratory's division director, has to allocate funds differently this year to meet her lab's goals. Her facility is an environmental lab that tests the state's public drinking water supplies for regulatory purposes, and their main funding is primarily fee based.

"The budget for our lab did not increase last year, and I don't think that it will increase in the next fiscal year; it may even decrease," Ingersoll says. "While most of our commodities have not had large cost increases, they have increased. Our service agreements have also increased."

The lack of funds to purchase new instrumentation or modify methods is preventing Ingersoll's organization from investing in new methods or improving old ones.

"Much of the money that we have allocated for instrumentation is shifted to cover supplies and services," she says.

Sara Goudarzi *is a freelance writer based in New York City. Her Web site is located at www.saragoudarzi.com.*

MAKING THE IMPOSSIBLE POSSIBLE!

PANELISTS FROM OUR NOVEMBER 18TH WEBINAR HELP READERS FURTHER EVALUATE UHPLC OFFERINGS

by Tanuja Koppal

DIAB ELMASHNI

FRASER MCLEOD

WILHAD REUTER

In November 2010, *Lab Manager Magazine* organized a first-of-its-kind "Product Showcase" webinar, featuring a panel of seven experts representing some of the leading vendors in the ultra high performance liquid chromatography (UHPLC) market; these experts discussed their perspectives on the new applications and trends in the field. This online event attracted a large international audience from diverse backgrounds and with various levels of expertise who were looking for an opportunity to interact with the panelists in real time, and to get their insights and advice on issues that were important and pertinent. Each panelist gave a brief presentation to outline the benefits of using UHPLC, and to help users decide if making the transition from traditional HPLC to UHPLC is right for them.

Below are answers to attendees' follow-up questions, provided by panelists Diab Elmashni, senior marketing manager, LC and LC-MS, Thermo Fisher Scientific; Fraser McLeod, senior director of product marketing, Dionex Life Sciences Business Unit; and Wilhad Reuter, technology specialist, PerkinElmer.

Q: With all the different UHPLC systems available, how does one choose the right system for his or her laboratory needs?

Elmashni: One should look at the features that are important to him or her. For example, do you need a quaternary pumping capability? How important is ease of use or are multiple detection technolo-

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gies, or the ability to scale up to LC-MS? These are some important considerations.

McLeod: The key questions are: Will the system run the methods you use right now and run the future methods that you will develop? For your current methods, you should essentially look for the same kind of system, but with UHPLC compatibility. For example, if your current method uses a quaternary pump, you should be looking for a system with a UHPLC quaternary pump. With regard to future methods, you should look for a UHPLC system with a lot of flexibility. Some systems are very restricted in things like flow rate and injection volume range. Such systems may severely restrict your future application needs, so it is always best to look for systems that provide wider operational ranges. Finally, ease of use is a key selection criterion. Here you need a system that makes it easy to perform day-to-day tasks (such as changing over columns), and you need to be able to use control software that makes creating, evaluating, processing, and reporting your data as straightforward as possible.

"You should look for a UHPLC system with a lot of flexibility."

Reuter: One should decide what columns he or she wishes to use and the overall flow rate requirements. This combination will then determine the highest pressure limit required. He or she should also have an idea of the expected injection volume ranges. From knowing the desired flow, pressure, and injection limits/ranges, one should select a system that meets these needs. Almost all the available UHPLC systems from reputable vendors that meet these requirements should be quite suitable.

Q: What are the key differences between sample and mobile phase preparations for HPLC and UHPLC?

Elmashni: UHPLC samples will need to be cleaner, because you are dealing with a smaller particle size, and dirty samples can easily plug up the sub-2-micron columns, whereas with a 5-micron column it will not be a problem. You will also be injecting nearly 80 percent less sample than before. With regard to the mobile phase, you will be using a lot less solvents, and these solvents should also be HPLC grade to ensure that they are clean for both the integrity of the analysis, the repeatability, and the lifetime of the column.

McLeod: UHPLC uses columns with smaller particle sizes (less than 3 µm instead of 5 µm). This requires that the mobile phase is filtered before use, with filters of 0.45 µm mesh size or, better, 0.2 µm. In some cases, it will also be necessary to filter samples before injection, particularly if the samples

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contain a lot of undissolved particles. UHPLC typically requires less sample volume, enabling volume reduction in sample preparation steps by a factor of 4 to 5. This can save a lot of time, and also saves on solvent costs. Finally, if the high-resolution power of UHPLC is fully exploited, the removal of matrix compounds, as normally required in conventional LC, can sometimes be skipped.

Reuter: There are two primary requirements for UHPLC. Always filter your samples and solvents through 0.2 µm filters, and typically keep the injection volumes under 5 to 6 µL to avoid overloading UHPLC columns.

Q: What are the cost savings resulting from the use of UHPLC? What are the incremental costs involved in the routine maintenance of UHPLC systems compared to conventional HPLC?

Elmashni: The cost savings will be realized in using fewer solvents, less instrument time, and less labor to achieve the same amount of samples analyzed. There will be an increase in revenue if the number of instruments and labor are maintained, because the sample-per-hour ratio will dramatically increase. Sample runs that used to take 10 minutes now take 1 minute. In some cases, run times of 50 to 60 minutes have been reduced to 3 to 4 minutes. The cost in routine maintenance on a per-sample basis does not increase; UHPLC is

just as robust as HPLC on a per-sample basis. You cannot measure the maintenance cost on a time basis, because you are running a lot more samples in the same time frame. For example, if you used to measure maintenance cost on a monthly basis, you are running 10 times the samples you used to run in that same month with UHPLC, so you will go through more columns and replaceable parts, but that is because you drastically increased your throughput. If you calculate the maintenance cost on a per-sample basis, you may even see a decrease.

McLeod: The main cost savings is the amount of time it takes to perform an analysis. Analysis times are reduced by a factor of between 5 and 50, providing labs with faster data and allowing instruments to run many more samples per day. In many cases, labs will find that they can run their current workloads with fewer UHPLC systems than they have HPLC systems. Another saving is solvent costs. UHPLC uses 80 to 95 percent less solvent than HPLC. There are no significant extra costs for UHPLC maintenance, as the mechanical robustness of wear parts in the latest-generation UHPLC systems comes close to that of conventional LC. If maintenance costs per analysis are considered rather than maintenance costs per time, UHPLC provides significant savings on maintenance costs.

Reuter: UHPLC has considerably reduced costs related to solvent consumption/disposal, besides

▲ *Waters ACQUITY UPLC H-Class*

being more environmentally friendly. There are very little, if any, incremental maintenance costs between UHPLC and HPLC.

Q: How does one assess the return on investment when comparing costs versus performance for UHPLC and HPLC systems?

Elmashni: This is always best to do on a per-sample basis, because that is the most accurate scale to use.

McLeod: The key metric is cost per analysis, which is calculated from the initial cost of the system, the cost of columns and the average number of injections per column, the costs for consumed mobile phase per analysis, the costs for sample prep per analysis (solvents, solid phase materials, labor), and the costs for analyst labor time. With UHPLC, you will generally find that the cost per analysis is lower than it is for HPLC.

Q: Can all conventional HPLC analyses be transferred to UHPLC?

Elmashni: As long as either the detection technology for the particular application is available in a UHPLC system or if using an HPLC detector with a UHPLC pump and autosampler provides the proper level of detection, then all analyses can be transferred.

McLeod: If there is a UHPLC column that provides a similar selectivity as the original conventional column, you will find that transferring is very easy. There are many software tools available to help calculate the new parameters, and that will give you a UHPLC method that separates all your analytes with the same resolution, but in less time. There are a wide range of UHPLC columns and selectivities now, so you will find that most methods can be transferred. In the rare cases where a highly dedicated separation column is required (e.g., enantiomeric separation), transfer to UHPLC conditions may not be possible. However, these columns can still be used on a UHPLC system, as these systems also support running HPLC methods.

Q: What are some of the improvisations and modifications being worked on for the new UHPLC systems entering the market?

Elmashni: Companies are always working on higher pressures, increased sensitivity, new column phases, and increased ease of use.

McLeod: Compatibility with conventional methods; reduced maintenance requirements and effort; assistance for method transfer; further extensions for performance specs like pressure, flow, and temperature; an increasing range of UHPLC-compatible detectors; and a better integration of mass spectrometers are some aspects that are being worked on.

Reuter: Vendors are looking to further reduce

▲ *Shimadzu Scientific Nexera*

▲ *Agilent 1290 Infinity LC System*

▲ *Thermo Scientific Accela High Speed LC*

mixing delay volumes and IBW [instrumental bandwidth] to make improvements in detector sensitivity/flow cell design and, though not specifically hardware oriented, to continue making improvements in column performance/robustness.

Other panelists from the webinar included:

- Eric Denoyer, Ph.D., Product Planning and Portfolio Management for Chromatography, **PerkinElmer**
- Curtis Campbell, Ph.D., HPLC business development manager, **Shimadzu Scientific Instruments**
- Stefan Schuette, Ph.D., senior marketing director, Liquid Phase Separations Business, **Agilent Technologies**
- John Burchell, chromatography business manager, **JASCO**
- Remco van Soest, HPLC product manager, **Eksigent**
- **Moderator:** Tanuja Koppal, Ph.D.

SHOWING OFF YOUR LAB

HOW A WELL-RUN LAB VISIT CAN IMPROVE BUSINESS, ATTRACT NEW EMPLOYEES AND GAIN COMMUNITY RESPECT

by John K. Borchardt, Ph.D.

Using a bit of showmanship to exhibit your lab to current and potential customers, R&D partners, and employees; coworkers from other locations; the media; and the general public has many advantages. The key to successful showmanship is to stress your lab's ability to solve problems. Current and future customers and potential codevelopment partners will be impressed by your capabilities and will be more likely to award your company business or to work with you on codevelopment projects. Potential employees will be more likely to accept the job offers you extend to them. The media will be more inclined to trust your lab employees, using them as sources for stories and giving your lab favorable publicity. If your lab is an academic laboratory, you will be more likely to attract undergraduate science students and science graduates to your institution.

> "If it can be done safely, have experiments or demonstrations running when the guests visit each laboratory."

The most effective strategies for showing off your lab depend on the people to whom you want to show it. However, all your visitors must see tidy laboratories with equipment in good condition. They must see appropriate safety equipment installed and staff members wearing their personal safety gear, particularly safety glasses. Lab visitors must also be issued the appropriate safety gear, especially safety glasses, when in your laboratories.

There should be a designated host for each laboratory your guests visit. Each host should prepare a list of points they want to make and the laboratory manager should approve these. Hosts should explain how equipment is used on a day-to-day basis. In doing so, hosts should remember that some of the guests may not be chemists. If this is the case, they should briefly explain the use of every piece of lab equipment they discuss. They also should define each technical term the first time they use it. When discussing a piece of research, they should explain what is interesting about it, and particularly what will be relevant to each set of visitors.

A schedule should be set for the laboratory tour, with times allotted for each lab to be showcased. Be generous in your time allotments as visitors' questions can substantially lengthen a laboratory visit. If it can be done safely, have experiments or demonstrations running when the guests visit each laboratory.

Visitors – customers and prospective customers

When current and potential customers come to visit your laboratory, be sure your invitation includes decision makers who can steer business your way. Often these will not be researchers, but business managers or purchasing agents who may bring along plant operating personnel or researchers as consultants. Design the visitors' schedule to show and persuade guests that your laboratory has developed outstanding products and processes relevant to their business. Finally, you should emphasize the high quality of your lab's customer service and how your staff can help your visitors solve operating problems in their production facilities.

To meet these goals, your visitors' lab tour should include plenty of time in labs devoted to developing products and processes in their areas of interest, plus customer service labs performing the types of work they may require later as customers of your company. It is also important to perform applications-testing using equipment and procedures that demonstrate how your customers would use your product. The tour should also include analytical or quality assurance laboratories performing the analyses and tests required to ensure the products your firm offers will meet their specifications. Production plant quality assurance labs, while perhaps less elaborate or visually impressive than research center labs, should be a part of plant tours for the same reason.

When scheduling lab tours, allow plenty of time for discussions with staff members. Brief your staff members on which details can be discussed with the visitors and which should be kept confidential. Put away containers of chemicals being used on confidential projects so that they are out of view.

Allot time in the schedule for meetings to discuss current products, and ongoing and potential projects of interest to the customer. Also allow time for one or more presentations on the lab's capabilities. These presentations should not include extensive discussions of organizational charts or your company's history. Invite visitors to discuss their product and process development needs. After these presentations, allow ample time for discussion of how your laboratory could help your visitors meet their business growth and quality improvement needs.

Laboratory visits can be the seed for joint development programs of new products that can help your own and your visitors' companies grow. Lab visits can help dissolve an "us versus them" attitude—on your staff members' and the customer's part.

On-site employment interviews

The final stage of screening many job candidates is to invite them for an all-day series of interviews. Your assessment of the candidate is the final determinant of whether or not the person gets a job offer. However, don't forget the candidate is evaluating you and your laboratory as well. Candidates are concerned with having four primary questions answered:

- Will the work be interesting and challenging?
- Will you, the lab manager, be a pleasant person to work for?
- Will the other laboratory staff members be congenial coworkers?
- Will the laboratory be a physically pleasant place to work, and provide the equipment and instrumentation needed to get the job done?

Enabling the job candidate to answer these questions, particularly the last one, will mean putting your lab on display. Customarily, a candidate's interview day includes a series of discussions with laboratory staff members who will be his/her coworkers. This day also includes a tour of the laboratory to permit the candidate to see what could be his/her future workplace. Of course, you want your facility to be clean and tidy for this tour. Your staff members should always work in a safety-conscious manner using the appropriate protective equipment, such as safety glasses and laboratory gloves. Mid-career job hunters will be particularly likely to notice lapses in safety protocols.

One of the most visited laboratories in the world, reconstruction of Thomas Edison's Menlo Park Laboratory in Dearborn, Michigan.
PHOTO CREDIT: WIKIPEDIA COMMONS

Other visitors

Hosting visits from students and faculty members from local universities, colleges and high schools can be a great way to get good publicity for your lab. Invite local newspaper reporters to tag along during the visit. You may wish to set up demonstrations of how your products work and how they help customers. Invite local newspaper reporters to join the tour. You may even wish to invite local TV news reporters and camera crews. Be careful, however, as cameras may be intrusive and make it look as if you're trying to exploit your visitors.

Lab visits can lead your visitors to develop good feelings about your staff members and the facilities in which they work. They may be more likely to later consider your laboratory as a future employer.

Non-visitation ways to show off your laboratory

Laboratory managers have several other strategies they can use to show off their laboratory's capabilities and accomplishments to current and prospective customers and other visitors. These include:

- Developing a section of your company's website that describes your laboratory, its capabilities and recent accomplishments. This may include video tours of some of your lab's facilities and demonstrations illustrating how your customers might use your products and processes in their own facilities.
- Preparing hardcopy bulletins describing your laboratory and its recent accomplishments. Sales personnel may provide these to customers during their customer calls and distribute them at trade shows.
- Presenting papers on your lab's recent accomplishments at conferences, particularly trade conferences, for industries to which you currently sell your products.
- Using online social media and online newsletters to communicate with current and potential customers. For example, a lab manager may develop a Facebook page for your laboratory; this could be an excellent activity for staff members who are highly interested in online technology. However, you may need to supervise them to be sure they don't become overly enthusiastic and devote an excessive amount of time to the project.

Confidentiality

All these examples involve communications with individuals outside your laboratory and your company. Consequently, data and information security can become an issue. Your staff members should be thoroughly coached to avoid inadvertent disclosure of confidential information. Should your laboratory staff members begin working with nonemployees on joint projects, you and your counterpart at the other company may need to work with intellectual property attorneys to prepare confidentiality agreements for the appropriate personnel in both firms to sign.

These strategies can also be useful for contract research firms and independent analytical service labs. They also provide opportunities to get lab staff involved in marketing your laboratory. However, you should brief your staff members on what information should remain confidential—particularly if your firm doesn't have signed confidentiality agreements with the organizations your staff members are talking to.

Inspections

Diagnostic and other laboratories, particularly those in the pharmaceutical and food manufacturing industries, have to be prepared for inspections by regulatory authorities such as the U.S. Food and Drug Administration to ensure your laboratory's compliance with Good Manufacturing Practices (cGMPs). The Laboratory Safety Institute (www.labsafetyinstitute.org) and other organizations have developed checklists that laboratory managers can use to prepare for these inspections.

Since some regulatory agencies may conduct unannounced inspections, it is best to keep your lab prepared at all times. To assist with inspections, make sure your staff members are familiar with the inspection process and what the inspector is looking for. Have the necessary procedure manuals, personnel folders, quality assurance documents, etc., organized and ready for examination. Appointing one person to answer the inspector's questions and to collect any requested information can expedite the inspection.

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When inspectors arrive, provide a clean, quiet, well-lit work area. It is usually best for this to be an unused conference room or office. Bring all the needed documents to this room when the inspector arrives. Also make yourself and any other staff members available as necessary. Occasionally check on his/her progress; however, don't hover around the inspector when he/she is trying to work.

Treat inspectors as though they are guests in your home, i.e., with courtesy and respect, not as an uninvited annoyance. Be courteous in greeting the inspector. If you are not the overall lab director, you may wish to introduce him/her to that person. Show the inspector to the room you have prepared. Offer him/her a beverage and then leave the inspector to his/her work.

Outside of the lab

Don't forget about the areas outside of the lab. Make sure the grounds are clean and tidy. Repair any building deterioration—inside or outside. Have windows cleaned on both sides. You don't want visitors inside your buildings looking out through dirty windows. Should your visitors arrive in the winter when there is snow on the ground, be sure walkways are shoveled and treated with rock salt or gravel to facilitate sure footing.

▲ *An Astra Zeneca pharmaceutical laboratory in Boston, MA.*
PHOTO CREDIT: ASTRA ZENECA CORPORATION

Academic laboratories

It's not just industrial labs that should be prepared for visitors. Academic laboratories should be prepared for visits from prospective students. Well-organized visits can persuade prospective students that your department may be the best place for them to continue their education, whether they will be pursuing a graduate or undergraduate degree. Many science and education departments schedule periodic tours. The basics of these tours should be the same as with industrial labs. Tours should also include teaching and research labs. While visitors should have time to visit with faculty members, the best tour guides are their future peers: undergraduates for undergraduate tour groups and graduate students for prospective graduate students.

Wrap-up

Well-organized laboratory visits can help your company expand sales, recruit new employees and persuade people that your laboratory is a community asset. So it's worth spending time and effort to organize them.

Dr. John K. Borchardt *is a consultant and technical writer. He is the author of* Career Management for Scientists and Engineers, *and often writes on career-related subjects. He can be reached at jkborchardt@hotmail.com.*

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Sarah Klemuk, Ph.D.
Co-Director of The Laryngeal Molecular and Cell Biology Lab at The University of Iowa

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THE KEY TO RESPECT AND SUCCESS?

BEGIN WITH ACCOUNTABILITY

by Marjorie Brody, CSP, PCC, CPAE

Many people may be reluctant to say it, but without a doubt, it's true: Our business environment is increasingly filled with apathy, entitlement issues, lack of professionalism, complaining, conflict, and blame.

I've personally witnessed how individual attitudes and behaviors continue to sabotage professional and organizational success.

My own professional development mantra that I share with my executive coaching clients, as well as during my accountability presentations, is that *we all need to step up and be accountable for the results, relationships, and rewards we want.*

This philosophy relates to four specific realities of our workplace that I've identified that delve into the vital characteristics, behaviors, and strategies that lead to personal and career growth.

These four areas are:

1) Attitude: *Life is not fair.*

2) Performance: *No one owes you a living.*

3) Behavior: *Reputation and relationships rule.*

4) Courage: *We regret the risks we don't take.*

These concepts share one thing in common: They relate to accountability. Besides being a buzzword of late, accountability as a concept is not new. It doesn't start at the top; it isn't the responsibility of others. It starts with each of us.

What we have to remember about attitude is that things will not always go our way. Not everyone will agree with you, get along with you, or treat you the way you would like. But, remember, you always have a choice as to how you respond to situations and people.

Performance relates to paying attention to the results you are producing, not your daily work activities.

Eliminate behaviors that can destroy relationships and reputations. Are you the person whom others want to be around? Do others refer and recommend you? What is your brand?

The final trait of accountability relates to courage. It's never easy to admit you're wrong. But successful businesspeople have the courage to admit their mistakes and don't try to pass off errors to their subordinates.

Courage also involves a willingness to take risks. After all, a wise risk is better than foolish safety.

Part of accountability surrounds leadership. You need to lead by example. Effective leaders have integrity … a vital trait to be successful and gain people's respect and admiration—not to mention trust.

These leaders take responsibility for their actions and know that the proverbial buck stops with them. You don't have to answer to "CEO" or "President," however, to be a responsible corporate citizen.

Corporate leaders who are truly effective realize that they are constantly growing and always have new challenges to face and conquer. We can look to those who have excelled in their fields and get additional perspective on the "going above and beyond" elements of excellence. Be dedicated and prepared to take advantage of each opportunity for excellence in a way that demonstrates your personal commitment to this value.

You *can* weather the current economic climate and other setbacks. A good start is to practice accountability.

***Marjorie Brody** is an author, Hall of Fame speaker, and coach to Fortune 1,000 executives. She is CEO of BRODY Professional Development, a business communication and presentation skills company in Jenkintown, PA, that offers tailored training programs, workshops, keynote presentations, and executive coaching. BRODY serves such diverse clients as Microsoft, Pfizer, Aramark, Campbell Soup, Genentech, Johnson & Johnson, JPMorgan Chase, NBC Universal, GlaxoSmithKline, Citi Private Bank, and many national and international associations. For more information on booking Marjorie or a BRODY training program, visit www.BrodyPro.com or www.MarjorieBrody.com. Or call 215-886-1688.*

If you missed Marjorie Brody's Lab Manager Academy webinar "Accountability: 5 Keys to Manage Success (Yours & Others)", originally broadcast on Wednesday February 2, 2011, visit www.labmanager.com/accountability to watch the archived video.

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EMAIL ETIQUETTE

ENHANCE YOUR PROFESSIONALISM

by Karen Litzinger

Have you ever been on the receiving end of an email from the "all caps junkie" or the "cc: monster"? In our fast-paced workplace, email is the norm, whether via computer or smart phone. Unfortunately, instant messaging has sparked the deterioration of language as we know it (U no wht I mean?). Practicing good email etiquette can help you effectively get your message across and enhance your professional image. It can also help with productivity for the entire team.

Start your higher standards with these tips:

- **Uses:** Email is best for relaying factual information and not for decision-making. Otherwise, the emails can go back and forth endlessly, cluttering inboxes with nothing getting done. Similarly, avoid email for anything confidential or sensitive. Sometimes it is better to schedule a meeting or conference call. Or you may want to pick up the telephone, or get up and talk to someone face-to-face.
- **The Basics:** Use correct spelling, grammar and sentence structure. Yes, you can be briefer with a BlackBerry or other smart phone, but remember that this is still business correspondence. For an initial email, you should still use a greeting and closing; for back-and-forth emails, you don't need the "hello" or "sincerely" and you can use just your initial in closing. Always include a clear subject line, and change it if the conversation changes.
- **Tone:** Because there are no verbal tone or nonverbal behavior cues as part of communication, avoid using email for any topic where emotion is involved, especially frustration or anger. If there is a chance your reply could be misinterpreted, draft your reply and wait 24 hours before sending it. Also realize that humor can be misread. Emoticons or other symbols are best left for personal correspondence. ;) Since email correspondence can appear abrupt, consider beginning with a "hello" or ending with a "thank you" or "have a nice day." Avoid all caps, since they are the equivalent of shouting. Watch the use of bold or red as well.
- **Timing:** Most business etiquette experts say the standard for replying to emails is within 24 hours. One expert held 48 hours as the standard; yet, increasingly organizations are having a same-day policy for answering email correspondence since so many people expect instant replies. Avoid using email for a topic that needs an immediate response. If you do prefer to email and need a quick turnaround, call the recipient and give a heads-up.
- **Automated Signature:** Do use an automated signature file with complete contact information. It could be that the receiver may actually want to pick up the phone and call you to resolve a situation. Or perhaps they want to send you a thank-you note! Don't overload your signature file with too much in the way of quotes, inspirations or link to buy your latest book.
- **Courtesies:** Refrain from cc'ing too many people who don't need to be involved or using "reply to all" when it is not necessary. Also avoid forwarding jokes, inspirations or even worthy causes to multiple people, unless you know they want to receive these types of emails. This applies in both your business and personal lives!

Comments about these tips and your stories about email blunders are welcome. Just email me…but please be nice!

***Karen Litzinger** is owner of Litzinger Career Consulting, which helps individuals and organizations manage career transitions and increase professionalism. Karen is a professional member of the National Speakers Association and is incoming president of the Pittsburgh Chapter. You can reach her at 412-242-5342 or through www.KarensCareerCoaching.com.*

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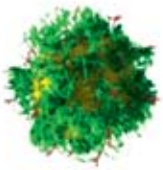

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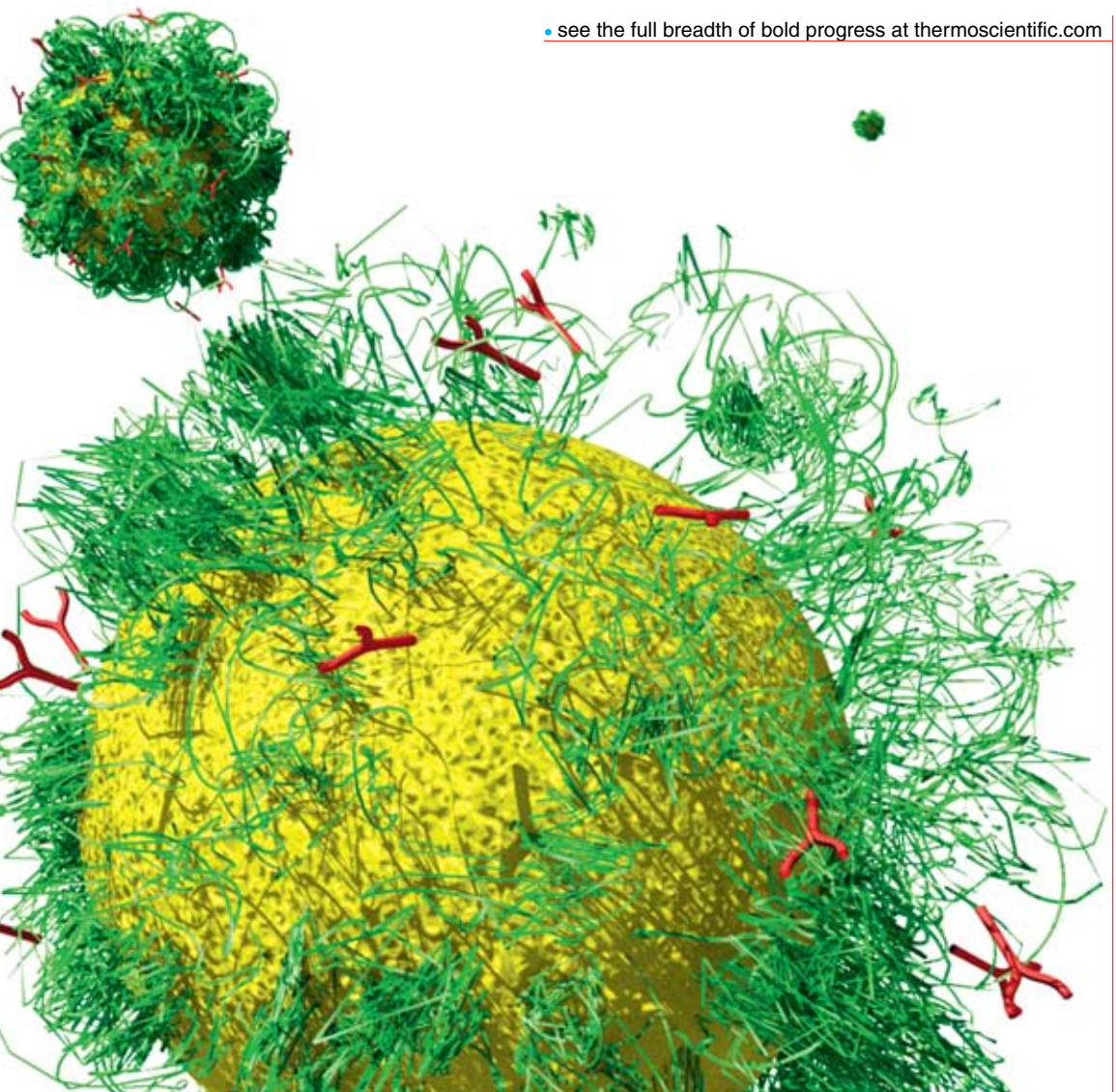


• helping answer big questions in drug delivery

DECIDE TO BE DIFFERENT

Many lab scientists remember what it was like to work "on the bench." The term referred to the standard practice of manual processes or methods. No matter what services a particular lab offered, you could bet the work was all done by hand.

Then suppliers of lab equipment and materials decided to do something differently, which ended up playing a significant part in the evolution of the industry.

Suppliers realized that to improve on manual processes, they had to start paying attention to the details of the relationship between a lab's customers and methods within the lab itself. Analyzing these delicate interactions, suppliers used their findings to develop automated instruments that could outperform old methods. The move added value to suppliers' products and ensured the industry's adoption. Automation in turn became the new industry standard, in part because of suppliers' willingness to look at the customer/lab relationship in a new way.

Just as supplier creativity led to an industry game changer, similar actions on the part of managers can dramatically improve a lab's bottom line in the business realm—but only if they are willing to embrace differentiation and change.

Labs of all sizes, however, sometimes continue to operate within an outdated business model that provides no opportunity to stand out in the crowd, even as personnel may feel confident in their ability to solve a customer's problems.

> "Labs will flourish if they stop competing on services and instead learn how to compete on best customer outcomes."

This dilemma demonstrates the need for modern laboratories, now more than ever, to adapt to the new marketing reality. As is true for most businesses, scientific labs will flourish if they stop competing on services and instead learn how to compete on best customer outcomes.

"Fix my problem"

Today's customers require a more solutions-based outcome before they even walk through a lab's door, and an opportunity always will be missed if they are greeted with the traditional menu of services.

Why? Every lab has one, so this traditional marketing tool, while serving a valuable function in highlighting a lab's basic capabilities, actually does very little to establish for the customer why a particular lab is preferable over another.

More important, we know from the past that customers did not always realize from looking at a menu of à la carte services the best way to synthesize those services into a desirable product that would lead to the best outcome.

Customers nevertheless have become more sophisticated about their expectations and, in the process, more demanding. A lab's customers, whether they are individuals or larger businesses, no longer want to buy single services from a list. They want to buy total solutions that will last and perhaps even help their own businesses grow. If a lab doesn't have a sales plan that goes beyond its basic list of capabilities, customers are likely to go somewhere else.

Use your employees to differentiate

Marketing a lab that provides customers with a unique solution to a problem is usually the easy part. The real challenge is identifying what has

the potential to make a lab different. In other words, how can a lab be truly "disruptive" in the marketplace? How can it take its standard practices and transform them into game-changing solutions that will make the lab exceptional among all others?

The path for getting there will be different for every organization. However, for nearly every lab, it likely will include a fresh approach to staffing. A lab may determine a unique solution capability that can be staffed with specialized skills designed around a common customer outcome. Managers must learn how to evolve their recruiting to identify the most critical skill sets in potential employees and learn how to use those skills to best support the solution and customer outcome.

The trend toward hiring contingent staff fortunately can make the manager's job easier. Today's contingent workers in the science industry are more prepared than ever to help propel labs in new creative directions because of their versatility. This means workers can respond easily to a variety of different skill requirements and challenges. They can be productive right away, minimizing the learning curve and increasing a lab's profitability.

Employing contingent workers can also give a lab a great amount of flexibility once it has established a new set of services and solutions. The lab will be better able to handle fluctuations in volume and demand as business grows and to deploy the right kind of workers as new demands crop up. It will be even possible to use talent in a remote way if work needs to be done at a customer's location.

Rising to these new marketing challenges might be difficult in the short term, but it is guaranteed to translate into a lab's long-term business and financial success.

Alan Edwards *is senior director and product leader of Kelly Services® Americas Products Group—Science. Kelly Services, Inc., a leader in providing workforce solutions, is headquartered in Troy, Michigan. For more information, visit kellyservices.com. Alan can also be followed on LinkedIn (linkedin.com).*

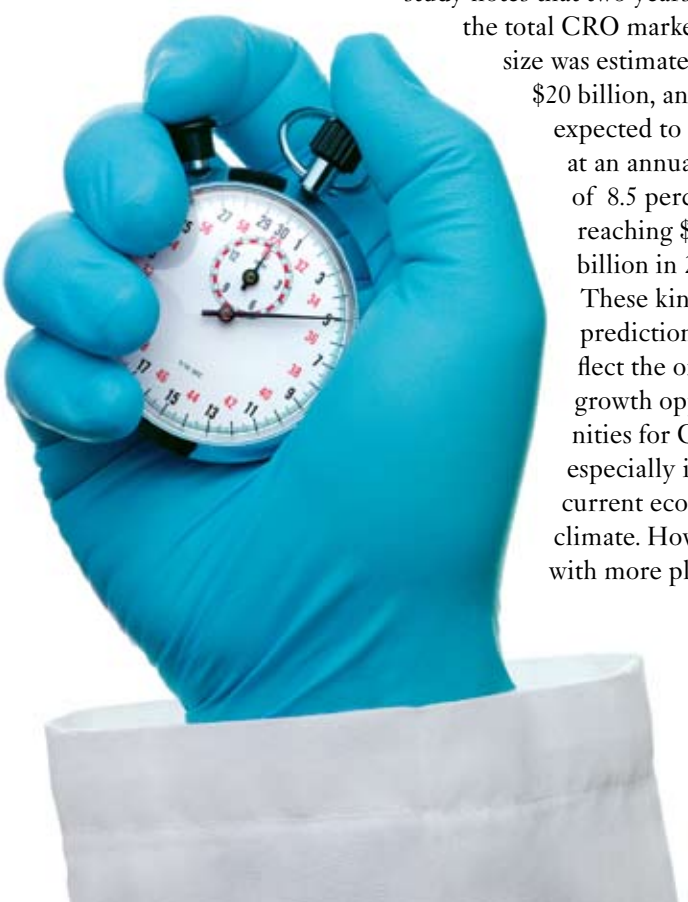
900 SECONDS AT XENOTECH

LEADING CRO GAINS HUNDREDS OF HOURS IN RESEARCH TIME THANKS TO NEW QA METHOD

by Paula Pou

Contract research organizations (CROs) have been growing at an impressive clip since the 1990s, when the R&D efforts and needs of pharmaceutical companies started becoming increasingly more complex. Despite their ongoing focus on innovation, most pharmaceutical companies, regardless of size, have also had to bear the weight of increasing external cost pressures, which have contributed to a downsizing trend over the past five years. CROs have had to step in, not only to allow companies to expand their R&D efforts beyond their in-house capabilities, but also to patch up gaps in competencies.

Indeed, CROs provide substantial global capacities to drug developers and have become critical contributors to clinical trials activity. According to a 2009 study conducted by Business Insights, an independent market research firm, clinical trials conducted by CROs are completed up to 30 percent more quickly than those conducted in-house by pharmaceutical companies. The study notes that two years ago, the total CRO market size was estimated at $20 billion, and is expected to grow at an annual rate of 8.5 percent, reaching $35 billion in 2015. These kinds of predictions reflect the ongoing growth opportunities for CROs, especially in the current economic climate. However, with more players entering the field, regulatory standards are bound to become more stringent worldwide. Successful CROs will be measured not by the amount of business they conduct, but by the quality assurance of their results.

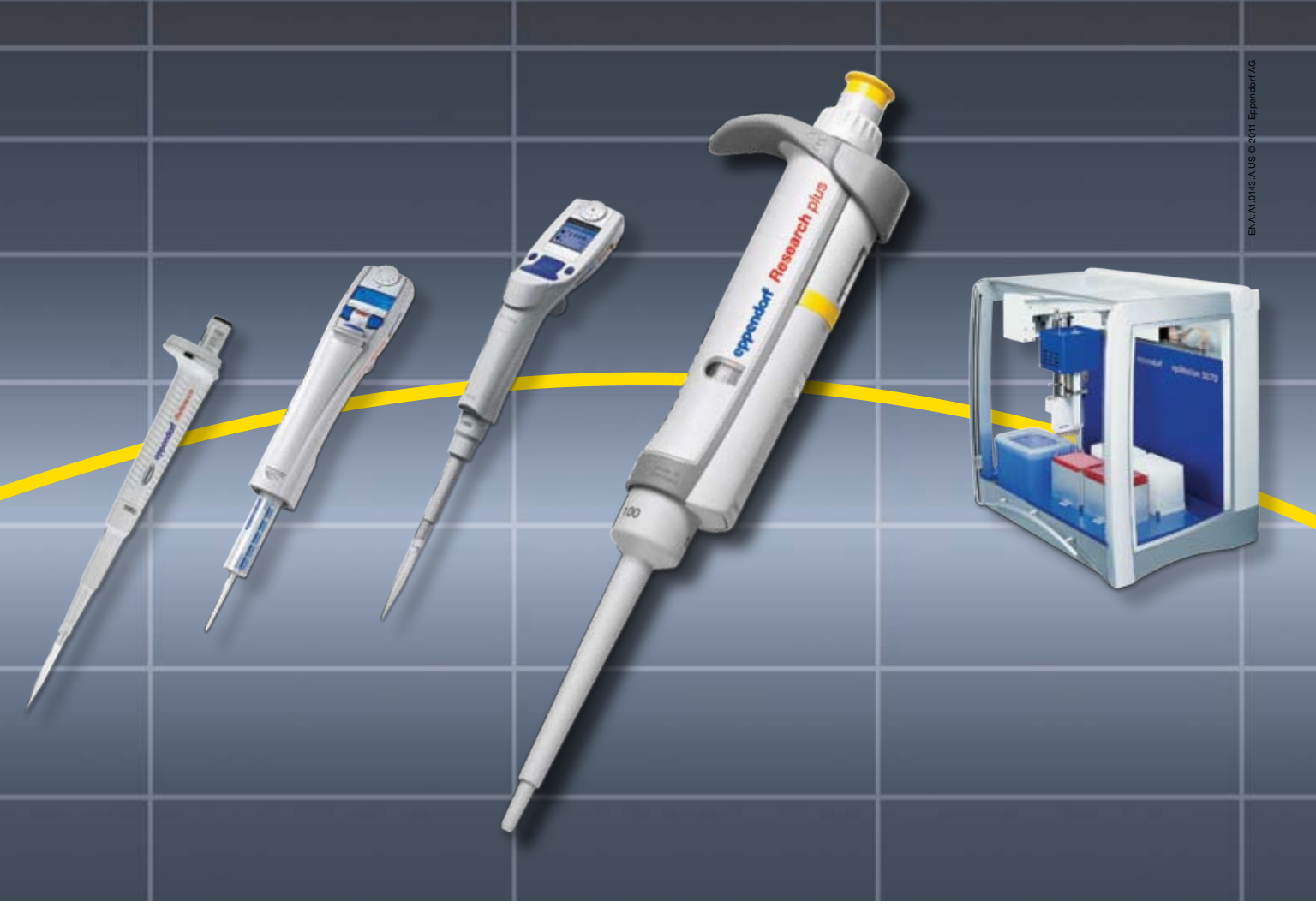


XenoTech LLC—a Kansas-based CRO founded in 1994 that offers drug inhibition, enzyme induction and drug metabolism studies for pharmaceutical, chemical, food, academic and regulatory organizations in the United States, Japan and Europe—realized the importance of quality assurance in its lab early on. Most of the studies performed by the company are governed by good laboratory practices (GLP) standards to ensure data quality. For XenoTech, a high standard of data quality translated into, among other things, the regular verification of its automated liquid-handling equipment. According to Steve Otradovec, XenoTech's lab automation senior scientist, the lab's automated liquid handlers are used primarily for sample preparation and incubation—the bulk of XenoTech's work.

"After purchasing our first liquid handler, we decided to verify it monthly—at a minimum—to maintain consistency with our verification standards for our manual pipettors," explains Otradovec. "At that point in time—this was about six years ago—it seemed like most liquid-handling companies dismissed the need for routine verification, insisting that annual verification was sufficient. At XenoTech, we constantly strive to perform our work at the highest standards of quality, and this demands a trustworthy assurance that our equipment is operating effectively. We can't put faith in mechanical equipment; we need evidence. We're also highly SOP-driven, and our robust SOP requires monthly validation of this equipment."

In 2006, XenoTech verified its liquid handlers gravimetrically using balances. Each liquid-handling robot took four hours to validate.

"We knew that if we added more automated liquid handlers, we'd practically have to hire someone full-time to verify them," adds Otradovec. "That's what drove us to find another method."



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Fifteen minutes

As XenoTech set out to find alternatives that would minimize the time it took to validate its automated liquid handlers, it began to experiment with developing an in-house spectrophotometric method. As XenoTech strove to replace gravimetry in its lab, the company learned about Artel.

Based in Westbrook, ME, Artel has pioneered liquid-handling quality assurance worldwide. The Artel multichannel verification system (MVS) uses dual-dye ratiometric photometry to assess the precision (the repeatability of volume transfer) and accuracy (the closeness of the transferred volume to the target volume) for each tip of almost any multichannel pipetting device at volumes as low as 10 nl. Because measurement results are NIST-traceable, the MVS allows for the direct comparison and measurement consistency between operators, methods and liquid handlers—regardless of make, model, manufacturer or location.

▲ *Xenotech research scientist of R&D / Method Validation of Laboratory Automation, Robert T. Grbac, using the Artel MVS® to measure the accuracy and precision of his automated liquid handler.*

"When we heard about Artel, we realized that the MVS would allow us to do exactly what we'd been trying to do and more," says Kammie Settle, marketing manager at XenoTech. "We're dispensing such low volumes, and everything has to be very accurate and precise to be repeatable and robust. Because we offer GLP contract services, we put a lot of emphasis on repeatable data. Samples have to be within a certain range. The more accurate our incubations are, the better our data is—we don't like to do repeat tests that use our time and resources ineffectively."

Keith Albert, Ph.D, Artel's technical marketing manager, arrived at XenoTech with the MVS, and proceeded to do an installation and operational qualification onsite. To Otradovec's delight, Albert completed the installation in less than two days, and proceeded to conduct a hands-on training for all technical staff.

Since Albert's visit in 2006, XenoTech went on to acquire additional automated liquid handlers to manage the increasing workflow. As the company used the MVS, the time it took to accurately verify each robot was slashed significantly—from four hours down to 15 minutes.

Having experienced such dramatic time savings with its liquid-handler verifications, the company started using the MVS to troubleshoot new scripts. According to Otradovec, XenoTech's use of the MVS goes beyond equipment verification, since the system is able to mimic what a new script does to ensure that it's working correctly. For instance, when XenoTech builds a script for its automated liquid handlers, it can use the MVS to make sure that specific target volumes within different automated scripts are transferred with accuracy and precision, before implementing them.

Another time-saving benefit of the MVS for XenoTech has been the MVS' ability to troubleshoot the company's liquid-handling robots. "When we want to troubleshoot a liquid delivery, we can use the typical automation interface and deck setup without the need to rearrange the deck for a gravimetric balance or an alternative software program," explains Otradovec. "The ability to test in real mode has enabled us to find liquid-handler hardware problems that would have been unidentifiable using alternative gravimetric methods."

A booming future and time to invest in it

Twenty years ago, both the role model and business model for CROs used to be simple. Pharmaceutical companies were in charge of developing a new drug and taking it through clinical trials, and CROs handled outsourced work for the drug company, staffing a trial or analyzing the data produced in the study. However, with competition, financial pressures and looming patent expirations battering the pharmaceutical industry, drug companies are continuing to turn to outsourcing as a principal component of their new business models. While this has led to CRO growth, it's also leading companies like XenoTech to provide more than just outsourced work.

"Our services go way beyond screening," notes Settle. "We specialize in regulatory submission studies, and provide our customers with enough information, going

beyond mere technical data, so that they can make an informed decision about whether they should move forward with a compound's development, and then what that next move might be."

Many of the studies performed by XenoTech revolve around in vitro enzyme induction studies in human hepatocytes, which are conducted in accordance with FDA recommendations. The company's process involves treating cultured hepatocytes from three human livers for three consecutive days with three or more concentrations of drug candidates. These studies, among other studies conducted at XenoTech, have the important task of predicting the metabolic pathways in humans years before human clinical trials are approved, and can also be used to predict dangerous drug-to-drug interactions. This is no small feat, and quality assurance and control play an integral role in achieving it. By bringing the Artel MVS into its lab, and with its current population of liquid handlers, XenoTech has added 336 hours per month to the time it can spend focusing on developing groundbreaking studies that can help drug companies bring safer drugs to market faster.

***XenoTech**, based in Lenexa, KS, is a contract research organization with expertise in evaluating drug candidates such as substrates, inhibitors and inducers of cytochrome P450 enzymes. For more information, please email info@xenotechllc.com or go to the company's website at www.xenotechllc.com.*

***Artel** is a worldwide leader in liquid-handling quality assurance. Artel's accurate and easy-to-use systems ensure data integrity in any process requiring liquid volume measurement. For more information, contact Artel at 207-854-0860 or go to their website at www.artel-usa.com.*

***Paula Pou** can be reached at ppou@abipr.com or by phone at 212-529-4500.*

TROUBLED STANDARDS

WHILE THE DESIRE TO STANDARDIZE DATA SYSTEMS IS STRONG, ENTRENCHED OBSTACLES REMAIN by Gloria Metrick

The effort to create an "integrated lab" just means that we want to get everything in the lab working together. Additionally, there is a desire to make it easier to make things all work together than has previously been possible. With the various brands of software and equipment, sometimes on different platforms, often with different data sources, the challenge remains—well—a challenge.

Is it "the same old, same old"?

Laboratory integration would be easier if we created more data standards. Recently, Waters put out a press release containing these comments: "One of the most important challenges laboratory scientists and information technology managers face today is the need for data management standardization. Many of our customers are forced to support multiple laboratory software and informatics platforms amongst their many labs."[1] What is notable about this is that many in our industry have been saying this for many years now. The desire to standardize data systems has been strong, but has not been realized in more than a few areas. So, when we go back 10 years, 20 years, probably longer, we find groups that talk about and/or start such standardization efforts and fail, for the exact same types of standards, and that each time fail to learn from or make progress from previous groups' efforts. Thus, why I say it is "many" years.

> "If you've looked under the hood of your systems, you know how complicated they are."

Consider these two other quotes from the same press release, as well: "Specifically, customer benefits of CDS standardization include reduced training efforts and support resources needed to maintain a single platform" and "… a standardized CDS can facilitate more consistent regulatory compliance through easier software validation and streamlined review/sign off of results."[2] Here, while Waters specifically mentions CDS (Chromatography Data System), these comments are true of all informatics systems.

Can we move forward?

If standardization is such a key element to integration, if it has so many benefits, if it is so highly desired, and if the industry has been so interested in it for so long, one might ask, "Why don't we have these standards in place?" My answer when asked that question is usually, "Because it's really, really hard!" Then, if that answer doesn't annoy the person who asked to the point that he or she walks off in a huff, we often end up having a dialogue about how many things have to happen to create these standards. Politics is a major factor of any undertaking. Also, if you've looked under the hood of your systems, you know how complicated they are. It's common to have several systems with huge databases of many tables and fields controlled by even more complex programs, and each one can be almost entirely different than the others.

All this is compounded by the fact that those users have spent quite a lot of money to implement a system and do not necessarily want it to change, and the software vendors trying to deliver new features and technology don't necessarily want to change their focus toward retroactively changing their software. By now, most customers and software vendors in our industry realize that the "seamless upgrade path" is never as easy as it sounds. Another issue is that software and hardware continue to change; therefore, our focus remains more on what is up-and-coming and whether it is a better solution, than on forcing a path for these solutions to take.

Once again, let me point out that it is not because of a lack of desire. If you ask anyone whether standards are good to have and worthwhile to work on and

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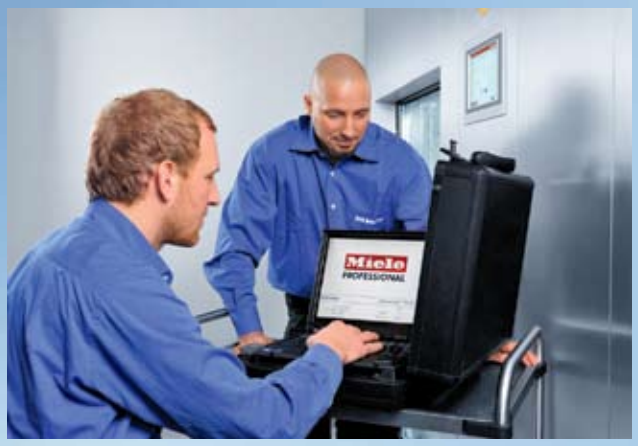

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HL7

With all that said, there have actually been some pockets of standardization. One notable effort has been HL7 (Health Level 7 International, http://www.hl7.org/), which is an effort to standardize health information technology.[3] HL7 has created standards for items such as electronic health records.

So, if HL7 can do it, we should wonder why we can't do it with everything else. I don't know the answer to that, but here are a few facts I'd like to mention:

- Specificity: Health information is a specific area. By targeting a single industry/area in this manner, the problem is smaller and better defined than the usual "let's try to standardize all laboratory informatics" plan of attack.
- Outside Influence: There is some governmental influence and some amount of public desire to standardize health records.
- Volume: The sheer volume of clinical data is much larger than the data involved in many other types of "studies" (e.g., stability studies).
- Breaking Down Silo Mentality: HL7 seems to have worked to involve factions from all over the industry, from software vendors to consultants to the companies actually involved in health care. Additionally, they seem to be working with other standards organizations that have expertise related to their efforts. So, while some past standards efforts have included too narrow a group of people to ensure that the potential standards are practical, this one evinces a willingness to involve others in the process that is important for buy-in and practicality.

I had been talking to someone who was involved with both HL7 and previous similar efforts. His main point was that past efforts didn't get enough people involved who had hands-on experience with the actual data, and that HL7 was addressing that very issue. Thus, while these factors I just listed might not tell the entire story of HL7's ability to move its efforts forward where others have failed, they are factors worth considering.

The Pistoia Alliance

A fairly new and notable standards effort is that of the Pistoia Alliance (http://www.pistoiaalliance.org/), a consortium created by several large pharmaceutical companies that has grown to include a number of other companies as members. They endeavor to "provide an open foundation of data standards, ontologies and services to streamline the Pharmaceutical Drug Discovery workflow (Chemistry, Biological Screening, Logistics)."[4] The observer wonders whether it is a worthwhile activity and what is its chance of success. However, until there is either a specific output from this group's efforts, or quite some time has gone by with a lack of such, it is difficult to tell whether their efforts are going to be any better than the multitudes that have come before them. Typically, if groups like this don't make some type of continuous progress, they lose momentum and, ultimately, fail.

What should new projects expect?

After many years of integration and standards efforts, your lab shouldn't count on any particular standard being in place during the course of any given upcoming project. Even if there is some specific date given for the release and adoption of the standard, dates can change, and adoption by the industry as a whole doesn't necessarily mean all software vendors have yet had a chance to comply.

Additionally, we're always hearing about "great new tools" that are "easy to use" and all we have to do is "drag and drop" and we're done, making integration a piece of cake. It's never that easy. If it were that easy, you wouldn't be reading this article and this topic wouldn't have so much web space devoted to it, with TheIntegratedLab.com, a site devoted to any aspect of integration of the lab,[5] being just one example (http://theintegratedlab.com/). Because then it wouldn't be an issue any longer—it would be old news and we'd be talking about something else.

References

1. Dr. Robit Khana, Vice President of Marketing for Waters Division, from a November 30, 2010 Waters Corporation Press Release, "Waters Empower 3 Answers Call for a Standardized Chromatography Data System at Enterprise-Level."
2. Ibid.
3. Retrieved from http://www.hl7.org/ on December 21, 2010.
4. Retrieved from http://www.pistoiaalliance.org/ on December 21, 2010.
5. Retrieved from http://theintegratedlab.com/ on December 21, 2010.

Gloria Metrick *is the owner of GeoMetrick Enterprises (http://www.geometrick.com/), which provides consulting services for Laboratory Informatics projects. She is the author of "Out on a LIMS®: The Newsletter for People Who Risk Life and LIMS™ on a Daily Basis" and "Out on a LIMS®: The Blog for People Who Risk Life and LIMS™ on a Daily Basis" as well as being a contributor to TheIntegratedLab.com. She is also a member of the 2011 SmartLab Exchange Advisory Board (http://www.smartlabexchange.com/Event.aspx?id=369178). Gloria can be contacted for projects, speaking engagements or writing requests at GeoMetrick Enterprises, +1.781.365.0180, or Gloria@GeoMetrick.com.*

ISOLATION OR CONTAINMENT WITHOUT CLASSIFIED SPACE

by Angelo DePalma, Ph.D.

Glove boxes are enclosed, controlled-environment chambers that serve as isolation or containment spaces for laboratory work. Most glove boxes operate in isolation mode, under positive pressure, to protect samples or experiments from the environment. More costly containment boxes shield operators from the process.

Brian Coy, director of marketing at Coy Laboratory Products (Grass Lake, MI), defines a glove box as "any enclosed, anaerobic work area that provides glove-only access." Thus, level-3 biosafety cabinets fall into this category but fume hoods do not.

Glove boxes are a mainstay of biology labs, but Mr. Coy says that demand from the biofuels industry has been brisk with renewed interest in alternative energy. Biofuel projects begin with anaerobic bacteria, which are grown in controlled environments boxes and assayed for their ability to break down organic matter and produce hydrocarbon fuels under nitrogen atmosphere. "This uptick in demand was not due to any technologic breakthrough; it was purely a result of new funding," Mr. Coy notes.

Containment vs. isolation

Mike Buckwalter, publications director at Terra Universal (Fullerton, CA), cautions potential customers to be aware of the differences between containment and isolation and make sure they don't confuse one for the other. "They are not interchangeable," he says.

> "Containment involves a lot of valve actuation, pressure monitoring, and airflow management to assure safe conditions."

In the glove box marketplace, Terra's strength has traditionally been isolation units. But the company has received orders for sophisticated containment boxes as well. One was for conducting experiments on a highly pathogenic, anaerobic strain of tuberculosis. Terra provided the anaerobic environment in a containment-type design in which all manipulations occurred under negative pressure.

Mr. Buckwalter says his company has seen a recent resurgence in orders for glove boxes, with a trend toward simpler, lower-cost systems vs. the more technologically sophisticated boxes that were previously popular. The technology dropoff "could be due to the bad economy, where large R&D projects or even manufacturing campaigns falling into the capital expenditure category have been mothballed or postponed."

Containment is significantly more expensive than isolation for several reasons. For most isolation applications, where the object under study is not pathogenic, leakage from the box to the lab occurs without dire consequences. In the case of the TB application, a leak could sicken or kill operators. Isolation systems also require a strategy to vent the airborne contents of the glove box to house exhaust in case of a breach or other emergency.

Sophisticated containment systems often employ PLC (programmable logic control) systems for automating glove box operation. Many also sport graphical human-machine interfaces that list pressure, humidity, and gas composition and depict which valves are open and closed. "Containment involves a lot of valve actuation, pressure monitoring, and airflow management to assure safe conditions," adds Mr. Buckwalter.

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Keeping them clean

Glove box sterilization is critical for most applications involving organisms, whether pathogenic or not. Glove boxes tend to stay cleaner than simpler tissue culture hoods, but when they become contaminated, they are harder to clean.

Periodic sterilization prevents the viral and bacterial contamination of cell cultures and animal subjects and reduces the likelihood of subsequent infection or cross-contamination in the case of infectious agents.

Hydrogen peroxide vapor is the most efficient way to sterilize a glove box, as the gas penetrates into every corner of the unit. However, the process requires hard-plumbing a gas tank to the side of the glove box, and the gas cylinder must be replaced periodically.

Peroxide is highly caustic, which is bad news for rubber seals and gaskets inside the glove box, and especially dangerous for operators. For these reasons, buyers who desire sterilization are increasingly specifying ultraviolet-C (UV-C) disinfection. UV-C is a short-wavelength irradiation that includes the germicidal 253.7 nm wavelength. UV-C is also hard on rubbers and plastics, but since almost any material, including glass, is a suitable UV shield, irradiation poses no threat to operators. Unfortunately, unlike hydrogen peroxide, UV disinfection is a line-of-sight technique that only disinfects areas that are illuminated.

Specialized containment apps

In contrast to Terra, Coy Laboratory Products has experienced greater demand for containment-type boxes, particularly for formulating chemotherapy agents, to support bioterrorism research, and for law enforcement agencies that handle suspected bioterrorism agents.

The chemotherapy angle is an offshoot of the recently revised USP 797, a standard for formulating pharmacies promulgated by the U.S. Pharmacopoeia. The de facto regulation states that pharmacists who mix sterile drugs at their place of business must do so either within a laminar flow hood inside a clean room, or in a much less expensive glove box.

One such box, specifically designed for non-biohazard drugs, is called a compounding aseptic isolator. A different glove box, the compounding aseptic *containment* isolator, is reserved for highly potent or toxic drugs.

Thus the two principal models designed for formulating pharmaceuticals recapitulate the larger glove box industry's main themes of containment vs. isolation.

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SURVEY SAYS: ARE YOU IN THE MARKET FOR A GLOVE BOX?

Glove boxes go by many different names and are used for many purposes. Their essential attribute is the ability to maintain a completely separate environment from ambient.

Glove boxes are completely closed compartments ranging in size from a few cubic feet to several hundred cubic feet. Glove boxes differ from other safety enclosures in two significant respects: users can introduce articles into glove boxes and manipulate them inside through ports fitted with gloves, and glove boxes typically use a specialized atmosphere.

Glove boxes consist of the main chamber, two glove ports and an air-locked antechamber for introducing labware and materials into the box. Opening the antechamber without taking preventative measures will introduce ambient atmosphere into the working chamber. This is dealt with by providing vacuum-assisted purging with the desired atmosphere. Sensitive applications will often add sensors for oxygen and/or water, with some type of scavenger mechanism to achieve ppm concentrations of those species. In regulated industries, the purge cycle is software-controlled and documented to ensure that materials are handled to specification.

Over 60% of labs surveyed have at least one glove box.

None	38%
1	23%
2	13%
3	7%
4	4%
5 or more	16%

Glove boxes are most often found in biochemistry and biology labs, but all scientific and engineering disciplines use glove boxes for one application or another.

Biochemistry and biology	18%
Hospital/Medical center	16%
Chemical	15%
Pharmaceutical industry	9%
Microbiology	7%
Environment	5%
Food and food-related products	5%
Polymers and plastics	5%
Other	20%

Glove boxes are most commonly used when a process or operation requires low humidity or low oxygen levels, or when either the product/process must be protected from the lab environment or the operator needs protection from the process or operation. "Isolation" and "containment" with respect to glove boxes are often used. Isolation is meant to protect the product, while containment refers to protecting the operator and/or environment. Isolation normally involves positive pressure, while containment operates under negative pressure. Twenty-nine percent of respondents use a glove box for working with dangerous, toxic substances.

Working with dangerous, toxic or moisture-sensitive substances	29%
Cell culture	13%
Air- or moisture-sensitive analyses	12%
Storage and processing of chemicals, metals, calcium, etc.	9%
Maintaining cleanliness for microchips or fabricated parts, sensor calibration	9%
Anaerobic bacterial growth	9%
Virus production	4%
Compounding pharmacy, vaccines	4%
Other	11%

Close to fifty percent of respondents work with vendors in manufacturing a custom glove box, but most needs are served by off-the-shelf designs, with or without add-ons. Many respondents integrate standard modules with additional functionality, for example, atmosphere filter system, dry gas purge system, gas filtration, controllers, sensors, automated doors, heating and cooling capability and humidity control.

Workbench	20%
Atmosphere filter system	16%
Dry gas purge system	13%
Humidity controller	12%
Oxygen controller	12%
Moisture trap	11%
Chiller	6%
External mount lamp	4%
Other	4%

Over fifty percent of respondents' annual glove box budgets for parts, maintenance, service and repairs is less than $1,000.

$0 - $1,000	52%
$1,000 - $2,500	14%
$2,500 - $5,000	8%
$5,000+	6%
Don't know	19%

On average, most respondents have their glove box for 12 years. Over 95% of respondents are satisfied with the performance of their glove box in getting the job done for the intended purpose with very little maintenance. Thirty-five percent of respondents expect to purchase a glove box within the next year. The main reason for the purchase is to accommodate additional projects or increase capacity.

Addition to existing systems, increase capacity	40%
Replacement of aging glove Box	22%
Upgrading existing glove box	14%
Setting up a new lab	12%
First-time purchase of a glove box	9%
Other	3%

Materials of construction are a significant glove box feature. Acrylics are transparent and inexpensive, but life science applications that demand sterility require boxes made of sturdier materials that hold up better to cleaning and constant use. Stainless steel is most easily treated with a variety of cleaners and is the most durable material of construction, but is the most expensive. Most pharmaceutical glove boxes are made of stainless steel with sanitary fittings, as is required by Good Manufacturing Practices.

	Currently using	Purchasing
Vinyl	23%	26%
Aluminum	12%	10%
Polymer	30%	22%
Stainless Steel	26%	29%
Other	10%	14%

Price is the principal factor affecting most glove box purchase decisions, as most of the respondents have to watch their budgets.

Price	44%
Ease of use	41%
Safety	33%
Low maintenance/operating costs	31%
Ease of installation	28%
Availability of accessories/options	21%
Product performance for intended application 19%	14%
Ergonomic design	18%
Energy efficient	14%
Service and support	13%
Reputation of manufacturer	13%
Small footprint	12%
Warranty	11%
Other	5%

The price of a glove box ranges from $500 to $50,000, from simple plastic boxes to sophisticated mini clean rooms that meet ISO sterility requirements.

Less than $1,000	53%
$1,000 - $5,000	21%
$5,000 - $15,000	9%
$15,000 - $25,000	6%
$25,000 - $50,000	4%
$50,000+	8%

To see the complete survey results and a list of vendors, please visit www.labmanager.com/glove-boxes

Completed Surveys: 207

BASIC "UTILITIES" FOR HEATING, DRYING, PROCESSING

by Angelo DePalma, Ph.D.

Most laboratory workers view ovens almost as utilities, using them principally for drying glassware and heat-resistant equipment, regenerating desiccants and catalysts, gently heating samples (and sometimes whole experiments), and curing or preparing materials and composites.

Common laboratory ovens maintain temperatures ranging from just above ambient to about 300° C and are ubiquitous in chemistry, biology, pharmaceutical, forensics, and environmental labs. Units operating at temperatures above 300° C are normally dedicated to specialized applications in physics, engineering, electronics, and materials processing.

> "Temperature control may be as narrow as a fraction of a degree or can span several degrees."

Typical lab ovens take up four to six cubic feet of space and are located on benchtops or stacked atop another oven; other units, particularly for centralized glassware washing and storage, may be much larger.

Oven applications are expanding beyond simple drying: chemists use ovens for thin film battery drying and solvent removal; the food industry desiccates samples inside ovens to determine moisture content; electronics and defense labs process integrated circuit boards and other components inside ovens; materials, pharmaceutical, and nanotechnology labs use ovens to remove solvents or waters of hydration from powders or chemicals; mechanical engineers subject parts to heating and stress to test durability and service life in temperature-programmed ovens; and optics and glassware labs subject parts to annealing in tightly temperature-controlled ovens.

"Lab ovens have evolved to suit the demanding needs of end users who require even more precise temperature control, heat distribution, and added safety features," explains David Craig, North America sales manager at BINDER (Great River, NY). "Laboratory oven purchasers can work in a variety of industries and utilize ovens in many different ways."

Temperature control, precision temperature distribution, and temperature ramping/programming are desirable features in an oven but not required for common drying applications. High-end ovens control temperature at 27 points inside the box, whereas ASTM standards require only nine-point control. Similarly, temperature control may be as narrow as a fraction of a degree or can span several degrees.

Temperature control

According to Mr. Craig, the single most important consideration for a potential oven purchaser is the type of temperature controller employed. Simple on-off controllers work through a thermostat to turn the oven on and off when the temperature is below or above the setpoint temperature, respectively. Proportional controllers are sophisticated versions of on-off controllers that slow down heating as the setpoint temperature is reached, thereby preventing the unit from constantly turning on and off.

By far the most sophisticated controller is the PID (proportional integral derivative) controller. PID controllers are highly desirable for applications that demand precise temperature control and uniformity.

PIDs measure the discrepancy between the actual temperature and the setpoint, then calculate how long to keep the heating element on to reach the setpoint temperature without overshooting it. While PID controllers take a bit longer to bring the oven to the desired setpoint, they do not constantly overshoot the target temperature as less sophisticated controllers do.

Other influencing factors

Beyond—perhaps before—considering choice of controller, buyers need

to assess which features they absolutely need. An oven dedicated to simple drying of lab equipment does not require sophisticated controls, temperature ramping, or precise temperature distribution. However, ovens used for high temperatures should be capable of low-temperature operation as well. "It's possible for one oven to do the work of several ovens, saving money and lab space," Mr. Craig observes.

Where lab space is at a premium, purchasers should also consider the unit's size and stackability. But perhaps the most often overlooked features are related to safety, for example, automatic turnoff if the unit overheats, susceptibility to corrosive materials when applicable, and flaps for venting solvent and chemical fumes.

Thermo Fisher Scientific (Asheville, NC) recently surveyed their oven customers to ascertain their preferences and usage. According to Konrad Knauss, oven product manager, Thermo's study uncovered a features wish list with at least one surprise.

"Until recently almost nobody cared about energy efficiency, but today it's high on the list of desirables," says Mr. Knauss. "Perhaps not for end users, but definitely for lab supervisors and facility managers." Another emerging trend, according to Mr. Knauss, is increasing demand for high-temperature ovens from engineering and materials processing labs.

"It's possible for one oven to do the work of several ovens, saving money and lab space."

Other features cited were small footprint, the ability to conduct sophisticated heating protocols ("particularly in pharmaceuticals, where everything is documented"), monitoring, and data logging. Yet, despite the call for more features, users valued a straightforward user interface. User-friendliness is a common trend in lab instrumentation and will grow in importance as labs are increasingly staffed with students, interns, and contract personnel, Mr. Knauss tells *Lab Manager Magazine.*

Price is naturally a decision point for ovens, but the importance of acquisition cost depends on who is being queried. Since ovens are considered utilities, end users tend to have less sway in purchase decisions than they might for spectrometers or chromatographs.

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OVENS:

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SURVEY SAYS: ARE YOU IN THE MARKET FOR A LAB OVEN?

Nobody gets excited about lab ovens, but they are definitely essential lab components. Ovens are found in almost every industrial, research and development laboratory. Applications include drying lab ware and keeping it ready for use; sterilization; conducting above-ambient, constant-temperature experiments; drying reagents and desiccants; annealing and curing materials; component and materials testing, and many others.

Basic components common to all general-purpose lab ovens are an electric heating coil, insulation, temperature measurement and/or recording, and a circulation mechanism that provides even temperature distribution. Advanced features include double doors, digital control and temperature recording (useful for regulated industries requiring documentation).

Oven configurations include bench or cabinet styles, conveyor, and vertical. Cabinet ovens are used for batch processing, while conveyor designs—common with medium- to industrial-sized process applications—provide continuous heating of many samples.

Despite the simplicity of lab ovens, manufacturers compete on numerous second-tier features, from temperature programmability, cooling-down capability, alarms, shelving options, monitoring and data logging.

Eighty-five percent of respondents have at least one oven in their lab.

1	20%
2	20%
3	17%
4	10%
5 or more	19%
None	15%

Ovens are found in almost every industrial, research and development laboratory. Applications include drying lab ware and keeping it ready for use; sterilization; conducting above-ambient, constant-temperature experiments; drying reagents and desiccants; annealing and curing materials; component and materials testing, and many others.

Biochemistry and biology	16%
Environmnent	13%
Chemical	15%
Quality control	9%
Pharmaceutical industry	5%
Hospital/medical center	8%
Microbiology	9%
Food and beverage	7%
Metal industry	3%
Other	18%

Applications range from low-tech glassware drying to sample drying and incubation, equipment sterilization, evaporation, hardening/curing, tempering, stability testing, aging, baking, annealing, brazing, sintering, burn-off of organics, melting, heat-treating and hot-pressing. Most basic lab uses employ oven temperatures from just above ambient to several hundred degrees Fahrenheit, although ovens used for materials processing reach temperatures in excess of 1000°F. Kilns, speciality ovens used to process ceramics, may reach 2400°F.

Heating and drying	50%
Temperature-linked experiments	19%
Evaporating	9%
Sterilization	7%
Baking	5%
Annealing	2%
Other	8%

In recent years, users' preferences have shifted from gravity ovens without fans to fan-based, forced-air units. Fans distribute heat more rapidly on startup and users are becoming less willing to wait for units to heat up. Oven configurations include bench- or cabinet-style, conveyor and vertical. Cabinet ovens are used for batch processing, while conveyor designs—common with medium- to industrlal-sized process applications—provide continuous heating of many samples. Circulation ovens (the most common in labs) come in two types: gravity convection or mechanical (forced) draft.

Most common types of ovens found in a lab:

Natural convection
Fanned convection
High-temperature
Clean room oven
Chamber furnace
Tube furnace
Vacuum furnace
Nitrogen purge oven

Uneven temperature distribution often arises in some ovens, which may not be an issue for glassware drying ovens, but many introduce variability for materials curing or biological cell culture. As a result, temperature monitors are the number one component used with lab ovens.

Controllers/programmers	23%
Over-temperature protection	22%
Temperature monitoring	34%
Data logger	10%
Chart recorders/DAQ	7%
Other	4%

Forty-five percent of respondents' annual lab oven budget for parts, service and repairs is less than $1,000.

$0 - $1,000	45%
$1,000 - $2,500	16%
$2,500 - $5,000	12%
$5,000+	10%
Don't know	17%

Forty percent of respondents expect to purchase a lab oven within the next year and have a budget of $5,000. The main reason for this purchase is to replace an aging oven.

Replacement of aging oven	40%
Addition to existing systems; increase capacity	28%
Setting up a new lab	22%
First-time purchase of a lab oven	5%
Other	5%

Over 90% of the respondents are satisfied with the performance of their lab oven in getting the job done for the intended purpose with very little maintenance. The respondents whose lab ovens were old and lack all the features of a newer oven expressed dissatisfaction. On average, most respondents have their lab oven for 7 years.

Despite the simplicity of lab ovens, in addition to price, manufacturers compete on numerous features from accurate temperature without overshoot, time to heat up, reliability, independent temperature safety or shutoff, temperature programmability, cooling-down capability, alarms, shelving options, monitoring, and data logging.

Labs concerned about operating costs can now select ovens that minimize electricity consumption. A highly efficient oven in constant use can save thousands of dollars over the life of the appliance. Energy efficiency is a complex characteristic based on type of heating and circulation, anticipated usage, temperature range, insulation, door closing, gasket options and other factors. Insulation also provides a measure of safety for operators.

Larger labs primarily interested in glassware drying are better served by large ovens with customizable configurations than by high-tech units with advanced controls. Materials testing or pharmaceutical development groups involved in drying or curing should focus on temperature stability/uniformity and perhaps automated recording and diagnostics. Vendors recommend that users should modestly overbuy on temperature range to ensure that their applications will easily be covered.

Price	73%
Low maintenance/operating costs	70%
Ease of use	62%
Safety	50%
Temperature ranges ambient +40°C to 200°C/250°C	38%
Service and support	36%
Warranty	35%
Energy efficient	31%
Smallest footprint possible with a large interior	26%
Controlled airflow to provide uniform temperature heat distribution	26%

To see the complete survey results and a list of vendors, please visit www.labmanager.com/ovens

Completed Surveys: 559

ROBOTICALLY CONNECTING MICROPLATE OPERATIONS

by Angelo DePalma, Ph.D.

Experimentation in microtiter plates exemplifies the two dominating trends in the life sciences: higher throughput and smaller sample size. Microplate handlers are the robotic glue that connects microplate readers, liquid dispensers, plate storage systems, plate washers, and other equipment essential for microplate-based research and development. Handlers transfer plates between and among these components to allow semi-automated to fully unattended assays.

Microplate handlers range from linear, benchtop models to more complex instruments with articulating arms. Linear handlers can integrate with between two and four adjacent instruments, such as liquid handlers, bulk liquid dispensers, centrifuges, incubators, microplate readers, labelers, or sealers. More complex microplate handlers with articulating arms have a larger, cylindrical work envelope and can automate more sophisticated laboratory workflows within contained, environmentally controlled environments. Traditional microplate-based applications include drug discovery, cell-based screening, and compound management. A rapidly emerging application is automated microplate-based sample preparation for next-generation genetic sequencing.

In the early days, microplates varied in size and dimensions. Today they conform to Society of Biomolecular Sciences standards; this allows any handler to process virtually any plate.

While many labs still transport plates manually, robotic handlers have become essential for high-throughput applications such as drug screening and medical diagnostics. Handlers have also found applications in materials, environmental, and forensics laboratories, and in low- to medium-throughput work where unattended operation is desirable.

Automation requirements vary widely among users of microplate instrumentation, and many potential users demand flexibility. "Some laboratories need total control of all their microplate-based assay processes and use major robotic handling systems," says Lenore Buehrer, product manager at BioTek Instruments (Winooski, VT). "Others need semi-automated systems where a single process, like dispensing, is automated but the plates are then manually transferred to the detection systems. These users are content with using the plate handler for just one or two operations."

> "With many users installing plate handlers within biosafety cabinets, demand for small-footprint handlers is strong."

What to look for

Flexibility, automation, throughput, software, and instrument size are factors potential buyers should consider when acquiring a plate handler. Size is always a consideration for labs short on space. But with many users installing plate handlers within biosafety cabinets, demand for small-footprint handlers is strong.

Flexibility relates to how, and how much, a plate handler interacts with surrounding equipment and processes, but there's a price point component as well. With entry-level microplate handlers costing $20,000 or more, "users want the greatest functionality they can get for their budget," Ms. Buehrer notes.

"Potential buyers should consider the speed, expandability, software compatibility, and space requirements of microplate handlers," says Dino Papoutsis, senior product manager at Agilent (Santa Clara, CA). Labs planning for a variety of assays or assays of increasing complexity may consider articulating arm handlers with a larger work envelope to enable integration with a larger number of devices.

Scheduling software is a critical component of automated microplate handling. To facilitate workflows, software

should be compatible with a wide variety of instruments. Purchasers should also carefully consider the space requirements for microplate handling devices, as space requirements vary from modular benchtop models to standalone containment-based systems.

Plate handlers as robotics

"Through the years, microplate handler evolution has pretty much followed the evolution of robots in the workplace," notes Mr. Papoutsis. Thus, the two have tracked closely from simple pick-and-place devices to the current practice of flexible automation. This trend toward greater flexibility and functionality recapitulates the evolution of non-robotic instrumentation as well.

Robotic systems may be purchased off the shelf like other lab instruments, but the components of personalization or application specificity with robotics are absent in markets for spectrophotometers and chromatographs. "Today, quite sophisticated articulated robotics are designed from the ground up to meet the particular demands of the biotech market. These posses a range of capabilities and prices that allow most laboratories to test the waters with minimal risk," Mr. Papoutsis adds.

"Scheduling software is a critical component of automated microplate handling."

Supporting this trend is the distinctly modular approach that many laboratories take to automation.

"They look for simple, labor-intensive tasks, such as microplate sealing, microplate barcode labeling, or plate reading and use a simple microplate handler to support one or more of these operations. The automation of simple tasks provides walk away time that eventually pays for the robotics platform, and convinces the team that they have made the right choice." When these benefits accrue, second or third plate handlers may be added to automate workflows even further.

Flexibility provides the technologic basis by which fast, compact, scalable lab automation modules can grow and change with the needs of each laboratory, ranging from compact, benchtop workstations to sophisticated containment-based systems that offer environmental control. "As needs change, most modules are easily repurposed. Today's investment in laboratory automation modules provides more utility, reliability, and benefits than ever before," Mr.Papoutsis says.

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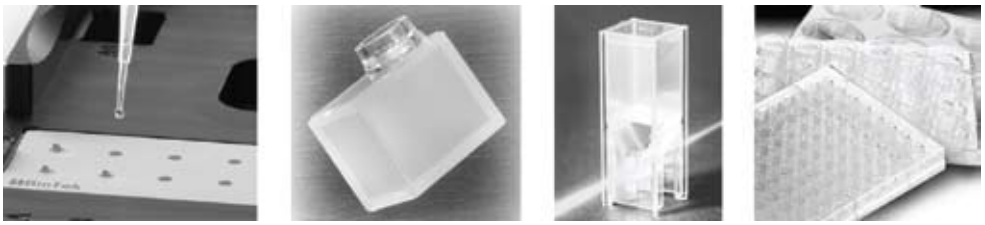

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SURVEY SAYS: ARE YOU IN THE MARKET FOR MICROPLATE TECHNOLOGY?

The microplate has evolved over the past 60 years into an indispensable piece of equipment used in many labs today. In 2007, HTStec estimated market growth of microplate instruments at about 6 percent per year, with an average high-throughput system costing anywhere from $65,000 to $110,000. (Note: simple absorbance readers for individual plates cost significantly less). Large pharmaceutical and biotech companies purchased 23 percent of systems, academic labs 25 percent, and small pharma/biotech 52 percent.

Microplates have become common lab ware in life science and medicine. Sixty-one percent of the labs surveyed use microplate technology; another 11% plan to make a first-time purchase within the next 12 months.

Microplate readers	39%
Microplate washers	19%
Microplate dispensers	9%
Microplate handlers	8%
Microplate robotics	8%
Microplate stackers	7%
Microplate sealers	7%
Other	2%

Microplate instruments are used widely in research, drug discovery, bioassay validation, quality control and manufacturing processes. Their usefulness lies in their ability to reduce, if not eliminate, the amount of human subjectivity needed to evaluate plate contents.

Biotechnology	29%
Education, Research	24%
Pharmaceutical/Medicine	18%
Clinical/Diagnostics	17%
Chemical industry	5%
Environmental	2%
Food and beverage industry	2%
Other	3%

For a laboratory involved in routine assay development and screening, achieving higher throughput depends on the ability to process multiple batches of assay microplates accurately and swiftly. Vendors offer systems for high-throughput primary screening, where labs need to process a large number of microplates, as well as for secondary screening, where labs process a large number of different assays.

Assay development	19%
Biomolecule concentration measurement	12%
Bioassay validation	11%
Biomarker research	10%
Cell biology	8%
Compound investigation	6%
Disease studies	6%
PCR setup and cleanup	6%
High-throughput drug screening	5%
DNA quantification	4%
Quality control	4%
Proteomics	3%
Stem cell research	2%
Other	3%

Microplate reader detection modes define the instrument's experimental capabilities, while the optics determine spectral selectivity. Detection modes include top- and bottom-read fluorescence, fluorescence polarization, time-resolved fluorescence (TRF), time-resolved fluorescence energy transfer (TR-FRET), AlphaScreen, absorbance and luminescence. Absorbance and fluorescence intensity constitute more than half of all applications.

Absorbance reader	35%
Fluorescence reader	19%
Multi-detection reader	17%
Microplate spectrophotometer	15%
Luminescence reader	13%
Other	2%

Labs have added components to their microplate instruments that are designed to perform specific functions, such as plate piercing, sealing, barcoding and centrifugation. The top two components used in the labs of the respondents are centrifugation and barcode scanners.

Centrifugation	30%
Barcode scanner	21%
High-speed robot	13%
Additional stacker cassettes	12%
Labeling and sealing	12%
De-lidding stacker cassettes	4%
Other	8%

Automated, unattended, reliable operation seems to be what most users demand from their microplate management systems. In order to drive down reagent costs, most labs in industry have migrated from screening in a 96-well format to screening in a 384-well format. A few have also moved to an even more miniaturized platform, using 1,536 wells.

Automate repeatable tasks and ensure reproducible results	20%
Avoid the need for increasing head count in the future	12%
Automate unattended repeatable tasks and ensure reproducible results	10%
Improved data quality	10%
Increased sophistication of experimental techniques	9%
Increasing sample throughput	7%
Prepare and test patient samples	7%
Handling devices for high-throughput screening of samples	6%
Improve our ability to meet regulatory requirements	6%
Incremental improvements in capability	6%
Improve the consistency/reliability of procedure execution	4%
Intellectual Property Management	1%
Other	1%

To increase microplate capacity, labs are integrating two or more instruments. Laboratory equipment vendors may sell stand-alone microplate instruments, but most labs prefer purchasing the robotics already integrated with readers, stackers and other instruments.

Microplate readers	53%
Microplate washers	28%
Microplate robotics	19%
Microplate handlers	14%
Other	4%

Flexibility (available detection modes), performance (sensitivity, throughput) and cost are prime considerations in microplate reader selection, although the order of preference may differ for each market. Pharmaceutical screeners typically value throughput as their top criterion, while academic researchers may be more satisfied with lower throughput but high flexibility, particularly if it means a lower overall cost.

Additional things to consider in making a purchase:
The number of people who will be using the instrument, and your desired throughput; the number of parameters required for read-out; whether or not the assays will have an endpoint; whether or not the results will be acquired over a time course; and the desired plate format, as plates can range from 96 wells up to 1,536 wells.

Accuracy	87%
Price	81%
Service and support	78%
Performance (sensitivity and throughput)	78%
Ease of implementation	73%
Reliability	72%
Total cost of ownership	71%
Flexibility (available detection modes)	68%
Software for data collection/analysis to documentation and validation to LIMS	57%
Availability of trained people to support programs	55%
Ability to effectively plan programs to work with all types of microplates	48%
Speed read mode	47%
Add-on functionality and upgrade capability	43%
Small footprint/size	41%
Input special plate configurations	32%
Robotic integration	23%

The biggest challenge in the implementation of a microplate management system is the funding. Prices can range from under $10K for a stand-alone instrument to $100,000 for more complex systems.

Funding	38%
Product & technology evaluation/selection	12%
Getting management support	8%
Finding trained personnel to manage/implement project	7%
Validation / meeting regulatory requirements	7%
Selling the benefits of microplate technology	6%
Planning	5%
Project management	5%
Other	12%

To see the complete survey results and a list of vendors please visit www.labmanager.com/microplates

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LEMUR RESEARCH CENTER UPDATED AND EXPANDED

TWO NEW BUILDINGS THAT FOCUS ON EFFICIENCY AND FLEXIBILITY, IMPROVING LIFE FOR LEMURS, KEEPERS AND RESEARCHERS

Life has improved dramatically for 140 diurnal lemurs and the husbandry staff and researchers who care for and study them, as a result of two new state-of-the-art facilities at the Duke Lemur Center (DLC), a refuge owned by Duke University that houses the world's largest collection of lemurs outside of their native Madagascar.

> "The buildings have made a great difference to our functionality and have improved life for the lemurs and the staff."

Prior to the completion of its two new structures, the DLC, a world-renowned sanctuary tasked with noninvasive research and conservation of lemurs and other prosimians, had outdated and undersized, though operational, facilities. As part of a $10.4 million project, architecture firm Lord, Aeck & Sargent developed a long-term master plan for the DLC and designed both new lemur facilities, which are targeting LEED certification from the U.S. Green Building Council.

The single-story heated facilities comprise the Releasable Building, which houses 60 lemurs allowed to free-range—when weather permits—in the DLC's fenced 69-acre Forest Stewardship Council (FSC)–certified Duke Forest, and the Semi-Releasable Building, which houses 80 lemurs, a mix of geriatric and other lemurs that for physical, behavioral or social reasons have limited free-ranging capacity. This building is also designed with research facilitation in mind.

"To update and expand our facilities, we wanted an attractive, sustainable design that would be flexible, functional and efficient both for cleaning and for shifting animals from one part of the buildings to another when they're sick or being used for observational research," said Anne Yoder, DLC director. "The Lord, Aeck & Sargent team designed two professional-looking facilities that have balanced all of our aspirations. The buildings have made a great difference to our functionality and have improved life for the lemurs and the staff."

▼ *The Duke Lemur Center's new Semi-Releasable Building houses 80 diurnal lemurs.* *Photo credit: James West/JWEST Productions*

Efficient designs

"When we began working with the DLC staff, we learned how inefficient and time-intensive it was for the keepers to feed, care and clean up after the lemurs," said Lauren Rockart, a Lord, Aeck & Sargent senior associate who served as project manager for the DLC buildings. "The new buildings needed to streamline these activities, so we designed both with animal housing wings radiating from a central core area that houses common resources such as a food prep kitchen for the keepers to prepare and portion food, a veterinary exam room, a laboratory, a bathroom with shower, and storage spaces for animal enrichment items and researchers' equipment. Each wing houses 20 lemurs along with dedicated storage for cleaning and keeper supplies. Sanitation in each wing is self-contained to promote the best practices of hygiene."

Rockart noted that the laboratory in the Releasable Building is a dry lab used by DLC researchers to record their observations of the free-ranging lemurs. The Semi-Releasable Building has a wet lab with a fume hood, chemical storage and ventilation to support biological and chemical analysis. The Semi-Releasable Building's core houses two hibernation rooms currently being used to study hibernation in the DLC's dwarf lemur population.

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Wings' flexible layout creates stimulating environment

"To create a stimulating environment and mimic as much as possible the lemurs' natural habitat, our design team created a flexible housing layout that allows for different paths for the animals to explore," Rockart said. "Each lemur is provided a housing module with 50 square feet of interior space attached to 100 square feet of fenced exterior space via a sliding door that opens whenever the temperature is 50 degrees or higher. There are multiple ways to house groups of lemurs and interesting ways for them to open and close doors to create different pathways from one housing module to another."

The housing modules are grouped into various-sized suites serviced by a double-loaded corridor. This arrangement allows DLC staff to isolate an area from other building spaces to control the spread of disease to or from a suite. Housing unit exterior ceilings and most walls are constructed of vinyl-coated welded wire mesh capable of withstanding repeated cleaning and sanitizing procedures. Some of the walls, however, are solid because some lemur groups don't always co-exist together well.

▲ *Researchers at the Duke Lemur Center use the dry laboratory in the new Releasable Building to record their observations of the free-ranging lemurs.* *Photo credit: James West/JWest Productions*

The housing layout facilitates easy feeding, cleaning and maintenance. Housing modules include human-sized interior module mesh doors with human-only latch operation. There are also keeper runs in each exterior area, with similar entries for humans.

Construction materials emphasize easy maintenance

"The buildings have to be washable outside as well as inside, so we chose concrete insulated sandwich panels as the wall construction system. Coated with epoxy paint on the interior and a concrete sealer on the exterior, they are easily cleaned," Rockart noted. "The panels are 44 feet long by 10 feet high, and glass blocks have been randomly inserted to bring into the buildings lots of dappled-like natural light that mimics light filtering through trees in a forest."

Buildings are sustainably designed

The U.S. Green Building Council's LEED rating system acted as a guide for the sustainable design of the buildings. Some of their water- and energy-saving features include:

- Use of regional construction materials
- FSC-certified wood laboratory casework
- Bamboo accent wall panels in the corridors
- Low-VOC paint sealants
- An energy-efficient HVAC system
- Occupancy light sensors in spaces occupied by humans
- Bicycle racks and preferred parking for low-emission vehicles
- Low-flow plumbing fixtures
- Drought-resistant plantings

Looking to the DLC's future

The completion of the Releasable and Semi-Releasable buildings marks the close of the first phase of the DLC's master plan. Over the long term, Yoder said, the DLC will implement capital campaigns to fund another building for free-ranging lemurs; improved nocturnal housing for the Center's aye-aye lemurs; better veterinary and research space for cryopreservation; and a visitor's center with an auditorium, displays and the ability for visitors to take self-guided tours.

The project team

The Duke Lemur Center project team included:

- Lord, Aeck & Sargent (Chapel Hill, NC, office), architect
- Stewart Engineering (Raleigh, NC) – structural engineer, civil engineer and landscape architect
- Affiliated Engineers Inc. (Chapel Hill, NC) – MEP engineer
- Barnhill Contracting Company, Building Division (Raleigh, NC) – construction manager
- System WorCx (Chapel Hill, NC, office) – commissioning agent and LEED administration

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A FUTURE OF RISING REGULATIONS WITH DWINDLING FUNDS

by Bernard Tulsi

U.S. forensic laboratories are reeling from the enfeeblement of city, state and federal budgets. And with substantive regulatory changes slated for 2011, the labs may soon experience alterations in how they are accredited and managed, how their staffers are trained and certified, and how they are funded and paid for their services.

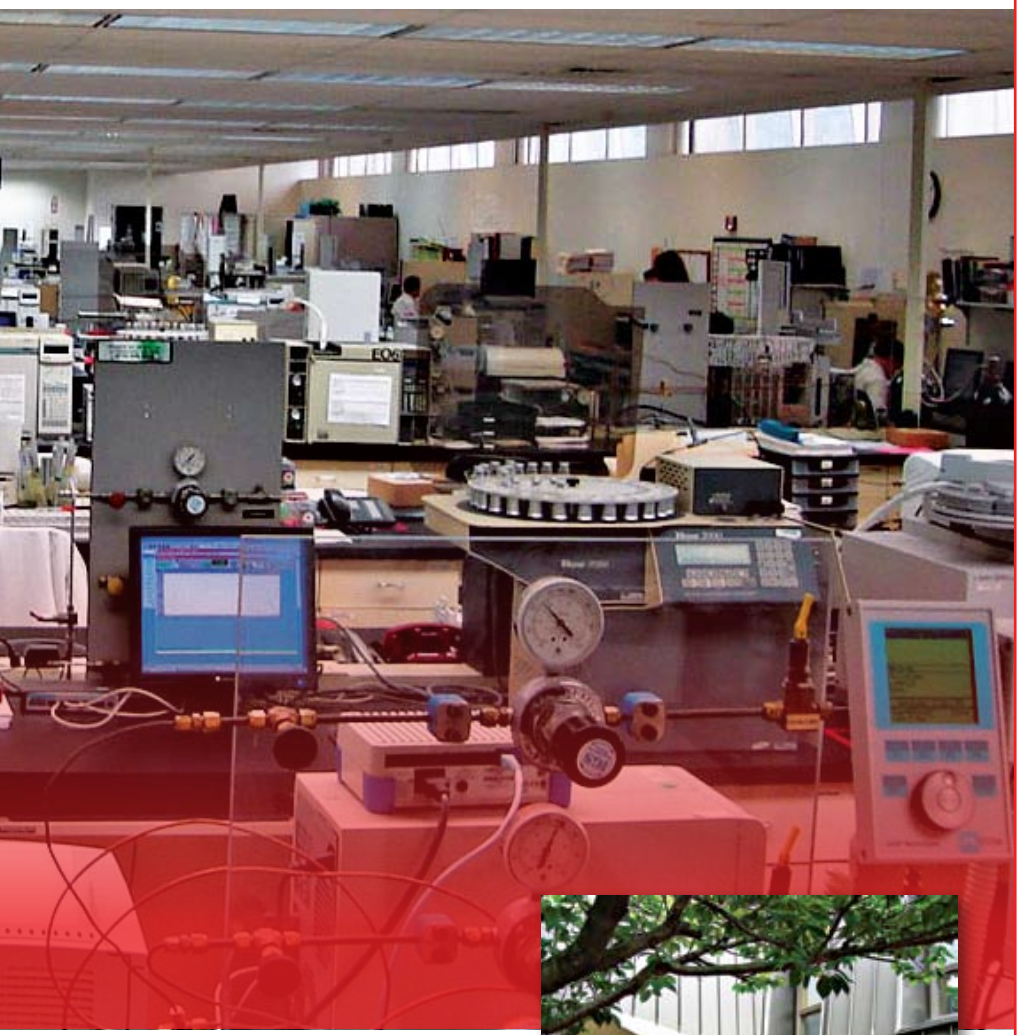
Having received a substandard congressionally mandated report card from the National Academy of Science (NAS) in February 2009, U.S. forensic laboratories are bracing for transformative changes. Following two Senate Judiciary Committee hearings, Chairman Senator Patrick Leahy (D-VT) plans to introduce new legislation that will require all labs receiving federal funds to become certified and meet proficiency, education and training standards. The White House is also expected to weigh in on the new legislation.

Still, not all labs are taking issue with the forthcoming requirements. "We have been satisfying those requirements for a long time now—our labs for 20 years and our staff members for 30 years. Private labs don't have many ways to prove their worth to the forensic community outside of accreditations and certifications," says Dr. Robert Middleberg, VP Quality Assurance, Lab Director and Forensic Toxicologist, NMS Labs, Willow Grove, PA.

He says that it will serve forensic labs well to accept the need for accreditation and certification but concedes that substantial expenses are involved in the form of fees to accrediting agencies as well as for the manpower, time and resources needed to maintain the accreditation status.

"I believe that the prevailing discussion on the state of the labs is necessary. It is clear that forensic labs don't have the same level of experience, training, support and education available to academic research, diagnostic, medical and industry labs—and it should be no surprise, therefore, that they are not at the same caliber as the labs in those other fields," says Dr. Karl Reich, Chief Scientific Officer, Independent Forensics Laboratory, Hillside, IL.

"There are few forensic R&D departments and few or no PhD-



level scientists in the field, and masters-level programs are not structured from an original science R&D perspective and they are not funded well—so it is inevitable that they will not measure up to the required standards," says Reich.

"I have reviewed the NAS report and participated in several discussions on this subject. Basically, the findings recognized some shortcomings in the processes and procedures used by forensic labs for some time. I have found that most of the report's positions were useful and welcome information," says Ronald Singer, Technical and Administrative Director, Tarrant County Medical Examiner's Office, Fort Worth, TX, and a past president of the 6,000-member American Academy of Forensic Sciences.

▲ *Exterior of NMS Labs, Willow Grove, PA.*
Photo credit: Laurie Caubet

Even though they, like the NAS report, acknowledge that some forensic labs perform below par and should be required to shape up, lab chiefs like Middleberg, Reich, Singer and others who have kept their labs in order have expressed disappointment in what they

consider a broad-brush approach by the NAS reviewers, which paints everyone into the same picture.

Singer notes, "There were lots of knee-jerk reactions on all sides to the NAS report. What is being overlooked is the report made it clear that it was not passing judgment on the techniques currently used in the field. Instead, it points out that the techniques have not been validated in most cases and that basic research to ensure overall scientific validity was needed. In addition, the report calls for standardization of terminology and reporting, which are tremendously important."

▲ *NMS Labs' LC-MS instruments.*
Photo credit: Laurie Caubet

Charged with key responsibilities in the criminal justice process, forensic labs have grown from a mere 100 state and local forensic facilities in the 1970s to more than 1,000 crime labs today, including about 400 with highly sophisticated capabilities, both in private settings and in the 14,000 police and other law enforcement departments in the U.S. Such growth signals the growing importance of scientific evidence in legal proceedings.

One of the fastest-growing areas today is DNA testing, according to Reich. "The field of forensic DNA did not exist much before 1997, and since then some 20 million samples have been analyzed—so, from zero to 20 million in 13 to 14 years represents a dramatic increase in growth," he says. With respect to new technologies, however, compared to other fields of science such as medical diagnostics or research, forensics is nowhere near the front edge of what is happening, says Reich.

Still, despite some of these shortcomings and deficiencies, the U.S. forensics model—lab design, work flow, type of samples, analyses and management structure—has been emulated by many countries around the world, says Reich.

In her book, *Forensic Science Under Siege* (Elsevier, 2007), Kelly Pyrek identified nine types of forensic science examinations: latent prints, documents, firearms, crime scene, explosive and fire debris, postmortem toxicology, forensic biology and molecular biochemistry, trace evidence evaluation, and controlled substances.

To maximize their resources, which are stretched in the current economic downturn, individual forensic labs do not generally offer analyses in every discipline. Based on 2004 statistics, the American Society of Crime Lab Directors (ASCLD) reported that 86 percent of accredited forensic labs

▲ *The Tarrant County Medical Examiner's forensic lab.* *Photo credit: Larry Reynolds*

have the capabilities to analyze controlled substances, 60 percent have the wherewithal to assess firearms and tool marks, 57 percent have trace evidence capabilities, 42 percent have forensic biology and DNA capabilities and 51 percent were equipped to do latent print analyses. This array of capabilities and the nature of the evidence they pursue give forensic labs a unique aura.

"The report calls for standardization of terminology and reporting."

Criminalistics-based sciences such as forensic DNA, trace evidence, serology and drug chemistry do tend to be unique compared to clinical laboratory science, R&D or other laboratory analyses, according to Middleberg. "We have always considered the field to be cool—even before the current popular TV shows. As a large, well-known private lab, we were involved in several high-profile poisoning, DNA and other cases across the country. We have worked on cases involving high-profile actors, actresses, political figures and athletes, among others. We were involved in the first O.J. Simpson trial, and I testified in the first Phil Spector trial a few years ago," says Middleberg.

Like other private forensic laboratories, NMS, in operation for 40 years now, has a fee-for-service business model, although it also does some contract work mostly via government RFPs. The single-location facility is possibly the largest private laboratory in the country providing forensic toxicology services, once labs that provide urine screening for drugs are excluded. In 2010, NMS handled more than 40,000 forensic samples, compared with some larger medical examiners offices in major U.S. cities that handle about 5,000 to 10,000 samples per year, on average, including DUI cases. NMS operates in multiple jurisdictions in all 50 states and also does some international work. "We would love

to grow international business. We recently obtained our ISO 15189 accreditation from the College of American Pathologists," says Middleberg.

NMS serves law enforcement—state, county, municipal and federal police—and legal agencies such as district attorneys' offices. Some states don't have toxicology facilities and must rely on private labs. "The majority of our work comes from other labs that need additional capabilities, and we also get samples on the public health side from medical examiners, coroners and private attorneys. We do not accept samples from the citizenry at large," says Middleberg.

▲ *The Tarrant County Medical Examiner's forensic lab's genetic analyzer used in DNA analysis.* *Photo credit: Larry Reynolds*

Competitors include other private labs as well as government facilities. "On the private side we bid against competing labs for contracts, but we don't have a lot of competitors in our space. We are probably the best known and benefit from the momentum of our 40 years of experience," he says. To market its services, NMS participates in key conferences and has sales and marketing teams covering both the U.S. and countries overseas.

Middleberg says, "We have also operated a limited-capability crime laboratory since our inception in 1970, which focuses on forensic biology including DNA, traditional serology, drug chemistry and some trace evidence—we are not doing fingerprint analysis, firearms examination, and pain and arson analysis, although we do some hair and fiber analysis."

"Criminalistics-based sciences ... do tend to be unique compared to clinical laboratory science, R&D or other laboratory analyses."

For its forensic work, NMS uses laboratory developed tests (LDTs), or "home brews," testing large panels of analytes simultaneously to enhance efficiency. "We home-grow our methods, sometimes from ideas in the literature but more often from internal efforts," says Middleberg. In the U.S., the Food and Drug Administration (FDA) has oversight responsibilities for LDTs, and its reach does extend to the forensic area, according to Middleberg. "They do not intervene, however, because they figure that in the forensic arena oversight of the tests is taken over by the courts. This is shortsighted because the courts are poor arbiters of the usefulness and utility of a given test," he says. This has been an ongoing issue, and the NAS report also covers it, he adds.

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"When the courts don't do a good job and the FDA remains uninvolved, labs like ours have to participate in various proficiency tests to ensure that our methods are working. But the reality is that for a number of our tests, we are usually first to market. There are no benchmarks, so we use internal mechanisms and blinds to assess the tests and sometimes share samples with and compare our results with other labs because there are no other options," says Middleberg.

▲ *The Tarrant County Medical Examiner's forensic lab's scanning electron microscope.* Photo credit: Larry Reynolds

Independent Forensics is the only nongovernmental forensics laboratory in the state of Illinois and does only DNA testing. One of Independent's key differentiating features is that it designs, develops, manufactures, sells and supports new products for the forensic market. "No other lab that we know of comes up with new products in this marketplace. A substantial amount of our effort is spent in R&D and in the development of new products. At the same time, we are a fully accredited laboratory able to do forensic DNA, paternity and family relationship studies and other processes with DNA," says Reich, who does an extensive amount of

1. Independent Forensics' RSID (rapid stain identification) strip tests for blood, saliva, semen and urine.
2. Independent Forensics' SPERM HY-LITER microscope package.

▲ *The Tarrant County Medical Examiner's forensic lab's comparison microscope used in trace analysis.* *Photo credit: Larry Reynolds*

expert witness work as well as lab reviews both in the U.S. and internationally.

Independent also uses a fee-for-service model and devotes about a third of its efforts to serving a broad spectrum of customers including attorneys, clients, the general public, law enforcement agencies and medical examiners, among others. Another third to a half of its efforts are aimed at developing and selling new kinds of tests and analyses such as the most scientifically rigorous tests for blood, saliva, semen, sperm and urine. The remainder of its efforts are devoted to expert witness work for the legal profession—mostly but not entirely for the defense in court proceedings.

The Tarrant County Medical Examiner's Office is a regional facility that serves four counties in the state of Texas on a contractual basis. The Tarrant county forensic lab also takes on cases on a fee-for-service basis regularly from about 10 to 12 other counties in north central Texas, and for anyone else with a legitimate need for its services. "We also get cases from all over the U.S. Most of our work involving the coroner's office—bodies coming in for autopsy—are from our region. In general, however, our laboratories are available to anyone in need of our services," says Singer.

Singer explains that this business model seems to be the current trend with medical examiner's offices. He says that city or county crime labs, which are arms of police agencies, are limited to law enforcement and sometimes even to their own parent organizations. "The medical examiner's office, however, is a more independent body and is therefore available to anyone that needs its services," says Singer. He adds that as a result, his organization works for both defense attorneys and for prosecutors (but never for both on the same case) in the immediate region and around the country. "We are funded primarily by the county. We earn revenue from our external services, and those earnings go to the county to help offset the costs of our laboratories."

"Our facility has full-service capabilities. We have a toxicology laboratory and a forensic chemistry laboratory for analysis of drugs, pills, powders and controlled dangerous substances. We are also

INSTRUMENTATION BOOSTS FORENSIC TESTING, EXCEPT FOR DNA

Dr. Karl Reich of Independent Forensics says that DNA testing gets the most attention in the forensics arena, "frankly because of its success." Ronald Singer of the Tarrant County Medical Examiner's Office concurs, "It is certainly the area where most of the money has been going."

Other disciplines such as ballistics, fingerprints and documents among others have been largely ignored, and the technological changes have been far less, says Reich. "There certainly have been improvements, but that is because manufacturers have made their instruments faster, more sensitive, and more specific—there is no comparison between the mass spectrometers of today and those of ten years ago—instrumentation has made a huge difference. But the basic approach, whether quantitative or qualitative, in almost all those other forensic disciplines have remained unchanged," says Reich.

"In forensics, handling large numbers of samples is not simple because we aren't using automated tests. These are complex chromatographically-based tests that involve much manual work. Overall it is not that open to automation, at least, on the front end," says Dr. Robert Middleberg, VP Quality Assurance, Lab Director and Forensic Toxicologist at NMS Labs. He adds that there is scope for automation such as autosamplers but a fair amount of manual processes are still involved.

The main instrumentation for DNA work, capillary electrophoresis, has remained virtually unchanged since its introduction 25 to 30 years ago, says Reich. The manufacturer, Applied Biosystems, has made improvements but the tool still has the same laser, capillary, and heating element, according to Reich. "The main problem is that the software to analyze the results has the same algorithm that was used when the tool was introduced on an Apple Macintosh computer 25 years ago," says Reich.

"So in the forensic world for DNA, there is one instrument only, worldwide. It is available in the single, four, sixteen or ninety-six capillary format, but it is the same instrument, the same technology, technique, software—while it is adequate, it has certainly not been upgraded to take into account what we know now about the science and normal variations in this area," says Reich.

"So my wish list would be for an instrument with much better analytical software and one that is more sensitive. Work is being done to develop such tools, such as on the development of microfluidics instrumentation, but so far they have not received the attention of large manufacturers," says Reich.

Like Reich, Middleberg says that for DNA, "You are limited; their electrophoresis systems provide a great business opportunity for Applied Biosystems."

In analytical chemistry, choices abound. "This is good and bad. When manufacturers compete we get better pricing. We have lots of options in many techniques, and for one of our popular tools, the LC-MS, there are several manufacturers," says Middleberg.

"Many tools and producers, however, do prevent standardization. Five separate labs may have five instruments from different manufacturers for the same tests. They can get different results, and sometimes have to use different processes to get results," says Middleberg. As for his instrumentation wish list, he says, "Right now, what we need is pretty much available."

Singer concurs, "In crime labs, the technology we want is always on the horizon and is always very expensive. The more pertinent question, however, is if the technology we have is adequate for the job we need to do? To that I will definitely answer yes."

With respect to his wish list, however, Singer says that the bigger question has to do with money. He says that by and large while most of the technology is available to meet the needs of crime labs, the biggest hurdle is to acquire the funds to buy them, a hurdle that seems to be getting higher every day.

responsible for the breath-alcohol program in north central Texas. In addition, we have a full-service crime laboratory that includes latent print capabilities, DNA testing, trace analysis and firearms. In addition, because we are a medical examiner's office, we have the added benefit of a full-time forensic anthropologist and an odontologist on staff," says Singer.

Looking ahead, the lab chiefs concur that there is tremendous uncertainty in the field right now and that the forensic sector will have to grapple with greater requirements for accreditation and certification while nursing decreasing budgets. Hiring is already being constrained. Chief toxicologists are losing their jobs; the city of Philadelphia, the Commonwealth of Virginia and several other counties have eliminated the position of chief toxicologist to save money, according to Middleberg.

"The next few years will be bumpy because of a lack of funding from the public sector and could get considerably worse unless the federal government comes up with an incredible amount of money for the forensic services. I am not sure that the picture in the next few years is very rosy…I think it will get a bit scary," says Middleberg.

Bernard Tulsi *is a freelance writer based in Newark, Del. He may be contacted at btulsi@comcast.net or 302-266-6420.*

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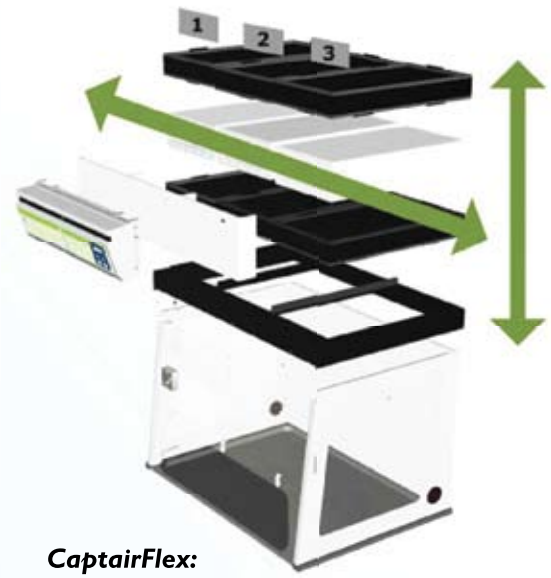

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EVOLUTION OF MASS SPECTROMETERS

BY JOHN BUIE

Mass spectrometers, one of the principal instruments for investigating chemical composition, operate by separating ions according to their mass/charge ratio by transmitting them through a magnetic and electrical field. The ions are initially created from molecules through a destructive process such as collision or laser irradiation and are evaluated after separation by an integrated detector.

The initial concept of mass spectrometry (MS) was ignited in the late 1890s, came to realization during the 20th century, and continues to evolve in the 21st century. The key milestones in the development of mass spectrometry are described below.

EARLY DEVELOPMENT

In 1921, the instrument that we now consider to be the first mass spectrometer (although it was then known as the 'parabola spectrograph') was constructed by J.J. Thomson. Thomson was the renowned British physicist who had some years earlier discovered the electron. Within the span of a few years, MS had become an established method for the separation of ions on the basis of their mass, although there was to be little significant development of the technique until the 1940s.

It was during the **1940s** that MS began to move away from its academic origins to find use in more practical applications such as nuclear isotope enrichment and the study of the composition of petroleum.

In **1941**, John Hipple designed the first portable mass spectrometer which was marketed by Westinghouse Electric. However, this model did not seem to catch the imagination of scientists, and was not a commercial success.

During the early **1950s**, the mass spectrometer was still extremely restricted in terms of its resolution limits. However, the instruments developed during this time may be considered the forerunners of today's popular and ubiquitous benchtop models.

1960 saw the first use of the quadrupole mass spectrometer as a residual gas analyzer.

In **1962**, the first commercial quadrupole mass spectrometer was sold to NASA by Electronics Associates, Inc. (EAI) as a residual gas analyzer for space chamber research.

During the **1970s**, a number of important modifications to MS were developed, including Fourier-transform, secondary ionization, plasma desorption, laser desorption, thermal desorption, spark source, and glow discharge MS.

1940 1950 1960 1970

In **1943**, the Consolidated Engineering Corporation (CEC) became the first company to achieve market success in the MS field, initially selling the CEC Model 21-101 mass spectrometer to the Atlantic Refining Corp. (Philadelphia, PA).

In **1946**, the first time-of-flight (TOF) mass analyzer was developed by W. Stephens of Pennsylvania. TOF MS involves acceleration of ions through an electric field of known strength, which confers the same kinetic energy to all ions of equal charge. By measuring the time taken for a particle to reach the detector, the mass/charge ratio of particles can be calculated.

In **1948**, the first mass spectrometer to use electron ionization (EI), the MS-2, was launched by Vickers in Manchester, England.

Also in **1948**, the first ion cyclotron mass spectrometer, known as the Omegatron, was developed at the University of Minnesota. This spectrometer incorporated a dual inlet with a changeover valve for rapid sample switching.

In **1953**, Wolfgang Paul and Helmut Steinwedel initiated development of the quadrupole mass analyzer (and quadrupole ion trap). In such a device, ions are separated by use of a quadrupolar electrical field consisting of both direct current and radiofrequency components. Quadrupole instruments are currently very popular, with sales exceeding the total of all other types of mass spectrometer.

In **1956**, Roland Gohlke and Fred McLafferty initiated the trend of coupling the mass spectrometer to other techniques by developing gas chromatography-mass spectrometry (GC-MS). Model 12-101 using GC-MS with a TOF mass spectrometer was developed by the Bendix Aviation Corporation and allowed mixtures to be analyzed without prior time-consuming separation.

Also in **1956**, MS was first used to identify an organic compound by breaking down the molecule to form positive, negative and neutral fragments.

In **1964**, W.M. Brubaker, P. Michael Uthe, and Robert Finnigan at EAI developed the first commercially available quadrupole mass spectrometer residual gas analyzer.

In **1965**, the first pre-packaged magnetic sector incorporating a helium enrichment jet separator was developed by R. Ryhage of the Karolinska Institute and sold by LKB instruments.

In **1967**, the first magnetic double-focusing GC-MS, the PerkinElmer Model 270, was introduced.

In **1968**, the technique of electrospray ionization (ESI) at atmospheric pressure was investigated by Malcolm Dole and colleagues. This advance was important to the biological future of MS, although the technique would not be routinely used for two more decades.

In **1974**, Fourier-transform ion cyclotron resonance was introduced.

In **1976**, Hewlett-Packard (HP) introduced the world's first integrated, digital benchtop GC-MS system, the 5992. The 5992 also featured the world's first true hyperbolic chromium-molybdenum alloy (Cr-Mo) quadrupole mass filter.

In **1982**, Bruker Spectrospin in Switzerland began successfully installing the first Fourier-transform ion cyclotron resonance (FT-ICR) mass spectrometry systems, drawing on Bruker's existing expertise in NMR and superconducting magnet technology.

In **1983**, the first commercial ion-trap system was introduced by Finnigan MAT (San Jose, CA), originally intended as a GC detector. In this instrument, a scanning radio frequency causes ions of increasing mass-to-charge ratio to become successively unstable. Today, ion trap instruments are common in GC detectors, LC-MS detectors and standalone mass spectrometers.

Koichi Tanaka of Shimadzu Corp., who developed the matrix-assisted laser desorption/ionization (MALDI) technique.

In **1985**, the technique known as matrix-assisted laser desorption/ionization (MALDI) was developed by Koichi Tanaka of Shimadzu Corp.

Shimadzu's LAMS-50K MALDI-TOF mass spectrometer.

In **1988**, the first commercial MALDI-TOF MS instrument, the LAMS- 50K, was launched by Shimadzu. MALDI rapidly became an important technique for analyzing biological samples, and was being used in protein structure studies by the 1990s.

Also during **1988**, John B. Fenn published two articles relating to an electrospray technique that revolutionized mass spectrometry. These articles showed that the release of ions could be achieved by spraying a sample using an electrical field so that charged droplets are formed. As the water gradually evaporates from these droplets, freely hovering "stark naked" protein molecules remain. The method came to be called electrospray ionization (ESI).

Finally in **1988**, HP introduced the 5971 MSD, the world's first mass spectrometer to employ a true hyperbolic glass quadrupole.

John B. Fenn, whose work revolutionized mass spectrometry.

In **2002**, the Nobel Prize in Chemistry was given to three pioneers of techniques for the identification and structural analyses of biological macromolecules. The recipients included Koichi Tanaka (Shimadzu Corp.) for his development of MALDI and John B. Fenn, who was recognized for the development of ESI.

Also in **2002**, Shimadzu Corp. announced and launched the laser ionization quadrupole ion trap time-of-flight mass spectrometer AX IMA-QIT.

In **2005**, the technique known as Direct Analysis in Real Time (DART) was patented. DART is based on the atmospheric pressure interactions of long-lived electronic excited-state atoms or vibronic excited-state molecules with the sample and atmospheric gases.

Finally in **2006**, Agilent introduced its innovative GeneSpring MS software to facilitate biomarker discovery from mass spectrometry data.

In **2008**, Waters Corp. launched the SYNAPT MS system; a next-generation, quadrupole acceleration, time-of-flight (QA-TOF) mass spectrometry platform, designed to generate high quality, comprehensive data from complex biological samples.

Also in **2008**, Agilent introduced the first mainstream mass spectrometer to break the femtogram-detection barrier.

In **2009**, Thermo Fisher Scientific Inc. launched the LTQ Velos, the industry's fastest and most-sensitive ion trap mass spectrometer, increasing both scan speed and resolution.

1980 1990 2000 2010

In **1987**, PerkinElmer SCIEX introduced the ELAN 500, the first ICP-MS system with platinum cones and an inert sample introduction system.

Finnigan's MAT 90, the first mass spectrometer to be completely controlled by computers.

Also in **1987**, Finnigan (later acquired by Thermo in 1990) launched the MAT 90 series of mass spectrometers—the first mass spectrometers on the market completely controlled by computers.

In **1990**, PerkinElmer launched the first turbomolecular-pumped ICP-MS instrument (the ELAN 5000).

In **1992**, low-level peptide analysis using MS techniques became possible.

Also in **1992**, Shimadzu Corp. launched the Kompact MALDI Series, enabling analyses of a wide range of applications including peptides, proteins, sugars, multiplex fats, nucleotides, pharmaceutical products and metabolites.

By **1993**, limited oligonucleotide sequencing had become possible, driven in part by the demands of the Human Genome Project.

By **1996**, MS was starting to be linked to HPLC instruments, and MS studies of viruses were beginning.

In **1997**, Shimadzu Corp. launched the LCMS-QP8000 with ESI and Atmospheric Pressure Chemical Ionization interfaces.

Shimadzu's AXIMA-TOF2TM, a TOF-TOF mass spectrometer with high-energy MS/MS.

In **2006**, Shimadzu Corp. launched AXIMA-TOF2TM, the next generation in MALDI CID MS-MS, a TOF-TOF mass spectrometer with high-energy MS-MS.

Also in **2006**, Waters Corporation introduced the SYNAPT High-Definition MS (HDMS) system at the American Society of Mass Spectrometry annual meeting in Seattle. The HDMS system analyzes ions by their size, shape and charge, in addition to mass.

In **2010**, Bruker obtained the first *in vitro* diagnostic CE mark for its MALDI-TOF-based microbial identification workflow solution, the IVD MALDI Biotyper. This system is pioneering the advancement of mass spectrometry in clinical diagnostics.

In **2010**, Waters Corp. introduced two new mass spectrometers for its Xevo MS platform (the Xevo TQ-S and Xevo G2 QTof) that offer an unequalled combination of separation power with the highest levels of sensitivity for compound identification, quantification and screening.

FUTURE OF MS

MS technology is still evolving to meet the latest demands of biotechnology. Innovations include tandem expansions, multiple connections to HPLC and the development of newer, portable systems. It is predicted that MS will remain the keystone of modern chemical analysis, as well as the ultimate chromatography detector.

« EXPERT: Greg Herman

ASK THE EXPERT

HOW TO DESIGN LABORATORIES WITH CHALLENGING SPACE REQUIREMENTS

by Tanuja Koppal, Ph.D.

Greg Herman, program manager at the Pacific Northwest National Laboratory (PNNL), talks to Tanuja Koppal, Ph.D., contributing editor at* Lab Manager Magazine*, about his experiences planning, designing and constructing the Biological Sciences Facility and the Computational Sciences Facility at PNNL. He emphasizes the need for early and timely decisions on operations, space management, project management and capital planning in order to incorporate changes in lab design that are the most user-friendly and energy and cost efficient.

Q: How do you go about designing labs when you are faced with space limitations?

A: When constructing the Biological Sciences Facility and the Computational Sciences Facility at PNNL, we were designing brand-new buildings where we could not go beyond a certain size and we had to meet certain efficiency requirements. Since we were actually reducing the amount of square footage we were coming from, we needed flexible and efficient laboratories. We had to be very careful about how we laid out offices and labs so that we had both usable and functional space. A lot of buildings now have utility corridors, but we actually incorporated the utility corridor inside the lab. What that did was give the lab occupants more usable space within the lab and helped us improve our efficiencies. We put a lot of equipment at the back of the lab, and moving vertically we put in lots and lots of shelving between the labs with mobile casework. We had quick disconnects on all our mobile casework so that we could easily remove and relocate any equipment. It all worked out quite well, and people got a lot more than they thought they were going to.

Q: What do you think is driving the need for increased flexibility in lab design?

A: Flexibility is being driven by cross-disciplinary work—where people from different fields are now working together. Although they all need similar infrastructure, they do have different equipment needs. It used to take a lot of time and money to take down walls and put in casework, and we just couldn't move fast enough. Today we are required to set up large "ballroom"-type laboratories, which are about 1000 to1500 square feet, very quickly. Hence, we need lots of shelving and mobile casework to move things in and out. Every workbench now has "quick disconnects" for all utilities, including gas, electrical and IT. All the casework we use is mobile, where everything can be unbolted and unhooked. All sinks and hoods are on the exterior wall so that the interior lab space can be opened up to anything. We don't have time for a big demolition that can take two or three months; we have just two or three weeks. With lab renovations we have to keep up with what the researchers are expecting.

Q: What has led to these innovative, flexible designs in lab equipment?

A: Over the last five years there has been a lot of emphasis on LEED accreditation with choosing materials that are renewable and reusable. What you also need is quality, because you are modifying the space so often that you can do all the modifications without making the lab look old. New technologies are also being introduced for more efficient use of equipment by being smaller and providing more individual controls. The technologies for managing utilities are also changing, with more individual controls for different labs.

Q: Did you account for any expansion in your design?

A: Yes, we did. Our buildings are sort of unique because our biologists and computational researchers wanted to work together. So we have a biological side and a computational side and the two buildings, which are about 64,000 square feet each, are connected by a common lobby where all the meeting areas are located. On the biological side we planned for about 15 percent vacant space for future expansion. We finished the building a year ago, and people are already moving in to occupy the vacant space. We thought we had a couple of years of expansion space, but with growth the building is already full.

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Greg Herman is the program manager employed by Battelle at the Pacific Northwest National Laboratory and is responsible for the conceptual development of facilities and projects related to PNNL's major initiatives. The department he is a part of is responsible for the development of requirements, engineering and design solutions, construction, and commissioning new and existing projects. His most recent project involved the planning, design and construction of the Biological Sciences Facility and the Computational Sciences Facility, where he was also responsible for the development and approval of the business case justifying the use of alternative approaches to finance these facilities. Additionally, as the manager of real estate and infrastructure planning, he oversees the development of campus master planning, strategic infrastructure planning for maintenance and upgrade projects, strategic site and space planning, and real estate development and planning. Some of his past responsibilities have included management, prioritization and oversight of laboratory capital investments; management of grounds maintenance, moves and relocation services. Herman has a B.S. in civil engineering from Washington State University and a Master of Business Administration. He worked as a civil engineer early in his career but has now spent nearly two decades in a multitude of roles within Facilities and Operations.

Q: What advice do you have for people looking to redesign or renovate their labs?

A: There is always the "need" versus the "want." So the first thing we did was to sit down with our users to find out what they really needed and then we asked them what they wanted. We were then able to decide what we had to deliver to meet their needs, and if we had the ability, then we could also give them what they wanted. The next thing is, you have to investigate what's the latest and greatest out there, because some are good but others are bad. You have to get opinions from experts on how to install and use certain things. We relied a lot on our general contractor to get his advice on what would be most reliable and useful for long-term use. If it's not reliable, then the users are not going to use it and will find some way to work around it.

Q: How can you ensure that the redesign process goes smoothly?

A: We got a person who was the single point of contact between us and the users, and that person became a kind of referee in the process. The person understood both sides and could better translate the user needs versus the wants. We had a great relationship with the users, but having that advocate who could speak on both sides of the fence was a huge benefit to us. This person had a unique background. The person was like an operations manager who understood facilities but had come out of a research background. Having this person helped us reach decisions much quicker, since we didn't have to reach out to 12 to 14 individual users separately.

Q: What would you do differently the next time around?

A: With these buildings, since they were a design build, we could make changes on the fly and our contractors and users worked well together. We included all the key decision makers at every step. But we did have one very unique lab that had some high-end light, gas and electrical requirements, and looking back, if we had spent more time initially to draw and sketch everything out in greater detail, it would have saved us some time. When you are doing pieces and parts of a building, you hope that in the end it all comes together, and that was one where we ran into some problems.

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CUTTING IT CLOSE

SIMPLE RULES FOR USING UTILITY KNIVES CAN PREVENT DANGEROUS WORKPLACE INJURIES

by Vince McLeod

Recently the Safety Guys had the unpleasant experience of investigating a gruesome and almost deadly accident. A maintenance worker was removing a cable tie from a package on the loading dock with his pocketknife. When the very sharp knife easily cut the plastic tie, the momentum of his pulling stroke continued and the knife punctured his thigh, slicing his femoral artery. If it wasn't for his quick-thinking co-workers and the fortunate proximity of the hospital emergency room, the outcome might have been tragic.

Luckily, compression was applied by co-workers well trained in first aid and a very short trip to the emergency room saved his life. The sad story here is that this accident was totally preventable.

The larger story is that every year there are thousands of these types of accidents in every kind of business across the country. In its 2009 annual report, the Consumer Product Safety Commission indicated that nearly 40 percent of all medically treated injuries related to the use of manual tools in the United States involved knives or retractable blades.[1] These injuries happen due to broken blades, accidental cuts while changing blades, inappropriate use or mishandling of utility knives and, of course, using the wrong tool for the job.

Research laboratory facilities are no exception when it comes to jobs requiring cutting or the use of sharp blades. I guarantee your facility has a shipping/receiving area and many laboratory tasks where cutting is done without a second thought. Continue reading for the Safety Guys' basic tips on safe use of cutting instruments and preventing accidents and close calls.

> "Utility knives are one of the most common tools used in the workplace, yet one of the most dangerous."

Take a look around

Have you noticed all the different applications around your facility or laboratory that require some type of cutting or use of a utility knife? Almost all workers will have to cut something during the week. In fact, we bet many carry pocketknives or have utility knives in their pockets, on their tool belts or within arm's reach in a drawer or on the workbench. Some common uses to search for include opening boxes and packages; cutting cartons, string or strapping material; slicing shrink wrap; opening chemical bottles and jars; and general maintenance.

Utility knives are one of the most common tools used in the workplace, yet one of the most dangerous, especially in terms of the number and types of injuries produced. We often take these tools for granted, and the dangers of inappropriate cutting equipment and procedures are too frequently overlooked. Let's see if we can cut down on these injuries by taking a look at our cutting tools and some of the newer knives available and then evaluating a few tips on proper cutting techniques.

The right tool for the job

Here we want to discuss some of the key features of utility knives and the specialty cutting tools now available. We have all heard the phrase above many times—choose the right tool for the job and the job can be done much quicker and safer. The first rule is to carefully choose the right tool to suit the material you are cutting. There are literally hundreds of knife designs and

blade types to choose from, so match the task to the best design and blade. Ask yourself, is a utility knife the most appropriate tool? Would a pair of scissors or snips do the job better or more safely?

According to the CPSC, the most prevalent injury is a cut or laceration during blade changes.[2] In order to minimize this risk, look for designs that make changing blades as easy as possible. Use of blunt-tipped blades along with ergonomically designed and ambidextrous handles is also helpful. In-handle blade storage can save time and blade handling, but the key is to make blade changing easy.

Cutters with permanent blade guards can protect employees, as the blade is never exposed. This type of cutter also protects the package contents from damage. In many designs, the protective guard acts as a guide to help position the cutter as well.

Another feature widely available in today's utility knives is the spring-back blade mechanism, which instantly retracts the blade when it loses contact with the material being cut. The spring-back feature can dramatically reduce puncture injuries.

> "The most prevalent injury is a cut or laceration during blade changes."

One of the newer design features for utility knives is the bi-metal blade. With the bi-metal technology process, two different metals are fused together using electron-beam welding. For utility knife blades this is usually a high-carbon steel for sharpness and a flexible spring steel that bends but does not break or shatter. These bi-metal blades can last significantly longer than plain carbon steel blades, with one industry reporting a six-fold increase of time between blade changes.

SAFETY TIP

REPORT, EVALUATE AND DISCUSS ALL ACCIDENTS (INCIDENTS)

By James A. Kaufman

While having no accidents isn't necessarily a good indication that everything's okay, having them go unreported makes the matter worse. The reporting of all accidents is extremely important. Every accident is an opportunity to improve your safety program, to learn how to do a better job, and to protect your workers and facilities.

Since accidents happen relatively infrequently, particularly in smaller organizations, keep track of the incidents and close calls/near-misses as well. These are the events where matters of inches or seconds were the difference between nothing happening, a minor mishap, and a major disaster. The rule of thumb is that there are three hundred minor incidents for each major one. Think of all you could learn from having a chance to review the close calls. When organizations provide an easy way for employees to self report and share accounts of close calls and near-misses, the frequency of accidents invariably goes down.

The safety committee should get copies of each accident or incident report and review it carefully. They should conduct an investigation of the event so that it can be correctly evaluated and the proper corrective action taken to prevent a reoccurrence. Don't go around looking for someone to blame. Looking to place blame is the quickest way to convince people that they shouldn't talk about what happened, to avoid telling the truth, or to have a loss of memory.

Then, the event should be brought to the attention of the rest of the people in your organization at a departmental safety meeting or by other means so that they too can learn from the experience. Photographs of injuries and property damage are graphic reminders of the consequences of carelessness, unsafe work conditions, and unsafe work practices.

At Cornell University, a review of the lab accidents for the prior several years revealed a pattern. There was one particular undergraduate lab experiment that was responsible for a disproportionate number of accidents. Changing the experiment helped to reduce the accident frequency.

Consider having an accident/incident report form for your employees and students to fill out. In the case of students, it will help them to develop an appreciation for this recordkeeping aspect of safety.

Source: Kaufman, James A., Laboratory Safety Guidelines - Expanded Edition, The Laboratory Safety Institute, www.labsafetyinstitute.org.

These blades can help reduce injuries and increase safety in two ways. By staying sharp longer, they reduce a worker's natural tendency to press harder as a blade dulls, thus decreasing the chance of slips and blade shattering. And, since they last longer, they reduce the need for blade changes, lowering injuries accompanying that task.

"Bi-metal blades can last significantly longer than plain carbon steel blades."

Tips for safe cutting

Now that we have chosen the right tool for the task, here are some rules for safe cutting:

- Always wear safety glasses. You never know when a blade might shatter or a strap snap loose.
- Wear appropriate protective gloves, especially on the hand that holds the work piece being cut. The right glove not only protects the hand but can improve the grip as well.
- Always cut with a sharp blade. As we mentioned above, a dull blade requires excessive force, increasing the chance for injury.
- Do not make blind cuts. This means to clear the entire length of the cut so nothing unexpected is encountered.
- Make sure you are balanced and your footing is stable and secure. Use a natural cutting movement. This will minimize chances of slips.
- Keep your noncutting hand away from the line of the cut.
- Always pull the knife toward you when cutting on a flat surface. This is a safe, natural movement that provides the best control.
- If using a guide or straight edge, make sure it is securely clamped.
- If the blade begins to tear the work rather than cutting, change the blade.
- Do not force a bend or apply side loads to the cutting blade. This is the primary cause of blade breakage.
- Do not use utility knives for prying or other noncutting tasks.

Summary

Every workplace involves cutting tasks where utility knives are used. This most common work tool is too often taken for granted and thus becomes a factor in many unnecessary injuries. By observing your various cutting operations and the type of utility knives used, you can ensure the proper tool is used for the task.

Reviewing a few simple rules with the employees who routinely use utility knives can help prevent some of the most common and potentially dangerous workplace injuries.

Be safe out there.

References

1. 2009 Annual Report to the President and the Congress, United States Consumer Product Safety Commission, Bethesda, MD. 2009. http://www.cpsc.gov/cpscpub/pubs/reports/2009rpt.pdf

2. National Electronic Injury Surveillance System, United States Consumer Product Safety Commission, Bethesda, MD. 2009.

Vince McLeod *is an American Board of Industrial Hygiene–certified industrial hygienist and the senior industrial hygienist in the University of Florida's Environmental Health and Safety Division. He has 22 years of occupational health and safety experience at the University of Florida, and he specializes in conducting exposure assessments and health-hazard evaluations for the university's 2,200-plus research laboratories.*

▲ *A cylinder containing hydrogen cyanide stored in a flammable storage cabinet exploded, destroying the room and blowing a hole in a block wall.*

▲ *Clean Harbors chemists overpacking a cylinder into a high-pressure cylinder recovery vessel.*

DANGEROUS GASES

A CYLINDER MANAGEMENT PROGRAM ENSURES CYLINDER INTEGRITY AND SAFETY WHILE MANAGING LIFE CYCLE COSTS

by Ed Isom

The September 2010 issue of *Lab Manager Magazine* featured an excellent article, "Compressed Gas Cylinder Safety" (p. 62 or http://www.labmanager.com/stips.asp?ID=137), in which Vince McLeod gave an overview of the topic. This article seeks to extend the discussion and get down to some specifics of how to actively manage on-site gas cylinders.

First, let me start by framing the issue:

- Each gas has its own handling and storage protocols and limitations.
- With the exception of inert gases, safety almost invariably decreases the longer the gases are stored.
- Unlike with bulk chemicals, it is often more expensive to remove and properly discard gas cylinder contents than it is to buy the materials in the first place.
- The older the cylinder, the harder it is to process and the more dangerous it becomes.
- The cost of disposal is directly related to the age of the contents and the condition of the cylinder and safety cap or valve.

"Even single cylinders can cause catastrophic explosions."

As demonstrated in these photos, even single cylinders can cause catastrophic explosions.

For all these reasons, gas cylinders present financial, safety and handling challenges from the day they arrive on-site until the day they are used and/or removed.

To put things in further perspective, last year the cost to my company, Clean Harbors, to dispose of gas cylinders, ranged between $20/unit and $176,000/unit. That's quite a spread. Obviously, some of the cylinders contained highly dangerous gases and were in poor condition. It is expensive to process unstable cylinders. If we have to overpack a dangerous cylinder, such as hydrogen bromide, into secondary containment, transport it and properly dispose of it, it can cost from $40,000 to $50,000. This is in contrast to the $275 to $1,500, depending on actual cylinder size, that it can cost for Department of Transportation (DOT) shippable containers.

So, although on-site gas cylinder management requires an investment, it is worth it from safety, process management and cost standpoints.

There is another outside force that is driving cylinder management at U.S.-based companies. The Department

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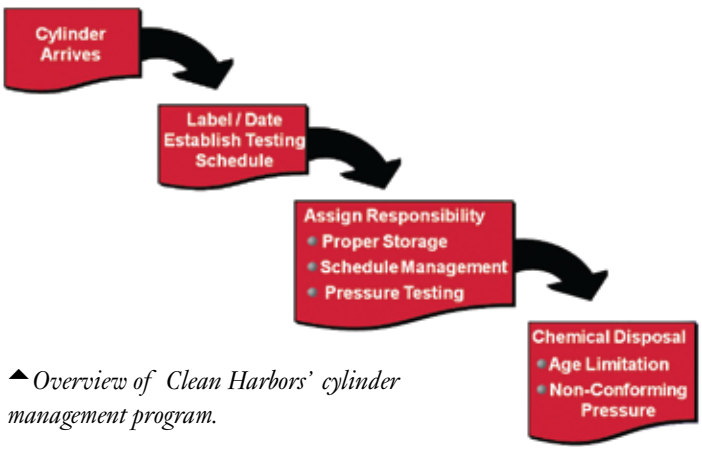
of Homeland Security now conducts inspections and audits of dangerous gases in labs and industrial settings to ensure that adequate controls and security measures are in place. An effective management program will avoid costly, last-minute cleanups and mandated remediation that could result from the audits.

Dedicated resources improve management

The graphic outlines the cylinder management approach that we use at our La Porte, Texas, and other treatment, storage and disposal facilities, and that we also recommend and use on generator sites.



▲ *Overview of Clean Harbors' cylinder management program.*

Given McLeod's full-cycle overview, this article concentrates on the second step, "Label/Date—Establish a Testing Schedule," using a barcode database tracking system.

Typically, gas cylinders are managed with the same mind-set and using the same controls as bulk chemicals or other hazardous wastes. They are assigned to a waste or environmental coordinator who may not have any special expertise in managing gases. The coordinator assigns cylinders to a storage area—often outdoors—and then forgets about them. Given that the gases are secured in metal cylinders, little or no consideration is given to dissociation and other dynamics of the specific contents.

Formalize a program

The first step is to recognize that compressed gases require a separate management program that tracks the material throughout its life cycle. Companies should start by designating a facility-wide gas cylinder manager who is trained in cylinder management techniques and is specifically trained on the materials that are used in the local production or research environment. This person's job is to keep track of the status of all gas cylinders at the site, both pre-use inventory and partially used or depleted cylinders that are considered waste and are slated for disposal.

Some companies and labs outsource this function to a service provider. This creates a measurable functional operation. It brings in a vendor that has the core competency, technology and business focus to manage the task day in and day out, and it facilitates ongoing inspections to ensure facility-wide cylinder management compliance.

Use a barcode management system

Regardless of whether the cylinder management program is handled in-house or is outsourced, it should be capable of pinpointing the chemical contents, location, age, disposal date and other important information for every cylinder. At the outset, this requires creating a master inventory that includes all on-site cylinders at every location.

This sounds simple, but it usually requires the cooperation of all the cost

centers that stockpile and control the cylinders that they use in their labs or production processes. We find that this is also the best time to consolidate the storage areas and facilitate centralized management.

Once an accurate inventory has been developed, the manager is responsible for controlling the inventory and overseeing the movement, use and disposition of the cylinders. We recommend a barcode-based inventory management system that starts at the receiving dock and ends with destruction by a disposal company.

"The Department of Homeland Security now conducts inspections and audits of dangerous gases in labs."

Homegrown spreadsheets and databases can work for smaller operations, but it is often more efficient to go with specific barcode/software application packages or outsourced service provider solutions. These applications provide a good template for cylinder control that can be customized to local conditions and reporting requirements.

The cylinders should be registered in the system immediately upon arrival. We input all the required information (preferably, most of it is directly imported from supporting documentation and database resources) and apply the barcode to the cylinder. We use rugged 4" x 6" paper labels that are stuck to the cylinders. Scanning the barcode provides a window into all the supporting information for each cylinder, including:

- Arrival date
- Expiration date
- Location
- Contents
- Material Safety Data Sheet
- Stabilizer/inhibitor renewal date
- Cylinder number
- Cylinder type
- Cylinder size
- Inspection dates
- Movements within the site
- Operator ID/handling history
- Cylinder condition
- Departure date (carrier, destination, etc.)
- Disposal/destruction date

Administrative data includes:

- Cost center
- Supplier
- Purchase order
- Cost center changes (if units are transferred)
- Date of removal from inventory
- Other customized fields

Barcodes in action

The operator scans the barcode on the newly received cylinder and a separate barcode that records the receiving dock location. The two barcodes are scanned using a handheld device; the cylinder/location information is time stamped and assigned to the operator. This dual-scanning process is repeated every time the cylinder is moved. The location codes

should be specific (row C in storage area 3, for instance) in order to immediately locate every cylinder based on the information in the database record. Ideally, the system does not rely on any information keyed in by the operator, which simplifies the process and cuts down on input errors.

"Compressed gases require a separate management program."

Scanned information is uploaded from the handheld scanner to the cylinder management system in batch mode through a base station or in real time over a wireless network. Once in the system, the data can be sorted to update aging, expiration, inventory, cost center and other reports. The cylinder management database can be set up to instantly update online, Web-based reports and export data directly into other corporate financial and management reporting systems.

Expiration notification

Perhaps the most important feature of an automated cylinder management program is its ability to flag cylinders that are due for inspection or are approaching expiration thresholds. Alarms and color-coded reports highlight the cylinders that are approaching expiration and should be removed from inventory. Using the aging data, the cylinder manager can notify the disposal company in a timely manner to schedule a "milk run" pickup, as opposed to a specially scheduled run. The up-front notification also allows the manager to review the full inventory and include additional cylinders in the shipment to further reduce unit costs.

A properly run management system will also export manifest data to the disposal company, further expediting the removal process. This expiration notification feature alone can save enough money to justify the investment in the management system—not to mention the increased safety and compliance that come from a well-managed process.

"Scanning the barcode provides a window into all the supporting information for each cylinder."

Finally, a cylinder management program can track cylinders through the disposal process, enabling the generator to certify that the contents were properly handled through destruction.

A well-managed cylinder control program should be a top priority for every industrial, educational and research facility. Only through close control and inspection of every cylinder in inventory can an organization guarantee cylinder integrity and safety while managing life cycle costs.

Ed Isom, *CHMM, CPEA, is general manager, Reactive Material Services, for Clean Harbors. He has 16 years of experience in gas cylinder management, including analysis, thermal oxidation, hydrolysis, destructive access and emergency response. Ed can be reached at isome@cleanharbors.com or by phone at 281-727-7618.*

CYLINDER MANAGEMENT MUST CONSIDER CONTENTS

By Ed Isom

Compressed gas cylinders and their contents are inherently dangerous for a variety of reasons. Extreme pressure, flammability, toxicity, radioactivity and corrosivity are a few examples of the dangers that can be encountered. Several specific types of gases/liquids that are routinely packaged within standard DOT 1,800 compressed gas "lecture" cylinders present a significant hazard upon prolonged storage. Since their burst pressure is estimated to be in the range of 6,000 gauge pounds per square inch absolute (psia)—at 10,000 psia, a failure is catastrophic in terms of pressure release and exposure potential.

A few examples of gases that require special attention:

Anhydrous hydrogen fluoride (AHF) and hydrogen bromide (AHBr)

Long-term storage (in excess of two years) of AHF and AHBr in carbon steel cylinders can be extremely dangerous. The slow corrosion reaction of AHF or AHBr with iron in the cylinder wall contributes to the dissociation of the material. As a result, hydrogen is generated and accumulates within the headspace of the cylinder. A secondary by-product of this reaction is the formation of iron fluoride and iron bromide solids, which tend to cause the main cylinder valve to become nonfunctional due to salt blockage. The dissociation reaction of AHF and AHBr combined with a nonfunctional cylinder valve are prime ingredients for a catastrophic cylinder failure. ***It is strongly recommended to use or dispose of AHF and AHBr within two years of purchase to prevent dissociation of the compounds.***

Anhydrous hydrogen cyanide (HCN)

HCN is an extremely reactive and toxic compound that mandates special consideration for movement, transportation and/or disposal. HCN is packaged and shipped with a 0.6 percent stabilizer to prevent the buildup of an unstable polymer that is capable of explosive decomposition/gas evolution. This stabilizer is typically a sulfuric or phosphoric acid additive that remains effective for up to 90 days. As polymer content increases within HCN cylinders, the product will begin to darken and generate excessive hydrogen pressure. This polymer is incompatible with HCN, and movement or product extraction may initiate an auto-catalytic explosive reaction. ***It is strongly recommended that HCN is used or disposed of within 90 days of purchase to avoid polymer buildup within the cylinder.***

RENT, LEASE OR BUY

MAKING A BUSINESS CASE FOR LABORATORY EQUIPMENT FINANCING

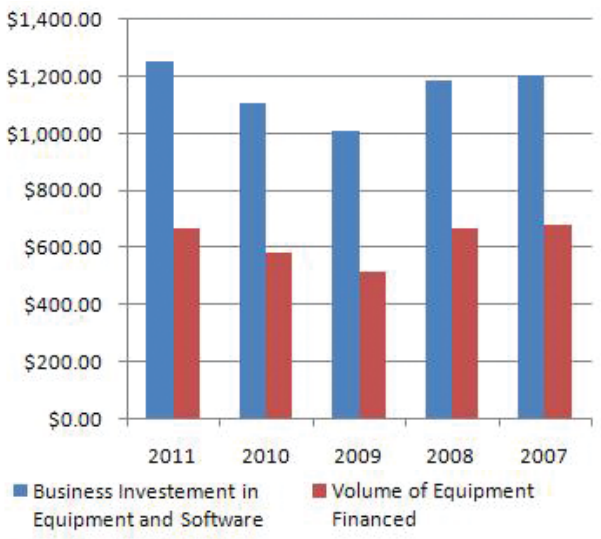
by Dean Stolberg

With Pittcon approaching, acquiring new equipment is on the agenda for many laboratories. The economic crisis has made finding capital for these purchases extremely challenging. Large companies are freezing budgets, banks are making borrowing more difficult and everyone is trying to get the most out of the equipment they already have.

Let's assume your company has signed several contracts in 2010, and you need new instrumentation to meet the increased demand, or you can no longer delay replacing existing worn or obsolete instruments. Normally, the next step would be to issue a purchase order and pay cash for the units. Is this your only option?

What happens when you are told "There is no capital budget available for the purchase" or that your company's existing bank lines are insufficient? What is the solution if your company is no longer profitable and cannot qualify for bank financing due to current economic conditions? Finally, what if your company is new in business or venture backed without revenue? The answer may be a capital lease or rental of the equipment.

Financing has been used for thousands of years. Archeologists have found finance agreements etched into clay tablets dating to 2000 BC. Evidence of equipment financing has also been found in the historically relevant empires of Babylon, Greece, Rome and Egypt. Fast forward to 2011: equipment financing has become a valued way of acquiring equipment for all businesses. Business owners agree that equipment financing is the best way to acquire equipment that may become obsolete or increase overhead costs. As a matter of fact, about 80 percent of large and small businesses in the U.S. use equipment financing to fund their operations.



A look at equipment finance activity in the U.S. since 2007. Volume for 2010-2011 is estimated. Figures are in the billions $US.

Let's take a look at:

- When to consider financing for laboratories in very large companies, labs in small to mid-size companies and, finally, labs in newer businesses or those that are pre-revenue or venture backed.
- The basic financing types to consider.
- How to choose the right finance provider.

When to consider financing

No other axiom rings truer today than "If it appreciates—buy it; if it depreciates—lease it." Of course, with today's changing tax laws and seemingly endless advancements in technology, there can be other factors driving this decision besides the fact that the instrument is a depreciating asset. Let's examine a few of the more common scenarios:

1. Laboratories in large companies

Let's consider a large company with multiple facilities that has either exhausted or frozen its capital budgets. When one of the labs needs additional instrumentation, they are told to wait until the next budget cycle, meaning the acquisition is delayed for what could be a very long time. Does this mean there are no other alternatives? Not necessarily, as there are rental agreements available that allow for payment through expense budgets until the capital budget is available. A well-written rental agreement will provide the option of purchasing the rented instrument by allowing a large portion of payments made to be applied toward the original purchase price anytime during the contract. This means that if you have

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room in your expense budget, you are able to acquire the instrument you need now even though you are told there is no capital budget available. Best of all, you also have the ability to purchase the instrument whenever your budget is approved.

2. Laboratories in small to mid-size companies

Let's consider the lab in a smaller company that does not operate under capital budget constraints, but has issues with either utilizing its existing bank credit or, because business has been slow due to economic conditions, cannot qualify for bank financing.

Equipment finance companies are easier to work with and more flexible than a bank. They can offer various structures for smaller labs in established companies, regardless of their credit profile. Labs of this size are looking for financing that allows for ownership of the instrument over a fixed period with a fixed payment. This can be accomplished through a lease contract that provides for a small purchase option (usually $1) at the end of the lease.

When utilizing this type of lease contract, you can often bundle most of the soft costs involved in the acquisition into the contract. For instance, shipping, training, installation, software and even an initial supply of consumables may be bundled into the amount you can finance.

3. Start-up companies/laboratories that may be pre-revenue or venture backed

Finally, let's consider laboratories in companies that would not qualify for financing from banks or traditional finance companies. Normally, the only option for companies such as these is a cash purchase. There is an alternative as there are finance companies that specialize in more difficult credit situations and/or in financing scientific instrumentation that may offer partial financing for needed instrumentation. These companies allow for the preservation of the precious capital raised to fund the operation until the company is self-sufficient. Finding a company like this can be vital to the overall achievement of your company's financial strategy, which is why we emphasize selecting the proper finance company.

Basic equipment financing types

Let's take a look at three common methods of equipment financing being used today.

1. Capital or finance lease – Under this financing contract, the lessee (the party making payments on the asset) owns the equipment at the end of the agreed-upon term for a bargain purchase price, which is usually $1. The term, interest rate and payment are fixed. It is the preferred method of lease financing for labs in smaller to mid-size companies as it is similar to a bank loan, but much easier to obtain.

The lease appears on the balance sheet as an asset. The interest portion of the lease is tax deductible as well as the depreciation associated with the asset.

A substantial benefit to this type of lease structure is that The Small Business Jobs & Credit Act of 2010 allows for the potential deduction of the entire cost of the instrument, assuming it is placed in service by the end of 2011, through Section 179 of the IRS code. The benefit begins to phase out after $2.5M worth of equipment purchases in 2011.

Example illustrating potential tax savings with Section 179

Cost of equipment	**$150,000.00**
1st year write-offs	
• Section 179	$150,000.00
Marginal tax rate assumed 35%**	**$52,500.00**
Bottom line equipment cost after tax savings	**$97,500.00**

** Tax rate assumed at 35%. Please consult your tax advisor for your actual tax rate

2. Operating or FMV (fair market value) lease – Under this financing contract, the lessee makes payments for a fixed time period and has the option to purchase the asset at the end of the contract term at its current fair market value. This structure is sometimes used by laboratories in large companies that do not have capital budget available. Generally, the payments on this type of contract are treated as an expense and do not appear on your company's balance sheet.

This structure has a couple of weaknesses when compared with a well-written rental contract. The first is that the asset cannot be purchased until the end of the lease term, which means that, if budget becomes available prior to the end of the term, all payments applicable to the initial term must be made prior to purchasing the asset. Second, there is no cost certainty since the fair market value purchase option at lease end is an undefined amount; the finance company's interests and those of your company may be at direct odds as the finance company will want the highest possible price for the asset.

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3. Rental contract – A well-written rental contract provides for fixed payments for the initial term of the contract, but allows for the purchase of the asset AT ANY TIME during the term, with application of a high fixed percentage of payments made going toward purchase. This structure is often used by laboratories in large companies that do not have capital budget available. Generally, the payments on this type of contract are treated as an expense and do not appear on your company's balance sheet. It is preferable to the fair market value purchase option since you may purchase the asset AT ANY TIME during the initial term; you also have cost certainty when purchasing the asset as the percentage of each payment applied to said purchase is provided at the time the contract is signed.

Please check with your tax advisor to ensure that you have a full and accurate understanding of the tax and accounting implications of any financing agreement you may enter into.

How to choose the right finance provider

There are several very important points in choosing an equipment finance company.

1. Seek out a finance company that has experience financing scientific instrumentation to laboratories on a regular basis. Companies with this experience can understand and work with your business, regardless of your company's credit profile, size or time in business.

2. Is the finance company willing to act as a financial consultant to your company, or are they just interested in making a deal? Take note of the representative's willingness to understand your situation and his/her level of service. How knowledgeable is the representative? Do the representative's answers to your questions inspire your confidence in his/her ability to help you select the best option for your situation? Are the company's offerings based on your needs?

3. Is the leasing company also part of the manufacturer? Many times the company providing the equipment or service will have a partner finance company that will handle the leasing. Many vendors have gone through a vetting process and have selected the finance partner because they have the same goals and values. Rest assured that this is a good company to work with.

4. Check references on the finance company. Ask the finance company for references for recently completed transactions. Check the Better Business Bureau for a rating and see if there is any negative feedback. Usually, a leasing company will be a member of a leading industry association.

5. How quickly can they give you an approval and lease documents. Once you select the instrument you want, you expect to receive it in a timely fashion. The same applies to finance companies. Ask them what their anticipated response time is regarding both approval and documentation preparation. This should be done expeditiously, thus making your equipment acquisition quick and easy.

> "Equipment financing is the best way to acquire equipment that may become obsolete or increase overhead costs."

Making a choice

Equipment financing can be an invaluable tool to help your company grow and acquire the instrumentation needed to fuel that growth. In the past, your laboratory may have only considered purchasing instruments. It is my hope and the intention of this article to offer viable alternatives to purchase that may allow you to acquire what you need today rather than delaying a much-needed acquisition.

Dean Stolberg *is vice president of Vendor Lease Management Group (VLMG). For 20 years, VLMG has been providing financing solutions to the scientific and test and measurement business community. VLMG is an industry leader in administering vendor programs with manufacturers in the scientific field, currently managing over 100 private label programs. For more information, visit www.vlmglease.com. Dean can be reached at dstolberg@captivelease.com or by phone at 973-292-0025.*

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A controlled venting feature allows vial pressure to be released gradually while a sample is being analyzed. This way, samples are depressurized by the time they return to the tray.

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The PLC 2020 offers an intuitive, easy-to-use software interface that allows users to start purifying compounds within minutes. The graphical icons with drag-and-drop functionality give users the ability to adjust mobile phase conditions on the fly and see on the screen where each fraction and its corresponding tube are located on the bed. With this real-time graphical sample tracking software, users can easily monitor pressure, flow rate, and % B. The unique touchscreen monitor eliminates the need for a separate PC, saving valuable bench space. To further save on space, the upper tray of the PLC 2020 holds up to four 4 L solvent bottles, giving users the ability to have four solvent lines on Pump B.

Interchangeable pump heads offer the flexibility of handling flow rates from 1–100 mL/min and pressure up to 4060psi depending on the application needs. In addition, the manual sample injection process (with electronic software-controlled positions for Load and Inject with graphical indicator) provides an electronic actuation resulting in higher reproducibility than a lever-based manual injection process. Sample loops are available from 20 µL to 5 mL, with 10 mL loops available with adapter fittings. The bed can accommodate up to three racks with customizable racks available upon request.

The PLC 2020 offers manual control options for advancing fraction collection or diverting to waste without affecting the rest of the purification run. This allows users to interrupt the normal method operation and prime the system from the run screen. Likewise, users have the ability to modify conditions—including tasks and mobile phase— mid-run so that samples can be quickly collected while they are being purified.

Built with convenience in mind, Gilson's PLC 2020 has three USB ports, giving users the option to connect to a printer, keyboard, mouse, or USB drive for convenient transfer of data. The system also features automatic stopping of the mobile phase at the end of a run with a gradual ramp- down so there are no worries about the mobile phase running dry or waste overfilling. Run light indicators above the fraction tubes and racks automatically turn off, notifying the users when the system is no longer in operation. These lights will also flash when an error has occurred in the method, so users can easily see from across the room if there are any issues.

To learn more visit www.gilson.com/plc2020

Differential Scanning Calorimeter

BOOTHS 2726, 2727

Flash DSC 1

- Features extremely high cooling (-4,000°C/sec) and heating (40,000°C/sec) rates
- Lets scientists study crystallization and reorganization processes of materials that were previously not possible
- Features a wide temperature range from -95°C to 450°C in one measurement

Mettler Toledo www.mt.com

NMR Analyzer

BOOTH 2753

MQC Series

- Features a compact magnet for a smaller benchtop footprint
- Requires no external PC, as a standard Windows™ PC motherboard is built inside
- Includes MultiQuant and EasyCal software packages, allowing simple calibration and measurement of up to four constituents in samples

Oxford Instructments www.oxford-instruments.com

Solid Phase Extraction (SPE) Sorbent

BOOTH 4634

Strata™-X-Drug B

- Specially designed and quality-control tested for drugs of abuse
- Does not require conditioning, saving time and solvent expense
- Detection for the 11 common drugs of abuse is below the lower SAMHSA cutoff levels
- Does not promote interconversion of norcodeine and normorphine to parent compounds

Phenomenex
www.phenomenex.com

Portable Gas Chromatograph

BOOTH 461

GC312

- Features flame ionization and flame photometric detectors with flame out sensors that shut off the hydrogen if the flame goes out
- Includes a 7-inch color touch screen
- Low and high set-points (depends on the options) can be customer programmed for each point and/or compound

PID Analyzers www.hnu.com

SCARA Robot

BOOTH 1320

PreciseFlex 400

- Intended for light payload material handling and assembly applications in the life sciences, medical products, semiconductor, electronics, and automotive industries
- Features vision-guided Guidance Controller, kinematics for Cartesian motion, and quiet, high-performance servo motors with absolute encoders

Precise Automation
www.preciseautomation.com

Microscope Platform Systems

BOOTH 3828

ZDeck Quick Adjust

- For Olympus BX51WI /BX61WI and Nikon FN1 microscopes
- Lowers quickly and easily via pneumatic pistons
- Includes condenser and pillar spacers for Koehler illumination at a wide range of focus heights
- Incorporates proprietary ProScan™ series motorized stage for submicron repeatability

Prior Scientific
www.prior.com

Mechanical/Ultrasound Homogenizer

BOOTH 618

DPS-20

- Combines full automation of mechanical and ultrasonic homogenizing into one unit
- Allows the use of each homogenizing method dependently or independently of each other within a programmable or manual mode
- Contains a brushless motor for mechanical homogenizing and 130-watt processor for ultrasonic
- Able to process up to 20 samples in one run

PRO Scientific
www.proscientific.com

SPEX CertiPrep®

SPEX CertiPrep has introduced a new line of Pure and Ultra-Pure Fusion Fluxes and Additives. Both lines are of a high purity, with the Ultra-Pure line being the purest on the market at 99.998% pure. These fluxes are made from a "Micro Bead" formula that ensures the same ratio of components is in each bead. This new formula has no harmful dust to clog your instruments which also reduces weighing times. Our highly standardized manufacturing process produces identical batches with no appreciable lot to lot variations, thus maintaining a high level of consistency and quality.

SPEX CertiPrep®
Your Science is Our Passion.®
203 Norcross Ave, Metuchen, NJ 08840
Phone: 1-800-LAB-SPEX
Fax: 732-603-9647
E-mail: crmsales@spexcsp.com
www.spexcsp.com

Fusion is an extremely effective method to prepare oxides, sulfides, fluorides, ferroalloys, and other metals for analysis by XRF, AA, ICP, DCP, etc. The samples are (if necessary) pulverized and mixed with a flux; this mixture is heated until the flux melts and the sample dissolves in it, yielding a clear, homogeneous melt. The melt can be cast as a glass disc for XRF or dissolved in dilute acids for analysis in solution form. In many cases fusion fluxing is simpler and the analytical results more accurate than if the sample was prepared by conventional acid dissolution or pressed powder methods.

SPEX CeriPrep's new line of Pure and Ultra-Pure Fusion Fluxes are available in a wide variety of compositions for the most popular fusion methods. Fluxes containing additives are pre-fused for better accuracy. Our Micro Bead formula ensures consistent component ratios while eliminating harmful dust and decreasing weighing time.

Every SPEX CertiPrep Fusion Flux product comes with a Certificate of Analysis stating impurity values. Custom Fusion Flux mixes are available upon request. Also, take advantage of quantity discounts for orders of 10 or more kilograms.

SPEX CertiPrep Fusion Flux is made by the leading manufacturer of Certified Reference Materials. SPEX CertiPrep has been in business for over half a century. Contact us today to request a free sample of the SPEX CertiPrep Fusion Flux of your choice. No purchase necessary. For a limited time only, also receive a free SPEXFusionFlux Scoop!

Handheld Automated Analytical Syringe

BOOTH 4335

eVol® NMR Edition

- Features extra-long syringe needles for use with NMR tubes
- With MEPS™ (micro extraction by packed sorbent), enabling chromatographers to semi-automate sample preparation, saving time, solvent and money
- Ideal for accurately aspirating and dispensing both aqueous and non-aqueous liquids

SGE Analytical
www.sge.com

Triple-Quad Mass Spectrometer

BOOTH 1134

LCMS-8030

- Features ultra-fast multiple reaction monitoring (MRM) transitions, enabling data acquisition with up to 500 different channels per second
- Improved electronics provide ultra-fast mass spectrum measurement speeds of 15,000 u/sec without sacrificing sensitivity or resolution
- Features UFsweeper® technology, which accelerates ions out of the collision cell by forming a pseudo-potential surface

Shimadzu Scientific Instruments www.ssi.shimadzu.com

Supercritical Fluid Extractor

BOOTH 2749

SFT-110

- Includes a removable oven lid and large side panel for easy access to high-pressure vessel
- Indicator light on pump module alerts user to proper operation of Peltier pre-cooler, ensuring CO_2 is maintained in the liquid state
- Robust outlet from restrictor ensures user won't accidentally damage outlet tube when inserting it into collection container

Supercritical Fluid Technologies www.supercriticalfluids.com

Portable FT-IR Chemical Identifier

BOOTH 921

HazMatID 360

- Rapidly identifies solid and liquid chemicals based on their distinct molecular fingerprint
- Features mixture analysis which allows chemical assessment of samples that may have been contaminated with more than one material
- Features built-in Bluetooth wireless communication for immediate data transmission

Smiths Detection www.smithsdetection.com

HPLC Injector

BOOTH 2220, 2221, 2321

Cheminert® C55

- Specifically designed to be built into an OEM system
- Optional Serial Interface board permits RS232 communications for both position input control and confirmation of valve piston
- Available in 4-, 6-, 8- and 10-port configurations in stainless or PEEK

VICI Valco www.vici.com

BASIC LAB

Counting Scale

BOOTH 2417

CBC Series

- Features a 16 lb (8,000 g) capacity and 0.0005 lb (0.2 g) readability
- Three backlit LCD screens show piece count, unit weight and total weight simultaneously
- Includes a bi-directional RS-232 interface with multi-language text on the print out
- Color-coded keypad highlights the most used keys

Adam Equipment www.adamequipment.com

Fume Hood

BOOTH 4275

Green Solution Hood

- Features Neutrodine® technology from Erlab
- Allows users to reduce energy costs by 96% and reduce operation costs by 70%
- Reduced CO_2 emissions by not replacing treated air
- Handles liquids and solids individually or together with a single hood

Air Master Systems www.airmastersystems.com

Agilent 1260 Infinity Analytical SFC System

Infinitely better SFC performance.

Agilent Technologies
www.agilent.com

Now available as complete system or as economically priced upgrade to existing Agilent LC systems!!

The new Agilent 1260 Infinity Analytical SFC System sets a true new milestone in performance, cost of ownership and reliability for SFC technology. It is an infinitely better choice –for chiral separations, for normal phase and for much more…

HPLC-like sensitivity, unique selectivity

The Aurora SFC Fusion A5 module combines next generation pre- and post-conditioning of supercritical CO2 to achieve the lowest detector baseline noise ever measured using SFC. Thistranslates directly into a 10-fold increase in detection sensitivityand opens the door to attractive new applications such as lowlevel impurity analysis.

Infinitely more SFC robustness

Based on well-established Agilent 1260 platform technology, all components have been factory-optimized for SFC operation, making the Agilent 1260 Infinity Analytical SFC System as reliable and robust as any Agilent 1260 Infinity LC. Now you can deploy SFC as a technique for routine analysis in your lab. And, with one software platform and one world-wideservice organization, you get a true single-vendor solutionfrom a name you can trust – Agilent.

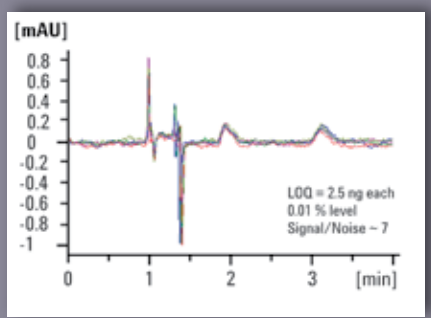
Cost of ownership matters

The costs for mobile phase and for the disposal of organic solvent such as acetonitrile contribute considerably to the overall operating cost. SFC helps to cut down expenses with lower solvent consumption, cheaper modifiers and by generating little waste. On top, the Agilent 1260 Infinity Analytical SFC System uniquely uses low-cost, beverage-grade CO2 as the major mobile phase component, reducing the costs 10 fold.

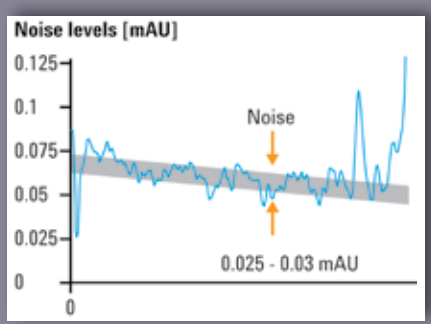
Flexibility for changing workflows

Modularity of the Agilent 1260 Infinity Analytical SFC system allows you to choose between DAD or MWD detection. Column switching to select the optimum stationary separation phase can be accomplished with the column screening kit and selection among modifiers by simply integrating our solvent selection valve. The Agilent method development solution, provides highly professional method development in an automated fashion. Furthermore detection capabilities can be extended with the Agilent 6100 Series Quadrupole LC/MS or with the Agilent 1260 Infinity Evaporative Light Scattering Detector (ELSD). IQ/OQ validation can be provided for regulated environments.

All in all the Agilent 1260 Infinity SFC is your best and most complete choice for chiral impurity analysis , pre-prep method development and beyond…



▲ *Unprecedented sensitivity for EE determinations shown by five consecutive runs of 0.005 µg of a Racemic mixture of Warfarin.*



▲ *Lowest detector noise ever achieved for SFC measurements with noise levels between 0.025 to 0.03 mAU.*

Forensic Evidence Processing System

BOOTH 4751

UV-Box™

- UV-absorbing door window ensures operator safety
- Features high-efficiency UV lamps that produce short-wavelength UV light at 254 nm to destroy exposed surface DNA and bacteria
- Available in two sizes, with dimensions of 15′ x 15′ x 15′ and 24′ x 24′ x 30′

Air Science USA www.airscience.com

Powder Flow Tester

BOOTHS 4919, 4924

PFT

- Ideal for manufacturers who want to minimize or eliminate the downtime and expense that can occur when hoppers/ silos fail to discharge
- Offers a choice of tests including Flow Function, Wall Friction, Time Consolidation and Bulk Density
- Lets users conduct QC checks on incoming materials and predict flow behavior for new formulations before scale-up

Brookfield Engineering www.brookfieldengineering.com

Texture Analyzer

BOOTHS 4919, 4924

CT3

- Features six built-in test modes plus a calibration check
- Stores up to 10 additional customized test methods
- Offers a choice of five load ranges up to 50 kg
- Conforms fully to GME and GMIA monographs for gelatin Bloom assessment

Brookfield Engineering
www.brookfieldengineering.com

Recirculating Chillers

BOOTHS 4570, 4571

F-Series

- Feature lockable wheels for easy movement and secure breaking
- F-105 features a cooling capacity of 500W at 15°C for use with a single rotary evaporator
- F-114 features a cooling capacity of 1400W at 15°C
- F-125 features a cooling capacity of 2500W at 15°C

Buchi
www.buchi.com

EPPENDORF - MICROCENTRIFUGATION REDEFINED

The Eppendorf approach to product development is—and has always been—about giving you more. More quality. More innovation. As a result, the new line of Eppendorf microcentrifuges delivers product performance that goes far beyond speed and capacity to benefit you and your work environment.

In addition to the speed, capacity and versatility you need for all your applications, our new Eppendorf microcentrifuges offer unparalleled ergonomic operation (e.g., whisper quiet operation, soft-touch lid closures, intuitive control) , superior temperature management for maximum sample protection and the Eppendorf quality you've come to expect. Some say that it's the little things in life that make a difference. We couldn't agree more.

Reward yourself with an Eppendorf centrifuge.

eppendorf

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In CANADA Tel: 800-263-8715
www.eppendorf.com

The new Eppendorf line of microcentrifuges consists of

- Models 5418 / 5418 R (18-place capacity for 1.5/2.0ml tubes, speed up to 16,873 x g) for medium throughput needs
- The new lab standard Centrifuges 5424 / 5424 R (24-place capacity, speed up to 21,130 x g)
- Unique cross-over Centrifuges 5430 / 5430 R (30-place capacity, speed up to 30,130 x g). These 2 models combine the best features of a microcentrifuge (small footprint) and multipurpose centrifuge (versatility) in one instrument. These centrifuges spin rotors for Eppendorf tubes and PCR strips as you would expect from any microcentrifuge. But that's not all. In a compact size—just over a foot of bench space—Models 5430 and 5430 R also accommodate a fixed-angle rotor for 15/50 ml conical tubes, Vacutainer, 10 to 50 ml OakRidge tubes, cryo and HPLC vials as well as a swing-bucket rotor for MTP and PCR plates. Until now, this has only been possible with large multipurpose centrifuges.

As a commitment to the environment and future generations we constantly look for ways to improve the eco-friendliness of our products. This already started many years ago when we switched all our refrigerated models to CFC-free refrigerants with zero ozone depletion potential. With our new line of microcentrifuges, we have now reached a level of performance and energy efficiency that defines an entirely new laboratory standard.

By equipping our new refrigerated microcentrifuges 5418 R, 5424 R, and 5430 R with the latest innovations in cooling technology, we're able to significantly reduce the overall energy consumption:

- Up to 20% improved energy-efficiency compared to predecessor models with optimized motor design and electronic parts (5415 C vs. 5418, 20 min run at 16,000 x g)
- Optimized insulation material of rotor chamber improves temperature efficiency.
- 60% less energy consumption with Model 5424 R during precooling to 4°C due to a unique, patent-pending compressor technology that allows for fast, 8 min precooling of centrifuge and rotor.
- Up to 47% energy savings (overnight) are achieved due to unique ECO shut-off feature that deactivates the compressor after 8 hours of non-use. This feature comes standard with all refrigerated Eppendorf centrifuges.
- Up to 79% lower energy consumption with unique FastTemppro function (Model 5430 R). FastTemppro allows for automated pre-cooling based on pre-programmable time and date. Turn off the compressor and let FastTemppro take care of pre-cooling in the morning.

There are a lot of centrifuges that offer speed and capacity. Eppendorf decided to take centrifugation to the next level and offer you features that benefit you, your applications and the environment.

Silence | Speed | Simplicity™

▲ *Centrifuge 5430 R (refrigerated): Microcentrifuge with multipurpose capabilities – spins tubes from 0.2 to 50ml as well as MTP and PCR plates. Fits on your lab bench - only 15 inches wide.*

epGreen®

Infrared Detector Arrays

BOOTH 2317

PbS and PbSe Formats

- 256-element arrays provide high sensitivity in the 1.0 to 5.5 μm wavelength region
- Cooler and stability features provide refined temperature control and programmability
- Ideally suited for gas analysis, spectroscopy, process and quality control and thermal imaging applications such as hot-spot detection in assembly process lines

Cal Sensors www.calsensors.com

Gas Switchover System

BOOTH 3747

IntelliSwitch II™

- Features an onboard web server for remote monitoring, secure system configuration and e-mail notifications of real-time system status and events
- Offers continuous pressure and flow control from liquid or high-pressure cylinder sources
- Proprietary software logic lowers yearly gas costs by eliminating liquid cylinder vent loss and excess residual return

CONCOA www.concoa.com

Mass Flowmeters and Controllers

BOOTH 3747

MFM and MFC Thermal Series

- Feature a standard maximum working pressure of 500 psig
- Supplied standard with correction factors for Air, Helium, Hydrogen and Carbon Dioxide (other factors available upon request)
- Available in a wide range of flows from 0 – 10 sccm to 0 – 20 lpm
- Made from 316L stainless steel bar stock

CONCOA www.concoa.com

Refrigerator/Freezer Thermometer

BOOTH 4070

Traceable®

- Monitors temperatures in freezers, water baths, heating blocks, incubators and refrigerators
- Triple display simultaneously shows high, low and current temperatures
- Features a range of -58 to 158°F (-50 to 70°C) with a resolution of 1° and accuracy of ±1°C
- Alarm feature provides alert when temperature rises above or falls below set point

Control Company www.control3.com

Lab Spatula

BOOTH 4070

Traceable® SpatulaBalance™

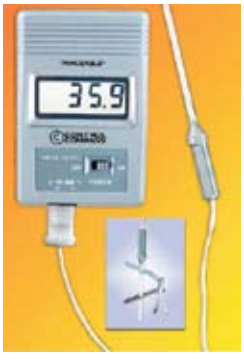
- Scoops and weighs crystals, granulated material, solids, liquids, precipitates and chemicals
- Digital display is located in the handle
- Features a range of 0 to 300 g (0 to 10.580 oz) and readability of 0.1 g/0.005 oz
- Scoop detaches from balance for easy dishwasher-safe cleaning

Control Company
www.control3.com

Freezer Thermometer

BOOTH 4070

Traceable® RTD -100.0 Platinum



- Monitors temperatures in freezers, water baths, heating blocks, incubators and refrigerators
- Range is -99.9 to 199.9°C with a resolution of 0.1° and accuracy of ±2°C
- 10-ft ultra-thin micro-cable permits freezer doors to close on it without affecting the seal
- Fast-response 100-ohm platinum probe is triple purpose for use with liquids, air/gas and frozen material

Control Company
www.control3.com

Ethernet Module

BOOTH 4377

Spectrum Server

- Allows remote operation of any proprietary USB2-type spectrometer
- Uses an on-board ARM microcomputer running an RTOS to control the spectrometer, providing high-speed sampling with real-time performance
- Computer queues up the time-stamped data (up to 65,000 spectra) until it can be read by the client, so there are no gaps in sampling

Control Development
www.controldevelopment.com

Xplore new ground with the Eppendorf Xplorer pipette

People who give 100% every day deserve the best tool and the best equipment. You work on demanding problems, and important decisions depend on the results of your work. Your standards are extremely high and your performance is professional. The new Eppendorf Xplorer electronic pipette was specially designed for high professional standards to provide optimal support for you in your work, with a new intuitive operating concept and design based on the proven Eppendorf PhysioCare Concept®.

These features set new standards for simplicity, precision and reproducibility, which mean no delays due to complicated programming or inflexible processes. Instead, you get precise adjustable parameters, reproducible results, fatigue-free work and full control over the pipetting processes.

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In CANADA Tel: 800-263-8715
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Reproducible results are essential for your laboratory work! Of course, dispensing results are affected by many factors; for example, by signs of fatigue or the aspiration and dispensing speed of the liquid. With the Eppendorf Xplorer, all relevant factors, e.g., volume, speed, mixing cycles, etc., can now be precisely and reproducibly set. Every day, consistently perfect. No matter where you are in the world, or which liquid you're using, the Eppendorf Xplorer can be individually adjusted to your environment and requirements. Program the Xplorer to an altitude or specific liquid density. Your unit can also be personally labeled to prevent an accidental exchange with another Xplorer.

Everything at a glance with one click

You can easily select all functions with the practical selection dial. The clearly arranged color display of all adjustable parameters means no more getting lost in the submenus! An optional help function can be installed in your language of choice.

Simple logic

To make pipette operation even more logical, we have developed a unique multi-function rocker for the Eppendorf Xplorer. The switch enables ultra precise control of liquid aspiration and dispensing. It follows the "Up is up and down is down"™ principle: Press the rocker up to aspirate liquids and down to dispense liquids. When the tip is ejected, the piston automatically returns to zero position.!

Everything under control

For slow pipetting, loading gels or dispensing supernatant, a feel for your task is required—and complete control of the piston movement! With the Xplorer, the "Manual pipetting" function and operational rocker make precise and flexible directional control of the piston possible.

The Eppendorf Xplorer was developed and produced by renowned ergonomic experts according to the strict criteria of the PhysioCare Concept.

The Eppendorf Xplorer's perfect balance and hand rest guarantee a low-impact position and efficient relaxation periods. The handle and size of the control buttons feature a user-friendly design, regardless of hand size.

Improved view

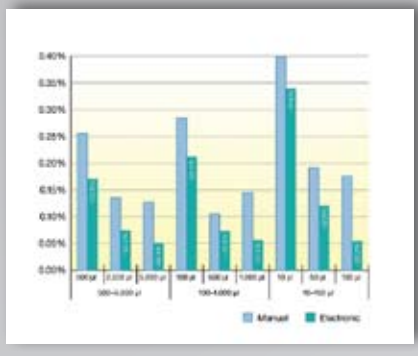
All information on the Xplorer display is clearly readable, regardless of your hand position or work position. The optimally angled pipette head and high-resolution display with individual brightness setting guarantee a comfortable work environment.

Improved balance of energy

The more energy you need to expend, the quicker your energy reserves are depleted. But because your performance is the most valuable resource, we have significantly reduced the weight and required operating force of the Eppendorf Xplorer.

When tips are optimally seated

The Eppendorf Xplorer's spring-loaded tip cone provides maximum tightness with minimal attachment force, noticeably reducing the energy required for ejection without compromising tightness. Because the tip always rests in the same position, the reproducibility of your results is heightened.



DC to HVDC Converters

BOOTH 961

A Series

- Occupies less than one-tenth of a cubic inch of volume; ¼ of an inch thick
- Controllable output voltages range from 100 volts to 6,000 volts
- Features a low-noise quasi-sinewave oscillator
- Input/Output Leakage Current, <100nA

EMCO High Voltage
www.emcohighvoltage.com

Forced Convection Laboratory Ovens

BOOTHS 4616 & 4617

Isotherm® Series

- Feature multiple redundant over-temperature protection systems for maximum sample and user protection
- Feature electrogalvanized steel with white oven-baked epoxy antimicrobial powder-coated finish
- Feature a single piece stainless-steel chamber with rounded corners

ESCO www.escoglobal.com

PRODUCT SPOTLIGHT BOOTH 2264

TYPE I WATER PURIFICATION SYSTEMS

FOR ANALYTICAL AND LIFE SCIENCE APPLICATIONS

Type I ultrapure water can be easily dispensed at the point-of-use, thanks to ELGA LabWater's newest additions to its PURELAB flex line of water purification systems. The PURELAB flex 3 and 4 were designed for analytical and life science applications, allowing users to focus on routine test work without having to worry about water quality.

The point-of-use display gives the user information at all times, providing updates on system status, temperature, alarms, time and Total Organic Carbon (TOC), which is displayed in real time. The point-of-use filters efficiently remove biological impurities, such as endotoxins, DNase, RNase and bacteria.

The PURELAB flex 3 and 4 systems offer a convenient range of dispensing options from proportional control (drop by drop) and auto volume to locked dispense for quick filling of large laboratory glassware. Routine sanitization can be completed in minutes due to the systems' easy-access doors. The sanitization cartridge ensures that no manual handling of chemicals is required.

Both models deliver up to 10 liters of ultrapure water per day and up to 2 liters per minute. The PURELAB flex 3 delivers ultrapure water direct from potable tap water and PURELAB flex 4 requires a pre-purified feed.

For more information, visit www.elgalabwater.com. To see the PURELAB flex line of water purification systems, visit ELGA LabWater at booth 2264 during Pittcon 2011 in Atlanta, Georgia.

Benchtop Purification System

BOOTH 4735

PLC 2020

- Features interchangeable pump heads for flow rates of 25 mL/min at 4600 psi, 50 mL/min at 2100 psi, and 100 mL/min at 1200 psi
- Ideal for high-pressure reverse phase and normal phase applications with built-in selection of up to 5 separate solvents
- Has electronically actuated manual injections of up to 10 mL volumes and variable dual-wavelength UV/VIS detection

Gilson www.gilson.com

360° Vertical Multi-Function Rotator

BOOTH 2116

PTR-35

- Combines three fully programmable mixing functions: vertical rotation, reciprocation and vibration
- Standard platform can accommodate up to 26 x 15mm diameter tubes or 26 x 1.5 ml – 2ml microtubes
- Four optional platforms provide the flexibility to mix and match different tube sizes
- Includes a 2-line, 16-character LCD display and quiet motor

Grant Instruments www.grantsci.com

Water Baths

BOOTH 2116

Aqua Plus Series

- Series includes digital and analog unstirred baths, linear shaking baths and boiling baths
- Feature drain taps, temperature pre-sets, front-panel lockout, countdown timers and non-drip polycarbonate lids and bases
- Complete series includes 21 models

Grant Instruments www.grantsci.com

Floor Mount Fume Hood

BOOTH 2252

UniMax Series

- Constructed from chemical-resistant, non-conductive modular panels featuring composite resin surface material
- Features special baffles; standard or explosion-proof lighting; electrical and plumbing services; and optional door configurations
- Ventilation and filtration equipment can be engineered to design specifications

HEMCO www.hemcocorp.com

BioTek's new Epoch Multi-Volume Spectrophotometer System

BioTek's new Epoch Multi-Volume Spectrophotometer System combines two innovative products into system designed for a wide range of applications, from nucleic acid and protein quantification on a micro scale to cell-based assays in microplates, BioCells or standard cuvettes. The Epoch Microplate Spectrophotometer offers a 200 nm to 999 nm wavelength range without interference filters for measurements in 6 to 384 well microplates, while the Take3 Plate extends the system's applications to very low volume nucleic acid and protein quantification. Up to sixteen 2 ul DNA, RNA or protein samples can be quickly quantified saving valuable time and samples. This system is well suited to the budget sensitive laboratory that needs maximum functionality and application flexibility.

BioTek®
Get a Better Reaction.
P.O. Box 998, Highland Park
Winooski, VT 05404
TEL: 888-451-517
www.biotek.com

The Epoch Microplate Spectrophotometer features a monochromator based optical system, with a wide 200 to 999 nm wavelength range, selectable in 1 nm increments. The main benefit is the ability to run a multitude of biomolecular assays without needing to purchase application specific filters. Controlled by the powerful Gen5 Data Analysis software, users need only to select the desired wavelength and read the microplate. When the assay wavelength is unknown, a spectral scan can be quickly run to determine the absorbance peak. Epoch can measure 6 to 384 well microplates with either a single data point taken in the center of the well, or by well area scanning in larger well diameters to provide multiple measurements that can be analyzed more closely. Measurements made in microplates can be corrected for pathlength by Gen5's automated pathlength correction option, which is an especially useful tool for direct quantification assays.

When used with the Epoch microplate reader, the Take3 Multi-Volume Plate extends applications into the increasingly important low volume area. Take3 allows measurement of up to sixteen 2 µL samples at a time so that DNA, RNA or protein samples can be measured quickly and without diluting. The Take3 plate uses a custom designed fused silica slides, one of which is precision printed with sixteen 2 mm microspots – the ideal size for samples as low as 2 µL. When the top of the Take3 is closed, a nominal 0.5 mm pathlength is created so that sample concentrations can be quickly and accurately made with results produced automatically, via pre-programmed applications within the custom Gen5 Take3 module.

Together, Epoch and Take3 comprise a system that allows the laboratory an assay multi-tasking capability in one compact footprint at a fraction of the cost of typical instrumentation and in a fraction of the time that would be required to accomplish the same results.

Hybrid Ion Milling System

BOOTH 2647

IM4000

- Capable of both cross-section and flat ion milling
- Uses a wide Argon ion beam to irradiate specimens and uses the sputtering effect to polish the surface without stressing it
- Features a high milling rate ion gun with a processing speed of 300 μm/hr
- Suitable for various industries, including semiconductors, materials, research and quality control

Hitachi High Technologies America
www.hitachi-hitec.com

Karl Fischer Volumetric Titrator

BOOTH 2919

AQUACOUNTER® AQV-2200S

- Features a small volume titration cell which requires 20 mL of titration solvent for accurate measurements
- With both a volumetric and coulometric channel, it can measure moisture over the entire range from 1 ppm to 100%
- Current status, data and function keys are displayed on a large color screen
- Includes a built-in thermal printer with high-resolution printouts

JM Science
www.jmscience.com

Gas Standards Generator

BOOTH 1552

FlexStream™/SD

- When combined with Secondary Dilution Module SD, creates variable concentration gas mixtures in constant output flow
- Primary mixture concentration can be varied over a 10:1 range in the permeation unit
- Simplifies production and reduces the cost of supplying required test gas mixtures

KIN-TEK www.kin-tek.com

Glassware Washer

BOOTH 4325

1700 LXA

- Available in single- or double-door configurations for pass-through applications
- Features high-capacity cleaning with up to three levels of washing
- On-board storage of cleaning chemicals is provided via an ergonomic, top-loading chemical storage compartment
- Features a HEPA-filtered chamber and direct injection drying

LANCER www.lancer.com

Heating/Cooling Thermostats

BOOTH 4622

ECO Series

- Provide precise, economical and flexible thermostating from -50°C up to 200°C
- Two different controllers are available—ECO Silver and ECO Gold
- Both controllers feature a powerful circulation pump with 30% higher capacity than previous models
- All cooling thermostats are available as air-cooled or water-cooled models

LAUDA-Brinkmann www.lauda-brinkmann.com

PRODUCT SPOTLIGHT BOOTH 4062

LIQUID DOSING MADE SIMPLE

TRANSFER CORROSIVE LIQUIDS WITHOUT HAVING TO MEASURE AND POUR

KNF Neuberger designed its SIMDOS® diaphragm liquid dosing pump with simplicity and ease in mind. Ideally suited for transferring corrosive liquids in the lab, the pump is available with a variety of wetted materials, including PTFE/FFPM.

The SIMDOS pump achieves fast, precise calibration within a short amount of time, transferring liquids at a flow rate of 0 to 100 ml per minute. Offering consistent reliability throughout entire processes, SIMDOS makes programming and access of all functions simple and intuitive.

Safety is a definite concern, with the pump head located outside the splash-protected IP-65 housing. The pump is safe to run dry and is self-priming in up to 9 feet of water. It can handle pressures of up to 90 psig and can transfer viscous media up to 150 centistokes.

Roland Anderson, laboratory product manager at KNF Neuberger, says SIMDOS has many benefits over conventional pumps. "Most people use a peristaltic pump," he said. "When you factor in the bending and aging of the tubing, performance starts to vary over time. The [SIMDOS] doesn't use any tubing, and it gives consistent results throughout its life."

The pump's electronic display, combined with a touch control knob, makes accessing all of its functions very simple. "It's designed so it's plug and play," Anderson added. "You can plug it in… walk away, and have it dose in the way you programmed it."

For more information, visit www.knf.com. To see the SIMDOS dosing pump in action, visit KNF at booth 4062 during Pittcon 2011 in Atlanta, Georgia. Roland Anderson, Laboratory Product Manager, can be reached at randerson@knf.com or by phone at 609-890- 8600 ext. 241.

Miele's PG 85 Series

Critical Research Demands Sophisticated Washing Systems

In general, the more critical the research, the more likely the laboratory will employ an automated washing process. Today more regulated industries, such as pharmaceutical, biotech, testing and forensics labs are requiring a paper trail which provides proof of accuracy as well as testimony for lawsuits and criminal trials. A validated washer combined with Standard Operating Procedures provides a more consistent, traceable result than hand washing. With these regulated industries and others that desire a validated process, Miele's PG 85 series offers the perfect solution. Not only do these systems reduce the daily workload and guarantee clean glassware for analytical experiments, but the "Perfect" features provide safeguards to ensure the consistent reproducible reprocessing of laboratory glassware.

The PG 85 series of washers provides uncompromising perfection in the delivery of clean glassware for analytical experiments as these systems provide control features that enable the "perfect' cleaning of laboratory glassware.

Miele PROFESSIONAL

www.labwashers.com
800-991-9380
proinfo@mieleusa.com

PG Perfect Speed Sensor

To guarantee safe cleaning results, the rotational speed of each spray arm is monitored and documented in the PG 85 series. With this monitoring, the user will be alerted if something is blocking the arms or excessive foam is slowing the arm motion. In most cases, improper loading is the typical problem of blocked spray arms, which goes undetected in most washers and causes cleaning problem. But an event that provides deviation from target values will produce an error message; the program is interrupted and the user can intervene to deal with the cause of the fault. This will ensure that the wash process was accurate.

Perfect Pure Sensor

Residue in the final rinse water can negatively impact reprocessing performance. The PG series offers a patented conductivity meter to ensure proper cleaning. The sensor detects undesirable substances in the rinse water, such as alkaline or acidic process chemicals – which are detected as a function of conductivity. This measuring is done through a contact-free - hence maintenance-free system, which is able to monitor conductivity conditions with exceptionally low tolerance levels in range from 5 – 40 mS/cm and 40 mS/cm – 100 mS/cm. With the Perfect Purse Sensor, PG Series eliminates the service and calibration issues associated with traditional conductivity meters and offers better monitoring of the wash process. This means the critical research lab is assured residual free rinses with reliable repeatable results

Perfect Flow Sensor

Good reprocessing results are dependent upon precise volumetric control of dispensed chemicals. The Perfect Flow Sensor employs ultrasound technology to produce precise readings irrespective of ambient temperature and fluid viscosity condition. This eliminates human error in the chemical dosing process.

Perfect Doc

Each PG series laboratory glassware washer comes complete with a network interface for process documentation. The Perfect Doc module allows data to be collected on a wide range of process parameters, for instance to plot temperature charts, as well as for the compilation of entire process protocols including dispensed amounts spray arms, wash steps, error conditions, speeds, conductivity and all the critical parameters to ensure proper cleaning. This information can then be ported to a printer.

Perfect HEPA Drying

The PG 85 series washers are equipped with the new Class H 13 high temperature HEPA filter – (in accordance with DIN EN 1822-1). The filter is located directly upstream from the cabinet, preventing the admission of unwanted air-borne particles from contaminating the wash load. This ensures exceedingly high levels of air purity in the cabinet.

Perfect Touch Control

The PG series features touch sensitive displays that are fully flush and chemical-proof for simple and effective wipe disinfection. This control is intuitive with simple user interface, yet contains tremendous flexibility behind the scenes. Programs are easily launched and each step of the process appears in the display in the user's own language with 20 languages available from which to choose. Actual temperatures, conductivity, countdown times and other protocol date can be defined individually and displayed in text providing further detail for critical research laboratories to assess the wash process and ensure its results.

Benchtop Titration

BOOTH 3435

900 Touch Control

- Starts titrimetric analyses through the use of a touch screen
- Provides direct access to LIMS and network printers
- Can be operated by users wearing gloves
- Auto-start function automatically starts Karl Fischer titrations once a sample is added

Metrohm www.metrohmna.com

Titration Program

BOOTHS 2726 & 2727

GTP™ - Good Titration Practice™

- Covers the entire life cycle of a titration system
- Facilitates compliance with regulations, precise results and reduced costs
- Covers installation and qualification of the system, routine operation and evaluation and selection of the appropriate analytical instrumentation

Mettler Toledo
www.mt.com

Laboratory Glassware Washer

BOOTH 4929

PG 8535/36

- Features temperature-independent dispensing control on the basis of ultrasound
- Includes a sleek touch screen control and spray arm monitoring
- Features continuous conductivity monitoring for residue-free rinse quality

Miele Professional
www.labwasher.com

Microwave Digestion

BOOTH 553

UltraWAVE

- Features proprietary Single Reaction Chamber (SRC) technology
- Digests up to 15 samples of any matrix simultaneously, eliminating labor associated with assembly/disassembly of digestion vessels
- Ideal complement to ICP-MS, due to superior digestion quality and minimal blank contribution

Milestone www.milestonesci.com

Sample Prep System

BOOTH 861

Samplicity™ Filtration System

- Provides a convenient alternative to syringe filters when preparing samples for analytical analyses such as HPLC and UHPLC
- Allows up to 8 samples to be simultaneously vacuum-filtered in seconds
- Multiple samples can be quickly and easily loaded onto the system using a standard pipette
- Features a low hold-up volume, which allows processing of samples as small as 200 µL

EMD Millipore www.millipore.com

Laboratory Oven

BOOTH 2922

TR 60 – 1050

- Features forced air circulation and a maximum working temperature of 300°C
- Stainless steel interior chamber is easy to clean and resistant to rust
- Suitable for various applications, including drying, sterilizing and warm storing
- Features consistent temperature uniformity

Nabertherm www.nabertherm.com

Fume Hoods

BOOTH 3460

FumeGard Series

- Series includes vertical laminar flow, conventional and by-pass fume hoods
- Made of polypropylene with seam-welded, stress-relieved, reinforced construction
- Feature UV stabilizers and anti-oxidizing agents to maximize thermal resistance
- FumeGard hoods are ergonomic and metal-free and can be customized

NuAire
www.nuaire.com

Adam Equipment's PMB Moisture Analyzer

Designed with smart features and simple operation, Adam's PMB takes the hassle out of moisture analysis for fast, dependable results. The PMB lets you store and retrieve unlimited test settings and results for any number of sample materials. Built-in capabilities like automatic test starting and easy sample removal and placement save time and increase efficiency for those repetitive testing applications.

With nearly 40 years of experience in the production of weighing instruments, Adam supports its customers with top rate service to achieve the best possible customer satisfaction. Adam Equipment offers the perfect balance of dependability and performance.

ADAM®
PERFECT BALANCE
Speed, Performance, Value
26 Commerce Drive Danbury, CT 06810
Phone: 203-790-4774
www.adamequipment.com

In virtually any industry, there is an ever-increasing need to process more samples in less time and with dependable results. While this demand has driven users to find better tools and methods, it has inspired Adam Equipment to develop the PMB moisture analyzers – two models that provide features and capabilities unlike any other, at affordable prices.

Storage capability for unlimited test routines and data lets you set parameters for every type of sample you need to test, and store them internally or directly onto a USB storage device. Test results can be stored just as easily and without limitation. Two USB inputs, one for a flash drive and one for connection to computers, provide complete communication flexibility, and an RS-232 interface is included as well. Multiple communication options let you pick the right interface for your needs and the automatic record-keeping function saves each test result.

A large brilliant backlit display allows you to monitor all critical information simultaneously during and after tests. Displayed information during tests may typically include current temperature, elapsed time, and % moisture content. Other data such as % residual solid, or current mass may be displayed at the touch of a button.

Options for testing include single or multiple temperatures, fast ramp up to temperature, manual end test, timed test, auto-stop, or timed auto-stop. With all of these choices you can design test routines for a wide range of sample types.

The PMB53 provides results accurate to 0.01% moisture content, mass measurements to 1mg, and a total weighing capacity of 50g. The PMB202 provides results accurate to 0.05% moisture content, mass measurements 0.01g and a total weighing capacity of 200g. Both models feature test temperatures up to 160°C in 1°C increments with a single 400W halogen heater.

Smart features, fast response time, and easy-to-use functionality make Adam Equipment's PMB the ideal moisture analyzer for a wide range of applications.

Hydrogen Generators

BOOTH 535

110H-MD

- Capable of flow rates up to 1.1 L/min at >99.9999% purity
- Features Proton Exchange Membrane and Pressure Swing Adsorption technology to produce ultra high-purity carrier grade hydrogen gas from a source of deionized water
- Cascading functionality is available to further enhance laboratory workflows

Parker domnick hunter www.domnickhunter.com/scientific

Hydrogen Gas Generator

BOOTH 535

Balston H2-PEMPD Series

- Produces up to 1,300 cc/minute of 99.99999+% pure hydrogen
- Features a maintenance-free, self-regenerative palladium membrane
- Lets users supply, control and automate all hydrogen gas supplies
- A single generator can support up to as many as 20 instruments with fuel and carrier gas

Parker Hannafin www.labgasgenerators.com

Zero Nitrogen & Zero Air Generator

BOOTH 3055

Fusion 1010

- Features "rapid restart" control, allowing it to be operational again after any power cut of up to 20 minutes
- Designed specifically for use with GC-ECD and GC-FID; can also be used with THA applications
- Catalyst chamber ensures removal of Hydrocarbons to <0.1 ppm
- Supplied with caster wheels for easy mobility

Peak Scientific www.peakscientific.com

Rotating Sample Divider

BOOTH 3827

Smart Boyd-RSD Combo

- Produces a split of any chosen weight, regardless of the sample's original total weight
- Jaws can be rotated top to bottom for longer life
- Jaws can hold 5 kg of sample as one load
- Includes touch-screen operation

Rocklabs
www.rocklabs.com

Metrohm is a lab-favorite for titration—and now for ion chromatography, too!

The Metrohm brand is synonymous with precision titrators that are as rugged as they are accurate. They've been lab favorites for more than 60 years because of our reputation for stretching the boundaries of technology coupled by the pride we take in designing and manufacturing our systems.

We're less known for our Ion Chromatography systems, but we're here to change that.

Metrohm
USA Inc.
6555 Pelican Creek Circle
Riverview, FL 33578
866-METROHM (638-7646)
www.metrohmusa.com

We are not newcomers to IC—not by a long-shot. We've been advancing the technology and capabilities of trace-level analysis for 25 years, we just haven't been very vocal about it. Until now.

And we'll start by saying the qualities that have made us a trusted brand in titration are what you'll find in our ion chromatography: innovation, accuracy, precision, built-in intelligence that makes our systems so user-friendly, ruggedness. And so critical in today's lab, where every budget dollar is stretched to its limit—an eye for saving you as much money as possible.

We're not a publicly traded company that answers to investors first. Metrohm is actually a foundation that gives back to the people and city of where it was founded in Switzerland. Our philanthropic roots run deep and branch out to our customers: if we do right by you, then we will be successful. It has been our time-tested recipe—and one we have no intention of changing.

Our IC systems save in so many ways…

Time- and cost-saving features abound. They range from a Suppressor that is guaranteed to last 10 years without compromising your results. 10 years! Our systems and accessories are inherently smart, too. For example, microchips in our columns track usage and communicate optimal system parameters to improve workflow. Manual sample preparation tasks are now inline and hands-free. Good-bye expensive syringe filters/caps! Hello higher accuracy, lab efficiency and tons of money saved!

Our system components are manufactured and assembled by Metrohm employees at Metrohm—we don't cut corners. Perhaps that is why we can confidently back our systems with industry-best warranties: 3 years for the entire system, and 10 years for the suppressor. Unlike other brands, we also guarantee a decade of spare parts for your system. How's that for peace of mind?

We also support you with application development and troubleshooting as well as the best maintenance services you can ask for. Trust our service professionals (also Metrohm employees, never outsourced!) to care for your system as if it was their own—because it is!

These are just a few of the reasons to check out Metrohm Ion Chromatography systems. We're just sorry we didn't do a better job of communicating them for all these years. So if you didn't think there were options when it came to IC systems, there are. And they're great.

Skeptical? That's OK, you don't just have to take our word for it—hear from your peers at our special website:

www.IC-changeisgood.com

3 year instrument warranty +

10 year suppressor warranty +

Microwave Digestion System

BOOTH 3447

NOVAWAVE

- Digestion tunnel system employs 12 dynamically operating micro cavities to process 12 samples simultaneously
- Features individual sample control and monitoring
- Lets users prepare up to 14 racks of 12 samples at a time
- Available in two models: stand-alone Model SA and fully automated Model FA

SCP Science
www.scpscience.com

Microfluidic Channel System

BOOTH 4335

SilFlow™

- Designed for flow switching and splitting applications
- Delivers flexible solutions for multidimensional gas and liquid chromatography
- Expands capabilities of capillary gas and liquid chromatography by minimizing dead volumes and using inert flow paths to ensure no decrease to analysis sensitivity

SGE Analytical www.sge.com

LIFE SCIENCE

Next Generation Library Sequencing Workstation

BOOTH 4426

VERSA™

- Open system compatible with third-party kits and reagents
- Automates nucleic acid extraction, reverse transcription and PCR setup
- Scalable solution can process up to 96 samples in parallel
- Reagent dispensing pins reduce both tip consumption and preparation time

Aurora Instruments www.aurorabiomed.com

Precast Gels

BOOTH 2534

Criterion™ TGX Stain-Free™

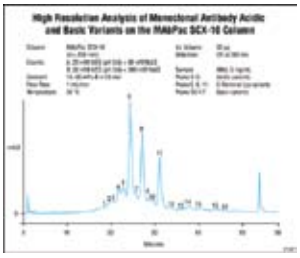
- When combined with the proprietary Gel Doc EZ Imager, users can achieve protein separation, gel imaging and data analysis in 25 minutes, without the need for staining
- The same gel can be used for western blotting, standard staining methods and mass spectrometry analysis
- Can be stored for up to 12 months without losing performance quality

Bio-Rad www.myelectrophoresis.com

Strong-Cation-Exchange Column

BOOTH 2861

MAbPac™ SCX-10



- Designed specifically for high-resolution analysis and characterization of monoclonal antibody variants
- Nonporous pellicular resin permits the separation of monoclonal antibody variants that differ by as little as one charged residue
- Hydrophobic interactions with the resin are essentially eliminated for very efficient peaks

Dionex www.dionex.com

Motorized Pipette

BOOTH 4735

Pipetman® M

- Fully motorized; requires virtually zero pipetting force
- Features four pipetting modes, including reverse, mix, repetitive and pipetting
- Features adjustable piston speed
- Four models available, covering the range of 0.5 µL to 1,000 µL

Gilson www.gilson.com

Semi-automated Microplate Sealer

BOOTH 4979

AccuSeal™

- Compatible with a wide range of plates, including PCR, assay, and deep-well storage plates
- Accepts shallow plates and high-profile plates and can be used with most manufacturers' heat sealing films
- Features adjustable sealing temperature and sealing time

Labnet International www.labnetlink.com

Water Purification, Pure and Simple

AQUA SOLUTIONS® began manufacturing and selling Reagent Grade Laboratory Water Purification Systems in 1987.

During the past 25-years, **we have saved our customers Millions of dollars**, by providing lab water systems that are simple to install, operate, and maintain, while costing less than most competitive brands.

Our Mission is to provide our customers with laboratory water purification systems that conveniently, economically, and reliably deliver the highest purity reagent grade water for laboratory applications, on a world-wide basis. **Mission accomplished!**

AQUA SOLUTIONS®

Pittcon Booth # 3871
Phone # (877) 594-7711
www.AquaA.com/simple

AQUA SOLUTIONS is unique in this industry for several reasons:

- To our knowledge, we are the only company in the USA that is EXCLUSIVELY dedicated to manufacturing and selling laboratory water purification systems.
- **AQUA SOLUTIONS** systems are individually hand-crafted by experienced technicians and wet-tested under laboratory conditions prior to shipment.
- LIVE people actually answer our phones and direct customers to other LIVE people, or ***Water Wizards***, who can answer their questions immediately.

AQUA SOLUTIONS offers a complete line of laboratory water purification products. Type I and Type II DI systems, are available with or without built-in reverse osmosis pretreatment. They can run on virtually any quality potable tap water. Our Type II and Type III central and point-of-use DI systems are available in many variations. We also offer small and large, stand-alone reverse osmosis pretreatment systems, available with or without Type 1 or Type II DI post-treatment.

AQUA SOLUTIONS Type I RO+DI systems combine a built-in RO pretreatment system with a Type I DI system, in a small, single-cabinet design that can be bench, shelf, or wall-mounted. These RO+DI systems are available in Analytical and Biological grades, with or without a dual-wavelength UV Oxidizer/Sterilizer that reduces TOC (trace organic carbon) contaminants to the lowest possible levels. These systems provide 10-20 Liters/hour of RO pretreated water that is stored in a pressurized 42-Liter tank - other sizes are available. They can operate on virtually any quality potable tap water and have a Type I flow rate of 2+ Liters/minute via the included remote dispenser. They accept 100-240 VAC at 50/60 Hz inlet power at less than 2 Amps, converting it to 12 VDC for safe, internal operation. The systems include a 2-year warranty, and are made in the USA.

AQUA SOLUTIONS Standard, 2+ Liter/minute Type I DI systems are available for operation on either good quality tap water or any quality pretreated water. They are essentially identical to our Type I RO+DI systems above, except for the built-in reverse osmosis pretreatment and RO storage tank.

Type II and Type II laboratory DI water is used in a wide variety of applications that call for less stringent water quality than most Type I applications. **AQUA SOLUTIONS** offers a complete line of Type II/III DI systems, ranging from small point-of-use DI systems with flow rates of 3-6 Liters/minute, to larger lab-sized systems with instantaneous flow rates of 20-40 Liters/minute for glassware washers. The Type II/III product line also includes systems with built-in or external reverse osmosis pretreatment, at continuous flow rates of up to 2 Gallons/minute.

Filter Plates

BOOTH 2353

AcroPrep™ Advance

- Smooth well design provides consistency in filtration times and efficient sample and bead recovery
- Optimized outlet tips minimize sample leakage during incubation steps
- Comply with SBS guidelines, allowing plates to be run in manual, semi-automated and automated processes
- Ideal for various applications, including flow cytometry, lysate clearance and protein purification

Pall Life Sciences www.pall.com

Centrifugal Devices

BOOTH 2353

Microsep™ Advance

- Features deadstop to prevent samples from spinning to dryness
- Lets users achieve 50X concentration and >90% recovery in minutes
- Features a versatile Omega™ membrane, which is available in a variety of MWCOs
- Color-coded and laser etched for easy identification

Pall Life Sciences www.pall.com

PRODUCT SPOTLIGHT BOOTH 3135

VERSATILE AUTOMATED LIQUID HANDLER

BROAD RANGE OF VOLUMES AND PIPETTING OPTIONS

The compact and user-scalable Versette automated liquid handler, from Thermo Fisher Scientific, is a compact and user-scalable instrument, featuring 19 self-interchanging and quick-swap options and a total volume range of 0.1 to 1,250 µL.

Versette supports various procedures, from automated serial dilution and cherry picking to 96/384 plate replications, as well as options for a 2- or 6-position stage, giving users the flexibility to transition from handheld pipetting or establish an integrated liquid handling system.

Its compact size enables the Versette to placed virtually anywhere, from a benchtop to an enclosure, and its user-friendly LCD interface lets users program simple and complex pipetting procedures in no time.

"The most critical step in any clinical research lab is the sample preparation," said Subodh Nimkar, Strategic Marketing Manager, Clinical and Toxicology, Thermo Fisher Scientific. "There's a lot of time spent preparing samples, and a lot of manual labor required. [With Versette], the lab operator can take the samples that are prepared and move on to the next step."

Related consumables have been designed to optimize liquid handling performance. Single-, 8- and 12-channel pipetting heads use proprietary ClipTips that securely seal to the pipetting head. In addition, all pipetting heads include RFID tags to self-identify for tracking usage and service information.

For more information, visit www.thermoscientific.com/versette. To see the Versette liquid handler in action, visit Fisher Scientific at booth 3135 during Pittcon 2011 in Atlanta, Georgia.

PURELAB flex- innovating water purity

ELGA's new innovative Type I ultrapure water purification system ensures accurate consistent results. The PURELAB flex 3 & 4 are the latest additions to the award winning PURELAB flex range of systems. Both systems deliver up to 10 liters of ultrapure water per day and up to 2 liters per minute. The PURELAB flex 3 delivers ultrapure water direct from potable tap water and PURELAB flex 4 requires a pre purified feed.

The PURELAB flex offers many advantages for analytical and lifescience applications. It allows users to focus on routine test work, without having to worry about the water quality affecting any test results. The PURELAB flex 3 and 4 are flexible water purification systems which can be adapted to respond to a laboratory's changing water purity needs today and tomorrow.

ELGA
5 Earl Court
Woodridge, IL 60517
(877) 315-3542
Email: elga.usa@veoliawater.com
www.elgalabwater.com

The water quality conforms to international water standards e.g. CLSI, CLRW, ISO 3696: Grade 1,2,3, ASTM D1193-06, Pharmacopeia USP, EP and JP. The PURELAB flex can be used for analytical and lifescience applications in all pharmaceutical, university, hospital, food and beverage laboratories.

The PURELAB flex is easily adaptable to facilitate changes to laboratory design layouts and applications.

Handset designed for today's laboratory

- Intuitive to use
- Ergonomic handset design
- Clear water purity for absolute confidence as you dispense
- Handset displays prioritized information shown at all times (system status, TOC, alarm)
- POU filters for multiple applications to remove endotoxins, DNase, RNase and bacteria
- Flexible dispensing in four different ways
    - o Variable flow – drop by drop or up to 2 liters per minute
    - o Autovolume dispense from 50ml to 60ml and repeat dispensing
    - o Hands free with optional foot pedal
    - o Locked dispense for glassware filling

Water Purification made easy

- Fast and simple sanitization to minimize microbial growth
- Data capture via USB port for system validation
- User settings can be customized via the web and uploaded using the USB post in seconds
- Multiple dispense positioning
    - o Wall, bench, height adjustable arm, hand-held dispensing

▲ *The PURELAB flex delivers 18.2 MΩ-cm water quality.*

ELGA is the global laboratory brand name of Veolia Water Solutions and Technologies, the world's leading water service company.

Anaerobic Work Station

BOOTH 718

Bac*BASIC*

- Features "ally designed" arm ports for maximum reach and comfort
- Includes a removable shield for easy introduction of equipment, cleaning and maintenance
- Features a rapid Auto-Purge Pass Box for introducing Petri plates, specimens and supplies (purge time is less than 50 seconds)

SHEL LAB www.shellab.com

Robotic Assay Workstations

BOOTH 1447

Zymark TPW3 and APW3

- Designed to prepare and analyze pharmaceutical solid dosage forms and intermediate granulations
- TPW3 features a high-shear homogenizer to disperse samples in a vessel containing 20 to 100 mL or 50 to 500 mL of solvent
- APW3 processes samples in 16 mm x 100 mm tubes

SOTAX
www.sotax.com

LIMS & SOFTWARE

Reporting Software

BOOTH 3053

ACD/Spectrus Processor

- All-in-one processing and reporting software for NMR, LC/MS, IR and other analytical techniques
- Supports more than 150 data file formats from most major instrument vendors
- Lets users process analytical data from multiple techniques in one interface
- Provides assistance with routine chemical structure confirmation

Advanced Chemistry Development www.acdlabs.com

BUCHI'S FULL RANGE OF ROTARY EVAPORATORS COVERS ALL APPLICATIONS AND BUDGETS

Rotary evaporation is the most commonly used method to remove solvents, as it is an efficient, fast and gentle way of separating liquids. The rotating flask generates an effective heat transfer for quick evaporation that prevents overheating while leading to a smooth mixing of the content.

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T 302 652-3000 • F 302 652-8777
www.mybuchi.com

For over 50 years, Buchi has been the market leader, inventor and innovator of lab instruments based on Evaporation and Vacuum technologies, and supplier of Rotavapor® products worldwide.

Now, Buchi, the world leader in rotary evaporation technology, is pleased to announce the launch of its newest rotary evaporator, the Rotavapor® R-3. This newest addition to Buchi's industry-leading evaporation solutions portfolio is a laboratory evaporator that features simple operation, exceptional durability and outstanding reliability for standard applications in education and research without compromising quality or saf ety.

The Rotavapor® R-3 provides a value-priced high-quality Buchi alternative to unreliable imitation brands for cost-conscious customers. Now, there is no longer a reason to compromise quality, safety, or peace of mind when choosing a basic rotary evaporator – there is a Buchi for every budget!

The R-3 shares many of its features with Buchi's more advanced evaporation systems, including a digital heating bath, stopcock for addition of solvent or rudimentary vacuum control, safety glass, and a high-performance one-piece vapor duct with the patented CombiClip. It utilizes a smooth manual lift for quick, accurate height adjustment without the cost of an automatic design.

As with all our modular evaporation solution systems, the Rotavapor® R-3 integrates seamlessly with a Buchi V-700 Vacuum Pump, a Buchi Vacuum Controller, and our environmentally friendly Chillers. Learn more about our complete Evaporation Solutions on www.mybuchi.com, or by connecting with Buchi via Facebook, Twitter, LinkedIn, or YouTube.

▲ *The Rotavapor® R-3 is a value-priced addition to Buchi's rotary evaporator portfolio.*

▲ *The Rotavapor® R-215 integrated with the V-700 Vacuum Pump, the V-855 Vacuum Controller, and the environmentally friendly F-105 chillers.*

Software for Analysis of Target Compounds

BOOTHS 1322 & 1323

TargetView™

- Designed to automate and improve detection and measurement of multiple target chemicals in complex GC-MS data sets
- Works with chromatograms of worst-case complexity; e.g. with high numbers of analytes of varying concentrations
- Automatically detects hundreds of target compounds in one run

ALMSCO www.almsco.com

ERP and Chemical Management Software

BOOTH 3472

TITAN™

- Features a tabbed Multiple Document Interface (MDI)
- Compatible with Crystal Reports and SQL Server Reporting Services
- Includes real-time access to filtered data
- Lets users import/export XML or other formats using XSLT

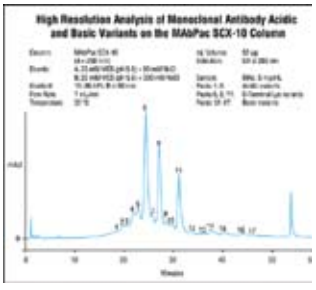
Accelerated Technology Laboratories www.atlab.com

Chromatography Data System (CDS)

BOOTH 2861

Chromeleon® 7.1

- Provides centralized data storage and license management, network failure protection and efficient administration
- New compliance tools include System Suitability Testing and Electronic Signatures
- Supports LC and GC instruments from Agilent, Waters and Shimadzu
- Method speed-up wizard generates UHPLC methods from HPLC methods for faster chromatography



Dionex www.dionex.com

Data Analysis Software

BOOTH 2468

NavPilot II©

- Designed for proprietary LabNavigator™ handlheld analytical meter
- Features direct-to-PC file transfer via a USB cable that eases integration to a LIMS
- Collects data from a wide range of sensor types, such as pH, ORP, ISE, colorimeter, turbidity, spectrophotometer, conductivity, TDS, salinity, force or impact and gas detection

Forston Labs www.forstonlabs.com

SAP Connector

BOOTH 3671

LimsLink

- Connect instruments and data systems such as ELN, LIMS and SDMS to SAP
- Retrieve Inspection Lots from SAP
- Extract almost any data in SAP and transfer it to lab systems
- Supports SAP custom functions and custom fields

Labtronics www.labtronics.com

Mobile Lab Application

BOOTH 3671

Nexxis Mobile™

- iOS4-based application that turns an iPhone or iPad into a "lab on the go"
- Connects to instruments, LIMS and ELN
- Use iPhone to review status of samples or experiments while in the lab or at home
- Lets users collect data remotely while in the field

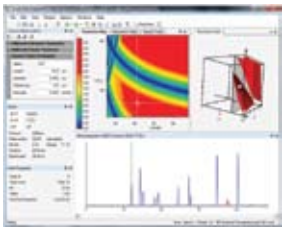
Labtronics
www.labtronics.com

Chromatography Modeling Software

BOOTH 1522

DryLab® 4.0

- Provides a platform for applying Quality by Design principles to method development processes in HPLC
- Resolution Map plots critical resolution vs. chromatographic variable(s) to evaluate feasibility and identify optimum conditions
- Alerts users of potential problems before they occur
- Speeds the modification of existing methods for new equipment and columns



Molnàr Institute www.molnar-institute.com

Captair® Flex™– Ductless Mobile Fume Hoods with Modular Filtration Column

From the people who brought you the energy saving GreenFumeHood®, ERLAB, the one and only inventor of the ductless filtering fume hood and worldwide leader since 1968 innovates once again with the low cost Captair® Flex™ Technology, an all in one filtration fume hood design configurable at will for use in chemistry, biochemistry, pharmacology, forensics, histology/pathology and more. New modular filtration column can handle liquids and powders individually or at the same time. Innovative liquid seal technology insures filtration integrity for both molecular and HEPA filters. Unique design allows for single or double back-up safety filtration to comply with the AFNOR NFX 15-211 Class I and II safety standard.

388 Newburyport Turnpike
Rowley, MA 01969
1-800-964-4434
www.captair.com

Fume Hood Safety & Flexibility – Like never before

Captair solutions are designed with safety in mind. The Captair Flex filtration technology is based on the proven principal of molecular adsorption; the toxins emitted in the workstation are adsorbed by the activated carbon within the filtration column and captured – keeping the user and the environment safe.

The Flex also has a unique modular filtration design which allows the hood to handle liquids and powders individually or at the same time. This interchangeability of the filters allows the filtration column to be configured specifically for the applications carried out within the enclosure.

The containment and filtration effectiveness of the Captair Flex, make this shared protective equipment a reliable, economical, flexible and environmentally-friendly solution.

The Captair Flex can:

1) Save on energy costs in your lab
The air balance necessary to run ducted systems results in high energy consumption. A Captair solution eliminates the energy costs related to systems for extracting and supplying conditioned air. It is able to keep operating costs low, even when the cost related to filter replacement is taken into account.

2) Eliminate installation costs associated with fume hoods
Implementing a Captair Flex is simple and quick. It does not involve the installation of a ventilation system for air supply and extraction as required by ducted systems. A single electrical outlet is all you need to run the Captair® Flex® fume hood. It can be installed at any time, without complex planning.

3) Easily transport and instantly use your fume hood
Captair solutions may be moved from one location to another within the same laboratory according to protection needs. They can be easily relocated without affecting the air balance of the equipment

4) Protect the environment
Free of any ducted airflow system, Captair solutions eliminate the direct emission of pollutants into the atmosphere and help to protect the environment. They also avoid the pollution generated as a result of the energy needed to run the airflow systems of traditional ducted fume hoods.

▲ *Captair Flex, designed to protect the user, the environment and your budget.*

LIMS

BOOTH 3917

Element DataSystem®

- Provides a seamless flow from sample logging to final report
- Features extensive operational and compliance reporting
- Includes real-time monitoring and embedded audit trails
- A hybrid model is available for access and computation

Promium www.promium.com

Graph Digitizing Software

BOOTH 2916

UN-SCAN-IT

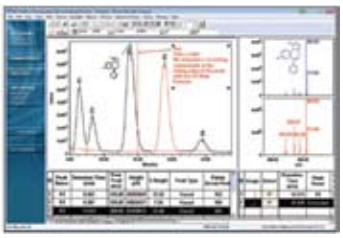
- Automatically converts scanned graphs into useful (x,y) data, using a simple drag-and-drop interface
- Can be used to digitize journal graphs, strip chart output, old graphs or any other hard-copy graph
- UN-SCAN-IT gel software is available for qualifying electrophoresis gel and TLC images
- Available in versions for both Windows and Macintosh systems

Silk Scientific www.silkscientific.com

Chromatography Data System (CDS)

BOOTH 1635

Empower™ 3



- Features improved navigation between review and reporting applications
- Lets users create sample tests post-acquisition
- Additional calculation capabilities allow users to determine current signal-to-noise requirements according to regional Pharmacopeias in the U.S., EU and Japan

Waters Corporation www.waters.com

NuAire's CellGard™ ES (Energy Saver) New Addition

2100 Fernbrook Lane
Plymouth, MN 55447
Toll Free: 1.800.328.3352
Phone: 763.553.1270
Fax: 763.553.0459
E-mail: nuaire@nuaire.com
Website: www.nuaire.com

NuAire, Inc. is please to announce the addition of two new CellGard™ ES (Energy Saver) Class II, Type A2 Biological Safety Cabinet models NU-475 and NU-477 available in four widths (3ft., 4ft., 5ft. & 6ft.). CellGard™ ES reliable safety performance exceeds NSF std. 49 for product, personnel, and environmental protection. Each model features a 10° sloped front window. The vertical sliding window is encased in a frame that opens 30° to aid in cleaning behind the sash. The window is compatible with NuAire's DECON 101 System which streamlines the decontamination process providing the service technician with a safe and easy method to protect your laboratory from harmful gases.

CellGard™ ES is engineered with an ultra high efficiency DC ECM motor to decrease energy consumption and your laboratory's total cost of ownership saving 40% over a 15 year period compared to previous models. With the use of the DC ECM motor, internal exhaust damper, motor speed controller, and an optimally determined forward curve fan, CellGard™ ES is able to increase the life of your filter, handling up to a 250% pressure drop when in operation. The NU-475 features NuAire's ESSENTIALS control package consisting of easy to use toggle switches that control cabinet functions. The NU-477 features the FlowGard™ control package, utilizing a digital pressure transducer which monitors the cabinet's plenum, warning laboratory personnel of improper airflow through audible and visual alarms.

CellGard™ ES model NU-477 features the nitecare™ night setback program, which is incorporated in the FlowGard™ Control System. nitecare™ will cut energy costs while maintaining work zone sterility when the cabinet is not in use. nitecare™ is initiated by closing the window, once the sash has been closed, the automated nitecare™ system turns off lights and decreases the fan/motor speed. The optional "UV Light Timer" allows the Germicidal Ultra Violet (UV) light to be activated for a period of time helping maintain work zone sterility. nitecare™ provides the performance, reliability, and cost saving technologies for your laboratory.

CellGard™ ES is constructed of heavyweight 16 gauge, type 304 stainless steel. Its superior construction provides long term durability with better safety features than other Biosafety cabinets. The ergonomic features enhance user comfort and safety when engaged with scientific research. A sloped front view screen, shorter reach into the work zone, more knee space, less noise and vibration, cool white lightning, frameless edge sash, easy cleaning are a few of many end user benefits to help reduce user fatigue.

CellGard™ ES models NU-475, NU-477 and the already popular NU-480 feature the user friendly TouchLink™ Electronic Control System, are custom built to order allowing you the ability to create the perfect cabinet for your specific research application needs.

Link: http://www.nuaire.com/biological-safety-cabinets/class2/type-a2/

SUPPLIES & CONSUMABLES

Gas Filter
BOOTH 2846

Easy-Connect

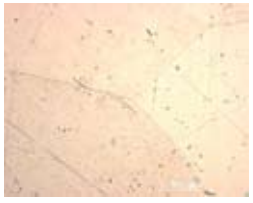
- Spring-loaded valves automatically isolate inlet and outlet lines as soon as old unit is removed, and keep them isolated until a new unit is installed
- Capable of removing up to 29 grams of water from an air stream at 20°C and 10% relative humidity while drying the gas to the dew point of -60°F

LabClear www.labclear.com

Grain Stabilized Platinum
BOOTH 4651

FKS

- No structural change during annealing (recrystallization) for better mechanical resistance
- Increase in tensile strength and yield strength as much as twofold, over regular platinum
- Features a higher degree of chemical resistance over normal Pt alloys
- Appliances made of FKS Pt can be used up to three times longer than those made of normal Pt alloys



OEGUSSA GmbH www.oegussa.at

Chromatography Vials
BOOTH 4634

Verex™

- Made of borosilicate glass, which has the lowest ion content possible
- Feature air-tight, leak-free seals for safe sample transfer
- Includes mix-and-match cap choices, including crimp, snap or screw, all with pure septa material, in pre-slit or non-slit formats

Phenomenex www.phenomenex.com

Dual-membrane Syringe Filters
BOOTH 4634

Phenex™-GF/NY

- Prevents build-up and blockage of chromatography columns and frits, minimizing wear and tear on injection valves
- Performs at higher capacity than nylon-only filters, and requires less hand pressure to filter the sample
- Ideal for applications with highly viscous or particulate-laden samples

Phenomenex www.phenomenex.com

Inlet Liners
BOOTH 4335

GC

- Color-coded by linear geometry to simplify selection
- Includes instrument-appropriate o-rings or sealing rings
- Guaranteed for deactivation with greater traceability options
- Unique packaging ensures contamination-free liners every time

SGE Analytical www.sge.com

Mass Spec Syringes
BOOTH 4335

Diamond

- Can be chosen to suit sample properties, such as acidic, basic, chelating or hydrophilic compounds
- Feature long working life, improved solvent resistance, greater operational temperature range, reduced dead volume and reduced carry over, compared to similar syringes
- Incorporate glass surface technology

SGE Analytical www.sge.com

Nucleic Acid Purification Kits
BOOTH 2835

KingFisher®

- Available for a range of sample types, from blood to plant material
- Optimized for use with proprietary KingFisher magnetic particle processors, which enable fast and accurate purification of DNA or RNA, increasing efficiency for downstream analysis
- Ideal for biotechnology, clinical, academic and pharmaceutical laboratories

Thermo Scientific www.thermoscientific.com

Injection Port Liners
BOOTH 2221

For GC

- Reduce breakdown of Endrin and DDT during injections, while increasing the interval between liner changes
- Produced by applying a highly crosslinked siloxane over a conventionally deactivated liner
- Sold in packages of five; may be used with VICI, Agilent/Finnigan, Gerstel and Varian injectors

VICI Metronics www.vicimetronics.com

HAMILTON

NIMBUS is Hamilton's compact automated pipetting workstation, offering a high-density deck in a small footprint. Available in 4-independent channel or 96-multi-channel platforms, NIMBUS provides speed, flexibility, and high performance air-displacement pipetting at an affordable price, even for small budget-challenged labs. An optional gripper with extended reach allows for easy labware transport and seamless integration to peripheral devices.

The fastest selling platform 5 years running, Hamilton's STAR line of automated liquid handlers offers world-class performance and reliability for all your assay and sample preparation needs. Our flagship platform features up to 16 independent pipetting channels as well as 96 or 384 multi-channel heads, providing the flexibility and throughput needed in today's busy lab.

HAMILTON
THE MEASURE OF EXCELLENCE SM
4970 Energy Way, Reno, NV 89502 USA
tel 775.858.3000 • 1.800.648.5950
fax 775.858.3024
email sales@hamiltoncompany.com
www.hamiltonrobotics.com

The MICROLAB NIMBUS is Hamilton's compact automated pipetting workstation, offering speed, flexibility, precise tip positioning, superior pipetting performance and affordability, all in a space-efficient footprint.

Available as a 4-independent (1ml or 5ml channels) system for flexibility or a 96-multi-channel (1ml) head system for speed, both NIMBUS platforms incorporate Hamilton's novel CO-RE (Compressed O-ring Expansion) technology, which facilitates tip and tool pick-up via a robust lock-and-key style attachment. This enables a positional precision of 0.1mm in all axes, critical for 384-well plates and applications such as MALDI target spotting which require accurate and reproducible sample placement.

CO-RE technology requires no vertical force for tip attachment or ejection, ensuring that potentially dangerous or contaminating aerosols are not produced upon tip ejection. This mechanism also allows tip pick-up from Hamilton's proprietary nested 96 disposable tip racks (NTRs). Space-saving NTRs may be stacked up to six high (576 tips/stack) in one deck position, thus freeing up deck space for sample plates and other labware.

NIMBUS utilizes the same proven air-displacement pipetting technology as found on Hamilton's flagship STARline of automated liquid handlers, so there is no sacrifice in pipetting performance (i.e. 2% CV at 10ul volumes).

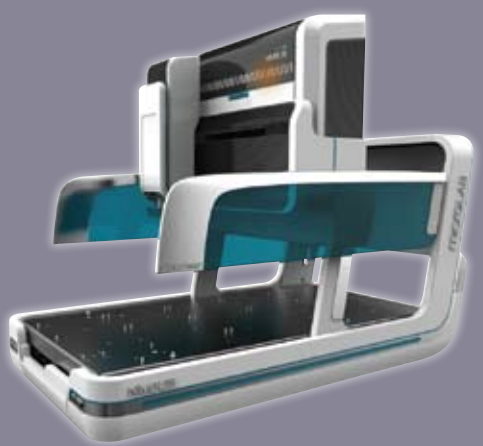
The NIMBUS 4 and NIMBUS 96 platforms incorporate "capacitive Liquid Level Detection" (cLLD), providing real-time feedback of volumes in plates and tubes as methods are conducted.

NIMBUS 4 also allows for "pressure-based Liquid Level Detection" (pLLD), essential for non-conductive reagents and volatiles. Furthermore, air-displacement pipetting affords the use of Hamilton's proprietary Monitored Air Displacement (MAD) technology on NIMBUS 4, which uses pressure within the channel to verify liquids have been successfully aspirated and no clots or foam have been detected. These technologies as well as Hamilton's novel "Anti-Drip Control" (ADC) feature provide for a highly robust pipetting environment. Optional Total Aspiration and Dispense Monitoring (TADM) software provides an even higher level of process control, recording and documenting all pipetting steps executed.

Both NIMBUS platforms feature an optional gripper, capable of moving plates and NTRs on or off the Nimbus deck. 270° rotation and extended reach allows integration with off-deck peripheral devices. NIMBUS also offers an array of on-deck integration options, including heater/shaker, vacuum station and magnetic separation devices.

A cumulative blend of enabling technology, a range of integrated options, intuitive software and the backing of Hamilton's renowned service and applications support makes the NIMBUS an essential tool for budget and space-constrained labs.

For more information call 800.648.5950 or visit www.HamiltonRobotics.com



2011 LAB MANAGER BOOT CAMP

www.labmanagerbootcamp.com

THE ART OF COLLABORATION

with Gregg Gregory

Sponsored by:

SPEX CertiPrep

Thermo SCIENTIFIC

Design cooperative teams that produce results. Utilize your most effective players to accomplish the mission in the most productive timeframe.

Teamwork has an enormous effect on employees at all levels of the organization. Weak, poor or negative workplace relationships with teammates or leadership are among the top reasons employees leave a team, department or organization. This year's Lab Manager Boot Camp is designed to help lab managers nurture those crucial relationships, build morale and get everyone to play nicely in the sandbox. In today's economic reality where everyone is asked to accomplish more with less, teamwork and collaboration are critical.

2:00pm Wednesday,
March 16, 2011
Georgia World Congress Center,
Atlanta, Georgia

ATTENDEE LEARNING CONCEPTS:

www.labmanagerbootcamp.com

- Why mutual accountability makes the team stronger
- The importance of understanding a team's chemistry
- Why knowledge of behavior styles can help team members communicate when conflict arises
- How to break out of the stove pipes, silos and buckets we put ourselves in
- The four-step team matriculation process
- The 7 levels of team empowerment
- The dynamics of working with people on a team
- The five distinct team roles and the relationships between them
- How individual strengths and challenges relate to the overall team's success
- Why adding or removing a team member affects the chemistry and process

With over 25 years of experience, Gregg Gregory has helped organizations, such as US Naval Research Laboratory; National Institutes of Health; Chesapeake Bay Research Consortium and Bridge Pharmaceuticals, develop a greater focus, more cooperation, increased productivity, and a greater impact. Gregg's programs are peppered with anecdotes, inspirational stories and filled with humorous real-life examples to energize and engage everyone and focus on moving the team forward, building trust and collaboration across department lines. His intensive and interactive training workshops are designed to affect change and create a positive environment where batteries are charged, more work gets accomplished and employees get along.

Lab Manager MAGAZINE PITTCON CONFERENCE & EXPO 2011

New Viscotesters for Easy and Accurate Testing

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Thermo Scientific brand Viscometers are established as the standard where fast and precise viscosity measurements are required.

With the new Thermo Scientific HAAKE Viscotester generation, we're setting a new standard providing a range of advantages:

- Standardized measurements according to ISO 2555
- Models optimized to meet individual needs for experts and beginners:
- Intuitive operation and maximum ease of use
- Individual extension of measuring and application range
- Thermo Scientific HAAKE RheoWin Software for fully automated measuring and analysis routines

Learn More

- Classical Thermo Scientific HAAKE Falling Ball Viscometer (Höppler) for high-precision viscosity measurements of transparent Newtonian liquids and gases
- HAAKE Viscotester 1 plus or 2 plus as a manual device with digital display for quick tests and comparative measurements on site
- HAAKE Viscotester 550 for DIN / ISO compatible rheological characterization of liquids and pastes

See technical details on all our viscometers in our new Thermo Scientific HAAKE Viscometer catalog.

For further information, please call us at (603) 436 9444, contact us at info.mc.us@thermofisher.com, or visit us at www.thermoscientific.com/mc.

Ultrasonication of Single-Walled Carbon Nanotubes

Problem: Single-walled carbon nanotubes (SWCNTs) differ from multi-walled carbon nanotubes by their electric properties. The band gap of SWCNTs can vary from zero to 2 eV and their electric conductivity features metallic or semiconducting behavior. As single-walled carbon nanotubes are highly cohesive, one of the major obstacles in processing them is the inherent insolubility of the tubes in organic solvents or water. To use the full potential of SWCNTs, a simple, reliable and scalable deagglomeration process of the tubes is needed—especially since the functionalization of the CNT side walls or open ends necessary to create a suitable interface between the SWCNTs and the organic solvent results in only partial exfoliation of the SWCNTs. Therefore, SWCNTs are mostly dispersed as bundles rather than individual deagglomerated ropes. If the conditions during dispersion are too harsh, the SWCNTs will be shortened to lengths from 80 to 200nm. For the majority of practical applications, i.e. for semiconducting or reinforcing SWCNTs, this is too short.

Solution: Ultrasonication is a very effective method of dispersion and deagglomeration of carbon nanotubes, as ultrasonic waves of high-intensity ultrasound generate cavitation in liquids. The sound waves propagated in the liquid media result in alternating high-pressure (compression) and low-pressure (rarefaction) cycles, with rates depending on the frequency. During the low-pressure cycle, high-intensity ultrasonic waves create small vacuum bubbles or voids in the liquid. When the bubbles attain a volume at which they can no longer absorb energy, they collapse violently during a high-pressure cycle. This phenomenon is known as cavitation. During the implosion, very high temperatures (approx. 5,000K) and pressures (approx. 2,000atm) are reached locally. The implosion of the cavitation bubble also results in liquid jets of up to 280 m/s velocity. These liquid jet streams resulting from ultrasonic cavitation overcome the bonding forces between the carbon nanotubes and hence, the nanotubes become deagglomerated. A mild, controlled ultrasonic treatment is an appropriate method to create surfactant-stabilized suspensions of dispersed SWCNTs with high length. For the controlled production of SWCNTs, Hielscher's ultrasonic processors allow for running at a wide range of ultrasonic parameters sets. The ultrasonic amplitude, liquid pressure and liquid composition can be varied respectively to the specific material and process. This offers variable possibilities of adjustments, such as:

▲*Hielscher's ultrasonic processor UIP1000hd with flow cell and pump is a powerful and reliable device for the production of nanomaterials, such as SWCNTs.*

- sonotrode amplitudes of up to 170 micron
- liquid pressures of up to 10 bar
- liquid flow rates of up to 15L/min (depending on the process)
- liquid temperatures of up to 80°C (other temperatures on request)
- material viscosity of up to 100.000cp

Furthermore, ultrasonication, as a polymer-assisted purification method, effectively removes impurities from as-grown SWCNTs. It is difficult to study the chemical modification of SWCNTs at the molecular level, because it is difficult to obtain pure SWNTs. As-grown SWCNTs contain many impurities, such as metal particles and amorphous carbons. Ultrasonication of SWCNTs in a monochlorobenzene (MCB) solution of poly (methyl methacrylate) PMMA followed by filtration is an effective way to purify SWCNTs. This polymer-assisted purification method removes impurities from as-grown SWCNTs. Accurate control of the ultrasonication amplitude allows limiting damages to the SWCNTs.

Hielscher offers high-performance ultrasonic processors for the sonication of every volume. Ultrasonic devices from 50 watts up to 16,000 watts, which can be set up in clusters, are appropriate for various lab applications.

For more information, visit: www.hielscher.com/CNT

The Baker Company's FlexAIR® Saves Energy and Provides Safer BSC Performance

THE BAKER COMPANY
P.O. Drawer E, Sanford, ME 04073
(207) 324-8773 • (800) 992-2537
Fax: (207) 324-3869
www.bakerco.com

The Baker Company's FlexAIR offers significant energy and cost savings to the laboratory, without sacrificing safety and performance. The Baker FlexAIR technology combines the security of a traditional canopy (or thimble) exhaust connection with the lower exhaust flows of a traditional hard exhaust connection.

Baker's FlexAIR works by utilizing dynamic front and side panels that open or close depending upon the variances in exhaust flow rate. With a FlexAIR connection, only the minimum amount of air necessary to achieve cabinet exhaust containment is used, Adding a FlexAIR reduces the amount of exhaust required to operate a biological safety cabinet by up to 18%. Additionally, safety for both the product and personnel exceed NSF standards even when the building's exhaust system fails.

For more information, please visit: www.bakerco.com

Lab Analytics for the Whole Lab

Problem: Lab Analytics is information about the utilization of assets in the lab, including people, equipment, supplies and samples. Lab Analytics data helps laboratories better understand how laboratory personnel and physical assets are being utilized, and how these assets affect the results of samples being analyzed. This information allows labs to make better decisions about their assets and their processes.

Traditionally, information is gathered on an application-by-application basis with each application only able to report its own data. That makes it difficult to find answers to questions such as:

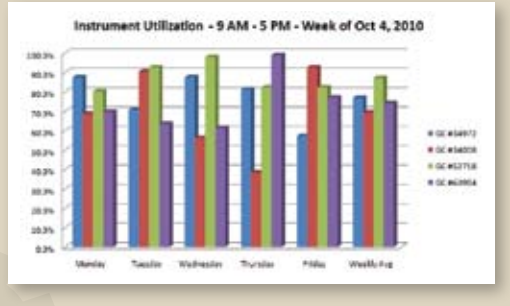
- Which instruments are in use more than 80 percent of the time?
- Which samples could be affected by a faulty HPLC column?
- Is my east coast lab faster than my west coast lab?

For example, as part of an investigation process you want to find out why some results done last month are incorrect. You might go to various instruments and print out raw data, go to your chemical inventory system to report on the chemicals that were used to make reagents, or look at ELN worksheets for the analysis results for these chemicals.

Having to gather information produced by many different applications and then compiling that information into an informative report can be difficult, tedious and time-consuming.

Solution: Lab Analytics for the whole lab introduces a more holistic approach to reporting, allowing you to look at all of the data in the lab at the same time. For example, a single report will include a list of samples, the raw data for each sample, information about the reagents used to prepare the samples, and analysis information for the chemicals that were used to make the reagents.

To accomplish this, the right data needs to be collected and it needs to be stored in centralized locations in a format that is both structured and searchable. An easy way to do this is to use an integration tool that is designed to both capture and store the information as it is being produced. For example, the integration tool used to connect instruments to LIMS can easily perform this function with little or no additional implementation costs.



▲*Nexxis LA (Lab Analytics) simplifies the process of quickly creating reports and charts using data from all laboratory systems.*

Data also needs to be linked (cross referenced). Result data in LIMS needs to be linked to its raw data, in SDMS. Information about reagents needs to be linked to the ELN worksheet that was used to produce the reagent. This worksheet, in turn, needs to be linked to users, instruments and other assets (e.g. pipette serial numbers) used to produce and test the reagent. Once the information is linked it is much easier to report.

Lab Analytics reports are easier to create when data is stored in as few locations as possible. Using the SDMS for storing both raw data and ELN worksheets is better than having a variety of instruments and ELNs storing their own data.

Nexxis LA (Lab Analytics) is a new module of Nexxis iLAB and Nexxis ELN. Its design allows users to report data from the whole lab. By following the principles described above, Nexxis LA is able to extract data from all of the systems in the lab, and coordinate the information into a single source, quickly generating reports such as:

- Instrument utilization by time, by location, by test
- Efficiency of personnel: compare people and sites to each other
- Efficiency of processes: compare and analyze different procedures
- Productivity throughputs
- Complete history of a sample (instruments, columns, reagents, personnel, etc)
- List of samples affected by an un-calibrated instrument

For more information, visit www.labtronics.com

Thermo Scientific Polar Series Thermostatic Laboratory Chillers

Thermo SCIENTIFIC
25 Nimble Hill Road
Newington, NH 03801
Phone: (800) 258-0830
www.thermoscientific.com/tc

The new Thermo Scientific Polar series of thermostatic laboratory chillers offers full range cooling for quick ramp-up and cool-down. The Polar Series is ideal for an expansive range of applications, including chemical reaction control, separations, spectroscopy and surface science. Available in 250 or 500 watts of cooling, a force or force/suction pump, and USB communication, the Polar Series is a perfect fit for any temperature control application.

Innovative

The Polar series of thermostatic laboratory chillers offer innovative features

- An internal reservoir minimizes fluid evaporation and optimizes chiller performance.
- An intuitive user interface allows you to choose between 5 temperature set-points.
- Remote temperature control and communication are available on selected models for remote operation, monitoring and data logging.

Reliable

Optimize your performance and productivity with:

- Built-in energy-saving feature limits power consumption
- Ideal for closed loop applications up to 500W
- Temperatures range from -10 to 80°C.

Compact

Its compact size maximizes work space and increases efficiency in the laboratory. With you in mind, all operational and preventative maintenance can be done right from the front of the unit.

Multiplex Testing to Conserve Sample

Problem: As more analytes are discovered, more tests are required per biological sample for drug discovery, research analysis and diagnostic testing. However, an unlimited amount of sample is never available. Small volumes of precious sample limit the number of tests that can be performed, which can hinder diagnosis and discovery.

Solution: Multiplex testing, the simultaneous analysis of multiple analytes from the same sample, has quickly become the standard to conserve precious sample. The Luminex® xMAP® platform uses differentially dyed microspheres of the same size to achieve multi-analyte profiling for proteins and nucleic acids. The key drivers for adoption include cost savings, labor efficiencies, sample conservation, work flow efficiencies, sensitivity and dynamic range. The versatility of the platform is evidenced by greater than 7,000 peer-reviewed publications. The breadth of bioanalytical applications includes hundreds of commercially available analytes and a vast number of custom assays developed for a global installed base of more than 7,000 instruments.

The configuration of an xMAP assay consists of a suspension array where specific capture moieties are covalently coupled to the surfaces of internally dyed microspheres (beads). After completion of assay incubations with a detection reagent, the beads are separated within a Luminex analyzer and interrogated with two lasers or LEDs—one for classification of the bead identity (region), and the other for quantification of bound reporter fluorophore.

Several varieties of fluorescent microspheres are available from Luminex. MagPlex® Microspheres are superparamagnetic beads functionalized with surface carboxyl groups for covalent attachment of ligands. MicroPlex® Microspheres are polystyrene beads also functionalized with surface carboxyl groups. LumAvidin® Microspheres contain a surface layer of avidin for binding biotinylated ligands and are useful for attachment of small molecules or peptides. SeroMAP™ Microspheres are carboxylated beads which reduce nonspecific binding and perform well in serological applications. MagPlex-TAG Microspheres use Luminex's proprietary xTAG® Technology with MagPlex Microspheres to facilitate the development of custom nucleic acid detection assays.

There are currently two flow cytometry-based instruments, the Luminex® 100/200™ and the FLEXMAP 3D®; and one flow cell-LED/CCD-based instrument, the MAGPIX®, available from Luminex or through its partners. Each only require a few microliters of sample in a 20 to 200 µL reaction, thus the instruments are well-suited for applications where sample size is limited.

The MAGPIX utilizes a flow cell and robust LED/CCD-based optics which supports multiplexing of up to 50 tests in a single reaction volume using MagPlex or MagPlex-TAG beads. At a low cost and compact size, MAGPIX provides an affordable multiplexing solution ideal for research laboratories and remote laboratory testing sites.

The Luminex 100/200 allows multiplex analysis of up to 100 analytes per reaction. The system is versatile and can be used for a variety of applications such as immunoassays, genotyping, gene expression and enzymatic assays. Robust optics and fluidics afford quantitative results over a 3-4 log dynamic range with strong concordance to enzyme-linked immunosorbent assay (ELISA) and mass spectrometry.

▲*The Luminex MAGPIX system.*

The FLEXMAP 3D enhanced optics permit multiplexing of up to 500 analytes per well and provide improved sensitivity with dynamic range extended to 4.5 logs. The system is compatible with both 96-well and 384-well plates and has a piercing probe which allows sealed plates to be analyzed. The dual syringe configuration processes plates 2 to 3 times faster than the Luminex 100/200. The FLEXMAP 3D is an ideal platform for multiplexing analytes that may have broadly dissimilar levels.

Multiplex testing has quickly become the standard in drug discovery, research analysis and diagnostic testing. The key drivers for adoption include cost savings, labor efficiencies, sample conservation, work flow efficiencies, sensitivity and dynamic range.

For more information, go to: www.luminexcorp.com

CONCOA

The fully-automatic IntelliSwitch II™ gas switchover is CONCOA's revolutionary new generation of gas management systems. The IntelliSwitch II™ features an onboard web server and proprietary embedded software, allowing remote monitoring, secure system configuration, and e-mail notification of real-time system status and events. It is ideally suited to interchangeable service/continuous supply in analytical laboratory, chemical process, instrumentation, and critical gas supply applications. The IntelliSwitch II™ offers continuous pressure and flow control from liquid or high pressure cylinder sources. The end-user selects the ideal mode of supply by the simple push of a button. Proprietary software logic lowers yearly gas costs by eliminating liquid cylinder vent loss and excess residual return. It is these features which make the IntelliSwitch II™ the perfect gas management system.

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Series MFM Thermal Mass Flowmeters and MFC Thermal Mass Flow Controllers are versatile and designed to be easy to use even for beginners to this type of flow monitoring or control technology. The units have a standard maximum working pressure of 500 psig and are supplied standard with correction factors for Air, Helium Hydrogen and Carbon Dioxide, with other factors available on request.

Made from 316L stainless steel bar stock, units are available in a broad range of flows from 0-10 sccm to 0-20 lpm. Their accuracy is very high at + 1% of full scale, and each unit is supplied with a NIST Traceable Calibration Certificate

Both a single- and four-channel 5-digit display and controller with 16-bit resolution giving a reading accuracy of 0.02% with field selectable voltages of either 110 volt DC or 220 volt DC are available to monitor and control from one to four units.

CCD100 Controller Display

CONCOA's CCD100 Controller Display features a graphical VFD display which displays the relevant units and generates ease of use menu structures. The Controller Display contains digital comms, alarm outputs, configurable units and multiple transducer supplies as well. The unit's firmware can also be customized for specific applications.

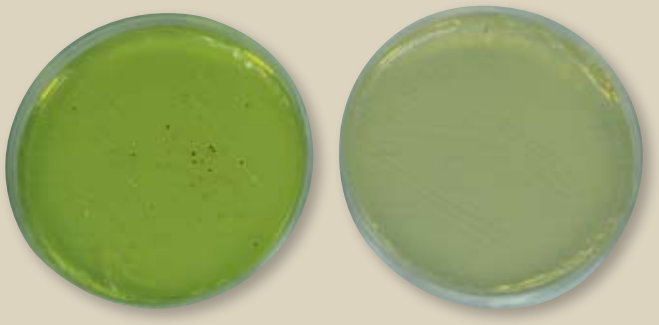
The CCD100 not only contains internal setpoint functions, but also features external inputs which can be used to generate slaved setpoint from another processor/transducer. The unit can also be programmed for tamper-resistant functionality by hardwiring the interface connector. The user can lock out the menu command and/or zero out the command button.

Mass Flowmeters and Controllers

The CONCOA Mass Flow Meter (MFM) and Mass Flow Controller (MFC) Series are based on a modular design. At the heart of each instrument is an insulated thermal transfer sensor which provides enhanced zero stability. This sensor is designed to virtually eliminate long downtime due to clogging. Additionally, the MFM/MFC design features an integral filter and an easily replaceable closed loop electronics card.

Bacterial Culturing for Faster Microbe Detection

Problem: When it comes to bacterial culturing, modern laboratories have little choice but to wait days for definitive proof that bacteria are alive and pose a health threat. Labs typically wait 18 to 24 hours for *E.coli* and *Listeria* cultures to grow, 48 hours for *Yersinia pestis* (Bubonic Plague) and 72 hours for *Group B Streptococcus*, just to name a few. PCR methods seem to solve this slow growth problem, but the tests are expensive, require specialized equipment and training, and do not distinguish between live and dead microbes. For more accurate results, laboratories culture samples and run their operations on a microbe's timetable, no matter how serious that wait may be for a patient or public health.



▲*After five minutes on the NanoLogix staining plate (green dish), bacterial micro colonies grown on the membrane are visible to the naked eye.*

In clinical settings, these long wait times force physicians to treat empirically even in the face of active infection. In the pharmaceutical, cosmetics, food and beverage industries, extensive wait times for quality control results can delay the identification of contaminated or spoiled product batches and increase public health risks. Additionally, the public is put at risk when people are exposed to waterborne pathogens days before positive results for bacteria such as *E.coli* and *Staphylococcus aureus* prompt beach closures.

Faced with the speed of DNA sequencing and the growing convenience of single-use diagnostics, today's laboratories experience increasing demand to return results faster. Unfortunately, microbes cannot be forced to grow any faster than their current speeds.

Solution: Today, new testing methods are making microorganisms visible sooner. Developed by NanoLogix, these methods are known to cut detection and identification times by at least 4 times. Instead of simply using a nutrient agar to culture colonies, a permeable, polymeric membrane can be sandwiched in between two agar layers. This extremely thin, clear membrane allows tiny microorganisms to grow and then be transported to a staining plate, after a third to a quarter of conventional incubation time has passed. Ten to fifteen minutes on a staining agar makes previously invisible micro colonies visible for detection. To further identify target bacteria, steps include a filtration process based on an immuno-enzymological method that uses HRPantibody conjugates to remove unwanted microbes. This target identification process increases sensitivity to as low as one cell.

By concentrating on this inexpensive, permeable membrane method, NanoLogix has developed a suite of products to detect and identify hazardous bacteria and assorted yeasts quickly, accurately and cost effectively. The company's several technologies speed detection of *E.coli.* and *Salmonella* by four times or more, *Group B Streptococcus* by at least twelve times, and *Yersinia pestis* by at least two times, to name just a few.

At the University of Texas Health Science Center, NanoLogix's BioNanoFilter technology is undergoing a 300-patient trial to detect and identify *Group B Streptococcus* (GBS) in pregnant women. Meanwhile, NanoLogix is working with the U.S. Environmental Protection Agency (EPA) to develop a rapid test to detect *E coli.* and *Cryptosporidium* in U.S. waterways, based on its BioNanoChannel technology.

The best materials for these membranes are non-permeable to cell structures, non-toxic, hydrophilic and non-fluorescent. Additionally, the membrane should be capable of working with organic and non-organic molecules and proteins.

For the most accurate results and to prove there is a health threat, labs must wait for bacteria to grow. NanoLogix cuts those wait times by helping labs see results sooner and meet the growing demand for faster, more accurate test results with a simpler and less expensive method than what is currently on the market.

For more information, visit www.nanologix.com

Parker Balston

Parker Balston Gas Generators eliminate the need for expensive, dangerous, high pressure cylinders of hydrogen, helium, and nitrogen in the laboratory. It is no longer necessary to interrupt important analyses to change cylinders. Whether it's directly on the laboratory bench or in a process monitoring application, Parker Balston Gas Generators are the dependable standard to deliver safe, high purity gases.

Parker's leading global presence and portfolio of product technolgies is unrivaled within the industry. At Parker, our mission is to provide our customers with premier service and high quality product solutions that ensure the quality of your products and operations and save you downtime.

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Parker Balston Hydrogen Generators

When selecting the proper carrier gas for gas chromatography (GC) , a laboratory manager traditionally has three choices; nitrogen, helium or hydrogen. Recent global supply issues related to helium have led to shortages and significant price increases in both gas costs and cylinder rental fees. As a result, many laboratories are re-evaluating the best carrier gas to provide maximum analysis time while offering

safety and cost effectiveness. The use of hydrogen as a carrier gas offers a reliable, safe and cost effective alternative to nitrogen and helium.

Parker Balston Hydrogen Generators produce 99.99999% hydrogen which exceeds carrier gas purity requirements. The generators offer a safe source of hydrogen, producing only the required amount of gas and eliminates the need for high volume, high pressure cylinders. Hydrogen Generators eliminate the need for expensive, dangerous, high pressure cylinders of hydrogen in the laboratory. It is no longer necessary to interrupt important analyses to change cylinders. Generator flow capacities of up to 1200 cc/min. of ultra-high purity hydrogen are available.

Parker Balston Hydrogen Generators are compact benchtop instruments designed for use in the laboratory or in the field. Hydrogen gas is produced by electrolytic dissociation of water. The resultant hydrogen stream then passes through a palladium membrane. Only hydrogen and its isotopes can penetrate the palladium membrane; therefore, the purity of the output gas is guaranteed to be 99.99999+% consistently. This technology produces hydrogen at a purity two orders of magnitude greater than competitive technologies using silica gel, desiccants, and drying tubes.

Parker Balston Hydrogen Generators offer many special features to ensure safe and convenient operation. These features include low-water audible alarms to indicate when the water reservoir needs filling and automatic shutdown to protect expensive laboratory equipment.

Benefits of Parker Balston Hydrogen Generators:

- Eliminates dangerous and expensive hydrogen gas cylinders
- from the laboratory
- Exceeds OSHA 1910.103 and NFPA 50A safety requirements
- Safe - produces only as much gas as you need
- Unique electron beam palladium cell technology
- Produces a continuous supply of 99.99999+% pure hydrogen gas, ideal for carrier and fuel gas applications
- Compact and reliable – only one square foot of bench space required and designed to run
- continuously 24 hours/day -includes automatic water fill
- Simple annual maintenance, no desiccant cartridges
- Certified for laboratory use by CSA, UL, IEC 1010, and CE Mark

Marketplace

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The eighth annual IMACS conference is the only technical and management conference dedicated to automating compliance-based processes for cGMP operations. With the recent FDA initiatives — "Pharmaceutical cGMPs for the 21st Century — A Risk-Based Approach" and "Quality by Design", this conference is designed to outline implemented solutions for laboratory-based operations in the pharmaceutical, biotechnology, medical device, CRO, CMO and generic fields. The conference fosters a stimulating information exchange on best practices and lean operating initiatives between senior analytical lab managers, IT groups and QC/QA GMP electronic notebook users with implementation details and performance metrics in automating quality systems for regulated environments.

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- Operational excellence impacts of automated compliance technologies on your QC laboratory and plant manufacturing operations (linking critical quality attributes to critical process parameters)
- Implementation approaches for best practice technology harmonization on a local, global, and industry basis
- Supporting new product launch activities in development (e.g., stability of clinical supplies with compliant bioanalytical and QC methods)
- Integration of GMP electronic notebooks with analytical instruments, LIMS, CDS and ERP systems
- ICH and QbD initiatives and their implications on QC/QA lab operations and electronic batch records

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*For more information on IMACS 2011 as the agenda evolves, visit **www.imacs-world.com** or email the organizers at **info@imacs-world.com**. If phone contact is preferred, call 508-497-0128.*


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PARTING POINTS

Takeaways from this month's issue:

CONFIDENT?

Our third annual confidence survey reveals that participants believe their research organizations will be slightly better off financially in 2011 than they were a year ago. Here are some highlights from the results:

- More than half of respondents believe that conditions in their market sectors will improve to support/attract significant research investments
- The microbiology sector shows the highest confidence level that 2011 will be a better year than 2010
- Participants from the clinical sector show the lowest confidence level for the new year
- 32% believe there will be no change in 2011's budget to modernize existing facilities

12

28

SHOWING OFF YOUR LAB

Well-organized laboratory visits can help your company expand sales, recruit new employees and persuade people that your laboratory is a community asset. Here are some ways managers can help show off their labs' capabilities and accomplishments to prospective customers and other visitors:

- Your visitors should see tidy labs with equipment in good condition
- Allow plenty of time for questions from visitors, and discussions with staff members
- If it can be done safely, have experiments or demonstrations running when the guests visit each laboratory
- Thoroughly coach staff members to avoid accidental disclosure of confidential information

64

PERSPECTIVE ON: FORENSIC LABS

U.S. forensic laboratories are bracing for transformative changes. They may soon experience alterations in how they are accredited and managed, how their staffers are trained and certified, and how they are funded and paid for their services. Some of the changes include:

- New legislation will require all labs receiving federal funds to become certified and meet proficiency, education and training standards
- Robert Middleberg of NMS Labs says substantial expenses will be involved in the form of fees to accrediting agencies, and resources needed to maintain accreditation status

84

DANGEROUS GASES

Gas cylinders present financial, safety and handling challenges from the day they arrive on-site until the day they are used and/or removed. It is in a lab's best interests to put a well-managed cylinder control program in place. Here are some tips to get you started:

- Elect a gas cylinder manager who is trained on the materials used in the production/research environment
- A barcode-based inventory management system can help keep track of all on-site cylinders and their contents
- Devise a system, via alarms, color-coded reports, etc., to flag cylinders that are approaching expiration

90

RENT, LEASE OR BUY

What happens when you are told that your company's existing bank lines are insufficient? What if your company cannot qualify for bank financing? The answer may be a capital lease or rental of the equipment. Here are some tips for choosing a finance provider:

- Seek out a company with experience financing scientific instrumentation to labs on a regular basis
- Take note of the representative's knowledge level and willingness to understand your situation
- If the leasing company is also part of the manufacturer, it's a good company to work with
- Check the finance company's references
- How quickly can they give you an approval and lease documents?

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Vertical Laminar Flow Station includes PLC control over motorized shield, FFU and lighting to meet Class 100 standards.

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ValuLine hoods provide peak performance at lower cost! Available in 36" and 48" widths, with HEPA filtration unit and built-in spill tray.

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- Ductless exhaust hoods incorporate activated carbon for safe purification of most organic vapors
- Laboratory hoods provide safe ventilation of fumes
- Benchtop models provide space-saving performance and economy
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