



Trends-in-Medicine

March 2009

by Lynne Peterson

SUMMARY

♦ 2009 is likely to be a challenging year for analytical tools companies. They are hopeful that the economic stimulus bill will translate to at least flat year-to-year sales, particularly to academic labs, but prices are under heavy pressure, and all customers are being very cautious about big ticket purchases. ♦ Most laboratories are stretching the life cycle of existing equipment by at least a year, only replacing things when they become unreliable or break. ♦ Pharmas are still buying capital equipment but carefully and cautiously, with heavy oversight on expensive items. Pharma mergers are not expected to affect equipment sales to other pharmas, but universities, contract research organizations, and non-pharma companies, particularly smaller ones, are likely to snap up any surplus pharma equipment. ♦ Food safety is one possible growth area for tools, with a mixed outlook for environmental testing and stem cell research. ♦ Academic labs will have stimulus and NIH money to spend, and one key thing they want is mass spectrometry devices, which may translate to sales by the end of this year. ♦ The new products generating the most interest were hand-held detection devices that can be used to identify contaminants.

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Trends-in-Medicine

Stephen Snyder, Publisher
2731 N.E. Pinecrest Lakes Blvd.
Jensen Beach, FL 34957
772-334-7409 Fax 772-334-0856
www.trends-in-medicine.com
TrendsInMedicine@aol.com

PITTSBURGH CONFERENCE (PITTCON) 2009

Chicago, IL
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Exhibitors were complaining that attendance and booth traffic at this year's Pittcon, a laboratory science conference and exposition, shrank significantly from last year. Exhibitors have been making this same complaint for at least the past seven years.

Generally, about half the people at the meeting are exhibitors, with an increasing focus on business-to-business (B2B). This year, the number of companies exhibiting and the number of exhibitors attending was down 9%, and numerous vendors had cut the size of their booths and their booth staff, resulting in a 14% drop in exhibitor attendance. Although the total non-exhibitor attendance was comparable to last year, several vendors said the number of leads generated by the meeting was not as good as usual, and the type and quality of the attendees appear to have changed to lower level people.

Pittcon Attendance

Category	2009	2008	2007
Conferee	9,599	9,450	9,477
Exhibitor companies	1,005	1,110	1,086
Exhibitor staff	7,582	8,859	10,440

With information so widely available on the internet, trade shows have become less important to sales, several exhibitors agreed. At least two major vendors, Varian and Mettler-Toledo, were absent from this year's meeting, and Bruker won't be at Pittcon in 2010. Going forward, Bruker plans to attend Pittcon in odd years and Analytica in even years. Other companies were talking about either following Bruker's example and attending every other year or reducing the size of their booth next year. A tools sales rep said, "Twenty years ago, when we didn't have the internet, people came to trade shows to get information. Trade shows like Pittcon are less useful sales venues than they used to be." Another industry official said, "We usually get 500 sales leads at Pittcon, and this year we got 300."

THE IMPACT OF THE ECONOMY

The major tools companies insisted that they are weathering the economic recession better than other businesses, with 2009 sales likely to be relatively flat or slightly down, which appears to be overly optimistic. However, some companies are hoping for strength in China or India to help mitigate softness in the U.S. The outlook actually looks rather grim, with the exception of some likely spending by academic labs through the economic stimulus package, but tools company executives were putting on a good face.

Comments included:

- *Tim Riley, vice president and managing director, pharmaceutical business operations at Waters:* "There is still good strength in high-end products. In general, business is holding up pretty well...The softness seems to be more on the higher volume products. Mass spec products are still strong...We are a worldwide company, and Asia and India are still fairly strong...It is not like the bottom is dropping out of our business. We are used to high growth, and we are having slower growth. But it is not as dramatic as you might expect."
- *Karen Kirkwood, vice president of corporate communications for Thermo Fisher Scientific:* "The good news for us is two-thirds of our revenue comes from consumable and sales/services, and that helps us...One-third of our mix is higher ticket items...which is still purchased, but a lot more thought is going on before people are spending \$300,000 - \$500,000 on a high-end instrument. We are working to address that challenge by developing new equipment that meets their needs but doesn't necessarily have every bell and whistle but which still has the analytical power at a lower price and which is easier for non-scientists to operate. We are trying to shift along with the challenges our customers are facing to offer solutions."
- *Robert Friel, PerkinElmer CEO:* "It is hard to say how the economy is affecting the tools industry as a total. You have to look at it by the individual participants. Each is taking a different approach. The impact is generally not significant, except perhaps for a little slow in investment in R&D and in expansion...I think industry is pulling back on investment (R&D), but we are trying not to do that...China has a big stimulus package as well, so it is not just the U.S. We are seeing a more concerted global stimulus effort, and we have a pretty good global presence."
- *Daniel Marshak, PhD, chief scientific officer and president/Greater China for PerkinElmer:* "A lot of pharmas have opened new sites in Shanghai, and we are proximal to that, so we are seeing a good uptake of new labs and opportunities in China and Shanghai."
- *Nick Roelofs, PhD, vice president and general manager of Agilent's Life Sciences Solutions Unit:* "We see the market down 1% to up 2% (up 2%-6% if currency were neutral)...Globally, people are putting (stimulus) money in environmental testing, food testing, and life sciences/healthcare. The offset is a decrease in pharma spending... Korea's stimulus will start at the end of June, China in early 2H09, and the U.S. should start identifying spending in April (2009)...The LC (liquid chromatography) market as a whole is down, and pharma is pulling back. Other companies have said so, too. Market share is holding steady in LC. The GC (gas chromatography) market is down, but, again, market share is holding steady...All large capital intensive sectors are shy of spending. Chemical plants and pharmas are sitting on huge amounts of cash."

- *A tools sales rep:* "The tools companies are kidding themselves if they think sales will be flat this year. It will be a deficit this year."

Has the economy hit bottom yet? Most sources said they hope so, but few are confident of that.

- *Waters' Tim Riley:* "I think it will take a while for things to get back to normal."
- *Thermo Fisher's Kirkwood:* "Who knows? Everyone is looking at a very conservative outlook...We told investors we could grow maybe 2% or be down 2%... Hopefully, we'll be even. We are not taking any drastic measures in this country, and we are continuing to invest in research and development (R&D). If an acquisition looks good, we can do that...and we have strong credit. We are hoping to get through this year. We know there are a lot of headwinds, we are doing what we've been doing all along – invest in technology, run our businesses as efficiently as possible, make strategic acquisitions where it makes sense. We are not pulling back the reins on everything."
- *Chemical company:* "The economy may have hit bottom, but the recovery will be drawn out. We won't bounce right back."
- *OTC pharma:* "I think there is another shoe still to fall."
- *Pharma #1:* "I think we are starting to hit bottom, but we are not at the bottom. We are no longer on the edge of an abyss."
- *Pharma #2:* "I hope the worse will be over by the end of 2009."
- *University lab manager #1:* "Yes, I think things will get better."

What business segments are doing better and worse? Industry said pharma has softened but is still buying, and food safety and environmental markets offer some hope. A vendor said, "What is selling right now is big things that multiple people at a university can use. People are combining groups to get big things. Pharma buying is down. Anyone not getting money from the government is a difficult sale."

Product life cycles

Most tools customers – academics, pharmas, and industrial users – agreed that they are stretching the life cycle of their equipment, especially high-end equipment, a little longer these days, but the tools companies downplayed this. (*Note that pharma sources are identified by number only.*)

- *Joseph Anacleto, PhD, senior director of clinical research and applied markets at Applied Biosystems:* "There is that potential (to stretch the life cycle) when things get tough, but we aren't seeing that yet to any large extent. New toys tend to stimulate customers to replace and upgrade, and we will continue to push that angle. But

there is much greater scrutiny on capital purchases right now, and that is having its impact.”

- *Thermo Fisher's Kirkwood*: “People are probably thinking twice about replacements now...I'd be surprised if they weren't, especially on costly items, just like I would think twice about buying a new car...There were some delays in our higher priced items...with customers thinking twice, but eventually I think they will come through when things ease up a little. As a company we are doing the same thing: we will re-evaluate halfway through the year and see if we continue things or put them off until 2010.”
- *PerkinElmer*: An official said replacement cycles are being stretched, and service is being deferred, “Clearly, there is a cutback in spending.”
- *Agilent*: “Where the equipment is a replacement, not an upgrade, people are stretching the life cycle by about a year. So far, we don't know if it will stretch longer.”
- *University lab manager #1*: “We are postponing replacements 1-2 years if we can.”
- *University lab manager #2*: “We are keeping things until they break, but we've always done that. It isn't anything new.”
- *Pharma #1*: “We used to buy more R&D equipment and more cutting edge equipment, and we've cut back significantly on that, but we haven't change the life cycle.”
- *Pharma #2*: “Currently, we extend the product life cycle as long as possible, but we keep buying new technology to support R&D.”
- *Pharma #3*: “We are stretching things 2-5 years longer than we used to.”
- *Pharma #4*: “It is the quality of the output, not the time in the lab that determines how soon we replace something.”
- *Fertilizer company*: “We will make do longer by 2-3 years unless something breaks. And with less expensive instruments or older equipment we are not getting service contracts.”

Pricing pressure

Customers are definitely putting more pressure on tool prices, and sources generally agreed they are having some success in cutting deals. One industry source said, “There is pressure, no question about it, from the economic situation. And there is increased competitive pressure with more players and products on the market. We offer a broad portfolio, from entry level to high-end systems, so we tend to manage the pricing pressure through a broad portfolio of offerings...I haven't seen a shift in the price point pharma companies are spending. If they need a \$500,000 device, they need it...But there is more scrutiny of purchases today.”

THE PHARMA AND BIOTECH OUTLOOK

Pharma sources said the capital purchase process has gotten harder but is not impossible, especially for necessary items, but “wish list” equipment is very hard to get. Pharmas are still buying but judiciously.

- *OTC pharma*: “We are willing to purchase things if we see a benefit. We are shopping around for analytical instruments – in the \$60,000 - \$100,000 range – to decrease solvent consumption and analytical prep time. Anything under \$100,000 is possible. Over that, the chances are slim, and I don't see this situation changing through 2010...What we are not buying is HPLC (high-performance liquid chromatography) systems.”
- *Pharma #1*: “Capital purchases have been severely cut, but there is still money for large equipment. More requests are rejected, and the ones that are approved are more need-based. We are going to buy an infrared spectrometer because our old one has issues, raising questions about its reliability. We had a large cut in capital spending in 2008, but 2009 will be comparable to 2008. For 2010, the capital budget should be flat; we aren't seeing it worsen yet...What we are not buying is high-end MS (mass spectrometry). We would like a LIBS (laser-induced breakdown spectroscopy), but that is on hold indefinitely.”
- *Pharma #2*: “Our capital budget is not frozen. Time is money. If something is necessary, it is not an issue. High throughput is the answer we are looking for.”
- *Pharma #4*: “If I found something I really wanted, budgets are not frozen, but they are looking more closely at our spending. You need to show a tangible advantage. Supervisors look twice at what we spend.”
- *Pharma #5*: “We can buy something if it is critical equipment or something breaks. Buying a mass spec for \$250,000-\$500,000 would take some planning. Nowadays, approving a large capital purchase takes not just a manager but a Board approval, and you have to justify it and document it, which means paperwork. It needs to be **business critical**, not just nice. We are still buying, but cautiously. We have to be stewards of the company's resources...Until we actually see a turnaround, we need to be cautious.”
- *Pharma #6*: “A lot of pharmas are still buying, and buying brand new stuff, just maybe not as much. Right now, I'm looking so I can keep up. Then, when I'm able to buy, I'll know what to get. I want to keep up...If I could, I'd buy a fast chromatography, such as UPLC (ultra performance liquid chromatography). A lot of our instruments are 6-years-old, and they may need to be replaced in 2010 because they are starting to need a lot of maintenance.”
- *Private label company*: “We have an unlimited capital budget. The economy is giving us a boost because we make store-brand infant formula...We are actually **hiring**

...We are shopping for an LC-MS quadrupole for about \$500,000, and we are looking at Agilent and Thermo Fisher. The decision will hinge on service. We use Agilent chromatography, ICP (inductively coupled plasma) by PerkinElmer, near IR (infrared) by Thermo Fisher. Thermo Fisher is the biggest and has good products all the way around. Agilent is good in chromatography, but its ICP is not great."

Industry officials had a somewhat more optimistic outlook for pharma/biotech spending, but, given the cautious pharma view, this appears a bit too optimistic:

- *Waters' Riley*: "We are seeing a little softness in pharma. They are just not making capital investments...to the level they were before...They have laid off people and have excess inventory...But pharma is still buying...We have a tremendous amount of instrumentation in pharma, so our consumable and service stream is still significant...There is a fair amount of business model change in pharma. They are downplaying their own core research facilities and contracting a lot more of that out to a larger extent than we saw 5-10 years ago. But that is not bad for us because we have strong activity in Asia and India...We are seeing good strength in biopharmaceuticals – stronger than the small molecule side of the business over the last two or three years and even now...Small biotechs are having money problems, but large biotechs are okay."
- *Applied Biosystems' Dr. Anacleto*: "Biotech is still in pretty good shape. There is still a lot of innovation, and pharmas are very interested in biotech."
- *Thermo Fisher's Kirkwood*: "Biotech has been less affected, large pharma is starting to be more affected. Pharma was going at a not great but not a terrible steady state...It has softened a little...All of biotech not as much, and academia is pretty flat."
- *PerkinElmer's Dr. Marshak*: "Pharma is still fairly strong. Consolidation and contraction of pharma happened to a large extent prior to the economic contraction...We continue to see pharma moving to different locations but still strong...Maybe biotech is a little softer...The cellular imaging area will be important – cellular assays, fluorescence – as opposed to some of the genomics and proteomics areas that were popular a few years ago."
- *PerkinElmer CEO Friel*: "They (pharma) did down select their therapeutic targets, but where those chose targets, they are continuing (to spend)...The issue in pharma has been there a while. They've been dealing with it for a number of years, so the recession per se is not having that dramatic an impact...Funding of biotech is under some pressure."

Pharma consolidation

Pharma mergers – Pfizer/Wyeth, Merck/Schering-Plough, Gilead Sciences/CV Therapeutics, etc. – could flood the market with used equipment, but neither industry nor pharma sources believes this will have much effect on tools company sales to other pharmas. They said pharmas rarely if ever buy used equipment. However, the used equipment may get snatched up by contract research organizations (CROs). A pharma source said, "Upstart CROs may buy it, and I know people doing that already."

Comments included:

- *Applied Biosystems' Dr. Anacleto*: "Pharma is under pressure, but they have been under pressure since before the economic crisis – from government cost-cutting, etc. That is not necessarily new...Consolidation in pharma can have both positive and negative influences. There are likely to be cuts, labs shut, people let go, and some instruments repositioned. That can stall budgets while people wait until the dust settles before making new purchases. But when the dust does settle, there may be new ways to use the technology, new projects which stimulate purchasing."
- *Waters' Riley*: "What's interesting about pharma is that it has been going in a challenging direction for some time, but the mergers and acquisitions have, in general, reduced demand, looking at total instrument inventory. To some extent, the economic situation has exacerbated that."
- *PerkinElmer's Friel*: "Clearly, the discovery process is being cut and outsourced more than other areas. Preclinical and clinical is where more spending is going, with less into discovery of new molecular entities...The issue of used equipment is always there...The best defense is innovation. If new products have innovative features, you can protect against that...There will always be some making that trade-off, but generally a lot of customers we deal with want incremental improvements...That is really the best defense."
- *PerkinElmer's Dr. Marshak*: "There are also different parts of pharma even within the same company – R&D, screening labs, formulation development, process development, quality assurance/quality control, etc...Once a pharma has a good lead and a compound going into clinical testing, they will still need to push that through, and quality assurance and process require a lot of analytical tools."
- *Agilent's Dr. Roelofs*: "Anytime two players consolidate, they will pause spending in areas where they already have technology. Where both sides need something, they will continue to buy...And there is a short-term softening on our access. Long-term, 16,000 jobs will be lost, so it will give them more money to invest in leading edge techniques...We've seen pharma consolidation in the past three years as prolific, so it is consistent, not grossly different now."

- *University lab manager:* “We will buy used pharma equipment if we can. And there are usually donations to help pay for those items.”
- *Pharma #3:* “Mergers don’t work that well. We’ve increased our ability to buy things because our company is more cost-oriented than Pfizer. Pfizer had older methods and is not interested in change. With our company, the purse strings are opened if we can demonstrate savings. Pfizer is older, stodgier. We are more cutting edge.”

FOOD AND ENVIRONMENTAL OUTLOOK

Industry sources see food safety as a growth area, particularly after the recent problems with adulterated products from China, including melamine in pet food and baby formula and hypersulfated chondroitin in heparin. Environmental testing is mixed; up in some categories, down in others.

- *Applied Biosystems Dr. Anacleto:* “(Food) is good. People are concerned about what they eat and what is coming from China.”
- *Waters’ Riley:* “We are seeing fairly good strength in food safety, environmental, and clinical applications.”
- *Thermo Fisher’s Kirkwood:* “The stimulus package could affect our air quality business. We are a leading supplier of air quality monitoring instruments for mercury. (Some purchases were) put on hold because people thought the regulations didn’t cover enough. Meanwhile, utilities have been gearing up to monitor emissions. They bought equipment and then stopped and put their plans on hold. Recently, they have been re-evaluating and may bring that back up. Companies have already invested, so let’s let the legislation through. We’re hoping that will turn around. If so, more utilities will place orders...And they are looking at pollutants besides mercury...We are also working with the government on a big ASP (advanced spectroscopic portal) monitor to screen cargo containers. This is in gridlock while the government evaluates the technology (from Thermo Fisher, Raytheon, and another supplier). If that breaks free, it is another area that could benefit it.”
- *PerkinElmer CEO Friel:* “Environmental testing is down; food testing is up.”

THE ACADEMIC OUTLOOK

Attendance at Pittcon by university lab managers seemed low this year, and industry sources said that is because the American Chemical Society meeting in Salt Lake City March 23-25 is where more academics go.

Unlike hospitals, university capital budgets are not frozen. Academic lab managers said they can buy – and are buying – equipment, even without the additional economic stimulus and

National Institutes of Health (NIH) grant money that the Congress has authorized, but the NIH and stimulus funds will enable them to get additional equipment this year. Grants are getting written, but sources at Pittcon were still buying cautiously, and many of the purchases are collaborative efforts with different university departments. Most sources did not expect to see actual purchases occur very quickly.

Comments included:

- *University #1:* “Things are bad but not frozen. We have a five-year budget, and we were anticipating the worst, so we are in better shape than we might have been. I don’t have any plans for any major capital equipment, but I could buy if I wanted something...We have put in grant applications, but we won’t know if we get them for 3-6 months. The typical request will be 40% for capital equipment...Really big ticket items are not getting purchased – LC-MS, ICP-MS...Things over \$100,000 are getting postponed, but 2010 may be okay for that.”
- *University #2:* “We are funded on a multi-year basis. The stimulus has freed up money, and we are more excited about the prospects of getting new instruments. We are doing a lot of grant writing. Some of the grant applications are due in March and others in April. The first year of a grant, we generally expect to ask for capital equipment because we don’t know if the money will be there in Years 4 or 5.”
- *University #3, Canada:* “Our recent federal budget put a lot of money into university capital budgets. In 6-12 months, we will spend it, but it took money from our operating budgets. Now, we can buy equipment, but there is no one to run it. We are seeing a lot of research talent move to the U.S...Even with the stimulus, we didn’t ask for much equipment. Over the next 24 months, we need only small items under \$5,000 each.”
- *University #4:* “As a department, we will put in departmental grants, but we haven’t met to talk about it yet... We’ll probably ask for an MS and an NMR (nuclear magnetic resonance) upgrade...Not only are capital budgets terrible, but travel is frozen except for research grant travel. Budgets are down by one-third, and there is no sign it is getting better. There have been tremendous cuts and layoffs, serious cuts. Everything I buy now is from grants...And we’ve been warned there will be more cuts, possibly even furloughs...We have an old ICP-MS, and we need to replace it. I’ve finally figured out how to do that...We are counting on the stimulus money, but it will be used for big equipment for multi-users.”

NIH has announced several new funding plans that are likely to affect the tools industry:

- **\$300 million for shared instrument purchases.** This program will give awards to pay for tools in the \$100,000-\$500,000 range, including mass spectrometry.

- **\$160 million for purchase of high-end research tools.** There will be ~40 awards for the purchase of equipment costing >\$600,000 to be used for biomedical research. The maximum award will be \$8 million. This can be for, but is not limited to, *high resolution mass spectrometers*, supercomputers, structural and functional imaging systems, macromolecular NMR spectrometers, etc.
- **\$1 billion for renovating core facilities.** NIH will spend this in grants ranging from \$1 million to \$10 million for the construction, renovation, or repair of existing non-federal research facilities. This may include equipment purchases, but specialized equipment costing more than \$100,000 cannot be requested as part of this, and the total project period for these awards may not exceed 5 years.
- **\$1 billion for improvement of extramural research facilities.** These will be \$2 million to \$15 million grants for the expansion, remodeling, renovation, or alteration of biomedical or behavioral research facilities. These grants will support the costs of improving non-federal basic research, clinical research, and animal facilities.

Tools companies are extremely, perhaps overly, hopeful that the economic stimulus program, including additional NIH research grant money, will translate into sales of their equipment, particularly high-end items like mass spectrometers. And they are hopeful that the spending will occur soon, even within the first half of 2009.

- *Applied Biosystems' Dr. Anacleto:* "With the stimulus package, we are optimistic about short-term solutions. We are hearing that we should expect to see spending from the NIH stimulus – though it is hard to predict when. We expect the government stimulus to have an impact in 1H09 through an NIH bolus, and then there is the potential for an increase in the NIH budget for the next fiscal year (which starts in October 2009)...It should have an impact on academic spending, where there has been a lack of funding for basic research.
- *Waters' Riley:* "Academia has more money than we've seen for a while because of the stimulus, so there is some shift of our attention to that...We are starting to feel an effect. People are scrambling in academia to put in grant proposals for shared instrumentation...Grant proposals have to be in very soon, and they will start awarding money in the next three months...And it will be spent."
- *Thermo Fisher's Kirkwood:* "Thank God (for the stimulus). We are hoping to get a little piece of that...It seems like it is happening fast...We have a whole initiative to bring together the right people in our organization, the right resources – using online tracking to see where the money is going. We are right on top of that. I think we will see the effects sooner rather than later, particularly the money getting allocated to states."
- *PerkinElmer CEO Friel:* "Spending more recently probably is a little stronger on the academic side because of the stimulus package and the increase in NIH spending."
- *PerkinElmer's Dr. Marshak:* "A lot of high throughput screening is coming out of big pharma labs and going to universities."

Where will the NIH grant money be spent? Much of it will go to capital equipment, industry and academic sources agreed, particularly for things like mass spec and NMR, which is good news for the tools companies.

- *Applied Biosystems' Dr. Anacleto:* "We tend to see it more geared to the capital equipment budget – a one-time bolus...where labs take the opportunity to get new instrumentation, to upgrade. It probably will go less for operating budgets and headcount...Consumables will go up with an increased NIH budget (for FY2010). But this is a one-time stimulus to get new hardware...We think mass spec will benefit. Grant proposals will look for innovation, and our system (the SCIEX 5500) is ideally suited to capture some of that."
- *Waters' Riley:* "They want to buy a lot of mass spec type of instrumentation...so it affects us pretty significantly...The stimulus will have the most effect on mass spec."
- *PerkinElmer's Dr. Marshak:* "Grant approvals may go 20% to capital equipment but not 50%...The government may force an early allocation of the money, but there has to be an application and a review process, so there potentially could be higher budgets this year, but I think if anything, (the spending) will be later this year."

MISCELLANEOUS TOOLS CUSTOMERS

Other industries – from chemical companies to fertilizer plants and agricultural firms – are variously affected by the economy. Some are seeing small bright spots, but most are taking a very cautious approach to any capital spending.

- *Chemical company:* "Our capital budget is frozen unless something reaches the end of its life and has to be replaced. But we are asked to look one more time before we buy something."
- *Fertilizer company:* "Our capital budget hasn't been eliminated. Instruments we need to replace are okay, but we can't get new things...We are not moving ahead on LIMS (laser ionization mass spectroscopy). We want a more configured commercial LIMS, but it would be ~\$200,000, so we are not getting it yet....If we get help from the stimulus money, it will lower our project costs but not get us a LIMS."

STEM CELL RESEARCH

Tools companies were optimistic that President Obama's decision to lift restrictions on federal financing of embryonic stem cell research will give their sales a boost. Thermo Fisher's Kirkwood said, "There is a lot of visibility on stem cells, and we play into that market in a big way. That may have more impact than the (NIH) grants." PerkinElmer CEO Friel said the reagents and instruments his company offers – as well as the company's applications and software – should get a boost from an increase in stem cell research, "Many of our cell-based imaging systems and assays may be used with stem cell (research)...Stem cells are seen not so much as therapy as a way of utilizing cells for screening for new therapies so they can replicate disease states or a type of cell needed."

A small agricultural company manager said his capital budget is flat and he believes that is true of agriculture overall. What he'd like to buy is a *used* HPLC. He said, "There is some money going to the U.S. Department of Agriculture to help low income farmers, and that could translate to sales for us because we sell chemicals to them, and that would increase our capital budget in time."

Federally-financed stem cell research may soften the economic blow for tools companies, even if it doesn't give them a boost. On the other hand, stem cell research-related tools purchases may not happen. The President's decision may not necessarily increase the total dollars available for stem cell research. States, faced with budget deficits, had already been cutting their support of stem cell research, and the potential for new federal funding may give states an excuse to cut their spending even more in this area and perhaps to redirect what they do spend toward clinical studies rather than basic research, where analytical tools are more likely to be used. In addition, non-profit organizations and philanthropists could see federal funding as a reason to reallocate or cut their funding.

NEW PRODUCTS

Conferees characterized most of the new products at Pittcon this year as incremental improvements or me-too products. The one type of product that several sources agreed is exciting, and a number plan to buy, are detection devices. The most interesting new product/technology items this year were hand-held Raman spectroscopy detection devices that can be used to determine if chemicals coming into a plant or lab are what they are supposed to be. Several pharma officials as well as other sources were excited about Raman spectroscopy devices from these companies:

➤ **Intevac/DeltaNu's ReporteR**, a material identification system. The light weight device, slightly larger than a PDA (personal digital assistant), costs \$15,000 and can be used by law enforcement to identify explosives or white powders and by plastics recycling companies as well as by pharmas. A DeltaNu official claimed this device is simpler to use than the Ahura device, more user-friendly, and with lower power so less damage is done to samples. The device cannot do metals.

➤ **Ahura Scientific's TruScan**. This is a bigger device than the ReporteR, but it is still hand-held. It comes with both a vial holder and a tablet holder as well as a barcode reader. A company official said, "It is designed for the non-scientist, including the warehouse worker to verify you have the incoming raw product you expected...It would have caught the contaminated heparin." Another official said, "We are trying to de-mystify spectroscopy, to make it easy to use...The biggest driver is taking cost out. We have one customer that is saving \$300,000 a quarter with this."

TruScan can be used by customers/border officials, law enforcement, hazardous materials (hazmat), chemical spills, bomb squads/explosives. An official said one advantage of TruScan over the DeltaNu device is TruScan was specifically designed for the pharma environment and is 21 CFR Part 11 compliant. The spectral range and resolution is billed as equivalent to a benchtop device, and it detects a greater range of compounds than the DeltaNu Recorder. It also costs more – \$50,000 – but an official said, "We can prove it will pay for itself in six months." Asked if there were any recurring revenue, an official said, "We charge \$3,000-\$5,000 yearly for recertification of the calibration, which can be done over the internet, and about 50% of customers want that." A pharma source said, "That (TruScan) is really cool. We are buying that. That will change business."

However, other detection devices also got a mention, including:

- **CEM's protein analyzer**. It won't detect melamine, and it won't read melamine either, but it gets low protein numbers, so we can tell something is wrong."
- **Thermo Fisher's hand-held FT-IR (Fourier transform infrared)**. This is cabled to an analyzer box; it is not completely hand-held like the Ahura and DeltaNu products, but it is more full-featured.
- **A2 Technologies' Exoscan FT-IR**, a surface analyzer that can be used in the field on a leaf surface or on soil. This is hand-held, but not light; it weighs 7 pounds. It can be used on aerospace structures, for agriculture, petrochemical, or pharma companies. The cost is \$35,000. The purported advantage over the Raman spectroscopy is that it works in the presence of water, which Raman doesn't do, and it works better with colors. An official said, "Raman does things that FT-IR doesn't do and vice versa, so these are complementary devices."

Other new technology/products mentioned by just one source as interesting were:

- **AlphaMOS' electronic nose**. "It has a high speed GC column that takes analysis from 20 minutes to 1.5 minutes."
- **Peptide mapping** by Agilent and Thermo Fisher.
- **Anything nano**. A university lab manager said, "Nano is Latin for fund-able."

NEWS ON SPECIFIC TOOLS COMPANIES

AGILENT TECHNOLOGIES

Agilent's mass spec was identified by conferees as the best low-end MS. In 2008, \$1 billion of Agilent's \$5 billion in revenues came from life sciences and \$1.2 billion from chemical analysis. For 2009, the company estimates that 20% of business will come from life sciences (15% pharma/biotech, 5% academia/government) and 25% from chemical analysis (10% petrochemical, 7% food, 8% other). Agilent expects 38% of 2009 business to come from the Americas, 34% from Asia Pacific, and 28% from Europe. The growth in 2009 is expected to come from food, with new product launches, expansion of consumables and service offerings, and improvements in the "customer experience."

Dr. Roelofs said, "There hasn't been any change in our strategy. We have an operating model that we stick to. There was a 10% pay cut for non-exempt employees, but we are still investing in R&D...The electronics side of the business is restricting a bit. The (economic) stimulus is a new opportunity, and we are responding to that and to any other new opportunities...We are also moving the Velocity 11 instrumentation manufacturing to Singapore."

Among the new Agilent products at Pittcon were:

- **7693A Automatic Liquid Sampler (ALS)**, with higher throughput, more flexibility, improved sample-preparation automation and serviceability for all current bench-top Agilent GCs. The company claims the 7693A is twice as fast as any competing ALS, and the handling system can handle 150 vials, an increase of 50 from the previous model. A feature that may be of particular interest for environmental analysis, food-safety testing, or pharmaceutical quality control is an optional heater/mixer/barcode reader module that can automate a number of pre-injection procedures, such as preparing highly viscous or slightly soluble samples.
- **Upgrades to the 7890A Gas Chromatography System** to increase productivity.
- **7820 GC**, a next-generation HPLC-chip mass spectrometer, an entry-level GC with EPC (electronic pressure control) and automated injection.
- **New J&W DB-1ms and HP-1ms Ultra Inert capillary gas chromatography columns**, which are particularly suited for applications like fragrance fingerprinting, analysis of pesticides and drugs of abuse, and unknown sample screening.
- A new **Low-Gas Alarm** gas management system, an accessory designed to reduce unscheduled downtime and inefficiency in typical analytical workflows resulting from running out of carrier gas for GC or time lost searching for the correct size syringe.
- **1200 Series HPLC-Chip II**, a second-generation high-performance nano liquid chromatography/electrospray

system for mass spectrometry with twice the life of the original HPLC-Chip.

Asked what the advantages of the 6530 QToF LC-MS are over the Waters UPLC, Dr. Roelofs said, "Its ease of use, low volume, high reproducibility, and increased pressure, which gives a faster run rate and fewer peaks...You trade separation speed, pressure, and loading volume with LC. We chose to give very high loading volume and capacity, so you can put more sample on at a trade-off of a little pressure...We have 13 clips at the moment. Other companies (competitors) have announced that they are interested in this technology, but this is difficult. Good companies will get there, but at the moment it is hard. Waters announced they have the chip technology, but they were not showing it at Pittcon. I believe they continue to work on it and will get there...Nanofluidics is clearly the future."

Agilent also announced that it:

- is providing **technical support for the development of the Aurora SFC Fusion A5™**, a new analytical instrument that converts existing HPLC systems into supercritical fluid chromatography (SFC) systems, which Agilent said pharma are increasingly interested in exploring. SFC is a method to substantially reduce organic solvent consumption, particularly acetonitrile, which is currently experiencing a global supply shortage. Dr. Roelofs said the global shortage of acetonitrile is causing people to buy columns that use fewer solvents.
- has entered into a **Cooperative Research and Development Agreement (CRADA)** with the U.S. Environmental Protection Agency's National Exposure Research Laboratory to use the Agilent time-of-flight mass spectrometer (TOF-MS) to detect and identify both known and unknown perfluorinated compounds (PFCs) in the environment. The collaboration will focus on identifying perfluorinated organic compounds in the isomers and related compounds in the environment in the part-per-trillion range.
- is playing a role in the 2010 Winter Olympics in Montreal – its 7000A GC/MS will be used for **drug testing**.

LIFE TECHNOLOGIES/APPLIED BIOSYSTEMS

The company was emphasizing how Applied Biosystems mass spec devices, through a joint-venture with MDS Analytical Technologies, have been simplified and can be used to solve real-world complex problems for customers like Jupiter Environmental Labs, which is working on an Everglades water quality restoration project; Aegis Sciences, a large sports doping lab; and the food testing lab at the University of Guelph in Canada.

Research director Dr. Anacleto emphasized four main application areas for mass spec in general:

1. **Environmental** – primarily water testing.

2. **Food** – where contamination is leading to more public awareness and more government regulations. Dr. Anacleto said Applied Biosystems is approaching this market three ways:
 - a. A broad portfolio of innovative systems.
 - b. Simpler software designed for non-expert users – Cliquid 2.0.
 - c. iMethods tests – 23 pre-configured tests that are reliable and easy to implement in a lab, reducing costs.
3. **Clinical research** – primarily disease markers and small molecule markers.
4. **Forensic toxicology** – to screen drug residues (illicit drugs, poisons, sports testing).

At Pittcon, Applied Biosystems was highlighting the AB SCIEX 5500 Triple Quad, which was launched in 2008, and the AB SCIEX 5500 QTRAP, which was shown for the first time at Pittcon this year. These are aimed at the proteomics market. Dr. Anacleto said proteomics includes pharma biomarker studies, biotech biomarker, proteins, and therapeutic applications as well as basic academic research.

How does the SCIEX 5500 compare to the 5000? Dr. Anacleto said the quantitative capability is the same or better with the 5500, but the scanning is faster with the 5500, “The (5500) system was designed with speed in mind. We maintained the performance levels, but we do it much faster. The (5500) system can scan in quantitative mode twice as fast as the 5000. That is important for faster chromatography...The speed aspect also is important when you talk about more analytes.”

Most lab managers questioned at Pittcon identified Applied Biosystems as having the top-of-the-line *quantitative* mass spectroscopy systems but indicated there were better *qualitative* systems. Dr. Anacleto responded, “From a qualitative perspective, we have been investing heavily in QTRAP applications...We invested from a software perspective...Now, with the 5500 QTRAP, we have up to a 100-fold improvement in trap mode sensitivity. That is a real significant improvement in qualitative sensitivity. Another qualitative improvement is the speed. Not only did we improve the speed in quantitative analysis but also in quality...Now, we can do up to 20,000 times per second...So, we can collect very high sensitivity very fast. And that allows customers to do different mass spec experiments faster. Really, that investment in QTRAP is the key differentiator we have to grow in that market.”

However, a big concern that labs have is the continued support of their equipment. They said they do not want to buy from a company that is here today and gone tomorrow, and that is even more true in the current economic environment. This attitude caused a few lab managers to raise questions about Applied Biosystems. They are worried that Life Technologies will spin off the high-end mass spec business; they are not

convinced that the merger of Invitrogen and Applied Biosystems reflects a commitment to the full Applied Biosystems product line. Dr. Anacleto said, “Life Technologies is committed to mass spectrometry. It is a good business that generated good revenue. We are the No. 1 provider in mass spec. It is core technology, and I think they are committed to it. Our competitors are definitely trying to confuse customers.”

MILLIPORE

The company's key product is water purification, and the key competitors remain Thermo/Barnstead, U.S. Filter, and Elga. Pall does not appear to have become a major competitor despite its foray into water purification.

Traffic was slow at Pittcon, and the company had a smaller booth than last year. The good news was that Millipore claims to have a lot of grant money customers, so the 2009 outlook is “okay.” An official said, “The economic stimulus plan could be good for us with smaller companies. And stem cell research could help us. The NIH grants probably won't.”

Millipore was showing 2 key water products at Pittcon:

- **Milli-Q Reference**, a water polisher that can handle about 2 L/min of Type 1 water. It can be mounted on the wall, bench, or under the sink. This was the launch of this product.
- **Milli-Q Integral**, a Type 1 water utilizing several technologies in the same box. This was new in 2008.

PERKINELMER

PerkinElmer officials insisted that the company has some real opportunities even in the current economic environment. CEO Friel said, “In this environment, you don't want to have multiple suppliers, so to the extent you can bundle your purchases, it can (be useful)...And we can do instruments, automation, reagents, software, and service...So, we are seeing some receptivity from pharmas on more bundling. That is both an economic consideration from the perspective of reducing cost, but also a consideration in the financial viability of suppliers. A number of pharmas in the supply chain are starting to make sure that critical sole source providers have financial viability, and that is putting a lot of pressure on smaller companies...and causing pharmas to move to larger, better capitalized providers.”

Dr. Marshak added, “All of the biomedical research areas run a variety of assays, so our multimode plate readers sell into all those areas. Those will be popular (this year). We are still the leader in the radiometric business and radioisotopes, which are particularly useful in preclinical studies...Now, we have a new line of HPLCs, and we think we have a very strong offering in HPLC to go along with our other chromatography devices and chromatography software packages.”

Asked about predictions that the GC and LC markets will be down this year, Friel said, "I think the market overall is fairly soft, but there are a number of areas in GC that offer the possibility of growth, particularly in testing. It is industry-specific and depends on the companies you serve. Overall, the GC market is probably down, but we focus on the industries with the greatest growth prospects to be sure we have the appropriate expertise to deliver those products specific to those applications...I think what you will see is instead of just one GC for everyone, it will be GC tailored for a specific application."

Friel predicted, "Consumer product and food testing will be strong. Environmental is stronger than industrial. Another area doing okay is renewable or alternative energy – biodiesel fuel analysis – and we make instrument-based systems for that ...We made a small acquisition recently in the GC area, largely focused on the petrochemical area." Dr. Marshak added, "We have penetrated into toy testing and children's product safety. Some is inorganic, looking for lead, and some is GC-based, looking for phthalates or chemicals in plastic that are toxic."

Asked what specific products are most likely to benefit from the government's economic stimulus package, Dr. Marshak pointed to cellular imaging, Opera at the high end or Operetta at the moderate price level, as well as the Vox Ultraview confocal microscope, EnSpire plate readers, and new reagents for assay on protein kinases and G-protein-coupled receptors (GPCRs). He said, "At this show we are seen as an instrument manufacturer, but we have a strong offering in reagents and consumables, and we are penetrating academics a lot with those."

THERMO FISHER SCIENTIFIC

At Pittcon 2009, Thermo Fisher debuted its **Exactive** benchtop LC-MS, designed for high-throughput and high-performance screening and compound identification applications. Exactive utilizes the company's Orbitrap mass-analyzer technology, and the company claims it is fast, easy to use, and cost-effective to operate, making it good for "new users in routine analytical laboratories." Kirkwood said Exactive has "Orbitrap at the top but not all the bells and whistles...You won't use it for proteomics, but you might use it for applied markets, such as food safety, environmental, and quality assurance applications."

How are Orbitrap, which was new in 2005, and Maldi doing? Kirkwood insisted both are selling well, "Last year we came out with Orbitrap with ETD and Orbitrap with Maldi. Both are selling well. Now, we have Exactive with Orbitrap imbedded. So we have different iteration of that (Orbitrap) platform. The platform is still very strong."

WATERS

Historically, Waters has been heavily weighted in pharma, but vice president Riley said that has lessened somewhat, "We are not as heavily weighted in pharma as we were 5-10 years ago. Actually, we have a very substantial chemical analysis business which is food safety-related and has environmental applications as well. And we expect to see that grow dramatically...We have exceptional growth with QToF, and we just brought out a new QToF in January (2009), and it is being shown for the first time at Pittcon. We also have a new tandem quadrupole with excellent growth. Applied Biosystems has a strong presence in the pharma small molecule market, no question, but we have some pretty competitive products. Applied Biosystems is the weakest it has been in a long time."

At Pittcon, Waters had several new product introductions, which the company said was aimed at providing customers with what they want – better efficiency, data quality, productivity, and profitability. This included:

- The new **Xevo** family of benchtop mass spec (TQ and QT), which Waters claimed is the most sensitive QToF ever developed. They said Xevo QT is the only commercially available mass spec to give UPLC/MSE performance, and the Xevo TQ lets labs conform to new FDA guidelines for bioanalytical method validation.
- New **supercritical fluid chromatography** (SFC) from TharSFC.
- Introduction of **Patrol UPLC**, a process analyzer for at-line analysis. This is designed to complement the company's on-line version introduced at Pittcon 2008.
- **Trizaic UPLC** with NanoTile Technology, a microfluidic separation technology for use with Synapt MS.
- **Empower 2 Business Intelligence Manager**, a web-based dashboard software solution that provides rapid analysis of critical chromatography performance data.
- **Atmospheric Pressure Gas Chromatography** (APGC), which allows laboratories to switch from LC/MS/MS to GC/MS/MS using the same QToF or tandem quadrupole MS.
- The new **Local Console Controller (LCC)** for its Acquity UPLC, a hand-held, PDA-like device that lets scientists monitor the status of Acquity, check operating parameters, or configure system settings without having to use a PC or network client.
- A new software option, **ESA Corona CAD HPLC detector**, for Empower 2 Chromatography Data Software. This is a joint project of Waters and ESA Biosciences. ESA will provide the Empower 2 driver to its existing Corona CAD customers, and new customers will receive the driver set in the instrument's start-up kit.

How is Acquity UPLC, which was first introduced at Pittcon 2004, doing? Riley said, “We are doing well. We are seeing a little softness in the HPLC/UPLC market...It is a little flatter than it has been...That has been a growth product...but it doesn’t mean a disaster. Customers are investing in innovative solutions...They are still very interested in things like Acquity which is very innovative and leading edge...They are interested in high-end MS solutions, which are very leading edge and let them do assays they couldn’t do before.”

