



# *Trends-in-Medicine*

**February 2008**

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*with Ilene Schneider contributing*

## *Quick Pulse*

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### **Trends-in-Medicine**

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### **LABAUTOMATION 2008**

Palm Springs, CA

January 27-30, 2008

More than 4,600 people from 40 countries attended the annual LabAutomation meeting, sponsored by the Association for Laboratory Automation (ALA). About half of these were scientists, researchers, and managers from a variety of laboratory settings – academia, big pharma, biotech, contract research organizations (CROs), hospital labs, and large commercial labs. Their time was split between highly technical lectures – often given or sponsored by industry and often barely more than sales pitches – and visiting some of the 242 companies on the exhibit floor. The meeting also was a way for exhibitors to network, since, in many cases, vendors in this space collaborate or are each other's customers.

The meeting focused on automation technologies in pharmaceutical and biotech lab settings, and that's what sources were interested in – automation and robotics. The only insight into the testing outlook for the industrial or food safety markets came from Bob Kibler, vice president of sales and marketing for ChemImage, who said, "ChemImage is teaming up with the U.S. Department of Agriculture (USDA) to develop a rapid and easy way to identify melamine and other substances in food products when they enter the U.S. The technology, which combines spectroscopy – initially raman but also including fluorescence, UV/Vis (ultraviolet visible), and infrared (IR) with GC/MS (gas chromatography/mass spectrometry) – will be applicable to both food safety and homeland security issues. The rapid, non-destructive techniques (using light) will not require reagents, saving in disposable and operating costs and providing greater safety."

### **THE ECONOMY AND THE ENVIRONMENT**

2008 is likely to be a tough, but not a disastrous year, for automation companies in the U.S., due to the current economic climate and the talk of a recession. That was the consensus of both industry sources and research scientists. If – or as – the U.S. market slows, some companies are hoping Europe, India, and China will pick up the slack. Most sources agreed that demand from big pharma has softened, though they described the growing transformation of pharmas into biopharmas as positive for lab automation companies. Many industry sources said they will depend on biotech more in 2008, but pharma scientists said they are still spending – just cautiously.

### **Industry perspective**

- "Government funding and grants are not impacted yet. That money is still there, so we don't expect a quick impact."
- "Pharma is the toughest. Some pharmas are taking manufacturing to Europe and China. But there is still an opportunity to sell to them there, just not in the U.S. However, there is no change in what they are buying because of the economy."

- “We haven’t seen any impact yet on pharma...2007 was tougher than 2008 is likely to be...But customers negotiate more now, and procurement is more involved. They still buy, but they take longer. Pharma is soft, but biotech is okay.”
- “It is too soon to see the effect of the economy on our customers. The (automation) industry is very healthy... Problems in big pharma are good for those of us with automation-compatible products. With more automation, there’s less need (for pharma) to hire people.”
- “We’re shielded from the economic situation in the U.S., but we are a bit concerned about the future. We’re able to weather it because we have systems of all sizes, and business in Europe and Asia is booming.”
- “With pharma layoffs and Pfizer closing its Ann Arbor facility, there is a lot of used equipment out there, and that is negatively impacting this (automation) industry. That means our industry will have a tough couple of years.”

#### Researcher/scientist perspective (including pharma and biotech)

- “Some years I come (to the LabAutomation meeting) to buy. Other times, I come to check the pulse of industry, and this year it is weak...It’s still business as usual, except possibly for a decrease in the availability of money.”
  - “The economy is starting to affect everyone. I’m hearing more about hiring freezes and layoffs. Everyone still has money to spend, but there is a trend to better spending. However, there have been no budget cuts and no negative effects yet.”
  - “It is tougher for high-end products; that is softening. Medium- and low-end products are benefiting. But there is still a move to automation.”
  - “In the short-term, the economy doesn’t affect capital investments, but people need to be creative now. And people are more careful on how they spend their money. The companies are under more pressure, but that’s not necessarily related to the economy; it’s like after the dot.com bubble burst.”
  - “We are looking to buy automation equipment, and we have a budget.”
  - “We are looking this year, not buying...The economy isn’t having any short-term effect on the outlook for automation companies. Customers could have a lag effect but not an immediate effect. Companies still have to maintain their equipment for long-term success. But pharma is re-sizing. They’ve invested so much in life science, but where has that paid off in candidate drugs? The concern is that there is a lack of blockbuster drugs on the horizon to keep funding their research. How long can they keep buying without payback?”
- “Ultimately there will probably be an impact, but not yet.”
  - “It is a somewhat tougher environment than the past few years.”

### TRENDS

#### What’s hot?

Not much. That was the opinion of most scientists questioned at the meeting. A biotech source said, “There is no buzz. It’s quiet in the (exhibit) hall...I’m interested in powder dispensing, but we’ve looked at it for 3-4 years, and it isn’t ready yet.” A pharma source said, “Nothing is jumping out this year.” Another source said, “There is not a whole lot new technology-wise, but companies are trying to find new ways to market what they have.”

Overall, interest in robotics and automation remains high. A source said, “We are shopping for robotics because of reproducibility, tracking, and a reduction in errors. We are semi-automated but want to be more automated. Many jobs are tedious and burn people out pretty quickly. With automation, we can keep employees and use their brains instead of having them do repetitive, boring tasks.” Another source said, “I’m looking for a system that is robust and flexible, especially in terms of software flexibility. It needs to do what *we* want it to do...In the past, the emphasis was on sequencing throughput, but now we want something else – software changes.” A vaccine researcher said, “The process for vaccine manufacturing now is a very manual, very inefficient process, and we want to make it more efficient. We use people to do testing, and that gives wide variability. Automation is not really regulatory-driven, but it could help from a compliance point of view.”

Several pharma sources called **touchless-transfer microfluidics** – acoustic pipetting – hot, particularly systems from EDC and Labcyte (which announced a merger with Deerac just before the meeting). An industry scientist said, “Microfluidics is a big word. There is a need to work with smaller and smaller volumes and for miniaturizing everything.”

➤ **Labcyte.** This system uses ultrasound to move ultra low volume (2.5 nl - 100 nl) liquid from a well to a plate automatically without the liquid ever touching a needle, a pipette, or anything. The ultrasound source moves under the well plate, allowing for rapid transfer (<30 seconds for a 384-well plate). An official said 60% of customers are big pharma, with biotech the other 40%.

➤ **EDC Biosystems’ ATS-100.** This system uses lower acoustic energy than Labcyte (1,000 times less power). An official said, “We don’t cook the liquid...Ours is stand-alone. No chiller is required. Labcyte needs a water cooler to lower the temperature. We also let the users do their own calibrations, and we don’t charge fees for calibration.” EDC can do aqueous solutions (≤20% glycerol), DMSO 50%-100%, and

plasma; and it can do more well plate sizes – 96, 384, 1536, and 3456. However, users have to get special well plates from EDC. The company claims it is the lowest cost instrument able to dispense in the low nanoliter range.

➤ **BioFluidix's PipeJet.** This non-contact microfluidics system is designed for a small-scale laboratory and medium-scale production of diagnostic substrates. PipeJet can do pipetting and dispensing of volumes from 5 nl - 60 nl, putting it onto chips and cards, not plates. The energy source is piezo-electric, not air or ultrasound.

The purchase price of the Labcyte and EDC systems is comparable, though, as noted above, EDC doesn't charge for calibrations, and an EDC official claimed their system has a lower cost of ownership. A pharma researcher said, "We plan to use both. The energy is so different, so they do slightly different things, and the software is different. Each is better in different applications. We also want to know the technology better." Another source said, "I thought the EDC system was very good technology, but having both EDC and Labcyte would give you flexibility. These systems are not for us; we need greater volume – 15 ml, not nl – but no-touch is a very good idea. (Pipette) tips become very costly when you do a lot of samples. This is not new technology, but it is getting wider attention."

One pharma source was impressed with Tradewinds Direct's laser barcode etching machine.

### Nanotechnology

Nanotechnology was a buzz word at the meeting, but sources weren't sure exactly what it means, saying the term is still too vague and not well defined. Comments included:

- *Industry #1:* "It is a little ahead of its time. Give it another 10-15 years."
- *Biotech:* "I'm still trying to figure out what it means. People are calling lots of things 'nano.'"
- *Pharma #1:* "The big thing is chip-based assays or chemistries, but nanotechnology is still not proven. It still has a way to go. It is very early on."
- "It has to show a benefit such as lower production/consumable costs, and you have to be able to engineer out of it. It also has to be better/faster/cheaper, or it is just another way to do what I'm already doing."
- *Pharma #2:* "Nanotechnology is here to stay, but it depends on your application."
- *Pharma #3:* "It is a funny term. What does it mean – volume, size, well size? It is a very vague term. Until there is an application and we know how it works, there is not a lot of interest."
- *Industry #2:* "There absolutely is a buzz about miniaturizing, but it is general, still broad."

- *Pharma #4:* "It is just miniaturizing, minimizing volume and the amount of reagents."

Ventana Medical Systems, which was just acquired by Roche, is working on a nanoparticle test for multiplexing – testing multiple genes at one time – in prostate or breast cancer, for example. Before the acquisition, Ventana partnered with Quantum Dots, which was bought by Invitrogen, on nanotechnology tests, and that collaboration is still in place. A Ventana official said at least one test is close to commercialization but still needs some fine-tuning, "Stability is proving more an issue than they thought, but they think they have almost worked it out."

James Storhoff PhD, a senior scientist at Nanosphere, described his company's Verigene System, a bench top molecular diagnostics workstation that uses gold nanoparticle technology to detect nucleic acid and protein targets. The system is composed of a Verigene Reader and a Verigene Processor plus single-use consumables (the Verigene Test Cartridges). Dr. Storhoff called Verigene an automated "multiplex PCR-less SNP and infectious agent system that is simple and robust, using no enzymes and no target amplification. He said Verigene is a "low cost, automated instrument platform designed for clinical use."

*Can Verigene detect a single particle on a chip?* Dr. Storhoff said, "No, but we can identify about 200."

Nanosphere is developing specific genetic tests for things like warfarin resistance, heart attacks, and prostate cancer. Dr. Storhoff said, "Our efforts are primarily focused on taking major scientific breakthrough at Northwestern University and commercializing those...We are doing direct genomic detection (of SNPs) without target amplification (without PCR)...Where other people are doing 'lab-on-a-chip,' we are taking a very complex step out of that process by interrogating SNPs directly with nanoparticles...High count multiplexing enables panels of nucleic acid tests in a single sample – for example in cystic fibrosis, looking at 24 SNPs in a single cartridge with only two pipetting steps...(Our system) has unmatched protein sensitivity (2-3 orders of magnitude greater than the gold standard). We are trying to push the boundaries of protein detection – for example with a cardiac troponin marker – which would allow earlier detection of disease and new diagnostic tests."

Among the tests Nanosphere is working on are:

- Hypercoagulation panel (Factor II/V and MTHFR) – This 90-minute assay is FDA approved.
- High sensitivity prostate specific antigen (PSA) test to detect very early PSA rises in prostatectomized men.
- Cystic fibrosis screening test for prenatal and newborn use. Dr. Storhoff commented, "Cystic fibrosis is a very challenging assay for a PCR-type system."

- High sensitivity cardiac troponin level test. Dr. Storhoff said, "Most current assays are 3-70 picomolars ( $10^{-8}$  to  $10^{-12}$  M), and really good ones get down to 10 picomolars, and we are lower than that...Current assays are pretty effective, but we are measuring much lower. Can that detect events earlier or can we detect more minor cardiac events that may be indicative of major heart attacks coming on? Thousands of patients go into the emergency room, register negative on a troponin test, and in a month or two have a heart attack and die...Were they really troponin negative, or did the test just not see it?...We need more studies."
- Warfarin monitoring – This was the first genetic test for warfarin sensitivity. It was approved by the FDA in September 2007. Dr. Storhoff pointed out that 2 million new prescriptions for warfarin were written in North America last year, but warfarin has a very narrow therapeutic index, and there were 7,000 adverse events with warfarin last year.
- Infectious agent detection.
- Protein detection. Dr. Storhoff said, "We can use the same technology to detect proteins...Right now, current protein technology is really in the low picomolar/high femtomolar detection level, and we are trying to take it into the initial ultrasensitive range (femtomolar to zeptomolar)."

Several sources described the Nanosphere tests as "very interesting." One lab source said, "I like it very much. It doesn't use PCR, which is a big plus, and it does use microarrays, which few use in diagnostics because of the cost...Nano-tests could be ~\$30 per test."

*The question is:* Has Nanosphere created a better mousetrap that no one wants? Does Nanosphere not only have to sell its products but also convince the clinical community that they need it? The tests appear to be more sensitive than what is currently available, but demand for these tests is not coming from the clinical community. Dr. Storhoff said, "Any time you go to lower levels, you bear the burden of proving relevance, and we are doing that. From a logical standpoint, if you can detect lower, you are probably detecting earlier...Just logically, we think if you can detect lower, you will probably see faster...but clinical data for troponin doesn't exist to say you should detect lower."

Nanosphere is not the only company or research center developing nanoparticle tests. Speaking at a session on nanotechnology, Weihong Tan PhD of the University of Florida said, "Whatever you are using today with fluorophores, you can change to nanoparticles...Nanoparticle-based assays may replace some of the existing fluorophore-based bioassays. Each type of nanoparticle has its own advantages and disadvantages...The size of the nanoparticle can be from a few nanometers to micrometers. Based on our research so far, there is not a big variation (in performance)."

Comparison of Fluorophores and Quantum Dots

Measurement	Fluorophores	Quantum Dots
Single amplification	Low	20x that of 1 fluorophore
Photostability	Poor	Excellent
Ability to bioconjugate	Easy but non-universal	Good, under investigation
Aqueous solubility	Mostly excellent, but some low	Low, under investigation

### Other trends

Among the other trends reported were:

#### ➤ Interest in molecular diagnostics, particularly HPV testing is growing. Industry comments included:

- *Qiagen*: "What you may see is many smaller companies entering the market...but the issue in HPV testing is not just to detect the virus. You have to have a certain sensitivity and clinical relevance of the test...We have the only FDA-approved test with a clinical relevance record. Any new test trying to come to market has to use this as a reference...and for now not a single test comes close to the performance (of our test)...PCR may be more sensitive in detecting HPV to a lower limit, but this may not be of clinical relevance...because only if there is a certain amount of virus do you develop cervical cancer."
- *Beckman Coulter*: "We've made it known we are going into molecular diagnostics...As far as what is coming and how automated it will be are still unknown...We have some product launches that are ancillary to molecular diagnostics this year. Then in 2010, we would have introduction of a molecular diagnostic instrument to the world."
- *Tecan*: "The diagnostics portion of our business has increased the last 2-3 years because of molecular diagnostics."

➤ **Large hospitals are increasingly interested in bringing tests in-house, including molecular diagnostics.** A Qiagen official said, "Today, molecular diagnostics is not an easy task to do, but with the new systems, just a regular hospital lab can do these, and they will take advantage of that – to do them faster, have control, etc. That is a clear trend. Typically this is for pathology or big viruses like HIV, HCV, and a number of small viruses like avian flu. There is no molecular human test for avian flu yet, but there are a number of tests rapidly evolving." Another Qiagen official said, "This is evolutionary. It will take a couple of years. Basically, what is shifting this out to the future are FDA regulations. The tests need to be FDA approved, and that path typically takes three years...In Europe it is a little different because the C.E. Mark is a faster approval." A Tecan official said, "Molecular diagnostics are moving to hospitals, but there is a 'push back' not only



because of regulatory hurdles but also because companies are not **proving** their tests are safe and effective. That has slowed migration of molecular diagnostics.” A Labcyte official said, “People want more assays for the same amount of money.”

➤ **Labs are decentralizing.** An industry source said, “What we see is a clear trend from larger labs to smaller hospital labs – decentralization.”

➤ **There is a shortage of lab technicians, especially for jobs involving repetitive tasks.** In addition, repetitive tasks can lead to carpal tunnel syndrome, which reduces the capacity of the technicians labs do have.

➤ **HPV test reimbursement is expected to go down in Europe but hold steady for the near term in the U.S.** A Qiagen official said, “At least in Europe, there is quite some price pressure on HPV genotyping testing, and that pricing is expected to go down. In the U.S. only Digene (which merged with Qiagen) has an HPV test on the market, so there are no competitors and no price pressure.”

➤ **Sample preparation to speed processes remains a focus.**

➤ **Sample management is getting increased attention.** Tecan, for instance, offers completely automated -80°C storage for DNA samples, pharma compounds, and forensic evidence, with an audit trail. A Tecan official said, “There is less degradation of biological samples at -80°C, and biotech and big pharma are buying that with all the clinical studies going on. Big pharma has money and is buying, but we actually sell more of this to biotechs.”

➤ **Process simplification is important.** Andrew Anderson, director of strategic partnerships at Advanced Chemistry Development (ACD/Labs), said, “Integration is a market-wide challenge. Vendors need to reduce the complexity of the user experience for informatics and decision-making applications.” Phil Farrelly, president of Hudson Controls, said, “Customers are looking for vessels smaller than 1 millimeter, more vessels instead of just one large one, using less space and fewer reagents, and reducing costs.”

## NEW TECHNOLOGY AND PRODUCTS

### Innovation highlights

More than 50 new products were introduced at the meeting. Eight companies, described as “highly innovative,” were selected to be on Innovation AveNEW, a specially-designated area on the exhibit floor that highlighted start-ups in the fields of laboratory automation and life sciences. Those companies were:

- **Advanced Liquid Logic**, U.S. – which is developing a digital microfluidic immunoanalyzer. Limited commercial availability is expected to begin in 2Q08. The key advantages are the power and portability. Right now, most other

assays are disposable, single-use assays. The tests are based on printed circuit boards, so, an official said, they can be built “very cheaply.”

- **Amtec GmbH**, Germany – a provider of high precision injection mold products.
- **Bio-Magnetics**, Israel – which developed a Combinatorial Magnetic Separation (CMS) machine.
- **Dynetix AG**, Switzerland – which is developing BR-8 Bright label-free biosensor instruments that are real-time, sensitive, and fast. CEO Max Witte said the markets for this include: research labs, drug discovery, universities, diagnostics, process control, food, and environmental analysis. He indicated the instrument should be ready by mid-2008 at a price of \$60,000-\$80,000, with a chip cost in the range of \$100 for 8 measurements in parallel.
- **LifeTool Limited**, U.K. – which is developing Recap-96, a capper/decapper for microtubes that takes about 30 seconds to cap and decap. An official described it as ergonomic and said it removes the issues of repetitive workplace injuries and ensures no cross-contamination of samples. The cost is expected to be \$29,000 for the manual version and \$38,000 for the automated version. It was launched in mid-2007, and it reportedly is already in use at AstraZeneca, Pfizer, and Genentech.
- **Phoenix S&T**, U.S. – which has 3-D microfluidic devices. These are high performance, injection-molded nanospray devices for mass spectrometry applications in drug discovery, clinical diagnostics, and homeland security.
- **Roylan Developments**, U.K. – a developer of laboratory storage solutions.
- **Spinomix SA**, Switzerland – which has fully automated, miniaturized systems for extraction, manipulation, and detection of biochemical substances. The products combine advanced magnetic nanoparticles-handling technology and microfluidics.

### New product awards

Three companies and products earned the ALA’s New Product Award (NPA) Designation this year:

1. **Formulatrix’s Formulator**, a new liquid handler which uses microfluidic technology to dispense liquids via air pressure into microplates. It can dispense 16 liquid ingredients (or up to 32 if it pauses and the bottles are changed) to well plates (≤384) for protein crystallography research by pharmas, universities, and biotech. A company official admitted that it is a small market but said they are looking to expand use to other markets and even other fields. With the current use, Formulator didn’t require FDA approval. The cost is ~\$90,000. The first two were to be installed soon after the meeting – one in Germany and one in Massachusetts. An industry source called it “amazing technology.”

2. **Viaflo’s Vision Electronic Pipettors**, sleek devices with a consumer electronic technology look. The pipettes have

full-color LCD displays that can be customized with the operator's own photo or a company logo. The user can scroll through volumes much like adjusting an iPod, and there is a tip feature that reduces tip insertion and ejection force. An official said they have an "easier and faster interface." A company official said the cost for a single channel device is \$395, which compares to \$295 for a comparable manual device with fewer capabilities. The company started shipping about a month before the meeting, with the first buyers from academia and the basic research community.

**3. Qiagen's QIASymphony SP.** Konstantin Lutze, project manager for software development at Qiagen, said, "QIASymphony is not just a new instrument but a foundation for a new series for coming years. It is a symbiosis of cutting-edge technology, innovative design, and easy-to-operate software."

The main features/benefits of QIASymphony were described as including:

- Complete inventory scans.
- Full reagent and sample traceability.
- Able to handle blood, tissues, cultured cells, respiratory samples, and more with a volume up to 1 ml.
- Touch screen operations.
- Permits different purification procedures within the same run of 96 samples.
- Modular extensions for complete workflow automation.

Lutze said that automated sample preparation was introduced this year, and next year QIASymphony will add automated assay setup. The assay setup module will allow for easy field upgrade for extended capabilities, independent operation of modules, and a central control unit for all modules. Additional devices also are expected to be announced. Lutze added, "Many companies advertise flexibility...but is that really what users care about? Some talk of 'workable flexibility.' We combine standardization and flexibility in one system."

QIASymphony gives Qiagen the ability to go more into molecular diagnostic labs, but the system is still missing a piece of the puzzle – real-time PCR. A Qiagen official said, "What we are doing now with reagents...is compatible with most widely used real-time PCR platforms...so our customers already have those detection platforms in the lab...Ultimately, the next step is RT-PCR, but that will take some time."

#### Other innovative technology

Technologies from other companies that were highlighted at a session on innovative technology included:

➤ **BioTek's Synergy 4 Multi-Mode Microplate Reader with Hybrid Technology.** This product combines a filter and a multi-mode sensitivity and separation filter with the con-

venience of a monochromatic-based system. A speaker claimed it would be a good research and screening tool. The cost is \$60,000.

➤ **Hudson Control's AutoReact,** an automated mini-bioreactor system for high-throughput cell culturing and fermentation testing in a compact design. A speaker said the advantages include:

- Reduction in personnel time dedicated to bioreactor processing.
- Significant space savings.
- Overnight operation with no human intervention through the entire growth cycle.
- Scalability – which saves development time, effort, and costs.
- Allows users to monitor conditions as well as make on-the-fly feeding and sampling adjustments.
- Modularity, which permits cost-effective entry price points. The speaker did not give the price.

➤ **TTP LabTech's Lab2Lab,** a solution for sending individual microtubes between analytical workstations or laboratories. A speaker said this avoids bottlenecks with instruments; reduces downtime and increases productivity; uses risk-free, tried and true pneumatic technology; and can be used stand-alone or as part of an automation workflow solution. Lab2Lab was being commercially launched at this meeting. The cost is ~\$150,000.

LabTech also had another innovative product that was being launched at LabAutomation 2008: comCHECK, which costs ~\$70,000. It non-invasively measures sample volumes within a tube with an accuracy down to 10 µL. A speaker said there is no need to remove the tube caps, to centrifuge, or to thaw the samples first. He also said comCHECK works with any color or concentration of tube contents and "most" types of microtubes, and it can operate stand-alone or integrated. Right now, the estimated 96-well throughput is five minutes per rack.

➤ **Phoenix S&T's SureSpray AutoNano Mass Spectrometry System.** A speaker said this is a high throughput, automated nanospray with 96 nozzles per chip. He said the company hopes to have a 96-well format by the end of the year. The applications for this are mostly in proteomics. Among the advantages of a nanospray are:

- 10x-100x the sensitivity of conventional mass spec.
- 10,000x-50,000x less sample used.
- Less buffer or sample is thrown away.
- It is 5x-20x faster than the next best spray.
- It is robust and non-clogging. It is this feature which a speaker said distinguishes this product from its competitors.

- **Novelx's mySEM Cartridge**, a compact, affordable scanning electron microscope that is about the size of a laser printer. MySEM costs ~\$100,000 plus ~\$10,000 for each cartridge. A speaker said, "We consider this a disruptive innovation." It basically turns a standard optical microscope into a scanning electron microscope. It utilizes a field-replaceable cartridge that is rated to last 10,000 hours of continuous use with consistent performance. It is not fully available commercially; the first machines were set to ship immediately after the meeting, with another production run scheduled for later this year.

### SPECIFIC COMPANIES

#### BECKMAN COULTER

The company wasn't introducing new products at the meeting so much as updating existing products. Keith Robey, a product manager for Beckman Coulter, explained: "At LabAutomation 2007 we showed:

- Paradigm detection platform, the first user-upgradeable and configurable multi-mode reader.
- A data acquisition and reporting tool, which this year is more user-friendly.
- BioRAPTR FRD, a high speed, high precision, non-contact bulk reagent dispenser (100 nl - 60 µl)."

Robey continued, "In 2008, we tried to take what we had and combine it to create complete solutions...We have the chemistries now to integrate with our robotic platforms...and we now have detectors and analyzers to integrate with that. Now customers can get chemistries, automation platforms, and the analysis all in the same place. And in 2008 we are starting to work more with collaborators to have a bigger and broader picture of applications."

- Cisbio – on Paradigm – for a cartridge that reads HTRF cartridges.
- Industrial (level) robotic solutions. An official said, "We call it an industrial robot...but the industry we are focusing on is pharma...(Pharma wants) stronger, more accurate robots...Our customers don't want failure mid-run...They want it engineered to run 24/7 without that kind of failure. The robots we sold in the past were not really rated for that kind of duty...They required an operator to service them more frequently...and the ones we have now are up to the industry standard – 'industrial.'"
- Fully-automated cell culture applications.

Among the collaborations that Beckman Coulter officials highlighted were:

- Johns Hopkins – on a CRC gene study with Agencourt.
- National Cancer Institute – again with Agencourt.

- NuGen – Beckman Coulter provides the Agencourt RNAClean nucleic acid purification for packaging in NuGen's new WT-Ovation Pico RNA amplification system.
- NuGen+Affymetrix – with Agencourt Bioscience on automation for preparation.
- Cisbio International – Beckman Coulter is the first automation partner for Cisbio.

However, a European lab manager said, "Beckman Coulter is falling behind. It has nothing new this year. Their molecular diagnostics is taking too long. They are saying 2010, but others will be in molecular diagnostics by then, too."

#### CALIPER LIFE SCIENCES

*What makes this company stand out?*

- It launched a used equipment service – a consulting business to help customers purchase existing (pre-owned) equipment. Caliper validates and certifies the equipment before the buyer purchases it.
- Lab-on-a-chip was developed by them, and Agilent and others pay Caliper for that technology.
- Caliper's plate movers were described as the industry standard, and a company official said they have the largest installed base (~75,000).
- In 2005, Caliper bought Novascreen, a CRO that lets them do in-house and outsourced drug technologies.
- In 2005, Caliper also bought Xenogen, which is known for development of the "glow" gene and its IVIS system, which has widespread use in oncology and infectious disease.
- Three years ago the company started its IIH bridge strategic initiative to bridge *in vitro* high throughput assays and make them translational to *in vivo* (preclinical) efficacy studies.
- After the best friend of the company president's young son died of MRSA (methicillin-resistant *Staphylococcus aureus*), Caliper decided to start work on building a model for MRSA. Watch that space.

#### QIAGEN

Qiagen sells more than 500 consumable products as well as instrumentation for those consumables and has more than 400,000 customers. Products launched in the last 12 months now reportedly account for 4%-5% of revenue. Dr. Michael Collasius, vice president of Automated Systems for Qiagen, said, "Automated solutions are key to our strategy. Convenience is increasing in importance, human errors need to be reduced, customers aim to solve problems, and customers need higher efficiency."

Dr. Collasius said Qiagen is focused on four markets: human molecular diagnostics, life science research, pharma, and applied testing. At the meeting, Qiagen launched three new instruments:

➤ **QIAxcel**, for nucleic acid separation via state-of-the-art capillary electrophoresis. Project manager Lutze said, “It is ground breaking. During a 10-minute run of 96 samples, you can virtually watch the screen when the gel image is appearing ...Data are converted to gel image and appear on the screen while you are standing there...And there is comprehensive, digital-result documentation.” Lutze said the system also offers higher performance and better resolution than conventional gel electrophoresis, requires less manual interaction, and is less costly than gel.

However, this actually is mostly a repackaging of EGene’s technology, which Qiagen acquired along with EGene, so it is not really a new product.

Lutze calculated the typical user cost for disposables at \$0.30 per result. And there are cartridges with lower resolution/faster performance and higher resolution/slower performance, giving labs a choice that they can swap out with different samples. Each cartridge can run 200 times, an official estimated.

➤ **EZ1 Advanced**, a low throughput automation system which is a generational improvement on EZ1. Company officials said this is used widely in the forensics market.

➤ **QIASymphony**, which won the New Product Award Designation (*See page 6*).

A European lab manager predicted Qiagen will become a tough competitor for Roche in Europe.

#### THERMO/FISHER SCIENTIFIC

While there were suggestions at Pittcon 2007 that Thermo was having some integration problems with the companies it has purchased, sources at this meeting did not indicate any problems with Thermo service or support. However, they also pointed out that Pittcon is a better place to check on that.

Thermo’s Momentum, laboratory workflow software, was launched at the meeting – and getting some attention – but it will not be available until the end of 1Q08. An official described it as “connecting the full laboratory workflow – processes, people, and services in real time,” adding that there is “lots of flexibility with this software.” The three key things that distinguish it are: open topology, flexible workflows, and plug-in architecture. A pharma scientist said, “We like this.”

