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Trump FY18 Budget Provides Little Certainty

The Trump Administration dropped a bombshell on the outlook for US federal science and research funding when it released last week its first fiscal year budget proposal. Although previewed by the Administration's "skinny budget" released in March, the extent of the cuts was only fully evident in the official FY18 budget release.

Among the proposed cuts: a 21% drop in the budget of the NIH, a 17% decrease for the DoE's Office of Science and a cap on NIH grant indirect costs. The table below is based on the actual FY17 final budget (see ***IBO*** 5/15/17), not

the continuing resolution figures used in the Administration's FY18 budget request documents.

Selected US Federal FY18 Budget Proposal Figures		
	FY18 ($M)*	Chg. vs. FY17 Final
NIH	$26,920	-21.0%
NSF Resarch & Related Activities	$5,362	-11.1%
DOE Office of Science	$4,473	-17.0%
USDA Nat'l Inst. of Food and Ag.**	$1,429	4.6%
NIST Sci. and Tech. Rsch. and Svcs.	$600	-13.0%
EPA Science & Technology	$451	-36.2%

** Source: IBO 5/15/17*
*** Source: FY17 Congressional explanatory report*

The news sent shockwaves throughout the US scientific community and prompted a strong response from scientific organizations. Joanne Carney, director of Government Relations for the American Association for the Advancement of Science (AAAS), told ***IBO,*** "Overall, federal R&D increased by 5% above FY 2016 levels. This serves as a reminder that federal R&D in large part enjoys bipartisan support in the current Congress, and that there is a willingness to maintain their own position and views on budget and policy matters that may not reflect the current administration." But, as she stated, "For FY 2018, one cannot assume that we will see yet another 5% increase and while overall R&D may continue to grow, individual agencies and programs may receive decreases in their funding levels."

Asked about science and research programs that are especially vulnerable to possible FY18 budget cuts, she commented, **"**There are some areas of research that have been more vulnerable; for example, applied research programs. Some policymakers in Congress view applied research programs funded by agencies such as the DOE as an inappropriate role for government spending and believe that industry should fund this area of research."

She highlighted biomedical research as one budget item widely supported by Congress. "Biomedical research funded by the NIH has been one of the few areas of research that has enjoyed strong bipartisan support over the years. Almost every Member of Congress and the public at large recognizes the value of investing in research to improve public health."

The FY18 budget proposal must be approved by Congress, and members of Congress in both parties have indicated that the budget will not pass in its current form. On May 22, *USA Today* quoted Democratic Representative John Yarmuth of Kentucky as saying, "I don't think there's much chance of this budget going anywhere based on how Republicans talked about the skinny budget." Republican Senator Mitch McConnell observed, "We'll be taking into account what the president recommended. They will not be determinative," as reported by the *Wall Street Journal* on May 23.

Specifically, the proposed cuts to biomedical research have drawn criticism from both Republican and Democratic members of Congress. "First of all, a disease like cancer and Alzheimer's don't [sic] make any distinctions on the basis of party or philosophy," said Republican Representative Tom Cole of Oklahoma in *The Hill* on May 23. "And second, I think most people—when they really look at the issue and our subcommittee has spent a lot of time—understand that this is actually a way to save a lot of money longer term. It's the right thing to do, obviously."

A May 24 MedCityNews article quoted Republican Senator Roy Blunt of Missouri as saying "That proposal will not be well received in the Congress. I just don't think you want to argue that we're doing X—almost no matter what X is—as opposed to cancer research or Alzheimer's research."

However, some cuts contained in the FY18 budget proposal are expected to make it into the final budget, according to observers, as Republicans control both houses of Congress. But months of negotiations lay ahead, making it difficult to speculate on the budgets for federal agencies and their programs, let alone science and research funding programs. Congress will introduce its budget proposals in June.

Regarding the prospects for cuts to science and research funding in the final FY18 budget, Howard Garrison, PhD, director of the Office for Public Affairs at the Federation of American Societies for Experimental Biology, told ***IBO***,

"I am not great at projections, but I believe that we can prevent the NIH cuts. I hope that we can do the same for the NSF and USDA."

He specified some programs that are popular in Congress, "Certainly, NIH programs dealing with the diseases of aging (like Alzheimer's) have had strong support. The programs identified in 21st Century Cures are also authorized for increases. These remain possibilities." Under Trump's budget proposal, the 21st Century Cures Act would receive its full allocated amount for FY18 of $496 million, consisting of $300 million for the Cancer Moonshot (see ***IBO*** 12/31/17), $100 million for the All of Us Research Program (previously the Precision Medicines Initiative), $86 million for the BRAIN Initiative and $10 million for Regenerative Medicine.

Although FY18 begins on October 1, it is doubtful that Congress will finalize the budget before then. "It has been almost 20 years since the U.S. Congress passed separate appropriations bills under what is termed 'regular order,'" Ms. Carney told ***IBO***. "For decades, the US has operated under a series of continuing resolutions and omnibus bills to fund the federal government. A truncated schedule will inhibit the ability of Congress to get its work done in a timely manner, so one can expect a continuing resolution to fund the government at FY 2017 levels in our near future." Dr. Garrison agreed, saying, "Congress is unlikely to compete its work by September 30 and the most likely outcome is a continuing resolution."

Among the most controversial proposals affecting research funding contained within the budget is a cap of 10% on indirect costs in each NIH grants. As defined by a 2016 report by the Government Accountability Office (GAO), "Indirect costs represent an organization's general support expenses that cannot be specifically attributed to a specific research project or function." Currently, the percentage is set based on negotiated agreements between each institution and the NIH.

> *"This proposal guts NIH support for these research costs. If enacted, the proposal will literally turn out the lights in labs where universities have no other funding to pay for these essential research infrastructure and operating expenses."*

As Mary Sue Coleman, president of the Association of American Universities, said in a statement to ***IBO***, "You can't conduct cutting edge medical research without high-tech facilities, utilities, hazardous waste disposal, and specialized maintenance and regulatory compliance personnel. This proposal guts NIH support for these research costs. If enacted, the proposal will literally turn out the lights in labs where universities have no other funding to pay for these essential research infrastructure and operating expenses."

According to the GAO report, in FY15, indirect cost reimbursements for the 10,170 NIH-funded grants and cooperative agreements totaled $6.3 million, or 28% of all costs versus 72% for direct costs. For universities, which represented 80% of all such grants, indirect costs accounted for 21% of grant costs. For the DHHS, NIH and Department of Defense, the review "determined that while the three cognizant agencies had designed some controls for setting indirect cost rates, deficiencies in the design of these controls could result in the waste of federal resources."

Testifying before the House Committee on Science, Space and Technology in May, James D. Luther, associate vice president of Finance for Duke University, stated in written testimony, "The federal government contributes over 50% of funding for academic research. These funds include the 'direct costs' of personnel, supplies and equipment, as well as the Facilities and Administrative (F&A) costs that represent critical research infrastructure." Making the case for the interdependence of the categories of funding, he explained, "F&A costs cannot be viewed separately from direct costs; together, they represent the total cost of performing research. If direct costs are thought of as 'gas' for the research engine, F&A reimbursements represent 'oil'—the research engine requires both."

Although NIH enjoys Congressional support, evidenced by the 6.2% increase to its FY17 budget (see ***IBO*** 5/15/17), attention to indirect costs has increased. In a May 17 hearing by the US House Committee on Appropriations on advances in biomedical research, the issue was a focus of discussion with committee members, noting that private foundations' grants allocate a lower percentage for indirect costs compared to the NIH (*ScienceInsider*). NIH Director Francis Collins defended the NIH higher limit noting that it allows universities to accept grants, such as those from private foundations, by covering more indirect costs, and rarely covers all of the indirect costs of doing research. The NSF's indirect costs are now facing similar scrutiny (see Industry Watch).

As Congress begins work on the budget, uncertainty remains regarding US scientific and research funding next

fiscal year despite the budget proposal's release. Such uncertainty spans nearly all scientific agencies and programs, especially as no final funding annoucement is expected by the beginning of the fiscal year in October.

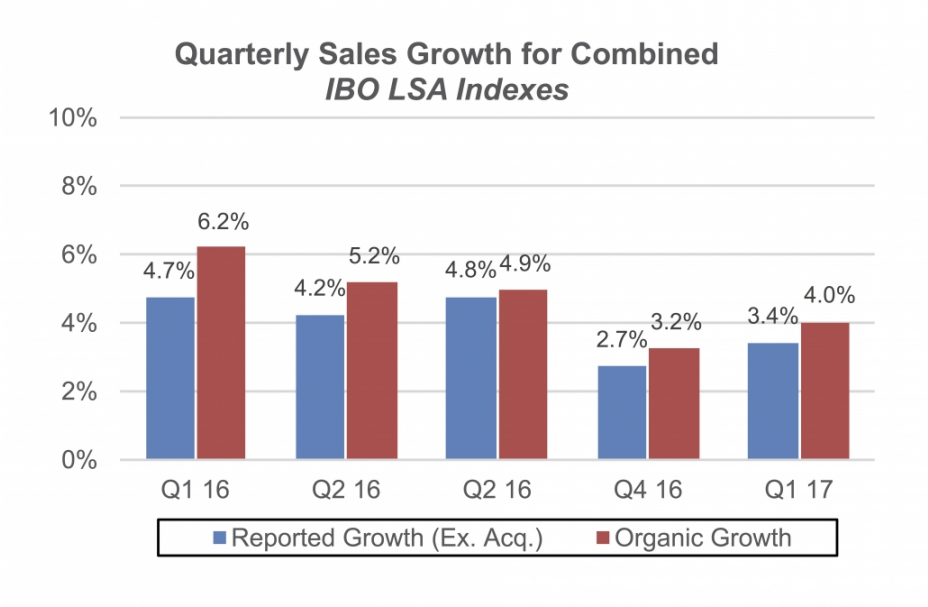
IBO Sales Indexes Off to Strong Start: Industrial Market Lifts First Quarter Growth

With mostly conservative sales outlooks for the first quarter of 2017, many publicly held instrument and lab product companies reported better-than-projected revenue growth. The relatively muted expectations were based on a strong year-over-year comparison, budget uncertainties and fewer selling days for several companies. Nevertheless, demand remained steadfast from biopharmaceutical and applied markets, especially for LC and MS products and services. Sales of life science products, specifically NGS and cell-analysis products, further contributed to growth. In addition, capital spending by industrial customers improved and even excelled for several companies, including Agilent Technologies and Waters. Geographically, demand in China and other Asia Pacific regions remained resilient, and apart from academic and government markets, European sales rallied. Lastly, currency fluctuations resulted in softer-than-expected headwinds for US-based companies.

Combined calendar year first quarter sales for the 22 companies or business units in the ***IBO*** *Life Science and Analytical Instrument Indexes* (*LSA Indexes*) grew 3.4% on a reported basis. Growth accelerated compared to the fourth quarter of 2016 when it improved 2.7%, but was down compared to the first quarter a year ago, when it advanced 4.7%

Organic growth for the *LSA Indexes*, which excludes acquisitions, currency and is based on constant exchange rates for non-US companies when converted into US dollars, advanced 4.0%, compared to 3.2% in the fourth quarter of 2016 and 6.2% in the previous year.

Quarterly estimates were calculated for companies that have not yet reported: Oxford Instruments, Spectris Materials Analysis and Tecan Life Sciences. Further financial reviews of the companies can be found in this issue (see First Quarter Financial Results) and in the May 15 issue (see ***IBO*** 5/15/17) of ***IBO***. All sales figures below are organic.



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Biopharmaceutical Markets

Sales in biopharmaceutical markets for the *LSA Indexes* grew nearly 9%, slightly ahead of the fourth quarter of 2016. Demand was strong for bioproduction, LC, MS and services across most geographies and customer markets. Biopharmaceutical sales were particularly strong for Agilent, Biotage and Bio-Techne, which climbed double digits each. Furthermore, Thermo Fisher Scientific and Waters each recorded 9% biopharmaceutical sales growth. However, Bruker and PerkinElmer sales for this market were less robust, advancing 3% each.

Applied Markets

Like the biopharmaceutical markets, applied sales for the *LSA Indexes* maintained healthy demand, driven by strength in China and other emerging markets due to increased regulatory measures for food and environmental testing. Overall, applied sales for the *LSA Indexes* advanced roughly 6%, including double-digit sales growth for QIAGEN and Waters each.

Applied sales for QIAGEN climbed in the mid-teens due to timing of orders for new human ID forensics products and a weak year-over-year comparison. Biotage and Illumina also recorded strong applied sales growth, which climbed in the high single digits each.

Food sales for the *LSA Indexes* improved nearly 7%, while environmental sales expanded more than 5%. These markets were robust for both Thermo Fisher Analytical Instruments (AI) and Waters. However, sales growth in food markets for Agilent and PerkinElmer decelerated to roughly 4% and 3%, respectively, because of strong comparisons.

Industrial Markets

Industrial markets experienced a notable recovery in capital spending and improved order growth, as sales for the *LSA Indexes* expanded nearly 4%. A majority of this strength was driven by chemical and refining customers and, to a lesser extent, improved demand from mining and materials characterization markets. Aftermarket and service revenues were sturdy for this market, as was demand for lower-cost instrumentation. In addition, industrial order growth improved, including an expanded backlog of high-end systems. Despite the positive momentum in this market, most companies in the *LSA Indexes* maintained cautious outlooks due to persistent challenges in the energy

markets.

Recording the strongest industrial sales growth among companies in the *LSA Index*, Agilent sales in this end-market climbed 10% due to strength in the chemical and refining markets, especially for GC products. Biotage and Waters also experienced steady demand in this market, as their sales grew roughly in the mid-single digits each, while Shimadzu Analytical and Measuring Instruments (AMI) and Thermo Fisher AI also recorded positive sales growth. Conversely, industrial sales for Bruker Scientific Instruments (SI) and PerkinElmer Discovery and Analytical Solutions remained in negative territory, sliding in the low single digits each.

Academic and Government Markets

Academic and government sales for the *LSA Indexes* were modestly higher, similar to the fourth quarter of 2016, due to mixed demand in Europe and the US. Bio-Rad Laboratories Life Science, Bio-Techne, Illumina and Shimadzu AMI reported resilient demand in this market, while sales for QIAGEN and Thermo Fisher improved in the low single digits each. In contrast, academic and government sales contracted for Agilent, Bruker SI, Merck KGaA Life Science, PerkinElmer and Waters.

Geographic Markets

Geographically, *LSA Index* sales in Asia Pacific remained robust, climbing more than 10%, including double-digit growth for Agilent, Biotage, Bio-Techne, Illumina, Thermo Fisher AI and Waters each. Sales in China were particularly strong, advancing roughly 15% for the *LSA Indexes* due to demand for biopharmaceutical, environmental and food testing applications. Several companies in the *LSA Indexes* recorded strong double-digit sales growth in this region, including 58% for Biotage.

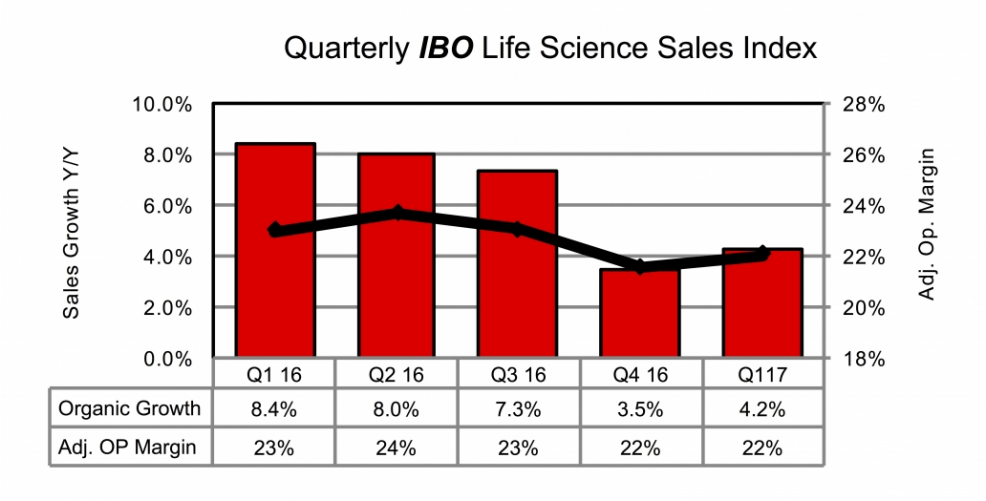
Several companies also experienced strong demand in other Asia Pacific regions such as South Korea and India. Japanese demand was mixed as sales expanded for Agilent and QIAGEN, but declined for Bruker SI, Illumina, PerkinElmer and Waters.

Despite continued weakness in academic and government markets, European sales for the *LSA Indexes* expanded more than 3%, led by biopharmaceutical and applied markets.

Sales in the Americas for the *LSA Indexes* grew nearly 2%, as healthy demand from biopharmaceutical and applied markets were partially offset by tepid academic and government sales. Bio-Rad LS and Bruker SI both recorded softer sales growth in the Americas.

Life Science Index Sales

First quarter ***IBO*** *Life Science Index* sales grew 4.2% organically to $3,441.0 million. This growth represents a steady improvement compared to the 3.5% organic growth in the fourth quarter of 2016, but is half the growth experienced in the previous year (see ***IBO*** 5/31/16). The variance in sales growth compared to the previous year was due to a strong growth comparison in the biopharmaceutical and applied markets as well as fewer selling days for several companies in the first quarter of 2017. Nevertheless, demand in biopharmaceutical and applied markets remained healthy, especially for NGS consumables and sample preparation products, as well as for cell-analysis solutions, bioinformatics and services. *Index* adjusted operating margin contracted 10 basis points to 22.0% as a result of increased investments.



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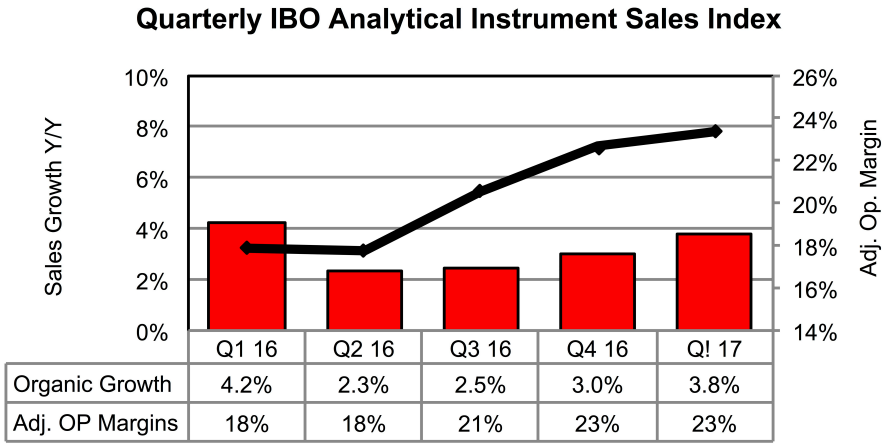
Analytical Instrument Index Sales

First quarter sales for the ***IBO*** *Analytical Instrument Index* grew 3.8% organically to $3,801.7 million. Growth was driven by sales of LC and MS products to biopharmaceutical and applied markets. Outside of energy markets, several companies in the *Index* experienced either improved demand or orders from industrial customers. Meanwhile, academic and government markets remained constrained with the exception of Asia Pacific. *Index* adjusted operating margin soared 550 basis points to 23.4%, driven by product mix, restructuring activity and cost control measures.



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Reported ***IBO*** *Indexes'* sales growth excludes acquisitions and are based on constant exchange rates for international companies when converted into US dollars.

IBO *Life Science Index* businesses: Becton, Dickinson (BD Biosciences); Bio-Rad Laboratories (Life Science); Biotage; Bio-Techne (Biotechnology, Protein Platforms); Fluidigm (Product); Illumina; Merck KGaA (Life Science); NanoString Technologies; Pacific Biosciences (Products, Services); PerkinElmer (Applied Genomics); QIAGEN (Life Sciences); Tecan (Life Sciences); Thermo Fisher Scientific (Life Science Solutions).

IBO *Analytical Instrument Index* businesses: Agilent Technologies (Life Sciences and Applied Markets, Agilent Crosslab); Bruker (Scientific Instruments); HORIBA (Process and Environmental Instruments & Systems, Scientific Instruments & Systems); Oxford Instruments; PerkinElmer (Discovery and Analytical Solutions); Shimadzu

(Analytical and Measuring Instruments); Spectris (Materials Analysis); Thermo Fisher Scientific (Analytical Technologies); Waters.

Techcomp to Change Ownership?

Hong Kong 5/23/17—The controlling shareholder and president of lab instrument distributor and manufacturer Techcomp, Lo Yat Keung, has signed a memorandum of understanding with an independent third-party regarding the possible sale of his 41% share in the company. Techcomp is listed on the Hong Kong Stock Exchange. According to the company's regulatory announcement, the sale might involve a company reorganization or disposal of certain assets. Mr. Keung may not discuss a sale with any other third party for 90 days, and the memo is non-binding.

Techcomp is thinly traded and, with its presence in China, may be an attractive acquisition target. As well as serving as a distributor of analytical instrumentation, Techcomp also manufactures chromatography, atomic spectroscopy and molecular spectroscopy products. Techcomp's sales in China, including Hong Kong and Macau, accounted for 74% of revenues in 2016. That year, company sales grew 6.5% to $183.0 million (see **IBO** *3/31/17).*

Diagnostics Firm Buys OGT

Tokyo, Japan 5/31/17; Skokie, IL 5/31/17—Sysmex, a publicly held, Japan-based provider of clinical laboratory systems and solutions, has agreed to acquire Oxford Gene Technologies (OGT) for an undisclosed amount. OGT will become a wholly owned subsidiary. OGT supplies the Cytocell FISH probes, CytoSure microarray products and SureSeq NGS reagents. In fiscal 2016 (ending September 30, 2016), OGT generated revenues of £19.7 million ($28.1 million = £0.70 = $1) (see ***IBO*** 12/15/16). OGT stated that with the acquisition, Sysmex enters the cytogenetics market, offering FISH and aCGH products. Sysmex commented that the purchase also gives it NGS reagent-development capabilities. Product synergies include the combination of Sysmex's IVD instrumentation business with OGT's assay development for hematology, solid cancer and rare diseases. The deal is expected to close in June.

OGT has increasingly focused on the clinical research and CE-marked IVD markets, strengthening its FISH probes and microarray offerings for cytogenetics. The acquisition builds upon Sysmex's increasing investment in genetic testing for clinical diagnostics, which includes DNA amplification, PCR and cell-free DNA analysis. The purchase will also be the company's entry into the array-based cytogenetics market, where competitors include Agilent Technologies and Thermo Fisher Scientific. For NGS sample preparation for diagnostics, Sysmex is developing the Plasma-Safe-SeqS DNA tagging technology utilizing unique identifiers. Sysmex recorded fiscal 2017 (ending March 31) revenues of ¥249.8 billion ($2.3 billion = ¥108.36 = $1).

Eppendorf Establishes New Subsidiary for Software

Hamburg, Germany 5/16/17—Life science firm Eppendorf has announced a majority investment in software firm Bio-ITech. Eppendorf acquired a majority of shares in March, creating a new subsidiary. According to Bio-ITech's website, the company's mission is "to develop intuitive web-based applications for documenting, organizing and sharing information in laboratories." Last year, the companies jointly exhibited Bio-ITech's ELN solution at Analytica.

The investment gives Eppendorf additional software expertise and web-based capabilities, which can be integrated with its range of lab equipment and instruments. Based in the Netherlands, Bio-ITech offers the eLABJournal ELN and LIMS, as well as eLABInventory Sample Management lab inventory system. The company also provides services such as data migration and training.

Hitachi Takes Stake in Automated Genetics Company

Tokyo, Japan 5/15/17; Tokyo, Japan 5/15/17—Hitachi High-Technologies (HHT) and Precision System Science (PSS) have announced a business alliance to develop and distribute automated genetic analysis systems and reagents, including systems for PCR and nucleic acid extraction. HHT will also make an equity investment in PSS via a new stock offering, giving it a 10% holding in the company. Under the agreement, PSS will provide systems and reagents to HHT, which will assist in the products' distribution, sales and production among other types of assistance. The companies will also codevelop a mid-size genetic diagnosis system. Reagents for this system will be developed by PSS and a third party, and distributed by HHT.

The deal gives PSS a large partner with additional resources, while HHT gains additional gene-based analysis expertise and products. PSS is primarily an OEM company. Among its research market partners are QIAGEN, Roche and Thermo Fisher Scientific. Its clinical partners include Abbott and Elitech. For the six months ending December 31, 2016, company sales declined 17.4% to ¥1,938 million ($17.8 million = ¥108.76 = $1) (see **IBO** *3/31/17*). (*For PSS's fiscal third quarter sales, see Bottom Line.)*

Lonza Invests in Exosomes

Basel, Switzerland 5/16/17—Biopharmaceutical development and manufacturing firm Lonza has purchased Estonia-based HansaBioMed Life Sciences (HBM-LS), a provider of R&D, manufacturing and distribution of products for the exosome research market. HBM-LS has six employees. Financial details were not disclosed. "Exosomes represent a dynamically growing segment in life sciences with opportunities in research, diagnostics and therapeutic applications," commented Dr. Uwe Gottschalk, chief technology officer at Lonza Pharma&Biotech. "Exosomes may play an important role in the promising field of liquid biopsies and could become the next generation of cell-free therapies in regenerative medicine." Lonza stated it will continue to expand HBM-LS's portfolio of research products and development of cGMP-compliant exome manufacturing processes. Lonza also announced a strategic investment in Italian firm Exosomics Siena, which is developing early-stage cancer screening and molecular diagnostic tests based on exosomes.

The acquisition marks Lonza's commitment to the exosomes market, which it is positioned to access from research through development and manufacturing. Describing exosomes, Behzad Mahdavi, PhD, VP of Strategic Innovation & Alliances at Lonza Walkersville, told ***IBO****, "Exosomes are nano-vesicles containing genetic material. They are secreted by almost every cell type and are responsible for cell-to-cell communication as well as modulating cellular immunity. Exosomes are considered to have potential as therapeutic agents, vehicles for drug delivery, diagnostic biomarkers and active agents in consumer care products, making them compatible with current Lonza markets." A particular focus for Lonza will be exosome production. "As exosomes are released by cells, they are produced during the cell culture process. With Lonza's capabilities in large-scale cell culture manufacturing, we are well suited to develop the processes needed for commercial-scale production for exosome applications. The HBM-LS expertise is complementary to Lonza's capabilities and together we look forward to growing and developing the exosome-based applications."*

Asked about Lonza's plan to translate this investment in R&D tools for exosome research into business opportunities for exosome therapeutics and diagnostic manufacturing, Dr. Mahdavi told ***IBO****, "This is our long-term goal and was the main reason for this strategic acquisition of HBM-LS. The acquisition of HBM-LS provides Lonza with a knowledgeable team with solid expertise and experience in exosomes that will support our efforts to enter a new, exciting field."*

Dr. Mahdavi stated that most of HBM-LS's products are self-manufactured and that Lonza that will slowly integrate the business over time, commenting, "It is important to keep the dynamic and entrepreneurship of the team, and support and leverage them gradually with Lonza capabilities and expertise."

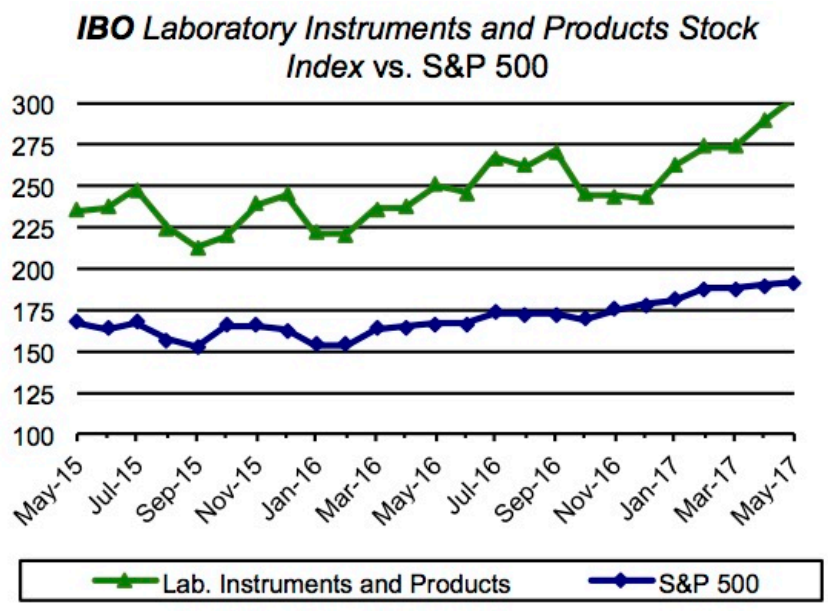
Physicochemical Measurement Tool Providers Join Forces

Billerica, MA 5/25/17—US-based Pion, which provides analytical instruments for drug development, has acquired UK-based Sirius Analytical Instruments, which supplies testing instrumentation to the pharmaceutical industry. Financial details were not disclosed. "The combination of these two companies, with such deep roots in the drug development process, will have immediate impact across the industry," commented Pion President Mike Kelly. "With a strategy of innovation and support, Pion firmly establishes themselves as the instrumentation leader for physical chemical property measurement."

The combined company will have approximately 50 employees, according to a Pion spokesperson. She told **IBO** *that no final decision has been made yet about whether Sirius Analytical products will be rebranded. Both companies provide solutions for drug formulation testing and development. Pion offers solutions for measuring dissolution, solubility, permeability, ionization and absorption. Similarly, Sirius Analytical offers products for determining solubility, dissolution and absorption, and also provides systems for particle-size measurement and injection testing. Both companies offer testing services as well.*

IBO Indexes Maintain Strength

Despite news of an independent counsel to investigate the Trump Administration's ties to Russia and the US Federal Reserve's plan to reduce its securities holding this year, US equity markets ended the month in positive territory. Other economic data suggests second quarter US GDP is expected to miss projections following flat capital goods orders, weak exports and slow business investments. Nevertheless, equity prices maintained their upward trajectory, as the Dow Jones Industrial Average, S&P 500 and NASDAQ expanded 0.3%, 1.2% and 2.5% for the month, respectively. Year to date, the Dow, S&P 500 and NASDAQ are up 6.3%, 7.7% and 15.1%, respectively.



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Laboratory Instruments and Products Stock Index

This month, the *Index* advanced 4.7% to 303.30 and is up 24.8% for the year. Most companies in the Index finished in positive territory, led by **VWR**, which jumped 17.0% due to the proposed acquisition by **Avantor** (see ***IBO***

5/15/17). **VWR** also beat first quarter adjusted EPS on May 5 due to productivity gains and sturdier industrial sales.

Similarly, **Agilent Technologies**, **Mettler-Toledo** and **MTS Systems** each topped quarterly EPS estimates due to improved industrial sales and expanded margins. Furthermore, all three companies posted strong double-digit adjusted EPS growth, which climbed 32%, 36% and 148%, respectively. Earnings growth for **MTS Systems** benefited from a large project in the Test segment as well as acquisitions. On May 8, the company maintained its fiscal 2017 GAAP EPS of $0.80–$1.20, yet shares jumped 11.6% for the month.

Agilent and **Mettler-Toledo**, which climbed 9.6% and 13.5%, respectively, both raised their outlooks on May 4 and May 22, respectively. **Agilent** lifted its fiscal 2017 adjusted EPS guidance by $0.05 to $2.13–$2.18. **Mettler-Toledo** increased its 2017 adjusted EPS guidance from $16.55–$16.75 to $16.95–$17.15, including second quarter adjusted EPS of $3.85–$3.90.

Bruker also climbed double digits for the month, expanding 11.6%. On May 3, the company reported first quarter adjusted EPS in line with expectations; however, sales beat consensus due to healthy demand for NMR, aftermarket products and services (see First Quarter Results). The company maintained its 2017 adjusted EPS outlook of $1.05-–$1.09. Also, on May 12, the company announced a new two-year $225 million share repurchase agreement.

A number of other companies benefited from stronger-than-expected financial results and elevated earnings projections. On May 2, **Luminex** beat first quarter adjusted EPS expectations due to product mix, cost containment and healthy sales volume. The company raised its 2017 sales outlook by $5 million to $300–$310 million for growth of 11%–14%.

Bio-Techne, which advanced 4.7% for the month, reported fiscal third adjusted EPS ahead of consensus on May 2 due to robust instrument sales. The company projected mid-single digits organic growth for the fiscal fourth quarter.

Despite increased investments, **PerkinElmer** beat first quarter adjusted EPS on May 4 due to expanded Diagnostics margins. The company raised its 2017 adjusted EPS range from $2.75–$2.85 to $2.80–$2.90. Shares climbed 6.1% for the month.

Bio-Rad Laboratories easily topped first quarter adjusted EPS expectations on May 4 due to operation improvements, leading share up 2.4% for the month. **NanoString Technologies**, which increased 4.9% for the month, met first quarter adjusted EPS consensus on May 4 but topped revenue consensus. The company reaffirmed its 2017 GAAP EPS loss of $2.51–$2.69.

Becton, Dickinson also beat earnings expectations on May 2 due to cost synergies, sturdy sales growth and product mix. The company reaffirmed its fiscal 2017 adjusted EPS guidance of $9.35–$9.45. However, on May 12, the company completed a $4.95 billion equity offering, including $2.25 billion of common stock, $2.25 billion of depositary shares and an additional $450 million in overallotment. As such, on May 23, Moody's Investors Service placed the company new euro senior unsecured note offering under review for a downgrade. Shares still improved 1.2%.

Not all companies in the *Index* benefited from earnings results. **Pacific Biosciences**, which recorded a wider-than-expected loss at the end of the previous month (see ***IBO*** 4/30/17), fell 16.2% in May.

Fluidigm, which contracted 8.3% for the month, reported weak genomics instrument sales on May 4. Nevertheless, first quarter adjusted EPS sailed past expectations due to cost containment and restructuring measures. The company projected second quarter sales of $22–$24 million.

In new ratings, Janney Montgomery Scott upgraded **Waters** on May 1 from "Neutral" to "Buy," and raised its price target from $185 to $200.

Company	Date Rep.	Fiscal Quarter	2017 Adj. EPS	Analyst Consensus	Vs. Estimate	YOY Growth	2016 Adj. EPS
Laboratory Instruments and Products Stock Index							
A	22-May	Q2	$0.58	$0.48	$0.10	32%	$0.44
BDX	2-May	Q2	$2.30	$2.23	$0.07	6%	$2.18
BIO	4-May	Q1	$0.41	$0.27	$0.14	-2%	$0.42
BRKR	3-May	Q1	$0.19	$0.19	$0.00	-10%	$0.21
FLDM	4-May	Q1	($0.41)	($0.64)	$0.23	23%	($0.53)
LMNX	2-May	Q1	$0.27	$0.08	$0.19	0%	$0.27
MTD	4-May	Q1	$3.34	$3.08	$0.26	36%	$2.46
MTSC	8-May	Q2	$0.67	$0.48	$0.19	148%	$0.27
NSTG	4-May	Q1	($0.87)	($0.87)	$0.00	-18%	($0.74)
PKI	4-May	Q1	$0.55	$0.54	$0.01	-2%	$0.56
TECH	2-May	3Q	$0.89	$0.87	$0.02	-8%	$0.97
VWR	5-May	Q1	$0.44	$0.41	$0.03	10%	$0.40
Diversified Laboratory Stock Index							
AME	2-May	Q1	$0.60	$0.57	$0.03	5%	$0.57
TDY	4-May	Q1	$1.26	$0.75	$0.51	15%	$1.10
XYL	2-May	Q1	$0.39	$0.39	$0.00	11%	$0.35

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Diversified Instrumentation Stock Index

The *Index* improved 1.9% in May to 236.58, and is up 15.1% year to date. All companies in the *Index* traded higher for the month, except for **Teledyne Technologies**, which slipped 2.5%. However, the company beat first quarter adjusted EPS on May 4, and raised its 2017 adjusted EPS guidance from $5.40–$5.50 to $5.76–$5.86.

Conversely, **AMETEK** recorded the strongest price gain for the month among *Index* companies, gaining 6.7%. On May 2, the company posted first quarter adjusted EPS ahead of consensus due to positive organic growth and operational improvements. **AMETEK** raised its 2017 adjusted EPS from $2.34–$2.46 to $2.40–$2.48.

Xylem, which advanced 1.4% for the month, reported in line first quarter adjusted EPS on May 2. However, the company raised its 2017 adjusted EPS range from $2.20–$2.35 to $2.23–$2.38. Barclays PLC upgraded **Xylem** on May 15 from “Equal Weight” to “Overweight.”

International

Asia Pacific equity markets traded mostly higher, led by the South Korea’s Kospi and Hong Kong’s Hang Seng, which advanced 6.4% and 4.2%, respectively. In addition, Japan’s Nikkei 225 expanded 2.4%. Conversely, Australia’s All Ordinaries declined 3.1%.

Malaysia’s KLCI and Singapore’s STI indexes fell 2.8% and 1.7%, respectively.

Prices for the Pacific Rim companies in the ***IBO*** Stock Table all traded higher in May, except for **JEOL**, which slipped 0.2%. The company reported on May 12 that EPS for the fiscal year ending March 31 slumped 85% to ¥6.17 ($0.06) due to lower sales volume.

Techcomp recorded the strongest gain for the month, as shares soared 51.1% following news of a potential takeover (see Executive Briefing). **Precision System Science** (**PSS**) also posted a significant gain, climbing 42.7% as the company announced on May 15 a capital and business alliance with **Hitachi High-Technologies** (see Executive Briefing). However, on May 31, **PPS** reported that fiscal third quarter EPS declined 5% to ¥8.11 ($0.07).

On May 10, **GL Sciences** reported strong fiscal 2017 earnings growth, which jumped 70% to ¥125.52 ($1.13).

HORIBA, which climbed 4.0% for the month, reported on May 12 that first quarter EPS climbed 19% to ¥89.69 ($0.79). In addition, the company raised its projected 2017 EPS by 5% to ¥322.66 ($2.85) due to improved economic conditions in Japan and abroad.

On May 11, **Shimadzu** reported that net income for the fiscal fourth quarter climbed 23% to ¥10.6 billion ($93.7 million). The company projected fiscal 2018 net income to increase 2% to ¥27.0 billion ($236.8 million). Shares rose 13.5% for the month.

All major European Indexes traded higher in May, led by the UK's FTSE 100 and Switzerland's SMI, which scaled 4.4% and 2.3%, respectively.

Prices for UK-based companies in the ***IBO*** Stock Table were mixed this month.

Abcam and **Oxford Instrument** had the strongest returns for the month, advancing 14.2% and 11.2%, respectively, while **Spectris** fell 5.3%.

Prices for other European companies in the ***IBO*** Stock Table all traded high apart from **Merck KGaA**, which slipped 0.3%. On May 18, the company reported that first quarter adjusted EPS climbed 17% to €1.80 ($1.91) due to improved organic growth and stronger margins. However, fiscal 2017 adjusted EPS are projected to be €6.15–€6.50 ($6.54–$6.91) for a decline of 1% to growth of 5%. **Biotage** recorded the strongest gain for the month, climbing 17.3%.

Company: Exchange	Market Value (US M)	52 Week Range Low ($)	High ($)	Price 5/31/17	Change 1 Month	Change YTD	P/E (ttm)	EPS (ttm)
Laboratory Instruments and Products								
Agilent Technologies: n	$19,611	41.98	60.48	$60.34	9.6%	32.4%	34	1.78
Becton, Dickinson and Company: n	$41,227	161.29	188.48	$189.23	1.2%	14.3%	31	6.02
Bio-Rad Laboratories: n	$6,685	135.94	224.24	$223.48	2.4%	22.6%	238	0.94
Bio-Techne: o	$4,202	95.68	117.42	$112.08	4.7%	9.0%	60	1.86
Bruker: o	$4,367	19.59	27.85	$27.21	11.6%	28.5%	29	0.94
Enzo Biochem: n	$417	4.88	9.68	$9.00	2.3%	29.7%	13	0.68
Fluidigm: o	$132	4.31	11.05	$4.53	-8.3%	-37.8%	NM	-2.52
Harvard Bioscience: o	$80	2.25	3.90	$2.30	-4.2%	-24.6%	NM	-0.14
Illumina: o	$26,072	119.37	189.48	$177.36	-4.1%	38.5%	36	4.99
Kewaunee Scientific: o	$63	16.38	27.60	$22.95	-1.3%	-6.1%	14	1.65
Luminex: o	$871	17.64	23.75	$20.26	7.6%	0.1%	63	0.32
Mettler-Toledo: n	$15,495	343.61	582.20	$582.81	13.5%	39.2%	38	15.30
MTS Systems: o	$991	41.53	59.00	$51.85	11.6%	-8.6%	44	1.18
NanoString Technologies: o	$396	11.89	23.45	$18.34	4.9%	-17.8%	NM	-2.47
Pacific Biosciences: o	$307	3.46	10.40	$3.30	-16.2%	-13.2%	NM	-0.86
PerkinElmer: n	$6,949	45.35	63.03	$63.06	6.1%	20.9%	31	2.04
QIAGEN: o	$7,883	20.73	33.06	$33.56	11.5%	19.8%	96	0.35
Thermo Fisher Scientific: n	$68,097	139.07	173.64	$172.79	4.5%	22.5%	31	5.49
VWR: o	$4,364	24.42	37.25	$33.06	17.0%	32.1%	30	1.12
Waters: n	$14,508	131.35	179.07	$179.62	5.7%	33.7%	27	6.57
Diversified Laboratory								
AMETEK: n	$14,096	43.28	61.37	$61.02	6.7%	25.6%	27	2.22
Corning:	$27,238	18.88	29.72	$29.10	0.9%	19.9%	8	3.66
Danaher: n	$59,942	73.42	88.01	$84.94	1.9%	9.1%	26	3.28
Honeywell	$101,485	105.25	135.00	$132.99	1.4%	14.8%	21	6.35
Illinois Tool Works: n	$49,286	98.32	142.82	$141.22	2.3%	15.3%	24	5.80
Roper Technologies: n	$23,419	159.28	228.21	$227.20	3.9%	24.1%	35	6.48
Teledyne Technologies: n	$4,748	92.52	137.00	$131.51	-2.5%	6.9%	26	5.10
Xylem: n	$9,422	42.52	54.99	$52.14	1.4%	5.3%	38	1.39
Laboratory Instruments and Products				**303.30**	**4.7%**	**24.8%**	**51**	
Diversified Laboratory				**236.58**	**1.9%**	**15.1%**	**26**	
Dow Jones Industrial Average				21,008.65	0.3%	6.3%		
S&P 500				2,411.80	1.2%	7.7%		
NASDAQ Composite				6,198.52	2.5%	15.1%		
Region Company	Market Value (Local M)	52 Week Range Low (L)	High (L)	Price 5/31/17	Change 1 Month	Change YTD	P/E (ttm)	EPS (ttm)
Pacific Shares								
GL Sciences: t	¥16,304	557	1,494	¥1,457	24.5%	64.6%	12	¥117.63
Hitachi High-Technologies: t	¥606,050	2,654	5,040	¥4,400	2.4%	-6.7%	15	¥292.08
HORIBA: t	¥288,372	4,280	7,080	¥6,780	4.0%	25.3%	22	¥306.38
JEOL: t	¥54,735	350	610	¥554	-0.2%	8.6%	NM	-¥3.17
Precision System Science: os	¥11,167	290	638	¥538	42.7%	32.2%	NM	-¥71.88
Shimadzu: t	¥634,182	1,344	2,191	¥2,142	13.5%	15.0%	26	¥81.10
Techcomp: hk	HKD 557	1.07	3.21	HKD 2.01	51.1%	55.8%	70	$0.00
European Shares (London)								
Abcam: l	£1,995	6.19	9.89	£9.79	14.2%	27.6%	49	£0.20
Halma: l	£4,345	8.54	11.58	£11.46	8.8%	27.7%	39	£0.29
Horizon Discovery: l	£192	1.04	2.22	£2.02	-2.4%	40.3%	NM	-£0.10
Oxford Instruments: l	£632	6.10	11.39	£11.03	11.4%	50.7%	114	£0.10
Scientific Digital Imaging: l	£23	0.09	0.34	£0.26	-1.9%	39.2%	15	£0.02
Spectris: l	£3,114	16.04	28.69	£26.13	-5.3%	13.0%	304	£0.09
European Shares (Other)								
Biotage: st	SEK 3,834	27.40	60.00	SEK 59.25	17.3%	29.1%	36	SEK 1.63
Datacolor: s	CHF 128	538.00	775.00	CHF 775.00	10.7%	19.2%	19	CHF 41.39
Merck KGaA: g	€ 13,887	78.28	108.70	€ 107.45	-0.3%	8.4%	30	€ 3.59
Sartorius: g	€ 6,487	59.00	86.93	€ 86.63	5.8%	19.0%	55	€ 1.58
Tecan: s	CHF 2,062	135.50	183.90	CHF 183.10	7.8%	15.2%	39	CHF 4.66

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First Quarter Financial Results: Agilent, BD Biosciences, Bio-Rad, Biotage, Bruker

CY Q1 2017 Results								
	Revenues			Rev. Growth Summary			Adj. Operating Profit	
Company	Rev. (M)	% of Co. Rev.	Growth	Curr.	Acq./Div.	Org. Growth	(M)	% Growth
Agilent Technologies	$1,067.0	100%	3.8%	-1%	0%	5%	223.0	8.8%
Becton, Dickinson (BD Biosciences)	$269.0	9%	-2.8%	-1%	0%	-2%	NA	NA
Bio-Rad Laboratories (Life Science)	$174.3	35%	5.1%	-1%	1%	5%	NA	NA
Biotage	SEK 185.2	100%	16.6%	4%	0%	13%	SEK 112.8	24.4%
Bio-Techne	$144.0	100%	10.0%	-2%	8%	4%	$49.8	-6.3%
Bruker (Scientific Instruments)	$346.4	93%	-1.1%	-2%	2%	-1%	$47.6	2.7%

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Agilent Gets Unexpected Chemical and Energy Boost

Agilent Technologies reported strong fiscal second quarter financial results, as sales advanced 8.1%, 8.7% organically, to $1.10 billion (see Bottom Line). Acquisitions, net of divestments, added 0.3% to revenue growth, while currency headwinds reduced growth by 0.9%. The stronger-than-expected quarter was driven by increased capital expenditure by chemical and energy customers, as well as continued strength in biopharmaceutical and China markets.

All sales figures below are based on organic growth. Chemical and energy sales climbed 14%, despite continued weakness in exploration. The company noted strong demand from chemical and refining customers, with strength across all geographic regions and product categories. Demand also improved from materials characterization and mining customers.

Agilent Technologies Q2 FY17				
	Rev. ($M)	% of Rev.	Growth	Org. Growth
Life Sciences and Applied Markets	$540	51%	2.7%	4%
Diagnostics and Genomics	$164	15%	3.8%	4%
Agilent CrossLab	$363	34%	5.5%	7%

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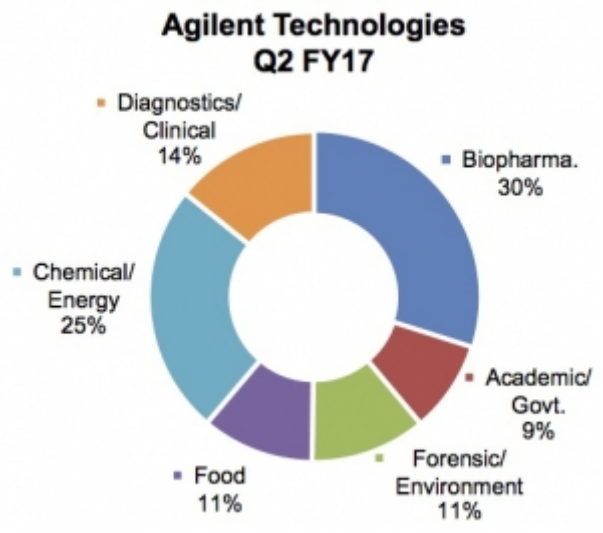
Biopharmaceutical sales advanced 12% despite a strong comparison, driven by new products, technology upgrades and particular strength in the nucleic acid contract manufacturing business.

Environmental and forensics revenue expanded 7%, as softness in the forensics market was more than offset by healthy environmental sales. Following 25% growth in the previous year, sales growth for the food business decelerated to 1%. Academic and government sales remained challenged, sliding 2%.

By segment, Life Sciences and Applied Markets Group (LSAG) sales advanced 6%, led by sustained demand for chromatography, MS, spectroscopy and cell analysis products. GC sales were also healthy, climbing in the high single digits, driven by demand for the 7890 product line due to strength in the chemical and energy, and environmental markets.

CrossLab Group sales advanced 10%, led by increased spending by chemical and refining customers, as well as strong revenue growth from contract services and consumables.

Diagnostics and Genomics Group (DGG) sales jumped 13%, including strong demand for pathology, companion diagnostics and nucleic acid solutions, especially in China and Japan.



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Agilent sales grew 10% in Europe to make up 27% of revenues. With the exception of academic and government sales, demand in this region was healthy across all other customer end-markets. Accounting for 39% of revenues, sales in Asia Pacific advanced 10%, including 11% in Japan. Sales in China, which advanced 7%, expanded at a slightly lower pace due to a particularly strong comparison. Sales in the Americas improved 6% to make up 34% of revenues.

Adjusted gross margin expanded 140 basis points to 56.0%. Adjusted operating margin advanced 270 basis points to 21.8% due to cost control measures and previous restructuring. Despite the strong quarter, Agilent increased its fiscal 2017 organic sales growth outlook by a conservative 50 basis points to 5.0%. On a reported basis, fiscal full-year sales are expected to grow 4.0% to $4.36–$4.38 billion. Third quarter sales are projected to grow 2.5%, 4.0% organically, to $1.06–$1.08 billion.

Timing Impairs BD Biosciences Growth

Fiscal second quarter revenue for Becton, Dickinson's BD Biosciences unit declined 2.8%, 1.8% excluding currency, to $269 million to make up 9% of company revenues. Segment sales were negatively impacted by timing of instrument orders in Asia and Europe. Supply issues caused by damaged inventory for certain research reagents further hampered segment sales growth and operating margins. The bottom line was also impacted, as the company recorded a write-off of the affected inventory. Excluding the supply shortages, BD Biosciences sales would have declined less than 1%.

BD Biosciences sales in the US were flat, as strength in the Advanced Bioprocessing business was offset by the reagent fulfillment issues. International segment sales contracted due to timing of instrumentation orders and, to a lesser extent, lower sales in the clinical HIV business in Africa.

PCR Drives Bio-Rad LS Sales

First quarter sales for Bio-Rad Laboratories' Life Science segment (LS) advanced 5.1% on both a reported and organic basis to $174.3 million, accounting for 35% of revenues. The acquisition of RainDance (see ***IBO*** 1/31/17) added 1.2% to sales growth but was offset by currency headwinds.

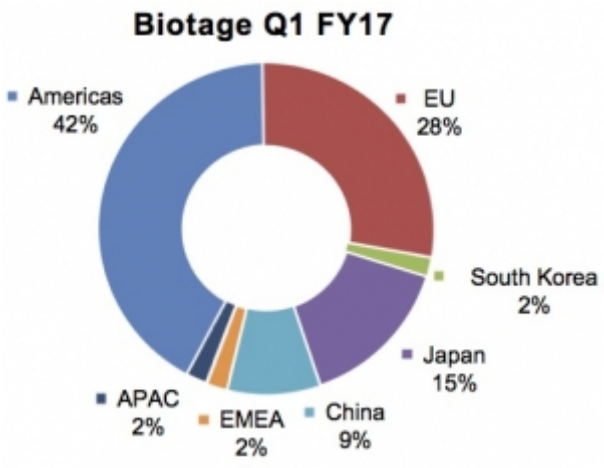
The company reported strong quarterly demand for Droplet Digital PCR and PCR food testing products, as well as a positive uptake for the new western blotting imager. Higher sales of amplification and cell biology products further contributed to revenue growth, but were partially offset by lower demand for process media products.

Geographically, LS sales were strongest in Europe, China and other Asia Pacific regions outside of Japan. North American sales declined due to lower process media revenues, which were particularly strong in the previous year.

For 2017, total Bio-Rad sales are projected to grow 4% excluding currency. RainDance is projected to add $18–$20 million to annual sales but reduce operating income by $7–$10 million. The company expects the acquisition to be accretive within the first 18–24 months.

Biotage Achieves Record Results

Following several quarters of strategic investments to expand its direct sales presence, Biotage delivered record quarterly sales and operating profit. For the first quarter, sales climbed 16.6%, 12.9% excluding currency, to SEK 185.2 million ($20.8 million at SEK 8.92 = $1).



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Sales for all major product areas grew more than 10%, including particular strength for Organic Chemistry products. Driven by robust demand in the biopharmaceutical markets, peptide system sales soared more than 100%. In addition, evaporation system sales climbed more than 50% due to continued demand for the V-10 Touch and Isolera systems. Isolera system sales were particularly strong in China. Overall, system and aftermarket products sales accounted for 47% and 53% of revenues, compared to 44% and 56% in the previous year, respectively.

Geographically, sales were robust in China, climbing 58%. Furthermore, as the company expanded its direct sales presence in South Korea, sales for this region jumped more than 150% to account for 2% of revenues. Revenues in all countries represented by a direct sales force grew more than 10%.

Gross margin expanded 380 basis points to 60.9% due to improved efficiency, stronger sales volume and favorable exchange rates. As such, operating margin climbed 440 basis points to 18.9%.

Instrumentation Sales Propel Bio-Techne Growth

For the fiscal third quarter, Bio-Techne's life science research–related sales (Biotechnology and Protein Platforms segments) grew 16.8%, 9% organically, to account for 82% of revenues. Acquisitions contributed 10% to sales growth, while currency negatively impacted revenue growth by 2%. Growth benefited from strong instrument placements, as well as healthy antibody and assay product sales.

Bio-Techne Q3 FY17				
	Rev. (M)	% of Rev.	Rev. Growth	Org. Growth
Biotechnology	$94.5	66%	16%	6%
Protein Platforms	$23.6	16%	20%	20%
Diagnostics	$26.0	18%	-13%	-13%

Click to enlarge

Biotechnology segment sales advanced 6% organically. This growth was driven by double-digits sales growth for Novus Biologicals antibodies, as well as healthy sales of Luminex products and royalties. Sales for the acquired Advanced Cell Diagnostics business (see ***IBO*** 7/15/16) jumped nearly 60% on a standalone basis. However, adjusted operating margin for the segment contracted more than seven-and-half percentage points to 47.9% due to acquisitions.

Bio-Techne's Protein Platforms segment expanded 20% organically, led by double-digits sales growth for its new imaging capillary electrophoresis platform. Sales for its legacy imaging platforms were roughly flat. Demand for the SimplePlex ELISA system was particularly strong, as sales soared more than 75%. Simple Western sales also contributed to growth, led by record Wes shipments. Adjusted operating margin for the segment jumped nearly six percentage points to 13.8% due to increased sales volume.

Geographically, life science research–related sales grew more than 20% in Europe, including robust demand from smaller biotechnology firms and high single digit sales growth in academic markets. Sales in China grew in the low teens, as strong demand for Western products was partially offset by lower PrimeGene sales because of regulatory amendments. In other Asian regions, Japanese sales grew for the first time in several years, and sales in South Korea climbed double digits, driven by sturdy reagent and instrumentation revenues. US sales grew in the low single digits, slightly below company expectations. The company maintained its fiscal 2017 organic sales growth outlook of roughly 6% or slightly higher.

System Sales Down for Bruker

Sales for Bruker's Scientific Instruments (BSI) segment slipped 1.1%, down 1.2% organically, to $346.4 million to account for 90% of revenues. Acquisitions added 1.9% to sales growth but was mostly offset by currency headwinds of 1.8%. Sales growth was negatively impacted by a strong year-over-year comparison, which included delivery of a 1GHz magnet NMR system and large Detection order in the previous year. Furthermore, instrumentation sales were hampered by weak European academic bookings in 2016. Overall, system revenues declined roughly 5% organically, while aftermarket sales climbed 9% organically to account for 71% and 29% of BSI revenues, respectively.

Bruker Q1 FY17

	Rev. ($M)	% of Rev.	Rev. Growth	Currency	Acq./Div.	Org. Growth
Bruker Scientific Instruments	$346.4	93%	-1.1%	-1.8%	1.9%	-1.2%

Click to enlarge

Bruker BioSpin sales increased in the low single digits organically despite the 1GHz NMR delivery in the previous year. NMR demand remained healthy, including strength in China from academic and industrial customers. In addition, sales for the aftermarket and services business, LabScape, grew in the high single digits. This growth was partially offset by lower Preclinical Imaging sales.

Bruker Nano sales grew approximately in the mid-single digits organically, led by strong demand for automated AFM products within the semiconductor metrology tools business. Bruker AXS sales also improved following weak demand in the previous year. The acquisition of Hysitron (see ***IBO*** 1/31/17), which offers nanomechanical test instruments, boosted sales growth for the Nano Surfaces business.

Bruker CALID sales contracted in the high single digits organically, as Detection sales dropped sharply due to the timing of orders in the previous year. Furthermore, Daltonics MS sales were negatively impacted by lower European academic bookings in 2016.

BSI adjusted operating margin improved around 50 basis points to 13.7% due to cost control and restructuring measures within the CALID and Nano Groups, as well as product mix and favorable NMR pricing.

BSI sales in Europe declined in the high single digits organically; however, orders for the region increased for the second consecutive quarter. Japanese sales were also challenged. In contrast, sales in Asia Pacific grew close to double digits, including particular strength in China from academic and industrial markets. North America organic sales were modestly higher. Bruker reiterated its 2017 organic sales growth outlook of 1%–2%. However, the

company raised its reported sales growth range from 1.5%–2.5% to 2.0%–3.5% to account for favorable currency fluctuations.

Lab-scale Cell-culture Chemistry Analyzers

Technology and Applications

Cell-culture chemistry analyzers, also known as biochemistry analyzers, are dedicated instruments used for monitoring, measuring and testing the chemical composition (nutrients, metabolites and electrolytes) and various other parameters of a cell-culture process, including osmolarity, cell viability, cell density, cell diameter, temperature, pH, gaseous exchange and other characteristics of biological samples. These instruments are commonly used for conducting quantitative assessments of mammalian cell culture and microbial fermentation processes.

The common chemical constituents that most biochemistry analyzers test for include glucose, lactate, acetate, glutamine, glutamate, ammonium, sodium, potassium, glycerol, iron, magnesium and calcium. Additionally, these analyzers also assess IgG antibodies or total protein, as well as the presence of dissolved or saturated gases such as oxygen, carbon dioxide and bicarbonates.

In order to achieve this, cell-culture chemistry analyzers usually employ a combination of biosensors, imaging equipment, micro-well plates, fluorescence readers, detectors, data-acquisition units and transmitters. Cell concentration and cell viability are often measured using the trypan blue exclusion method, which employs dyes and other chemicals. These systems often work using reagent cartridges, require only a small volume of sample and have fast analysis times (usually 3–8 min). Some analyzers also provide additional features such as automatic calibration, high-resolution cell imaging and onboard QC systems, as well as offer multiple kits that differ based on the cell sample, in order to provide the user more flexibility and an efficient workflow.

Cell-culture chemistry analyzers have strong applications in the pharmaceutical and biotechnology industries due to the need for cell-culture–focused research for the purpose of developing drugs and vector-based therapies, respectively. A large number of laboratories in the public sector perform cell culture research, which thereby constitutes an important market due to the affordability of automated analyzers, even for budget-constricted institutions. Demand from the hospital and clinical industry is primarily composed of the need for cell viability studies, along with growing applications in stem cell research and therapy.

Market Snapshot

The market for laboratory-scale cell-culture chemistry analyzers is estimated to be about $48 million in 2017. The market for cell-culture chemistry analyzers is growing moderately, with a forecasted growth rate of more than 4% over the next five years. This market growth can be attributed to growing cell-culture demand, along with instruments' increasing level of automation and sophistication for real-time monitoring of biomass constituents, which favor high-throughput bioprocessing applications in the biotech and pharmaceutical industries.

Nova Biomedical currently leads the market with its series of fully automated BioProfile Analyzers, which are offered in 6 different models that vary in their capacities to test and measure different parameters. Its cornerstone model, the BioProfile FLEX measures up to 16 cell culture attributes, including cell chemistry, cell density, cell viability, osmolarity and electrolyte content. Roche is another leading vendor in this market, thanks to its Cedex Bio, Cedex Bio HT and Cedex HiRes Analyzers. Other significant vendors include YSI Life Sciences (Xylem), Applikon Biotechnology, Sartorius, Kuhner, m2p-labs and LT Industries.

Cell Culture Analyzers at a Glance:

Leading Suppliers:

- Nova Biomedical
- Roche
- YSI Life Sciences (Xylem)

Largest Markets:

- Biotechnology
- Academia
- Hospital and Clinical

Instrument Cost:

- $10,000–$24,000

Clinical

For the first time in the Agency's history, the FDA has approved a drug based on genetic abnormalities instead of the organ in which the disease is located. The FDA made the landmark decision for pembrolizumab, an antibody-based drug used for advanced solid tumors with microsatellite instability-high (MSI-H) or mismatch repair deficiency (dMMR) that have not responded well to previous treatments. Cells in advanced solid tumors with MSI-H or dMMR are unable to repair their own DNA errors, which can lead to cancer. MSI-H or dMMR cells are most commonly found in colorectal, endometrial and stomach cancers, and patients with these types of cancers generally do not respond well to chemotherapy treatments. The FDA's decision was based on an "accelerated process," which means that the Agency can revoke its approval if pembrolizumab is not successful in treating patients in clinical studies.

Usually, health care insurance providers hesitate in covering broad genetic tests for cancer, but the FDA's approval of pembrolizumab is projected to serve as good news in encouraging insurance companies to do so more often. With increasing evidence of specialized medicines and treatments helping patients combat their illnesses, insurance providers will be more likely to pay for personalized tests. However, only a small percentage of patients respond to drugs such as pembrolizumab, and scientists are still researching why this is. By uncovering more biomarkers and genomic indicators to understand why the same cancer manifests differently in patients, researchers will be able to develop comprehensive treatments that would increase the odds of success in treating cancer patients.

Source: *Xconomy*

Pharmaceuticals

The number of approved medications in the first half of 2017 indicates that drug approval has gotten back on track this year, after a sluggish 2016. Only 22 medications were approved by the FDA in all of 2016, while 21 have already been approved so far this year. The European Medicines Agency has approved 42 drugs (which includes generic drugs, as well, unlike the FDA numbers), compared to 31 drugs in the first half of 2016. After a six-year low for drug approvals in 2016, there were concerns about an underlying issue within the industry or drug regulation, but the industry seems to be back on track in 2017.

Drug manufacturers have taken a different approach to drug development, with many companies now moving away from mass market drug products and focusing more on specialized medicines. Simultaneously, US regulators specifically have taken a new approach to drug approvals as well, such as approving a cancer drug based on genetics instead of the location of the tumor, which is accelerating the approval process (see Clinical).

Source: *Reuters*

Government

From FY00 to FY16, indirect costs represented 16%–24% of the total amount of annual NSF awards, with the number increasing from 2010 onwards. The NSF defines direct costs as employee salaries and the purchase of equipment that can be attributed to a particular project that won an NSF award. Indirect costs are defined as expenditures that are less relevant to a particular project and are more related to general operations for an award program, including infrastructure and maintenance costs. Generally, agencies such as the NSF calculate the proposed rate of the award by dividing its total indirect costs by total direct costs, which is applicable to all of the agency's federal awards. The resulting figure is the proposed rate. As a percentage of total NSF awards, indirect costs steadily increased from a decade low in 2010, reaching 24% in 2015 and falling back to approximately 22% in 2016. In 2016, indirect costs at the NSF totaled approximately $1.3 billion of the total $5.8 billion the agency awarded.

This is not the first time a federal agency has been found to be overspending on indirect costs. In September 2013, reimbursements for indirect costs were found to be increasing faster than direct cost reimbursements at the NIH from FY02 to FY12. In the resulting analysis of the situation, it was found that there were "deficiencies" in NIH agencies' systems for setting rates for their awards, which meant that the NIH was including "inappropriate" indirect costs, causing federal agencies to overpay their shares for reimbursement.

The NSF analysis also uncovered that universities account for the vast majority of NSF award funding, representing, for example, 91% of the $1.3 billion in indirect costs in 2016. According to the analysis, NSF staff did not follow proper guidance for setting up appropriate proposal rates. The analysis will provide recommendations to the NSF on how to better budget award costs in a report to be released this fall.

Source: *United States Government Accountability Office*

Australia

Originally presented to the Australian government in February and made official earlier this month, the Australian 2016 National Research Infrastructure Roadmap details the country's plans to raise its profile and contributions to global scientific R&D over the next 10 years. The Roadmap identifies nine key areas that are essential in fostering R&D in Australia, including establishing nine focus areas of research, including Earth and environmental systems, biosecurity, complex biology and therapeutic development; establishing a National Research Infrastructure Advisory Group to advise the government on R&D investments; committing to educating and training for a more skilled workforce; continuing investments into existing R&D facilities; and collaborating more with global partners to increase reach and access to global R&D infrastructures.

The Roadmap indicates the need to grow opportunities for science industries, such as in complex biology, for which the Roadmap suggests increasing the scale and number of prospects to expand biomolecular R&D for technology platforms such as genomics, proteomics, metabolomics and bioinformatics. The Roadmap also identifies the need to create better infrastructures to enable clinical trials and to have more easily shared data between state and federal disease control databases.

Between 2005 and 2016, over AUD $2.8 billion ($2.1 billion) was invested in the National Collaborative Research Infrastructure Strategy (NCRIS), which led to coinvestments from universities and state governments totaling over AUD $1 billion ($748.1 million). The Roadmap also points out the benefits of collaboration between research and industry, citing the Melbourne Biomedical Precinct as an example, which has raised over AUD $5 billion ($3.74 billion) to date from public and private investments. The majority of this investment has gone toward building state-of-the-art hospitals, as well as research buildings and infrastructure. The country's leading biotechnology hub, the Bio21 Institute, is another example of this, with CSL, a large Australian biopharmaceutical company, investing AUD $36.4 million ($27.2 million) into the Institute for establishing more research infrastructure for chemical, bioengineering and biomedical R&D, including the CSL Global Hub for Research and Translational Medicine.

The Roadmap lists the nation's top science R&D priorities as being in the areas of digital data and eResearch

platforms for food, soil and water, energy, resources, advanced manufacturing, environmental change and health. These platforms will enable new methods for research, quality instrumentation and accelerated R&D.
Source: *Australian Government: Department of Education and Training*

UK

Last year, the Association of the British Pharmaceutical Industry (ABPI) launched an online database indicating payments and benefits in kind made by pharmaceutical companies to doctors and health organizations all over the UK. In total, 109 companies disclosed information about the in kind payments they made in 2015. Of the 109 companies, 54 were ABPI companies. Two thirds, or £229.3 million ($297.3 million), of all payments made were related to R&D, specifically working with health care companies for clinical trials. The remaining 33% of payments made were for events, donations, grants, travel for events, service fees and other non R&D-related activities.

As part of the ABPI's submission to the Treasury for the 2016 Autumn Statement, the Association recommended the UK government channel R&D funding through the recently established UK Research and Investment initiative (UKRI), which the government accepted. An additional £2 billion ($2.6 billion) will be made available for R&D funding per year through UKRI and Innovate UK, the region's leading innovation agency. The new funding is a 20% increase in total government R&D spending , the highest increase since 1979, and is geared especially for the life sciences industry.

Source: *ABPI*

France

In 2010, the French government announced plans to establish a €5 billion ($5.5 billion) infrastructure in Saclay of 18 universities, public and private research labs, and higher education institutes, with the hopes that the science "super campus" would serve as an "integrated research university" that would rival the world's top science institutes. However, as of February, French reports indicate that the plans are at a dead end due to certain higher education institutions demanding to maintain autonomy instead of integrating with other institutions in the campus.

The original proposal stated that all universities and institutions would give up their identities and be known under the umbrella term of the University of Paris-Saclay. While negotiations were initially proceeding smoothly, CentraleSupélec, a leading engineering institution, unexpectedly turned down the proposal due to the institution preferring to remain autonomous and not merge its identity into the University of Paris-Saclay. The other engineering institutes may follow suit, as they are not disclosing whether they are willing to integrate as part of the super campus yet. The University of Paris-Sud, which accounts for 50% of all research in Saclay, may serve as the only member of the project, especially considering that the institute has received €33 million ($37 million) annually over the past five years in research grants through the IDEX initiative for top research institutes in France. However, the future of funding for Paris-Sud is as uncertain as the establishment of the super campus, as the institute has until December to prove that it deserves continued funding.
Source: *Nature*

Broad-Based Companies

Company Announcements

QIAGEN appointed **Dr. Håkan Björklund** to its Supervisory Board in March, increasing the Board to eight members. He currently serves as Operating Executive at **Avista Capital Partners**.

In March, **Thermo Fisher Scientific** filed a motion seeking to move a December 2016 California case brought by **Fluidigm** naming Thermo Fisher as the defendant to federal court. Fluidigm alleges breach of a patent cross-license agreement.

In March, the US District Court of the Southern District of California granted plaintiff **Zef Scientific** and defendant **Shimadzu Scientific Instruments'** joint motion to dismiss their case with prejudice (see ***IBO*** 8/31/14) following a settlement agreement. The original complaint alleged monopolization, restraint of trade, tortious interference with contractual relations, tortious interference with prospective business advantage and unfair competition.

In April, **Halma** announced that Group Finance Director Kevin Thompson will retire next year.

First quarter sales for **Harvard Bioscience** fell 10.4%, 5.5% organically, to $24.2 million (see ***IBO*** 4/30/17). Sales were negatively impacted by delayed NIH funding and weak European demand. Adjusted operating margin fell nearly five percentage points to 1.3%. The company reaffirmed flat organic sales growth for the year.

Full-year 2016 sales for **Eppendorf** grew 3.6%, 4.8% excluding currency, to €651.5 million ($723.9 million) (see ***IBO*** 4/30/17). The company highlighted strong sales growth in Asia and for services. Despite increased R&D investments, operating margin expanded 240 basis points to 21.4%.

In May, **Bioanalytical Systems** named Dr. Peter T. Kissinger, founder and former executive chairman and CEO, as a scientific advisor.

First quarter sales for **Mettler-Toledo** Lab's business grew 11%, 10% organically, to account for 50% of company revenues, or roughly $300 million (see ***IBO*** 5/15/17). Revenue growth benefited from new products and extra selling days in Europe. All product lines and geographic regions experienced growth, including particular strength in China and Europe. Lab sales in the Americas grew 6.5% organically.

Teledyne Technologies reported that first quarter sales for Environmental Instrumentation grew 9.9% to $75.5 million.

Endress+Hauser announced in May that Mathis Büttiker, an attorney specializing in financial investments and wealth management, replaced CFO Fernando Fuenzalida on its Group Supervisory Board effective May 31.

In May, **PerkinElmer** named Dr. Madhuri Hegde as vice president and CSO of its newly created Laboratory Services group within its Diagnostics business. The Laboratory Services group brings together the company's global diagnostic lab resources for genetic screening and diagnostics testing. Previously, Dr. Hegde was CSO and executive director of **Emory Genetics Lab**.

For the fiscal year ending March 31, **JEOL Scientific and Measurement Instruments** sales declined 10.0% to ¥66.5 billion ($613.8 million) (see ***IBO*** 5/15/17) to account for 67% of revenues. Segment operating profit slumped 72.5% to ¥1.3 billion ($11.7 million).

In May, **Spectris** named Mark Williamson, chairman of **Imperial Brands**, as non-executive chairman, replacing Dr. John Hughes.

Illumina promoted Mark Van Oene to chief commercial officer. He was previously senior vice president of the Americas region and interim chief commercial officer.

In May, **FLIR**, a provider of MS and molecular spectroscopy products, named James J. (Jim) Cannon as president and CEO, effective June 19. Most recently, he was president of Stanley Security North America & Emerging Markets, part of **Stanley Black & Decker**. He will replace Andy Teich, who is retiring.

Sequencing

Company Announcements

In December 2016, the **University of California** (UC) filed suit against **Genia Technologies,** its cofounder Roger

Jinteh Arrigo Chen and unlisted defendants in **US District Court**. The complaints seek correction of inventorship, declaration of patent ownership, breach of contract, breach of the implied covenant of good faith and fair dealing, conversion, and constructive trust. The suit alleges that Mr. Chen, who worked on nanopore technology at **UC Santa Cruz**, violated UC's Oath of Allegiance, Patent Policy and Patent Acknowledgement. UC filed patent applications for the technology that Mr. Chen worked on, identifying him as an inventor. UC alleges that Mr. Chen evaded or challenged UC's request to fulfill his obligations under the Oath, including declarations necessary for completing the patent applications. UC also alleges that the patents held by Genia are based upon its technology.

In April, **HTG Molecular Diagnostics** transferred its listing from the **NASDAQ Global Market** to the **NASDAQ Capital Market** in order to meet listing requirements.

HTG Molecular Diagnostics announced in April a research agreement with **Centre Léon Bérard** utilizing the HTG EdgeSeq Oncology Biomarker Panel to retrospectively characterize immunologic profiles from advanced malignant tumor samples collected in the ProfiLER Study.

HTG Molecular Diagnostics signed a master services agreement with **Daiichi Sankyo** in May for work in HTG's VERI/O lab. The initial project includes the development of a custom assay for the detection of nearly 3,000 mRNA targets.

In April, **Thermo Fisher Scientific** named the **Institute of Medical Genetics and Pathology at University Hospital Basel, Switzerland** as the first partner in its Next Generation Sequencing Companion Dx Center of Excellence Program.

In May, **Thermo Fisher Scientific** and **Agios Pharmaceuticals** entered into an agreement to develop and commercialize an NGS oncology companion diagnostic for ivosidenib, which is currently in a Phase 3 trial for treatment of patients with advanced IDH1m positive cholangiocarcinoma. Upon validation, Thermo Fisher will submit a supplemental premarket approval application to expand clinical claims for its multi-therapy NGS test that is currently awaiting **FDA** approval. Thermo Fisher retains the right to commercialize the test globally and will lead all regulatory filings.

Congenica and **Edico Genome** partnered in April to create an all-in-one genome data analysis solution for clinical labs and hospitals for diagnostics of inherited diseases.

Edico Genome announced in June that it raised $22 million in a Series B financing round. **Dell Technologies Capital** led the round.

Edico Genome announced in May that **Illumina** has added the DRAGEN to its BaseSpace Sequence Hub.

In April, **Cogenica** completed a Series B funding round. Investors included **BGI Genomics** and China-based **Healthlink Capital**. Healthlink's clinical diagnostic lab also signed a contract to use Cogenica's Sapientia software.

In May, **QIAGEN** formed **MAQGEN**, a joint venture with Chinese IVD firm **Maccura Biotechnology** for local adaptation, development and commercialization of QIAGEN's GeneReader NGS System.

BGI announced in May that it plans to open a West Coast Global Innovation Center co-located in Seattle, Washington, and San Jose, California.

In May, **DNAnexus** announced its selection as a partner for **AstraZeneca**'s Centre for Genomics Research, which will analyze over two million genomes in the next 10 years by building a bespoke database of genomic sequences.

In May, **Fabric Genomics** partnered with data management company **ITTM (Information Technology for Translational Medicine)** to provide secure genome data hosting capabilities for EU customers.

Nabsys, which is developing the HD-Mapping optical mapping platform, announced its launch of a beta program in select labs early next year.

In May, **Integrated DNA Technologies** (IDT) announced a partnership with **Illumina** for NGS library preparation multiplexing and target enrichment. The companies will develop a portfolio of indexed adaptors to be manufactured by IDT, as well as comarket a complete workflow for exome capture. The index adaptors will extend the number of unique dual indexes from 8 to 24, with a 96 kit planned for introduction in the fourth quarter. The optimized index

codes are currently available through IDT for incorporation into custom third-party NGS library preparation adapter sets.

ATCC and **One Codex** announced in May a partnership to provide sequencing controls and references materials for microbiome research. ATCC's Microbome Research Solutions includes nucleic acid and whole-cell standards, which can be utilized in 16S and whole-genome sequencing. Customers can upload NGS data to the One Codex platform and receive a scorecard analysis of their ATCC Microbiome Standards.

Product Introductions

Thermo Fisher Scientific launched in March the Ion Torrent Oncomine Knowledgebase Reporter via Thermo Fisher Connect. The tool allows researchers to link sample-specific variants to labels, guidelines and global clinical trials.

Thermo Fisher Scientific launched in May the Ion AmpliSeq On-Demand targeted sequencing panels for inherited disease research, which provide easy and practical design customization capabilities to lower upfront costs regardless of project size.

FlowJo released in March SeqGeq, a desktop application for analyzing single-cell omics data featuring reduced processing time. It accepts many data types, including scRNA-seq, RNA-Seq or microarray data.

Illumina announced in April that it will launch in the fourth quarter an accessory device and consumables for its NovaSeq system enabling customers to address each lane of the flow cell independently, allowing easier loading of different library pools, applications and samples.

Oxford Gene Technologies launched in April expanded content for its SureSeq myPanel NGS Custom Cancer Panel. The Panel now covers 70 genes.

QIAGEN introduced in May the CLC Genomics Cloud Engine, optimized for near-automatic rapid deployment and runs on a customer-owned virtual private cloud infrastructure.

In May, **Lab7 Systems** released the Lab7 High-Performance Genomic Cloud powered by **IBM**, a complete solution for the management and analysis of genomic-scale data workloads and lab operations. It features the Enterprise Science Platform, calling it the industry's only end-to-end solution for integrating web lab and computational operations.

New England Biolabs launched in May the strand-specific NEBNext Ultra II Directional RNA Library Prep Kit and the nondirectional NEBNext Ultra II RNA Library Prep Kit, both designed for **Illumina** sequencers. The kits are compatible with poly(A) mRNA isolation and rRNA depletion, and libraries can be constructed from an input range of 5 ng to 1 µg of total RNA.

Sales/Orders of Note

In April, precision medicine firm **Personalis** ordered 10 **Illumina** NovaSeq 6000 systems, with 2 instruments already delivered.

DNAnexus announced in May that the **Rady Children's Institute for Genomic Medicine** adopted its DNAnexus Platform.

Sample Preparation

Company Announcements

In March**, RBC Bioscience** announced that **Parallel Devices** is distributing its nucleic acid sample preparation products in the US.

Pressure BioSciences hired **EKG Sales Associates** in March and added 2 of its planned 4 additional field sales directors.

Product Introductions

Innova Biosciences introduced a magnetic conjugation kit in February. It allows researchers to covalently conjugate antibodies and proteins to 0.5 µm magnetic particles without the need for extensive optimization of the conjugation reaction.

Zymo Research released in February the Discovery Series DNA and RNA purification kits, which includes 8 of the company's most popular kits in a new 5- and 10-prep/reaction format. They are designed to maximize flexibility and provide convenience for small-volume labs.

In March, **CEM** launched the new iPrep Microwave Digestion Vessel for its MARS 6 system, calling it the first ever dual-seal vessel that requires no probes for precise temperature control while achieving digestion conditions unattained by any other vessel. It allows for twice the amount of sample to be prepared and allows for complete dissolution of samples previously undigestable by microwave sample preparation.

Roche launched in March the MagNA Pure 24 System for nucleic acid extraction and purification. It is designed for low- to medium-throughput customers and features on-board primary sample handling. It is IVD/CE-IVD labeled.

In March, **Empirical Biosciences** launched a new Agarose Gel Extraction Kit for efficient DNA purification from agarose gel, with a maximum recovery of DNA from 100 bp to 100 kb. It is based on silica membrane technology.

Horizon Technologies introduced in March the SPE-DEX 5000 Extractor System for the extraction of semivolatile and nonvolatile organic compounds.

In May, **Chromatrap**, a **Porvair Sciences** company, introduced the improved Chromatrap FFPE ChIP-seq kit, offering a streamlined protocol for performing ChIP assays from a range of FFPE samples. The kit contains Protein A- or Protein G-based spin columns, buffers and reagents to perform 24 ChIP assays and up to 10 chromatin preparations.

Thermo Fisher Scientific launched in May the PureLink Expi Endotoxin-Free Maxi Plasmid Purification Kit, a plasmid DNA–isolation kit that allows researchers to yield up to 1.5 mg of advanced transfection-quality plasmid DNA in less than 90 minutes. It utilizes proprietary anion-exchange membrane–based columns in combination with a vacuum-assisted workflow.

In May, **Analytik Jena** announced the availability of its SmartExtraction technology for manual isolation of nucleic acids.

Biotage launched in May the ISOLUTE FILTER+ high-performance filtration plates. The plates are designed to prevent sample particulates from reaching the UPLC column. Typically, sample volumes up to 1,500 µL can be processed.

Porvair Sciences introduced in May a new range of 384-well filtration plates with a unique drip geometry for greater sample recovery and minimized surface and sample concentration. They are available in four different membranes with a 140 µL volume and three pore sizes.

Materials Characterization

Company Announcements

MANTA Instruments announced in January that HORIBA Scientific will distribute its ViewSizer 3000 Nanoparticle Tracking Analysis System in the Americas.

Analytik announced in January that it is now the exclusive distributor of **Particle Metrix**'s particle analyzers in the UK.

According to its fiscal year 2016 10-K **SEC** filing, **MTS Systems**' Materials business accounted for 30% of its Test business, or an estimated $154.0 million.

MTS Systems announced in May the appointment of Brian Ross, currently corporate controller, as senior vice president and CFO.

In May, particle analysis system maker **Optofluidics** announced a name change to **Halo Labs**, coinciding with a new focus on making analytical tools for biopharmaceutical QC.

Product Introductions

Malvern Instruments introduced in February the MicroCal PEAQ-DSC (Differential Scanning Calorimetry) system for characterizing protein and biomolecule stability. The new system is created specifically for the regulatory environment. Features include unattended 24 hour operation.

In February, **CANNON Instrument** introduced the miniAV-HT viscometer, developed specifically for asphalt viscosity testing at 60 °C and 135 °C.

In March, **Spheryx** launched a beta program for its xSight system for sub-visible particle characterization, based on Total Holographic Characterization using holographic video microscopy to characterize each particle in colloidal dispersions and multicomponent colloidal mixtures.

In March, **TA Instruments** released WinTest 8.0 for its TA ElectroForce Mechanical Test Instruments. Features include a simplified set-up process and new application-specific add-on software modules.

In April, **PAC** launched the next generation ISL OptiCPP (Cloud and Pour Point Analyzer), featuring improved usability and lower cost of ownership.

Anton Paar introduced in April the TORC (Thermo-optical Oscillating Refraction Characterization) 5000 system, which utilizes periodic thermal excitation and analyzes the optical response. It enables the determination of time-dependent processes.

In April, **Postnova Analytics** launched the AF2000 MALS (Multi-Angle Light Scattering), a temperature-controlled Flow Field-Flow Fractionation system for the separation, characterization and fractionation of biopharmaceutical proteins.

Reported Financial Results

$US	Period	Ended	Sales	Chg.	Op. Prof.	Chg.	Net Prof.	Chg.
Agilent Technologies	Q2	30-Apr	$1,102.0	8.1%	$201.0	53.4%	$164.0	80.2%
Agilent Tech. (Life Sci. & App.)	Q2	30-Apr	$523.0	5.7%	$110.0	17.0%	NA	NA
Agilent Tech. (Diag. & Genom.)	Q2	30-Apr	$201.0	12.9%	$49.0	81.5%	NA	NA
Agilent Tech. (Crosslab)	Q2	30-Apr	$378.0	9.2%	$82.0	10.8%	NA	NA
Bioanalytical Systems (Products)	Q2	31-Mar	$1.3	7.5%	$0.0	547.1%	NA	NA
HTG Molecular Diagnostics	Q1	31-Mar	$1.4	58.5%	($5.4)	18.5%	($5.8)	17.2%
Pressure BioSciences	Q1	31-Mar	$0.6	8.0%	($1.0)	4.5%	($5.6)	6.0%
Teledyne Tech. (Instrumentation)	Q1	31-Mar	$232.8	4.1%	$30.4	-3.2%	NA	NA
Other Currencies								
Diploma (Life Sciences)	H1	31-Mar	£57.9	10.3%	£9.0	13.9%	NA	NA
GL Sciences	FYE	31-Mar	¥20,582.0	11.3%	¥1,801.0	88.6%	¥1,318.0	70.3%
Immuno-Biological Laboratories	FYE	31-Mar	¥742	3.3%	-¥1,157	-1435.3%	-¥2,094	-6466.1%
Merck KGaA (Life Science)	Q1	31-Mar	€ 1,481.0	6.0%	€ 236.0	124.8%	NA	NA
Photon Control	Q1	31-Mar	CAD 11.9	65.2%	CAD 2.5	-10.9%	CAD 1.7	7.0%
Precision Systems Science	Q3	31-Mar	¥895	-13.2%	-¥160	8.6%	-¥169	4.0%

NA = Not Available, NM = Not Material