



# IBO

Strategic Information for the  
Life Science and Analytical  
Instrument Industry

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## M&A 2018: A Year of Bolt-Ons

In 2018, M&A in the analytical instrument and lab products industry can be viewed as a tale of two companies, Agilent Technologies and Bruker. Together, the firms were responsible for the announcement of 16 purchases, as they acquired smaller-sized companies addressing each firm's respective target markets.

But the year was not without \$1 billion deals, as Danaher and Illumina each paid over \$1 billion with ambitious entries into new markets. Yet it was a relatively restrained year in terms of deal size after multi-billion dollar deals in the recent past, such as Avantor's \$6.5 billion purchase of VWR in 2017 (see [IBO 5/15/17](#)) and Thermo Fisher

Scientific's 2016 acquisition of FEI for \$4.2 billion (see [IBO 5/31/16](#)).

This was against a backdrop of US tax reform, which was expected to increase company's cash holdings and stimulate M&A. According to the "[EY Global Capital Confidence Barometer](#)", a survey of 2,600 executives cross industries released in October, M&A activity this year was less than expected due to geopolitical uncertainty and regulations. But most executives expect the M&A market to improve over 12 months. Deloitte's [report on M&A trends](#) next year, released last month, found most executives of the one thousand surveyed expect an increase in M&A volume and size in 2019, but concerns remain about the rise in interest rates.

In *IBO's* annual review of M&A activity, we examine the acquisition activity reported in *IBO* between December 31, 2017 and December 15, 2018. Our analysis includes only pure-play deals, excluding acquisitions of dedicated diagnostic or process (analyses conducted inline and online during manufacturing) companies, even if made by a lab product company. Financial figures are drawn from publicly available sources. Sales and purchase price were not available for all announced acquisitions.

Greatest Number of Acquisitions Announced Dec. 2017–Dec. 2018	
Company	Number
Agilent Technologies	8
Bruker	8
LGC	4
PerkinElmer	4
Thermo Fisher Scientific	4
Thomas Scientific	4

*Click to enlarge*

## Target Markets

As in recent years, cell biology, sequencing and consumables companies were priorities for many lab instrument providers in 2018. Companies investing in cell biology included Agilent Technologies through its purchases of ACEA Biosciences (see [IBO 9/30/18](#)) and Luxcel Biosciences (see [IBO 1/15/18](#)), as well as Miltenyi Biotec, which added imaging to its cell analysis portfolio with the acquisition of LaVision Biotec (see [IBO 10/31/18](#)). ACEA Biosciences was not the only flow cytometry purchase this year as Luminex bought Merck KGaA's divested business, also seeking to diversify (see [IBO 10/31/18](#)). Addressing the cell analysis market through the company's core competence of advanced microscopy, Bruker added to its cell analysis capabilities with the purchase of JPK Instruments (see [IBO 7/15/18](#)) for \$16.6 million.

However, the largest deal for cell biology involved cell media. In one of the year's highest-priced deals overall, Fujifilm purchased Irvine Scientific and IS Japan for \$800 million (see [IBO 3/31/18](#)), adding to its regenerative medicine business. This follows Fujifilm's recent purchase of Wako Pure Chemicals, which also offers cell culture media, for \$1.4 billion (see [IBO 12/31/16](#)).

Similarly, companies investing in cell media and serum included Bio-Techne, which acquired Atlanta Biologicals (see [IBO 1/15/18](#)), and BelHealth Investment Partners, which invested in Gemini Bio-products (see [IBO 9/30/18](#)). As with Fujifilm's purchase, Bio-Techne's acquisition of Quad Technologies' cell separation reagent technology (see [IBO 6/15/18](#)) positions the business for serving cell-based research and therapeutics, from R&D through manufacturing.

Agilent and Illumina continue to address the DNA sequencing market, accumulating technologies for a comprehensive offering across the workflow, an approach that has increasingly informed M&A of this technology in particular. DNA sequencing grabbed headlines with Illumina's plan to purchase Pacific Biosciences, one of the few companies that has successfully commercialized a DNA sequencer (see [IBO 11/15/18](#)). In addition to a large investment in long-read technology, Illumina bought its first data analysis firm with its acquisition of Edico Genomics (see [IBO 5/15/18](#)) for \$100 million (net of cash acquired). Agilent continued its streak of NGS workflow-

related purchases, buying Advanced Analytical Technologies (see [IBO 2/28/18](#)) for \$250 million and purchasing the remainder of NGS development partner Lasergen (see [IBO 4/15/18](#)). In 2017, Agilent added two assets in the space (see [IBO 12/15/17](#)).

In the NGS sample prep market, Tecan became the latest entrant, acquiring NuGEN Technologies (see [IBO 8/31/18](#)). Combining its expertise in standards and expansion in NGS, LGC purchased SeraCare Life Sciences (see [IBO 11/30/18](#)). In addition, the company's purchase of Lucigen targets the NGS market (see [IBO 2/28/18](#)).

Recurring revenues provide a stable source of sales if end-markets face volatility, higher margins than instruments in the case of consumables and closer customer contact in the case of service. So it is not surprising that many traditional instrument companies have made M&A in these product lines a priority, including Agilent and Danaher. This year's purchases include Danaher's major investment in oligo maker Integrated DNA Technologies as well as its purchase of Chinese firm Bonne Agela (see [IBO 2/15/18](#)), Agilent's pick up of Ultra Scientific (see [IBO 5/31/18](#)) and ProZyme (see [IBO 6/30/18](#)), Biotage's planned acquisition of PhyNexus (see [Executive Briefing](#)), as well as the cell media and Tecan purchases described above.

Highest Premiums, Based on Revenue Multiples, in 2018 for Pure-Play Companies				
Price-to-Sales Ratio	Purchaser	Acquired	Purchase Price (\$M)	Acquired Co.'s Annual Sales (\$M)
12.8	Illumina	Pacific Biosciences	\$ 1,200.0	\$ 93.5
6.9	Biotage	PhyNexus	\$ 21.5	\$ 3.1
6.2	Thermo Fisher Scientific	Gatan	\$ 925	\$ 150
5.9	JSR	Crown Bioscience	\$ 400.0	\$ 67.8
4.8	Thermo Fisher Scientific	BD Advanced Bioprocessing	\$ 477	\$ 100

[Click to enlarge](#)

## Building Businesses

In addition to Agilent and Bruker, other companies that added strategically key products markets this year were LGC, Metrohm, Thermo Fisher Scientific and Waters. Thermo Fisher diversified its rapid growth electron microscopy (EM) business with the purchases of Phenom World (see [IBO 12/31/17](#)) and the planned buyout of Gatan (see [IBO 6/30/18](#)). In addition, Thermo Fisher took on BD's Advanced Bioprocessing business (see [IBO 9/15/18](#)), adding new product lines to its bioprocess business. Like Thermo's EM investment last year, Metrohm followed last year's investments in Raman technologies, adding Innovative Photonic Solutions (see [IBO 1/31/18](#)) and B&W Tek (see [IBO 7/31/18](#)). LGC accumulated even more oligo companies, both oligo reagents with Berry and Associates (see [IBO 9/30/18](#)) and systems with BioAutomation (see [IBO 5/15/18](#)), as well as contributing to its standards business with SeraCare and now MBH Analytical (see [Executive Briefing](#)). Waters added to its series of TA purchases, buying Theta Industries (see [IBO 9/30/18](#)), supplementing its materials testing business, and additionally its offerings for clinical MS, adding clinical imaging, with the purchase of DESI technologies (see [IBO 7/31/18](#)).

Highest-Priced Pure-Play Instrument and Lab Product-Related Acquisitions Announced Dec. 15, 2017–Dec. 15, 2018			
Purchase Price (M)	Purchaser	Acquired	
\$1,200	Danaher	Integrated DNA Technologies	\$930
\$1,200	Illumina	Pacific Biosciences	\$350
\$925	Thermo Fisher Scientific	Gatan	\$358
\$800	Fujifilm	Irvine Scientific and IS Japan	\$200
\$477	Thermo Fisher Scientific	BD Advanced Bioprocessing	\$25

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## Former Partners

Whether targeting suppliers, distributors or collaborators, a number of acquisitions this year focused on consolidating existing relationships or building upon successful development agreements. Distributor acquisitions included Agilent adding South Korean distributor Young In Scientific (see [IBO 5/31/18](#)) and TESCAN ORSAY's purchase of Germany's EO Elektronen-Optik-Service (see [IBO 5/15/18](#)). Product collaborations leading to acquisitions were Bruker's purchase of Lactotronic (see [IBO 7/15/18](#)), HORIBA's addition of AIST-NT (see [IBO 1/15/18](#)), Illumina's gaining Edico and Tosoh Biosciences' investment in SEMBA (see [IBO 11/30/18](#)).

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## OECD: Digitization Driving Evolution of Science R&D Funding

In the [2018 edition](#) of its *Science, Technology and Innovation Outlook* report, the OECD examined trends, new policies and instruments being used in science, technology and innovation policy in OECD member countries. A key discussion within the report was the interconnected relationship between digital technologies, such as AI, and public funding.

This is because as digitization becomes more commonplace and vital across numerous disciplines and markets, more data is being collected and in need of analysis. To address these analysis concerns, new digital technologies are required; to address the R&D investments required for innovating these new digital technologies, additional funding—including federal funding—is required; to optimize investments for digital technologies, governments and public funding institutions require a solid comprehension of how these new digital technologies work by analyzing their functions and data collections; and to analyze those data collections, these public institutions also require their own digital technologies that can handle the vast amounts of data that technologies such as AI can gather.

Thus, digitization is not only a major aspect of future innovation across industries and the improvement of economies around the world, but also a central driver of the future of funding instruments and mechanisms. In its report, the OECD examined the wide impact of digital technologies such as AI as well as the efficacy of federal funding instruments, and how they can be improved to be better prepared for what the Organization calls the “next production revolution.”

### The AI Factor

The growing prevalence of AI is serving as a catalyst for many industries, and, as the OECD stated in its report, AI could establish entirely new industries altogether. Moreover, technologies that depend on AI for their advancement, such as biotechnology or 3D printing, have great potential for accelerating economic growth. As the report highlighted, the development and implementation of new production technologies is imperative, not only for the future of economic productivity across numerous industries, but also for raising the standards of living and labor productivity growth in some OECD member countries.

Digital technologies are able to ramp up productivity through numerous methods, such as reducing machine downtime through prediction techniques, increasing precision and efficiency, and developing green technologies that benefit the environment (i.e., nanotechnological materials that have the capability to cool themselves down without consuming energy).

***AI technology is in an almost-constant state of evolution, making it imperative that public institutions gain a better understanding of rapidly changing digital technologies.***

AI has already helped drive growth in numerous industries. For example, within pharmaceutical applications, AI is said to become the “primary drug discovery tool” by 2027, according to an industry expert from AstraZeneca, cited in the report. Thanks to AI's support in managing bioinformatics, analyzing genomic and drug safety data and

improving in silico modeling, AI has more than proved its utility within the industry. AI is also useful in oil applications, as it has the capabilities to examine and analyze photographic imagery of the interior of oil pipelines, searching for microscopic fissures.

In the mining industry, AI is effective in the exploration for mineral deposits and the operation of autonomous drills, ore sorters, loaders and haulage trucks. AI is also the key driver of analyzing massive volumes of IoT data, as it has the ability to process combined sensory data and text. Because of this, the OECD forecasted that AI's impact on future production could drive the creation of completely new industries, comparing it to the new industries that were spurred by the discovery of DNA structure in the 1950s.

The report explained that since many companies are in possession of large, valuable datasets that they may not be using effectively, it would behoove them to partner with AI startups and other businesses using AI to help determine the datasets' value and the best way to utilize it. The governments, the OECD stated, can serve as "honest brokers for data partnerships," working alongside stakeholders to establish agreements for data sharing amongst companies. Creating more open-data initiatives are also a way to ensure the use of data for the public benefit, according to the report. However, the OECD indicated that it is essential that regulations on AI and the impacts of those regulations be monitored carefully and regulatory reviews be common—this is due to the fact that AI technology is in an almost-constant state of evolution, making it imperative that public institutions gain a better understanding of rapidly changing digital technologies.

## Public Research Funding Trends

Governments also play a significant role in the funding and growth of scientific research and, therefore, innovation for technologies such as AI. Therefore, a key issue raised by the OECD was the efficacy of funding instruments, specifically, what the merits of accomplishing specific policy goals are. In examining this, the OECD examined several country reviews and evaluations of programs that support research around the world to determine how particular funding instruments are adapted to certain policy goals, as well as how these funding processes are implemented at Higher Education Institutions (HEI) and Public Research Institutes (PRI).

***While the 2008 recession negatively impacted R&D funding, research continues to be and will likely remain a significant aspect of government budgets, especially as trends such as digitization and centralized databanks continue to rise.***

Scientific progress is the main driver of innovation, and it is especially important, the OECD states, at knowledge institutes like HEIs and PRIs. However, in 2016, HEIs and PRIs represented approximately 18% and 11%, respectively, of Gross Domestic Expenditure on R&D (GERD) in OECD member countries. This figure is much lower than the business sector, which made up 69% of 2016 GERD in OECD countries, yet HEIs and PRIs conduct over 75% of total basic research. HEIs especially are important in the fostering of R&D, while the influence of PRIs has diminished in certain countries. HEIs are vital to scientific research because not only do they provide higher education opportunities, but they are also deeply involved in what the OECD called "longer-term and higher-risk scientific knowledge," and have an indelible influence on applied research, knowledge and technology transfer, and other innovation endeavors.

While there are variations amongst countries, federal governments are the main sources of academic research. In 2015, government allocations propelled 67% of HEI research and 92% of PRI research. While the 2008 recession negatively impacted R&D funding, research continues to be and will likely remain a significant aspect of government budgets, especially as trends such as digitization and centralized databanks continue to rise.

## The Evolution of Publicly Funded R&D

While the portion of government funding for PRIs has been generally stable since the 1980s, it has been on a steady decline for HEIs, which have been increasingly obtaining third party funding. While federal HEI R&D funding had seen a revival a couple years after the recession, by 2010-2011, the increases to R&D budgets had reverted or slowed down. GERD to HEIs and PRIs decreased, even though economic growth continued.

***Research project information necessary to determine the proper channels of funding allocations can be directly retrieved through data processing, reducing the need and costs for expensive award competitions.***

The OECD argued that this continuing decrease cannot be blamed on budgetary pressures, but is actually a corroboration of anecdotal evidence from experts in the science industry that suggest a “frustration” regarding the lack of enough tangible, real life innovation results from past GERD allocations to R&D. This also creates hurdles for science advocates when they are negotiating with ministries and representatives that are responsible for science-related policy areas.

The OECD separated publicly funded R&D into two categories:

- **Competitive project funding:** in this mechanism, funding instruments, agencies, councils or ministries provide resources for a particular research project, one that has specific scope, budget and time requirements. This mechanism allows researchers to apply for funding, and financial awards vary in their size, time period and winner (i.e., an individual versus a research center)
- **Non-competitive institutional funding:** this funding mechanism provides a block of funding in more general terms, without specifying particular R&D projects or programs. This type of funding is usually provided as an annual federal allocation to HEIs or PRIs, not specific research groups, and the funds are used not only for innovation, but also for administrative purposes, such as staff wages, infrastructure, and maintenance and upgrades that are related to R&D. Institutional funding used to be for specific research projects, but is now typically allocated as a block grant, or a lump sum, giving institutions more freedom in how they want to spend the funds.

The OECD stated the evolution of funding has blurred the lines between competitive and non-competitive funding instruments, and that this has led to the need for more “nuanced” frameworks for research funding. The OECD proposed that the separation between competitive and non-competitive funding requires a revamping into a single analytical framework, and suggests that certain factors—namely, competition, granularity, competition level, selection/allocation criteria and orientation/directionality—should be taken into consideration when creating this new funding framework.

Digitization is cited by the OECD as a major gamechanger, not only within the science industry, but also in regards to funding instruments. As digital technologies such as AI continue to transform the R&D landscape, they are also providing policymakers and funding mechanisms with the capability to monitor research. This is because more current research has been made available, thus allowing a more thorough analysis and evaluation through digital innovations. Research project information that is necessary to determine the proper channels of funding allocations can be directly retrieved through data processing, which greatly reduces the need and costs for expensive award competitions. As digitization and AI continues to grow, governments are looking more towards cost efficiency and accountability within scientific R&D when considering budgets, and it will be imperative to design new funding instruments and programs to address these concerns.

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## New Funding Announcements

### Funds Designated for Lab Technology

**Amount:** \$250 Million

**Recipient:** SUNY (State University of New York) Research Foundation

**Funder:** Empire State Development

**Date Announced:** [November](#)

Empire State Development, a private company created to support businesses in New York State, will provide the funding in the form of a capital grant to the Foundation specifically for the purchase of tools for a new global materials engineering R&D facility. The facility will be located at the new Materials Engineering Technology Accelerator (META Center). Located on the SUNY Polytechnic Institute campus in Albany, New York, the META Center will be funded by a \$100 million investment in leases by materials engineering company Applied Materials. In total, the public-private partnership is valued at \$600 million over seven years, including research grants totaling \$25 million, with a matching amount coming from Applied Materials. The META Center will open in 2019.

### Harvard Medical School Receives Largest Gift Ever

**Amount:** \$200 Million

**Recipient:** Harvard Medical School

**Funder:** Blavatnik Family Foundation

**Date Announced:** [November](#)

The funding will be used to enhance the School's research and therapeutic development capabilities, including investments in cryo-EM resources at the Harvard Cryo-Electron Microscopy Center for Structural Biology, single-cell sequencing and high-throughput screening. The gift will also go to fund researcher recruitment, creating a core facility dedicated to life science data science. Grants will be funded for research collaborations across the School's different institutions and disciplines. To further this aim, the new Blavatnik Harvard Life Lab Longwood will be home to early-stage startups founded by Harvard associates. Finally, the School's 10 academic departments will now be known as the Blavatnik Institute at Harvard Medical School.

## **New Monies for Cystic Fibrosis Research**

**Amount:** \$100 Million

**Recipient:** Various

**Funder:** Cystic Fibrosis Foundation

**Date Announced:** [October](#)

The Cystic Fibrosis Foundation has announced a \$100 million, 5-year Infection Research Initiative for detecting, diagnosing, preventing and treating infections associated with cystic fibrosis. The funding represents two times the amount of its previous five-year spending. Research on micro-organisms will include detection and treatment. In 2018, the Foundation awarded \$124 million in awards for all cystic fibrosis research to academia and industry.

## **NIH Announces CRISPR Work**

**Amount:** \$86 Million

**Recipient:** Various

**Funder:** NIH

**Date Announced:** [October](#)

The NIH Common Fund has awarded 21 Somatic Cell Genome Editing Grants to 17 institutions and one company. The grants are part of the new six-year, \$190 million Somatic Cell Genome Editing program. The latest grants provide five years of funding for researchers to further develop gene editing techniques. The effort involves improving the effectiveness, safety, validation of gene editing as well as new animal models created using gene editing. A "genome editing toolkit," including new techniques, will be created.

## **Chan Zuckerberg Initiative Launches New Awards**

**Amount:** \$51.95 Million

**Recipient:** Various

**Funder:** Chan Zuckerberg Initiative

**Date Announced:** [December](#)

The Chan Zuckerberg Initiative (CZI), a philanthropic organization, has established the CZI Neurodegeneration Challenge Network and announced the initial round of funding for research on the basic biology of neurodegenerative disease. The Network is designed to foster collaboration across disciplines and resources, and support new approaches, including a more holistic understanding of such diseases. The funding consists of \$42.5

million in CZI Ben Barres Early Career Acceleration Awards for 17 early career researchers and \$9 million in CZI Collaborative Science Awards for 9 research teams. The CZI received 700 applications for the awards.

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## Biotage Buys Automated Purification Firm

*Stockholm, Sweden 12/4/18; San Jose, CA 12/4/18*—Separations technology provider Biotage has agreed to acquire PhyNexus for \$21.5 million in cash and stock. Based in California with 2017 sales of \$3.1 million, PhyNexus supplies Dual Flow Chromatography tip technology for automated biomolecular purification. Annual EBIT was -\$0.1 million. “The acquisition of PhyNexus is in line with our strategy to grow our separation business through expansion into new application areas,” explained Biotage CEO Torben Jörgensen. “This transaction enables PhyNexus’ products to reach a larger global market through Biotage’s direct sales organization, at the same time as Biotage obtains access to customers in industries where Biotage historically has not been as active.” PhyNexus has 14 employees. The purchase is expected to be completed in January 2019.

*As Mr. Jörgensen told IBO, the industries in which Biotage has not been active that the acquisition addresses are CROs using lab-scale purification of biomolecules and biomolecules in general. Asked about the barriers to greater adoption of Dual Flow technology, he stated it was global access, which Biotage can now provide. Biotage will also invest in automation to grow product access. Purification of plasmids and antibodies are the most widely used applications for PhyNexus technology, according to him.*

*PhyNexus’ pipette tip chromatography fits with Biotage’s portfolio of separation products, which includes SPE and SLE. Designed for bulk purification and sample sizes as small as 5 µL, PhyNexus’ Dual Flow Chromatography provides an alternative to spin columns and magnetic bead techniques.*

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## 10x Makes Second Acquisition

*Pleasanton, CA 12/10/18*—10x Genomics, a provider of tools for understanding biology, human health and disease, has purchased Spatial Transcriptomics for an undisclosed amount. The field of spatial genomics addresses how cells are organized in relation to each other, with 10x stating that Spatial Transcriptomics’ technology was the “first to capture the transcriptome, all active genes, from tissue section.” “We are thrilled to have the Spatial Transcriptomics team join forces with us,” commented 10x Genomics CEO and Co-founder Serge Saxonov. “Now, researchers will not only be able to understand what is happening within a cell but also understand where cellular activities are happening in relation to one another.” Spatial Transcriptomics will remain headquartered in Stockholm, Sweden. The company’s cofounders will continue to collaborate with the business.

*According to a 10x spokesperson, the company currently employs 380 people. Regarding Spatial Transcriptomics, she told IBO, “Throughout 2019, 10x Genomics plan to expand its presence in Sweden and will continue to grow its employee base.” She said that Spatial Transcriptomics’ technology adds growth opportunities for the company in the fields of oncology, neurology and immunology. Using glass array and barcoding technologies, Spatial Transcriptomics’ workflow maps the tissue section’s cell for RNA sequencing followed by microscope for tissue alignment. No dedicated instrumentation is required.*

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## PerkinElmer Names President and COO

*Waltham, MA 12/10/18; Washington, DC 12/13/18*—PerkinElmer has named Prahlad Singh as president and COO, effective January 1, 2019. He assumes the role of president from PerkinElmer Chairman and CEO Robert F. Friel. Mr. Singh is currently president of the company’s Diagnostics business, a position he has held since 2014 when he

joined the company. He was named executive vice president in March. “It is clear that technologies, applications and customer needs are converging across DAS [Discovery and Analytical Solutions] and Diagnostics as our customers’ businesses evolve and the lines between therapeutics, diagnostics, food and digital health are intersecting,” stated Mr. Friel. “The opportunities for DAS to become an enabler of the sciences of Diagnostics, and vice-versa, continue to grow.” The company highlighted opportunities between the businesses for incremental growth, operating efficiencies and faster innovation.

*Mr. Singh is charged with further integrating PerkinElmer’s business segments. Similarly, the company cited integration of capabilities as behind its 2016 creation its Discovery & Analytical Solutions unit (see [IBO 9/30/16](#)), bringing together its Environmental Health and Life Science Solutions divisions. Discussing the convergence of the DAS and Diagnostics businesses on its third quarter earnings call, Mr. Friel specified potential collaborations around assay development, genomics, workflow automation and digital offerings; for example, food testing using genomics techniques, and AI.*

## LGC Makes Analytical Chemistry Purchase

London, UK 12/12/18—LGC has acquired MBH Analytical for an undisclosed amount. Based in the UK, MBH manufactures and distributes metal alloy reference materials (RMs). “We are delighted to be adding MBH’s range of over 900 mainly unique products to our portfolio and their deep metal alloy development capabilities to our team,” commented Euan O’Sullivan, managing director, Standards, LGC. “MBH’s products are a great complement to LGC and the combination enables us to provide our customers with a portfolio of unrivaled breadth for all of their metal alloy RM requirements.”

*End-markets served by MBH include aerospace, automotive, metal manufacturing and electronics, as it supplies RMs for atomic spectroscopy testing. Although LGC’s recent acquisitions have been weighed toward the life sciences, the latest purchase shows its continuing investment in its general standards business.*

## Third Quarter Results: Biotage, Fluidigm, Hitachi High-Technologies, HORIBA, NanoString Technologies and Oxford Instruments

### Asia Experience Biggest Percentage Sales Increase of Biotage Products

Biotage Q3 FY18		
	Rev. (M)	Chg.
<b>Total Company</b>	SEK 232.2	30.7%
Systems	SEK 209.8	43.6%
Service Contracts and Other Services	SEK 20.8	-31.2%
Other Sales Revenue	SEK 1.6	13.6%

*Click to enlarge*

Biotage reported strong third quarter revenues, which exceeded the company’s expectations. The company’s third quarter organic sales rose 9.9% to SEK 232.2 million (\$26.1 million at SEK 8.90 = \$1). (See [IBO 11/15/18](#).) On a reported basis, systems and aftermarket product sales accounted for 51% and 49% of revenues respectively, including an increase in system sales in China and a high demand for peptide synthesizers in Australia. As a result,

Biotage did not achieve its desired sales split target of 40% system sales and 60% aftermarket sales.

Biotage Q3 FY18			
Op. Profit (M)	Chg.	Op. Margin	Chg. (bps)
SEK 45.1	53.9%	19.4%	294

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Analytical Chemistry sales increased 47% to SEK 90.7 million (\$10.2 million). Organic Chemistry sales rose 19.8% to SEK 125.0 million (\$14.0 million), thanks to the combined sales of the Isolera purification system and Biotage SNAP consumables for flash purification. Industrial product sales increased 41.6% to SEK 16.3 million (\$1.83 million).

Biotage Q3 FY18		
	Chg.	% of Rev.
North and South America	25.9%	43%
Europe	34.5%	25%
Japan	34.5%	12%
China	52.0%	10%
EMEA and APAC	10.3%	6%
South Korea	51.2%	4%
India	-42.5%	0.2%

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Geographically, Asia experienced the largest percentage sales increase thanks to consistent sales of organic chemistry products and growing demand for analytical chemistry products.

## Mass Cytometry Sales Lead Fluidigm Quarterly Revenue

Fluidigm Q3 FY18			
	Rev. (M)	Chg.	% of Rev.
<b>Total Company</b>	\$29.0	17.0%	
Instruments	\$13.9	32.1%	48%
Consumables	\$10.4	2.9%	36%
Services	\$4.7	14.2%	16%
License and Grant	\$0.0	-100.0%	0%

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In the third quarter, organic sales for Fluidigm increased 17% to \$29.0 million due to an increase in both product and service revenues, partially offset by a decrease in license revenue. (See [IBO 11/15/18](#).) Foreign currency had minimal impact on revenue growth and was not reported by Fluidigm. Mass cytometry revenue increased 50% to \$17.9 million. The company attributed to the robust instrument placements in translational research and cancer centers, especially the strong sales of Helios instruments. Another revenue highlight included the solid sales of Hyperion Imaging Systems, especially in the US.

Fluidigm Q3 FY18		
	Chg.	% of Rev.
US	18.6%	46%
Europe	13.9%	30%
Asia Pacific	34.4%	23%
Other	-58.9%	1%

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In contrast, genomics revenue decreased 13% to \$11.1 million. Specifically, genomics products sales fell 12% to \$9.0 million. The decrease in genomic product sales was due to lower sales of high-throughput genomics instruments, single-cell genomic product sales and consumables. Regarding genomics consumables, sales decreased because of a small customer base and inventory management.

Fluidigm Q3 2018			
Adj. Op. Profit (M)	Chg.	Adj. Op. Margin	Chg. (bps)
-\$11.6	25.5%	-40.1%	2290

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By region, highlights include China which increased 12% to \$3.4 million, accounting for 52% of the Asia-Pacific regional sales and 12% of global sales. China's regional sales mostly stemmed from multiple system placements for industrial, medical and pharmaceutical end-markets. Fluidigm projected its fourth quarter revenue guidance to be \$29-\$32 million.

## Biotechnology Sales for Hitachi High-Technologies Science & Medical Systems

Second quarter fiscal 2019 revenues increased despite a decrease in sales for biotechnology and medical products. (See [IBO 11/15/18](#).) The company reported steady demand for clinical chemistry and immunodiagnostic analyzers in Asia, primarily in China. In addition, there was growing demand for electron microscopes from electronic device and materials manufacturers in Asia. Other segment highlights included demand related to rechargeable batteries and RoHS compliance.

Hitachi High-Technologies Science & Medical Systems Q2 FY19			
	Rev. (M)	% of Rev.	Chg.
<b>Total</b>	¥511		6.9%
Medical Products	¥297	58%	16%
Scientific Instruments	¥84	16%	0%
Electron Microscopes	¥93	18%	5.7%
Biotechnology Products & Other	¥37	7%	-26%

[Click to enlarge](#)

The company forecasts third quarter fiscal 2019 division sales to increase 12% to ¥2,110 billion (\$18.5 billion = ¥114.04 = \$1).

Hitachi High-Technologies Q2 FY19			
	Rev. (M)	% of Rev.	Chg.
<b>Total</b>	¥1,922		11.1%
Advanced Industrial Products	¥739	38%	-0.9%
Science & Medical Systems	¥511	27%	6.9%
Electronic Device Systems	¥445	23%	38.6%
Industrial Systems	¥227	12%	22.7%

[Click to enlarge](#)

## Asia and the Americas drive HORIBA's Process & Environmental Sales

HORIBA's combined revenues for its Scientific & Systems (SI), and Process & Environmental Instruments and Systems (P&E) businesses rose 10.2% in the third quarter to ¥11,258 million (\$94.6 million at ¥119.00 = \$1) to make up 4% of total company sales. (See [IBO 11/15/18.](#))

HORIBA Q3 FY18			
	Rev. (M)	Chg.	% of Rev.
Process & Environmental Instruments & Systems	¥4,250.0	7.5%	9%
Scientific Instruments & Systems	¥7,008.0	11.9%	15%

[Click to enlarge](#)

P&E sales were driven by the Americas and Asia. In the case of Asia, the increase in sales was thanks to high demand for water quality and air pollution analyzers, while in the Americas, process measurement equipment drove regional sales. P&E orders grew a modest 1.7% to ¥4,856 million (\$40.8 million). Operating income increased by 180.3% to ¥1,182 million (\$9.9 million) due to increased sales in Asia. P&E fourth quarter revenue was forecast to

rise 29.4% to ¥5,500 million (\$46.2 million).

HORIBA Q3 FY18				
	SI		PE	
	Rev. (M)	Chg.	Rev. (M)	Chg.
Japan	¥1,628	10.5%	¥2,046	0.1%
Asia	¥2,264	24.3%	¥1,087	30.8%
Americas	¥1,863	7.8%	¥628	20.8%
Europe	¥1,254	1.5%	¥491	-12.6%

*Click to enlarge*

SI sales were driven by the Americas and Japan. As was the case last quarter, the increase in sales was attributed to high R&D spending. Despite being the most profitable region for SI sales, the Americas experienced an operating loss of ¥414 million (\$3.5 million) due to HORIBA's continuing investment to establish a presence in the region. SI orders rose 28.5% to ¥7,635 million (\$64.2 million). SI fourth quarter revenue was forecast to rise 28.5% to ¥7,635 million (\$64.2 million).

## NanoString's Overall Revenue Rises Due to Solid Biopharma Customer Base

In the third quarter, NanoString Technologies' total revenues increased high single digits due to its product and service revenue, which rose 26.8% to \$21.5 million. (See [IBO 11/15/18](#).)

NanoString Technologies Q3 FY18			
	Rev. (M)	Chg.	% of Rev.
<b>Total Company</b>	\$28.6	5.9%	
Instruments	\$5.4	22.2%	19%
Consumables	\$11.1	23.5%	39%
In Vitro Diagnostics	\$2.5	50.8%	9%
Service	\$2.3	32.6%	8%
Collaborations	\$7.2	-29.1%	25%

*Click to enlarge*

Instrument sales were strong because of consistent demand from the biopharma end-market, which accounted for half of the company's total instrument revenue. Oncology clinics continued to be NanoString's largest customer base, accounting for 60% of new instrument sales. Immunology panel sales grew more than 50% which resulted in the product line making up one-third of new instrument sales and accounting for one-quarter of all panel sales.

Other highlights included the nCounter systems' installed base growing 22% to 695, and nCounter Sprint system sales making up 45% of total instrument sales.

Total consumable sales rose 27.8% to \$13.7 million due to a 35% rise in sales of panels and a 50% sales increase in Prosigna IVD kits revenue. PanCancer panels were the most profitable consumables products as sales rose 25%.

Revenue from collaborations mostly stemmed from NanoString Technologies' partnership with Lam Research (See [IBO 08/15/17](#)).

NanoString Technologies Q3 FY18		
	Chg.	% of Rev.
Americas	4.8%	73%
Europe & Middle East	24.4%	21%
Asia Pacific	-27.9%	5%

[Click to enlarge](#)

Geographically, within the Americas, US revenue increased 3.6% to \$20.4 million. The Americas, Europe and Middle East, and Asia Pacific accounted for 68%, 21%, 10% of instrument revenue, respectively.

NanoString Technologies Q3 FY18			
Op. Profit (M)	Chg.	Op. Margin	Chg. (bps)
-15.1	-51%	-52.9%	-1572

[Click to enlarge](#)

Fourth quarter product and service revenue are forecast to increase 5%-9% to \$22-\$23 million, while total company revenue is expected to be about \$28-\$29 million. Fourth quarter instrument revenue is expected to remain consistent with the last couple of quarters sequentially. Collaboration revenue is expected to be around \$6 million thanks to updated plans for R&D spending of Hyb & Seq technology.

Due to third quarter product and service revenue guidance exceeding by \$1 million, NanoString raised its full-year revenue guidance to \$82-\$83 million, a 14%-15% increase. NanoString's total company revenue is forecast to be consistent with the previous guidance of \$104-\$106 million.

## Broad-Based Order Increase for Oxford Instruments

Oxford Instruments H119			
	Rev. (M)	Chg.	% of Rev.
<b>Total</b>	£147.0	11.3%	
Materials & Characterization	£60.1	20.0%	41%
Research & Discovery	£54.3	13.4%	37%
Service & Healthcare	£32.6	-4.4%	22%

[Click to enlarge](#)

In constant currency, Oxford Instruments' half-year fiscal 2019 sales ending September 30 rose 12.6%. (See [IBO 11/15/18.](#)) Orders rose 10.3% to £162.9 million (\$213.7 million at £0.76 = \$1) or 12.0% in constant currency.

Oxford Instruments H119				
	Adj. Op. Profit (M)	Chg.	Adj. Op. Margin	Chg. (bps)
<b>Total</b>		11.7%	14.3%	150
Materials & Characterization	£9.7	34.7%	6.6%	170
Research & Discovery	£4.80	14.3%	3.3%	41
Service & Healthcare	£6.50	-12.2%	4.4%	-61

[Click to enlarge](#)

Materials & Characterization (Asylum Research, NanoAnalysis, Plasma Technology) revenue was up 21.2% in constant currency. Orders increased 13.7% to £69.5 million (\$91.1 million). Semiconductor & Communications accounted for 39% of segment revenue, with the Advanced Materials, Environment, Energy and Healthcare & Life Science and Quantum Technologies markets representing 39%, 8%, 7%, 6% and 1%, respectively. Product sales strength included imaging and analysis products, semiconductor processing systems and AFMs. In addition, the recently launched Symmetry, a material structure analyzer, and Ultim, a large area X-ray detector, also sold well.

Research & Discovery (Andor Technology, NanoScience & Magnet Resonance, X-Ray Technology, minority share in ScientaOmicron) revenue was up 14.6% in constant currency. Orders increased 3.8% to £60.0 million (\$78.7 million). The Healthcare & Life Science, Quantum Technologies, Research & Fundamental and Advanced Materials markets respectively accounted for 40%, 25%, 18% and 10% of sales. Oxford Instruments did not report the remaining segmented revenues for Environment, Semiconductor & Communications and Energy. The company highlighted that the segments accounted for the remaining 7% of Research & Discovery's total revenue. Growth was offset by soft sales growth for x-ray tube and benchtop magnetic resonance systems revenues. Areas of revenue strength included optical microscopy systems, scientific cameras, cryogenic systems and superconducting research magnets.

Oxford Instruments H119		
	Chg.	% of Rev.
North America	5.3%	32%
Asia	18.9%	41%
Europe	10.8%	25%
Rest of World	66.7%	2%

*Click to enlarge*

Service & Healthcare revenue was down 2.9% in constant currency. Orders grew 14.8% to £33.4 million (\$43.8 million). Sales growth was led by demand for services. Revenue declined due to low sales of the OI Healthcare business' refurbished systems.

## Cryo-Electron Microscopy

Cryo-electron microscopy (cryo-EM) is a powerful emerging technology which enables high-resolution imaging of proteins, nucleic acids and other biomolecules, an area where traditional methods such as TEM, x-ray crystallography and NMR spectroscopy have been somewhat limited. In TEM, biomolecules are not compatible with the intense electron beams and high-vacuum environment, resulting in damaged or destroyed samples. X-ray crystallography, which requires the crystallization of molecules as part of the sample preparation process, yields altered molecules, rendering them unsuitable for study. Moreover, there are many proteins and other molecules that cannot be crystallized easily or even at all. NMR, while useful for small molecules, is severely limited in its ability to image large or membrane-bound biomolecules.

Cryo-EM overcomes these challenges by using frozen samples, less-intense electron beams and advanced image processing tools, resulting in a new method for the imaging of proteins and other larger biological molecular structures. In cryo-EM, samples are prepared using a rapid freezing process to ensure that water does not form a crystalline ice lattice, which is necessary to preserve the biological sample's structural integrity. Like traditional EM, in cryo-EM, an electron beam is used to interact with the sample, thus leaving traces that are detected and used to construct many 2D images. These 2D image constructs are further processed in order to generate a high resolution (3 Å-10 Å limit) 3D structural image of the sample.

The applications of cryo-EM are numerous due to the vast library of biomolecules that can be imaged using the technology. The understanding of the structure, function and interaction of biological molecules is paramount to the field of biochemistry, which provides potential significant advances in the understanding of disease, immune interactions, and ultimately the development of better therapeutics and medical treatments. In fact, the 2017 Nobel prize in chemistry was awarded to scientists "for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution," further validating its potential for high-impact scientific research.

The current end-user market for cryo-EM is primarily in academia. In 2016, University of Texas Southwestern Medical Center opened a new \$17 million cryo-EM center containing three new cryo systems. As the technology continues to mature and be adopted, it is migrating into the pharmaceutical and biotechnology sectors as well. AstraZeneca recently announced its investment in a Thermo Fisher Scientific Titan Krios G2 cryo-EM by its discovery sciences team, which the team has already used to define the world's first protein structures for human ataxia telangiectasia mutated (ATM), a prime therapeutic target in cancer.

Current vendors in the cryo-EM market include Thermo Fisher Scientific, JEOL and Hitachi High-Technologies. Thermo Scientific is currently in a leadership position following its \$4.2 billion acquisition of FEI (see [IBO 5/31/16](#)), offering three cryo-based models: the Glacios Cryo-TEM, Krios G3i-TEM and Talos Arctica. As the commercial cryo-EM market continues to develop, more vendors will surely be entering this space as well. The market is expected to grow in the high single digits going forward.

## Cryo-EM at a Glance:

### Leading Vendors

- Thermo Fisher Scientific
- JEOL
- Hitachi High-Technologies

### Largest Markets

- Academia
- Pharmaceutical
- Biotechnology

### Instrument Cost

- \$3-\$5 Million

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## Water

In a survey of 98 engineering, operations and corporate management experts within the water industry, nearly 70% of respondents reported that they are planning upgrades to existing facilities, indicating that new equipment and instrumentation is a necessity for municipalities. According to 48% of respondents, the budget for upgrades has generally remained the same from last year. Nearly 47% of respondents have a budget of \$1 million or more, and 22% have budgets between \$100,000 and \$499,000.

In last year's survey, 50% of respondents stated that revenues had increased, but this year's survey results imply a plateau in revenues, which is in line with the unstable political climate around infrastructure funding that was prevalent for most of 2018. For companies that import material from China, tariff increases will begin January 1, which will also impact the water industry. However, many manufacturers expect the trend of record revenues that has been experienced over the past few years to continue into 2019.

The most pressing issues for respondents in the coming year are state and federal regulations and compliance issues; funding; maintaining and upgrading facilities; developing and expanding the workforce; and preliminary wastewater treatments, including headworks and screens.

The majority of municipal funding for water has been in energy efficiencies, specifically relating to the purchase of drives. This points to a long-term strategy in which municipalities are investing. While public utilities' reinvestments are lagging, the private sector is filling in the investment gap. The hurricanes and other natural disasters in 2018 also contributed to opportunities to rebuild infrastructure.

State legislatures that secure funding projects are expected to be more involved than the federal government in 2019, according to experts in the water industry, as public-private partnerships are mostly only effective for larger companies and municipalities.

While most markets in the water sector are trending (i.e., food and beverage, power, oil, gas, agriculture irrigation, etc.), the key factor linking those markets is developing and utilizing recycled water, both for environmental and monetary concerns. Water needs have grown by 30%-40% year over year with no signs of slowing down, which makes the highlighted need of wastewater reuse in the industry a major one.

Source: [Water & Wastes Digest](#)

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## Clinical

Molecular diagnostic tests that employ gene-based analytical techniques use many advanced technologies such as FISH and MS, but like other diagnostic testing fields, there is a lack of harmonization of results. Cholesterol testing results have been harmonized by the CDC since the 1980s through the Lipids Standardization Program, which has led to potentially billions of dollars in savings and a major prevention of medical errors; however, most lab tests do not share the same luxury of a standardization program that harmonizes results.

Many researchers assume that clinical lab assays are accurate and will provide the same results regardless of where the testing is done, which is a serious misconception, as assays can vary from vendor to vendor, method to method, or instrument to instrument. In a survey of 16 molecular diagnostics labs earlier this year, nomenclature, description of methodology, managing variants of uncertain significance and result content were listed as areas in dire need of standardization.

Advocates for the harmonization of lab results celebrated a win in early 2018 when the US FY2018 federal omnibus spending package included \$2 million for the CDC for advancing harmonization efforts, specifically for results for free testosterone, thyroid stimulating hormones and estrogen/estradiol tests. However, additional federal funding is not enough—harmonization will not be possible without the support and initiatives undertaken by other stakeholders, such as clinical societies, lab organizations, reference material suppliers and IVD producers. This is especially significant for the future as molecular diagnostic testing is becoming more prevalent in the health industry.

**Source:** [Biocompare](#)

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## Genomics

On the heels of the recent news of the first gene-edited babies born in China, many questions arose regarding the safety and ethics of gene editing tools such as CRISPR, as well as questions regarding the role and responsibilities of the vendors supplying the technologies. The questions raised include whether a vendor is responsible for the actions of a buyer, how a seller can ensure how a buyer will utilize the technology, what technologies require better vetting and where the onus for ethical behavior lies.

Merck KGaA became a significant vendor for CRISPR and other gene editing tools in 2015 when it acquired Sigma-Aldrich (see [IBO 11/30/15](#)). According to the company, Merck is developing methods to verify the authenticity of its buyers and it does not condone heritable human genome editing of any kind, due to the lack of understanding of off-target effects.

The consent document that was signed by the parents of the Chinese babies listed Thermo Fisher Scientific and Sythego as suppliers of the Cas9 and guide RNA, respectively, used in the experiment; however, neither company has confirmed that their technologies were used, and each stated they are working on promoting the ethical use of gene editing.

Other companies state that they have systems to evaluate potential customers, including the nonprofit Addgene, which investigates applications to establish that the genes they supply will be used for a legitimate research project. Experts in the field believe that it is imperative that gene editing tool companies need a “know-your-customer” screening process.

**Source:** [Chemical & Engineering News](#)

# Czech Republic

Direct federal R&D spending in the Czech Republic reached CZK 30.7 billion (\$1.3 billion) in 2017, a 9.6% jump. Private business R&D received CZK 3 billion (\$131.7 million) from the government, rising 15.4%. To calculate public funding of R&D, the Government Budget Appropriations on R&D (GBARD) is examined for direct funding, and statistics of Government Tax Incentives for R&D expenditures (GTARD) are measured to calculate indirect public support for R&D. In 2016, indirect support for R&D through GTARD reached CZK 2.4 billion (\$105.3 million). 2017 figures are not yet available.

The Czech government provides budget allocations for R&D based on 13 specific socioeconomic objectives, which include: protection and improvement of human health; production, distribution and rational utilization of energy; agricultural production and technology; and research financed from General University Funds (GUF).

In the health category, CZK 2.4 billion (\$105.3 million) was allocated by the government to R&D, which represented 8% of total GBARD. The vast majority of this funding, or 89%, was for medical research, hospital treatment and surgery, totaling CZK 2.1 billion (\$93.2 million). Biomedical engineering and medicines GBARD was CZK 154.1 million (\$6.8 million), while nutrition and food hygiene GBARD reached CZK 41.1 million (\$1.8 billion). Other medical research GBARD was CZK 20.6 million (\$904.1 thousand).

Approximately 61% of energy GBARD was for nuclear fission, which received CZK 635.1 million (\$27.9 million) in funding. Renewable energy sources received CZK 57.1 million (\$2.5 million), and general research received CZK 5.4 million (\$237.0 thousand). Agricultural technology GBARD was allocated CZK 529.4 million (\$23.2 million), which represented 44% of total agricultural GBARD. This was followed by veterinary medicine and animal products, which received CZK 203.6 million (\$8.9 million) and CZK 162.9 million (\$7.1 million), respectively.

Within research financed from general university funds, engineering sciences received the greatest GBARD allocation at 20%, at CZK 1.4 billion (\$60.5 million). Medical sciences and biological sciences received CZK 701.3 million (\$30.8 million) and CZK 695.4 million (\$30.5 million), respectively, while chemical and physical sciences received CZK 776.4 million (\$34.1 million) and CZK 671.9 million (\$29.5 million), respectively.

**Source:** [Czech Statistical Office](#)

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# South Korea

South Korea has long had an impressive R&D-to-GDP ratio, but the country is now the world leader in the field, according to a Ministry of Science and ICT survey of 50,619 domestic companies between April and September. In 2017, South Korea's R&D-to-GDP ratio was 4.55%, up 0.32 percentage points, beating Israel's ratio of 4.25%. In total, South Korea invested KRW 78.8 trillion (\$69.3 billion) in R&D last year, a 13.5% increase that puts South Korea in fifth place for highest R&D spending globally.

R&D investment by the private sector expanded the most at 14.7% to KRW 60.1 (\$53.15 billion). Corporations spent KRW 62.3 trillion (\$55.4 billion) on R&D, which made up 80% of total R&D investments in 2017. Corporate investments also include a portion of government R&D activity, which accounts for KRW 20 trillion (\$17.7 billion) per year. Public research institutes spent KRW 9.6 trillion (\$8.5 billion) on R&D in 2017, representing 12% of total R&D spending, and universities spent KRW 6.7 trillion (\$5.9 billion), accounting for 9%.

Development research for commercialization made up 64% of total R&D investments at KRW 50.1 trillion (\$44.3 billion). It was followed by application research and basic research, which totaled KRW 17.3 trillion (\$15.3 billion) and KRW 11.4 trillion (\$10.1 billion), respectively. The number of researchers in R&D also grew 4.8% last year, reaching 482,796, with 383,100, or 79%, working as full-time equivalent researchers.

**Source:** [BusinessKorea](#)

# Germany

After a few years of an upward trend, Germany's 2019 outlook for the chemicals industry is "less optimistic," thanks to potential global trade issues, uncertainties due to Brexit and a general slowdown of the German economy, according to VCI, Germany's chemical trade group. The largest chemical producer in Europe, Germany's chemical industry sales reached €203 billion (\$232 billion) in 2018, a first for the nation and a 4.5% jump; however, experts report that the momentum is coming to an end. Although 2018 was a positive year, ultimately many chemicals companies' production actually declined.

German chemical prices increased 2.0% in 2018, while output grew 2.5%. The increase in output was largely driven by an 11.5% improvement in sales in the pharmaceutical sector. Inorganic basic chemicals' output fell 2.5%, while output for polymers and petrochemicals decreased 2% each. Soap, detergents, and cleaning or cosmetics manufacturers produced 3% less than in 2017. Fine specialty chemicals output is one of the only categories with increased output, growing 1.5%.

In 2019, production in the German chemical-pharmaceutical industry is expected to rise 1.5%, provided no significant issues affect the industry. Prices and sales for chemicals are forecast to grow 1% and 2.5%, respectively.

Source: [ICIS](#)

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## Broad-based Companies

### Company Announcements

**Shimadzu Scientific Instruments (SSI)** and **Oklahoma State University (OSU)** established in September the **College of Engineering, Architecture and Technology's (CEAT) Mechanical and Physical Properties Testing Lab**, part of the **ExxonMobil Testing Laboratory** in the new ENDEAVOR facility at OSU's Stillwater, Oklahoma campus. To support OSU in the establishment of ENDEAVOR, SSI awarded a grant as part of the Shimadzu Partnership for Academics, Research and Quality of Life program. The Shimadzu suite of instruments in the new lab includes an ED-XRF spectrometer and six fully loaded, high-capacity Universal Test Machines offering testing capabilities that can be found only on the OSU campus.

In its third quarter earnings call held in November, **Bruker** announced that it expects its Malaysia-based manufacturing, engineering and final-test facility to become operational in 2019. The facility will accommodate select Bruker Nano products, with product sales from the facility expected to total \$50 million in revenue by 2021.

**Mettler-Toledo's** third quarter lab revenue grew 11% in local currency, 9% in US dollars, to make up 50% of total sales, or \$369.0 million (see [IBO 11/30/18](#)). The company highlighted sales in the process analytics, automated chemistry and pipettes businesses. The **Biotix** acquisition (see [IBO 11/15/17](#)) added about 2% growth. Chinese lab sales grew slightly less than 20%. The firm expects 2019 lab sales to grow in mid- to high-single digits.

In November, **Agilent Technologies** announced the opening of a purpose-built extension to its Little Island, Cork facility in Ireland. The campus will focus on developing advanced technologies for the analysis of live cells in real time, including the acquired **Luxcel Biosciences** technology (see [IBO 1/15/18](#)). The complex will house two new laboratories, one dedicated to cell analysis technologies, and the other to developing biosensors and related bioassay solutions.

**Diploma** reported that sales for its Environmental businesses grew 1% to £20.2 million (\$35.4 million) but were flat in constant currency for the fiscal year ending September 30 (see [IBO 11/30/18](#)). Revenue for Germany-based **a1-group** grew 7% in euros. Sales were strong in Germany, but UK revenue declined. UK-based **a1-CBISS** sales declined 8% due to delays in orders for continuous emission monitoring systems. Service revenue for the businesses remained healthy.

**Merck KGaA** announced in November a joint venture with software firm **Palantir Technologies** to form **Syntropy**.

Syntropy will provide data integration and analytics technology for collaboration to drive scientific discovery, while ensuring control, ownership and traceability of the data.

In November, **Merck KGaA** promoted Jasper Bos to managing director of **M Ventures**, its strategic corporate venture capital arm. He replaces Roel Bulthuis.

In November, India's **Council of Scientific and Industrial Research-Institute of Microbial Technology** partnered with **Merck Life Sciences** to create a "High End Skill Development Center" in Chandigarh.

**Rigaku** announced in November a partnership with analytical services provider **Covalent Metrology**. Rigaku will supply Covalent with several instruments for its new facility in Sunnyvale, California. The facility will also function as a Rigaku North America demonstration facility.

In November, **Metrohm** announced a continuation of its collaboration with **USP** on a global initiative to modernize monographs that have traditionally features wet chemistry methods. The updates center on IC and autotitration methods.

Canada's **Valens GroWorks**, a licensed, vertically integrated provider of cannabis products and services, announced in November an expanded research collaboration agreement with **Thermo Fisher Scientific**. Valens will utilize Thermo Fisher's instruments and consumables to develop and validate analytical methods for the study of cannabis.

In December, **Endress+Hauser**, which provides measurement and service solutions for industrial process engineering, announced that Dr. Andreas Mayr will become COO, responsible for sales, production and support, effective March 1, 2019. He will also serve as deputy CEO. The company stated that the new position will shift operational responsibilities to the COO, freeing up time for the CEO, whose areas of focus will include the lab analytical business.

**Sartorius** announced in December the appointment of Dr. René Fáber, head of the Bioprocess Solutions Division, and Gerry Mackay, head of the Lab Products & Services Division, as new members of the company's Executive Board, effective January 1, 2019. Reinhard Vogt will step down from the Board.

**Porvair** announced in December that it expects Laboratory division sales to grow 12% for the fiscal year ending November 30.

**Anton Paar** has announced plans to open new direct subsidiaries in Spain and Taiwan, effective January 1, 2019.

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## Liquid Chromatography

### Company Announcements

CDMO firm **Cobra Biologics** announced in September a collaboration with the UK-based **Center for Process Innovation** and **GE Healthcare Life Sciences**, funded by a £0.57 million (\$0.67 million) **Innovate UK** grant. The project aims to increase the robustness and reduce costs for the manufacturing of adeno-associated virus (AAV) vectors. The project will extend the advantages of GE Healthcare's Puridify fiber-based chromatography technology platform and develop a multistep fiber-based chromatography purification process for AAV.

**GE Healthcare** opened in November a biotechnology manufacturing center at the **Stevenage Bioscience Catalyst (SBC) Open Innovation Campus**, in Stevenage, UK. In the first half of 2019, the center will begin producing a fiber-based purification platform, which has the potential to significantly improve efficiency in the purification steps of manufacturing biopharmaceuticals, gene therapies and viral vectors. Additional products will also be produced at the center to serve both laboratory and clinical applications.

In September, **SiliCycle**, a provider of silica-based products, received a CAD 1 million (\$0.76 million) repayable contribution from **Canada Economic Development for Quebec Region** to assist the company in diversifying its markets through the development and commercialization of products that result from the conversion of residual

biomass.

**Novasep** announced in October a partnership with **Solanic**, an **AVEBE** company, to industrialize its purification process to produce high-performance potato proteins for the food industry. The installations are the first industrial compact-bed chromatography systems for vegetable proteins purification.

In November, **Cobra Biologics** announced a £1.5 million (\$1.9 million) shared **Innovate UK** grant with **Pall** and the **Cell and Gene Therapy Catapult** to investigate continuous manufacturing of AAV for gene therapy applications. The work will involve in-process analytical techniques and manufacturing approaches based on continuous chromatography platforms to significantly increase process yields, including Pall's Cadence BioSMB system.

In December, **Purolite** named Iowa-based **Global Water Services** as the midwest distribution point for Purolite ion exchange, adsorbent and other resin products.

## Product Introductions

In October, **MilliporeSigma** launched the Eshmuno CP-FT resin, calling it a first-of-its-kind CEX chromatography resin for the flow-through removal of aggregates from mAb therapeutics. The resin uses flow-through frontal chromatography.

In November, **Trace Elemental Instruments** launched the XPREP C-IC, calling it the world's first automated combustion-IC sample preparation system. It samples = combustion gas and automatically transfers the condensed samples towards the IC.

**Shimadzu Scientific Instruments** released in November its new Shimpack Velox columns with core shell technology. The currently available phases are SP-C18, C18, biphenyl, PFPP and HILIC.

## Sales and Orders of Note

**Allotrope Foundation**, an international consortium of 14 global biopharmaceutical companies, selected **TetraScience** to standardize chromatography data captured by **Waters** Empower 3 Software through conversion to the Allotrope Data Format (ADF) for an **Allotrope Community Project**.

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# Laboratory Products

## Lab Automation

### Company Announcements

Fiscal year 2018 sales ending September 30 for **Brooks Automation's Life Sciences Segment** grew 32.1%, including 14% organic growth, to \$196.5 million, or 31% of total revenues (see [IBO 11/30/18](#)). Products and Services accounted for 47% and 53% of segment revenue, respectively. The life science sample management market made up 31% of segment revenue. Revenue outside the US represented 63% of segment revenue. The company reported 200 new customers for the segment, a 20% increase.

### Product Introductions

**Labcyte** launched in October the Echo 650 and 655 Liquid Handlers, featuring new usability such as an improved fluidics system with a simplified maintenance procedure. The Echo 500 series liquid handlers remain available.

In October, **Hamilton Storage** released a six-channel head to cap and decap large-format tubes, such as the **Nunc**

## Lab Equipment

### Company Announcements

**Paragon Care**, an Australian publicly listed medical equipment company, acquired distributor **LabGear Australia** over the summer.

**INFORS HT** announced in October an expanded distribution agreement with **aquila biolabs**, adding the LIS. The LIS (liquid injection system) is an easy-to-use technology for automated feeding of liquids in shake flasks.

In October, **Adam Equipment** announced it is now shipping its new Equinox and Solis advanced lab balances in the UK and Europe. Semi-micro, analytical, and precision models are available and include both external and internal calibration.

**Porvair Sciences** introduced in October the UltraVap Mistral XT 100 for fully automated dry down of organic solvent-based samples in tubes up to 100 mm in length.

**BIOKÉ**, a business unit of **Cell Signaling Technology Europe**, has signed a distribution agreement in November with **Syntec International** to distribute Syntec's semi-automated homogenizer Medimachine product line in the Netherlands, Belgium and Luxembourg.

### Product Introductions

In October, the **Fraunhofer Institute for Molecular Biology and Applied Ecology IME**, the **Goethe University Frankfurt/Main** and **Pharma Test** announced the development of the new Dispersion Releaser apparatus, PT-DR, for a standard dissolution tester to provide a solid system for the release testing of nanomedicines, microformulations and semi-solid dosage forms. The DR technology is a dialysis-based device to test the dissolution rate of dispersed dosage forms using a standard USP apparatus two-tablet dissolution bath.

In November, **Asynt** introduced the DrySyn OCTO Mini Conversion Kit to enable efficient sample reactions using the DrySyn OCTO 8-position parallel synthesizer. The Kit quickly adapts a standard DrySyn OCTO unit for use with shorter-length reaction tubes, enabling faster reaction sampling with disposable needles.

**VELP** released in November the new OHS Series overhead stirrer, featuring brushless motors that ensure a long life span and reliability. VELP technology guarantees that OHS Advance and Digital have constant torque along the whole speed range.

**MilliporeSigma** debuted in October the MilliQ IQ 7003/7005 integrated ultrapure and pure system for Type 1 and Type 2 water, a complete redesign of its MilliQ product. Unique design features include system auto-rinsing prior to production, a seamlessly integrated vent filter for improved protection against airborne contaminant and a built-in e<sub>2</sub>o bactericidal UVC LED lamp.

In November, **Boekel Scientific** launched a new line of programmable heating block with advanced touch screen control. The interface allows for programmable time and temperature steps for up to five temperature changes, and the ability to repeat programs indefinitely for thermocycling procedures.

**Restek** introduced in November new pesticide residue standards to meet the specific cannabis analysis needs of Oregon and states with similar pesticide residue regulations/programs. Dissolved in acetonitrile and formulated for stability, the 59 compounds are separated into 6 x 1 mL solutions with individual analyte concentrations of 600 mg/mL, resulting in a 100 mg /mL solution when blended immediately before use.

In November, **BINDER** released the ultra freezer series, stating that compared with other products in its class, it has the best energy efficiency values. The series features interior volumes of 500 L and 700 L.

# Electrochemistry

## Company Announcements

In November, **MANTECH** announced it will exclusively sell its systems, parts and consumables in Canada, effective January 1, 2019.

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# GC & GC/MS

## Company Announcements

In October, **VUV Analytix** signed a distribution agreement with **Shimadzu**. Shimadzu, along with its subsidiaries and sub-distributors, will market and sell VUV's VGA-100 and VGA-101 universal vacuum UV spectroscopic detectors as bundled solutions with its GCs.

## Product Introductions

In October, **VUV Analytix** released VUVision 3.0 Data Analysis Software, which features an intuitive interface for analyte characterization by Vacuum Ultraviolet (VUV) spectroscopy. VUVision 3.0 now includes integration with the **National Institute of Standard and Technology** spectral library as well as inclusion with the **EPA** and **NIH** Retention Index Library.

## Sales and Orders of Note

**FLIR Systems** announced in October the receipt of received an award for its portable G510 GC/MS from the **US Department of Defense Joint Program Executive Office for Chemical Biological Radiological and Nuclear Defense** in support of **the Multi-Phase Chemical Agent Detector** program. The "Other Transaction Authority Agreement" is valued at \$28.7 million, and expected to be executed through mid-2022.

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# Reported Financial Results

Other Currencies in Millions								
DKK-TOA	Q1	30-Jun	¥4,058.0	31%	¥359.0	102%	¥204.0	179%
DKK-TOA	Q2	30-Sep	¥8,515.0	26%	¥868.0	58%	¥572.0	60%
Olympus (Scientific Solutions)	Q2	30-Sep	¥26,215.0	6%	¥3,182.0	73%	NA	NA
Syft Technologies	H1	30-Sep	NZD 7.1	49%	NZD 4.4	56%	NZD 0.6	140%

NA = not available; NM = not meaningful  
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