
Strategic Directions International, Inc.

INSTRUMENT BUSINESS OUTLOOK



Strategic Information for the Analytical & Life Science Instrument Industry

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June 30, 2018

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IBO Productivity Review: Illumina Leads the Pack

The productivity, measured as currency-neutral sales per employee, of selected analytical instrument and lab product companies/businesses rose 19.1% in fiscal 2017 to an average of \$317,205. Six of the 16 companies

recorded sales per employee of over \$300,000. However, the seemingly dramatic increase was affected by several factors, including acquisitions and skyrocketing growth for one company. Excluding NanoString Technologies, whose sales grew 33% in 2017, average sales per employees for the remaining 15 companies tracked by **IBO** (see table below) were flat at -0.2%. Average sales per employee for the table, excluding NanoString, were \$280,247. In addition, PerkinElmer and Thermo Fisher Scientific each completed two major acquisitions in 2017, EUROIMMUN (see [IBO 6/30/17](#)) and Patheon (see [IBO 5/15/17](#)), respectively, affecting their employee-to-sales ratio.

Company	FY17 Sales per Employee	FY17 # of Employees	Empl. Chg. 2016-17	Currency Neutral Rev. Chg. 2016-17	Currency Neutral Productivity Chg. 2016-17
Agilent Technologies	\$331,259	13,500	8.0%	7.4%	5.9%
Biotage	\$250,724	349	13.3%	12.7%	11.4%
Bio-Techne	\$312,778	1,800	15.4%	13.8%	11.3%
Bruker	\$284,839	6,200	3.3%	8.4%	15.0%
Eppendorf	\$244,919	3,167	4.6%	7.9%	9.3%
Fluidigm	\$201,980	505	-14.3%	-2.3%	11.2%
FOSS	\$239,540	1,408	2.5%	4.9%	7.3%
Illumina	\$443,919	6,200	12.7%	14.8%	16.8%
NanoString Technologies	\$246,049	467	14.7%	32.9%	53.8%
Pacific Biosciences	\$204,974	456	4.1%	3.0%	2.0%
PerkinElmer	\$205,180	11,000	37.5%	6.3%	-17.5%
QIAGEN	\$301,603	4,700	0.3%	5.9%	11.9%
Sartorius (Lab Prod. & Ser.)	\$175,705	2,521	8.3%	8.0%	20.8%
Tecan	\$377,592	1,482	4.9%	8.3%	11.9%
Thermo Fisher Scientific	\$298,829	70,000	27.3%	5.0%	-5.6%
Waters	\$329,868	7,000	1.5%	7.0%	12.3%

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The Acquirers

Thermo Fisher's purchase of contract research and manufacturing organization Patheon added approximately 9,000 employees. However, the acquisition closed in August 2017 so only a portion of Patheon's sales were included in Thermo Fisher's full-year revenues. As a result, sales per employee for the company fell 5.6% to \$298,829 sales per employee. However, calculated on a pro forma basis (as if Thermo Fisher had owned Patheon for the whole year), sales per employee totaled \$316,342.

In addition to growing through acquisition, Thermo Fisher is investing in emerging markets. Its Chinese workforce accounts for 6% of the company's total employee base and includes 2,400 commercial employees. China accounts for 11% of Thermo Fisher's revenues or \$2.2 billion last year. This results in an impressive \$488,889 per employee. The sales per employee in China is at \$150,000, with Indian sales at approximately \$300 million and 2,000 employees.

PerkinElmer closed its purchase of EUROIMMUN in December 2017. Thus, in 2017, PerkinElmer added EUROIMMUN's 2,400 employees but only a small portion of the acquired company's revenues were counted for the fiscal year. Consequently, the company's productivity declined 17.5% to \$205,180. However, calculated on a pro forma basis, sales per employee totaled \$232,961. In total, the company reported a reduction in headcount of 147 in FY17, less than 1% of its workforce, compared to 94 in 2016.

The Gainers

NanoString Technologies and Sartorius' Lab Products & Services Division showed the largest percentage jumps in productivity in 2017 of the businesses examined in the table. For NanoString, its skyrocketing sales growth,

including a sizable increase in collaboration revenue, was matched by only a 14.7% increase in its workforce, including increasing its R&D personnel by other a third (see table below).

R&D Headcount at Selected Companies for FY17			
Company	Total	% Chg.	% of Employees
Bruker	1,000	6.4%	16%
Fluidigm	100	-23.7%	20%
NanoString Technologies	144	34.6%	31%
Pacific Biosciences	176	10.7%	39%
QIAGEN*	953	-4.2%	20%
Waters	1,004	3.4%	14%

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Similarly, Sartorius Lab Products & Services recorded an increase in productivity of over 20%. The boost was assisted by the company's March 2017 purchase of Essen BioScience (see [IBO 3/15/17](#)), which added \$60 million in revenues and approximately 178 employees, including 39 R&D employees. Thus, the business' productivity figures benefited last year from Essen BioScience's higher sales per employee of around \$337,079. Nonetheless, Sartorius Lab Products & Services has the lowest sales per employee among the companies in the table at less than \$200,000.

The Hirers

In addition to Sartorius Lab Products & Services, as well as PerkinElmer and Thermo Fisher Scientific, which all completed acquisition during 2017, four other companies recorded workforce increases that surpassed sales growth last fiscal year.

Agilent Technologies added 1,000 employees, an 8.0% increase. The company completed three acquisition during fiscal 2017 but its two largest acquisitions (see [IBO 12/31/16](#), [IBO 7/15/17](#)) added a total of only 142 employees. This suggests that most of the company's new employees were direct hires. Posting the largest percentage increase among the company's business units was Agilent CrossLab, whose employee count rose 18.4% to 4,500. Also boosting its headcount was Diagnostics and Genomics Group, where total headcount rose 15.8% to 2,200. In contrast, headcount for the Life Sciences and Applied Markets Group declined 2.3% to 4,200.

In China, sales accounted for 20% of the company's total revenues in FY17, and with an employee base of over 1,700 employees, the result is a strong \$526,118 in sales per employee for the country.

Headcount grew slightly faster than sales for Bio-Techne in fiscal 2017. The company noted on its quarterly conference calls during the fiscal year investments in sales and marketing in both Europe and China. In its fiscal third quarter 2017 call, the company disclosed a 200-person workforce for sales and marketing. The company also highlighted the addition to the business of new employees support the its newest business Advanced Cell Diagnostics (ACD) (see [IBO 7/15/16](#)). Completed in fiscal 2017, ACD contributed 100 employees to the total of 240 new hires last fiscal year. With \$25 million in annual revenues, ACD's sales per employee were \$250,000.

Biotage's percentage growth in employees also slightly edged out its sales growth in 2017 as the company added personnel in all its regional businesses except France and Germany. The company has announced an expansion in its regional presence with a new office in South Korea opened in 2016. Last year, Biotage more than doubled its staff at this office from 2 to 5. The company also boosted personnel in its Chinese operations from 13 to 18 with resulting sales of SEK 64.3 (\$7.5 million at SEK 8.55 = \$1), or \$417,804 in sales per employee in US dollars.

Similarly, Pacific Biosciences' headcount showed a minor percentage increase compared to sales growth. Among the biggest changes were a 10.7% increase in R&D employees to make up 39% of total employees. Thus, 17 of the the company's 18 new hires were in R&D as the company, offset by reductions in other functions.

The Outliers

Illumina stood out in the table, for as its employee count grew double digits, sales grew even faster. The company has the highest sales per employee among businesses in the table at \$443,919, far surpassing the next largest sales per employee of \$377,592 per employee for Tecan. Illumina's advantage is related to its premium priced consumables, a growing testing service business and overall fast sales growth. As the company disclosed last year on a quarterly conference call, headcount additions have been made in its sales force for benchtop instruments as well as investments in China.

In contrast, Fluidigm was an outlier in that it was the only company in the table to record a decline in employees numbers and sales growth. However, employee numbers declined faster than sales, leading to double-digit growth in productivity. Among the areas with the biggest declines in personnel were R&D with a 23.7% decline and sales, technical support, and marketing headcount with a 17.7% decrease.

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Contract Testing Labs Deliver Strong Revenues

After experiencing negative impacts due to sluggish oil, gas and mineral markets in 2015 and working on recovering revenues in 2016 (see [IBO 7/15/17](#)), publicly held contract testing labs ALS, Eurofins and SGS were back on track in 2017 to deliver strong revenues across their business segments.

Through acquiring companies, making divestments and investing in startups, ALS, Eurofins and SGS generated significant gains in revenue last year, especially in the environmental, food and agriculture testing segments. ALS

and Eurofins' revenues increased in the double digits, while SGS revenues rose less than 10%. Nonetheless, revenues for ALS, Eurofins and SGS are on an upward trajectory, as each of the three testing companies are in the middle of a specific multi-year strategic growth plans.

Contract testing labs have a global presence and offer broad testing services, which establish them as an important customer base for analytical instrumentation and lab product companies. Through acquisitions, consolidations and operational changes, the business activities of contract testing labs are influential in deciding on the purchase, utilization and application of analytical instruments and lab products.

ALS, Eurofins and SGS Latest FY Revenues		
	Rev. (M)	% Rev. Change
ALS	AUD 1,446.9	14.7%
ALS Life Sciences	AUD 734.1	14.4%
Eurofins	€ 2,971.4	16.9%
SGS	CHF 6,349	5.4%
Environment, Health and Safety	CHF 485.8	3.0%
Agriculture, Food and Life	CHF 1,016.3	7.7%

ALS

Australian firm ALS provides testing services in three main segments: Life Sciences, Commodities and Industrial. In March, the company decided to exit its Oil and Gas segment due to continued underperformance in the sector. With over 300 labs in 70 countries in Africa, Asia, Australia, Europe and the Americas, ALS operates in numerous industries, providing testing and inspection services for the mining, natural resources, environmental, food, pharmaceutical and industrial end-markets.

FY18 ending March 31 proved to be a strong year for ALS, with revenues jumping 14.7% to AUD 1.5 billion (\$1.1 billion at AUD 1.36 = \$1), and underlying net profit spiking 21.1% to AUD 142.2 million (\$104.5 million). ALS acquired numerous companies in FY18, specifically in the food, pharmaceutical and tribology testing sectors, including Marshfield Food Services in the US, OILCHECK in Brazil and Mikrolab in the Nordic region.

All of ALS's segments delivered healthy results in FY18. Commodities revenue grew the most, up 21.5% to total AUD 518.9 million (\$381.3 million), while Industrial sales improved a nominal 0.6% with revenues of AUD 193.9 million (\$142.5 million). The Life Sciences segment brought in the largest share of revenues, which are discussed below.

ALS Life Sciences

The company's Life Sciences segment conducts testing in environmental, food and pharmaceutical, and consumer product sectors, focusing on microbiological, physical and chemical testing services. In FY18, Life Science revenue grew a robust 14.4%, bringing in revenues of AUD 734.1 (\$539.4 million), marking it as the best performing segment.

Food and pharmaceutical testing revenues increased in all regions. ALS plans to continue acquiring food testing companies, specifically in the Americas and Europe, in FY19.

Segment revenues increased in all regions. However, even though Europe delivered a 25% increase in revenues, the segment reported a decline in contribution margin in the region due to acquisition completion costs brought upon by

the integration of ALcontrol in the UK, which was acquired in December 2016. Asia and Australia delivered strong growth, especially in the environmental testing sector.

Eurofins

Based in Luxembourg, Eurofins provides testing services for a variety of sectors, such as the agriculture, biopharmaceutical, clinical diagnostic, environment, food and genomic markets. Eurofins has over 400 labs across 44 countries, and a portfolio of more than 150,000 analytical methods. The lab testing company performs over 360 million tests each year.

One of the fastest growing public European companies, Eurofins' sales have grown by a CAGR of 36% since its IPO on the French stock exchange in 1997, totaling €2.97 billion (\$3.5 billion at €0.86 = \$1) in FY17, a 16.9% increase. Of this, 6% was organic growth. Capital expenditures for FY17 grew 9.7% to total €213 million (\$247.3 million), with the ratio of net capital expenditures and sales having dropped 50 basis points to 7.2% of FY17 revenues. This was mostly due to the sale of a facility that had been obtained in an acquisition from years before. Capital expenditures in FY17 included the addition of 570,487 ft²(53,000 m²) state-of-the-art lab space, the establishment of 30 startup labs, and continued development and implementation of new IT solutions.

Geographically, North America continued to represent the largest market for Eurofins at €902.8 million (\$1.0 billion), 30% of revenues, jumping 12.3%. The growth was largely driven by biopharma services, which was bolstered by the US FDA approving a record number of novel drugs. France remained the company's second largest market, accounting for 23% of sales and bringing in FY17 revenues of €677.8 million (\$787.1 million), an 8.3% increase. While revenues grew, organic growth was below average in France, mostly due to total lab spend being capped by French health authorities. However, this limitation was offset by demand for food, microbiology, environment and genomics services, with the latter having the fastest organic growth. German revenues spiked 22.6% to €342.5 million (\$397.1 million), thanks to the vigorous food testing market as well as the biopharma sector, which brought in the greatest organic growth in the region.

Continuing its expansion in Asia Pacific, Eurofins reported revenues of €272.0 million (\$315.8 million) in the region, a 19% jump. During FY17, Eurofins further expanded its footprint, establishing its market presence in Argentina, Estonia, Lithuania, Slovenia and South Korea, which boosts its portfolio in Central and Eastern Europe, and sets the stage for future growth in Latin America.

Acquisitions and Startups

Eurofins acquired 60 companies in FY17, up over 100% from the 27 acquisitions it made in FY16. Significant acquisitions include environmental testing labs such as Ahma Ymparisto, Finland's second-largest environmental testing lab, and Nab Labs Group, another large Finnish environmental testing lab; VBM Laboratoriet, a leading environmental testing lab in Denmark; the analytical business of Finland's Ramboll, made up of five testing labs; and Spectro Analytical Labs in India, which serves as an entry into the environmental testing market in the region.

Other acquisitions completed in FY17 included Canadian company Alphora Research, a contract R&D and manufacturing organization; Italy's Genoma, a leading genetic testing provider in the country; California-based DiscoverX, which provides drug discovery products and services; and LGC Forensics, the largest forensic science services lab in the UK. In December, Eurofins also completed the acquisition of EAG Laboratories, which provides testing, inspection and certification, for \$780 million, the largest acquisition in the company's history. The 60 acquisitions represent revenues of approximately €700 million (\$812.8 million).

As part of Eurofins' startup program, the company established 30 startups in FY17, a record number for Eurofins, up 36.4%. Startups, along with businesses in the process of being restructured or reorganized, brought in revenues of €258 million (\$299.6 million), accounting for 8.7% of Eurofin's total revenues, a 21.6% decrease.

Infrastructure

As previously mentioned, Eurofins added 570,487 ft² (53,000 m²) of lab space in FY17, and has planned to construct an additional approximately 1,065,627 ft² (99,000 m²) of lab space in 2018 and an extra 968,751 ft² (90,000 m²) in 2019. During the year, the company opened a new facility in Chile for its Agriscience Services segment and relocated its Chinese food testing facility.

New facilities with construction plans already underway include a new space for biopharmaceutical testing as well as global data centers. The company also has major infrastructure plans underway in India, as it is developing a new bioanalysis lab, and an expansion of its chemistry and agro chemical services.

SGS

SGS is a leading inspection, verification, testing and certification company, with 2,400 offices and labs worldwide. It provides services for a variety of industries, such as life science, agriculture and food, energy, chemical, and oil and gas. In FY17, the Swiss company reported revenues of CHF 6.3 billion (\$6.3 billion at CHF 0.99 = \$1), a 5.4% increase in constant currency, with the Consumer and Retail, Agriculture, Food and Life, and Transportation segments driving much of the growth. Organic growth in FY17 was 4.2%, with acquisitions contributing 1.2% growth.

Environment, Health and Safety

One of the key segments for SGS, Environment, Health and Safety grew 3.0% in FY17 to reach revenues of CHF 485.8 million (\$489.0 million), of which 1.3% was organic. The main driver for growth was the lab services and Health and Safety services, which delivered strong results in Europe, Northeast Asia and Asia Pacific. Adjusted operating margin for the segment dropped 15.3% to 10.0%, largely due to a large, one-time project's completion in 2016, a sluggish South American market and difficult conditions in Angola.

In North America, Accutest, acquired by SGS in 2016, completed non-profitable contracts and shut down numerous lab sites, which impacted the segment for a short period. China and Taiwan delivered robust growth, particularly for dioxin testing, and India and Australia bolstered growth in the Southeast/Asia Pacific region.

Capital additions in the Environment, Health and Safety segment totaled CHF 22 million (\$22.1 million) in FY17, a 7.1% increase.

Agriculture, Food and Life

SGS's Agriculture, Food and Life segment is one of its most important and well performing. In FY17, the segment brought in revenues of CHF 1.0 billion (\$1.0 billion), rising 7.7%, of which 6.7% was organic growth. Adjusted operating margin for the segment grew two basis points to 16.0%, driven mostly by incremental growth in Food and Life, which was partially offset by investments into digital projects. The company's Food services revenue grew in the double digits due to recent investments in lab infrastructure and progress in food certification services. The Seed and Crop business also performed well, thanks to SGS's recent investments into precision agriculture.

The company's efforts in its Life segment continued to grow, with revenue growing in the double digits, mostly driven by Asia and Europe. Clinical Research service revenues also increased in the double digits, with the early development clinical segment gaining momentum with the company's diversification into viral disease testing.

New acquisitions added to the segment include Morocco-based Laboratoire LCA, which performs analytical services like soil fertility testing; independent Canadian microbiology and food chemistry services lab, ILC Micro-Chem; Central Illinois Grain Inspection, which is licensed by the USDA; and another Canadian lab, BioVision Seed Research, which conducts seed, grain and soil testing.

Capital additions in the Agriculture, Food and Life segment totaled CHF 54 million (\$54.5 million) in FY17, jumping 18.0%.

GE Healthcare Set to Become its Own Company

Boston, MA 6/26/18—GE has announced plans to spin off its \$19 billion Healthcare business, which includes the company's medical imaging, biomanufacturing and cell therapy franchises, in order to focus on its Aviation, Power and Renewable Energy businesses. GE will also separate its Baker Hughes business. "GE Healthcare's vision is to drive more individualized, precise and effective patient outcomes. As an independent global healthcare business, we will have greater flexibility to pursue future growth opportunities, react quickly to changes in the industry and invest in innovation," stated GE Healthcare President and CEO Kieran Murphy, who will continue to head GE Healthcare.

"We will build on strong customer demand for integrated precision health solutions and great technology with digital and analytics capabilities as we enter our next chapter," GE Chairman and CEO John Flannery stated, "Today's actions unlock both a pure-play healthcare company and tier-one oil and gas servicing and equipment players." The separation of the GE Healthcare is expected to result in cash equal to 20% of GE's interest and the distribution of the remaining 80% of cash to GE shareholders tax free. GE also named former Danaher CEO Larry Culp as lead director, succeeding Jack Brennan.

The change comes as GE responds to declining profitability, high debt and a falling stock price, and is part of the company's general overhaul that also includes the divestiture of three other businesses. As a separate business, GE Healthcare is expected to benefit from its scale and leading positions in markets such as bioprocessing and contrast agents, according to Mr. Murphy.

Last year, GE Healthcare accounted for 16% of GE's revenues. It consists of four businesses: Diagnostic Imaging & Service, Mobile Diagnostics & Monitoring, IT & Digital Solutions and Life Sciences. In 2017, the Life Sciences division, which encompasses the company's bioprocess, protein and cell science, contrast media and nuclear tracers, and cell therapy business, generated \$5 billion in revenues. In spring 2017, the company reported an expected compound annual growth rate from 2016 to 2018 of 5% for the Life Sciences business, including 9% growth for Bioprocess. In 2016, Life Sciences reported margins above 20% and free cash flow of more than \$1 billion.

The spin off could provide the Life Sciences business, whose products include instrumentation and consumables for the analysis of genes, proteins and cells, with a higher profile, and the bioprocess business, whose products include LC, with additional resources to focus on acquisitions in a highly competitive market.

The separation is expected to complete in 12-18 months, with \$18 billion of debt and pension obligations transferred to the Healthcare business. As Mr. Murphy told investors on a conference call, "We have a unique position in the industry. We are the only company positioned to work at the center of an ecosystem delivering on the promise of precision health," referring to diagnosis, therapy and patient monitoring.

Thermo Fisher Adds to Electron Microscopy Franchise

Waltham, MA and Sarasota, FL 2/28/18—Thermo Fisher Scientific has agreed to acquire Gatan from Roper Technologies for \$925 million in cash. Gatan provides instrumentation and software for electron microscopy workflows, such as filter systems, cameras and software, for the materials science, electronics and life sciences markets. Based in California with 320 employees, Gatan expects to generate 2018 revenues of \$150 million. Gatan will join Thermo Fisher's Analytical Instruments division. "Gatan has been a trusted supplier of components to the electron microscopy industry for many years, and we look forward to building on its strong reputation," stated Dan Shine, president of Thermo Fisher's Analytical Instruments business. "Adding Gatan's technologies to our leading electron microscopy portfolio will enhance our customer offering by creating an integrated system that seamlessly connects microscope hardware, software and accessories." The transaction is expected to close this year.

A Thermo Fisher spokesperson told **IBO**, “The Gatan acquisition will enable us to better serve customers working in life sciences and materials science applications, and that is likely to increase adoption of electron microscopes overall.” Asked how the purchase enhances Thermo Fisher’s cryo-EM offerings, she commented, “The advantage of having Gatan’s technologies as part of our electron microscopy platform is that we can offer our customers an improved, differentiated solution that combines hardware and software elements of the workflow more seamlessly than we can do today as separate businesses.”

Gatan was Roper Technologies’ only electron microscopy-related business.

Agilent Buys Glycan Analysis Specialist

Santa Clara, CA 6/28/18—Agilent Technologies has entered into an agreement to purchase ProZyme, a provider of glycan analysis reagents, kits and standards, for an undisclosed amount. “ProZyme is a market leader and innovator in the glycan consumable space. This acquisition provides greater scale to our biopharma consumables business and enhances our value proposition by enabling complete glycan liquid chromatography and mass spectrometry workflow solutions,” stated Padraig McDonnell, vice president and general manager of Agilent’s Chemistries and Supplies Division. Based in California, ProZyme has 47 employees.

In line with Agilent’s strategic aims, the acquisition builds upon the company’s consumables business, offerings for the biopharmaceutical market and workflow solutions. Agilent currently sells the AdvanceBio N-Glycan Sample Preparation kit and columns. The companies have worked together, creating a combined automated solution for n-glycan digestion, labeling and cleanup.

Oxford Nanopore Evaluates IPO Opportunities

Hong Kong 6/18/18—The [South China Morning Post](#) reports that DNA sequencer firm Oxford Nanopore Technologies is considering listing on the London and Hong Kong stock exchanges. The listing would take place next year or in 2020. According to the article, Oxford Nanopore’s revenues totaled £13.8 million (\$17.9 million at £0.78 = \$1) in 2017 (see [Bottom Line](#)). China represents 10%-15% of company sales presently but is expected to become the company’s largest market, according to the article.

According to a regulatory filing, the company reported cash and cash equivalents of £57.8 million (\$741. million) as of March 31, which was prior to its latest funding raising (see [IBO 3/31/18](#)). The US accounted for the majority of company sales last year (39%), followed by Europe excluding the UK (31%), Rest of World (16%) and the UK (14%). However, Rest of World sales grew the fastest, up 432.4%. European and US sales rose 195.8% and 155.6%, while UK sales were up 94.9%. The company’s average number of employees totaled 343.

Genomic Mapping Company Files for IPO

Washington, DC 6/28/18—Bionano Genomics, which makes the Saphyr system, chips, kits and software to measure genomic structure and structural variation, has filed with the SEC for an IPO. The company listed 2017 revenues of \$1.8 million, up 2.8% (see [Bottom Line](#)), with over 90 systems installed at 80 customer sites. The Saphyr system complements NGS by providing analysis of larger structural variation (an average of 250,000 base pairs long). Current applications are cytogenetics, including LDTs, and rare disease and cancer research. The company’s posted accumulated deficit stood at \$58.1 million as of March 31, with cash and cash equivalents of \$7.6 million.

The company expects the cost per sample for its testing process to be \$500 this year and decrease to less than \$100 per sample in 2020. A system upgrade is planned for next year to increase capacity from 1 chip per run to 2. It is expected the system will be able to process as many as 6 human samples daily next year and increase to 12 per day

by the end of 2020. The company's major stockholder is the LC Fund. The number of shares to be offered and pricing has not yet been decided.

Bio-Techne Buys Liquid Biopsy Company

Minneapolis, MN and Waltham, MA 6/25/18; Washington, DC 6/25/18—Life science firm Bio-Techne has signed an agreement to purchase Exosome Diagnostics for \$250 million and additional payouts. Exosome Diagnostics' technology platform enables noninvasive liquid biopsy diagnostic tests. The company currently offers the urine-based test, ExoDx Prostate(IntelliScore) (EPI) test for accessing the need for a prostate biopsy due to ambiguous PSA test results. "This is a very strategic acquisition for us as we also expand in the CAR T cell marketplace, leveraging our growing critical mass in cell culture-focused product lines," said Bio-Techne President and CEO Charles R. Kummeth. "Following this acquisition, the Company now sells solutions to the entire workflow of cancer: research, diagnostics and therapeutics. When this transaction closes, Exosome Diagnostics will mark our 14th acquisition in the past 5 years, and our most promising to date." The deal is expected to close by August 1.

With the purchase, Bio-Techne adds to its fast growing cell testing business and gains greater IVD capabilities, especially in regards to regulatory experience for genomic testing approval. The company's ACD business is developing the CTCscope liquid biopsy testing technology. Investors in Exosome Diagnostics included QIAGEN.

Exosome Diagnostics' technology analyzes exosomal and cell free DNA (cfDNA) RNA. According to Bio-Techne, the advantages of Exosome Diagnostics' exosome-based liquid biopsy technology compared to tests based only on circulating tumor cell or cfDNA are earlier detection, use in non-oncological applications and access to information on immunophenotypic characteristics of the originating cell. Exosome Diagnostics has over 70 employees. The company launched its EPI test in 2016. Costing \$760, the test is covered by major health care providers such as United Healthcare, Kaiser Permanente, Aetna and Medicare. Products in development at Exome Diagnostics include companion diagnostics and an exosomal protein detection system.

Materials Characterization Companies Join Forces

Norcross, GA 6/18/18—Micromeritics International, a manufacturer of advanced materials characterization products, has acquired Freeman Technology for an undisclosed amount. Freeman Technology specializes in the measurement of powders' behavior properties, including powder flow properties. "Not only does it expand our portfolio of products and solutions in high-growth market segments where we are already active and have a large, global base of customers, but Freeman Technology's strong scientific and applications focus is very much in line with the pre- and post-sales support customers have come to expect from Micromeritics," stated Micromeritics President Preston Hendrix.

As a spokesman for Micromeritics told IBO, "Freeman Technology's range of tools for powder characterization not only expands Micromeritics' portfolio in market segments where the company is already well established but will also increase the product offering in complementary and emerging sectors. In addition, Freeman's focus on applications and scientific understanding, and dedication to customer support, is consistent with the approach users have come to expect from Micromeritics." Freeman Technology has 20 employees.

The purchase adds rheometry to Micromeritics' extensive line of materials characterization techniques, which includes products sold under the Particulate Systems brand name, in particular complimenting its powder characterization systems. Competitors in the powder rheometer market include Anton Paar and Brookfield Instruments (AMETEK).

Based in the UK, Freeman Technology was established in 1989. Its products include the FT4 Powder Rheometer. Among the end-markets served by the company are the chemical, pharmaceutical, food, powder coatings and cosmetics industries.

Variant Analysis Company Acquired

Milan, Italy 6/16/18—NGS informatics firm SOPHiA GENETICS has purchased Interactive Biosoftware for an undisclosed amount. Interactive Biosoftware provides the Alamut software for interpreting clinical genomic data. “With a community of now over 900 teaching hospitals using our technologies we are in a unique position to connect clinicians and enable them to share knowledge,” commented SOPHiA GENETICS CEO and co-founder Jurgi Camblong.

Interactive Biosoftware’s Alamut software expands SOPHiA’s variant annotation capabilities that are part of its DDM platform for tertiary analysis, including visualization capabilities. SOPHiA is positioned as employing machine learning for dedicated use in hospitals for clinical NGS analysis.

PerkinElmer Completes Purchase of RHS

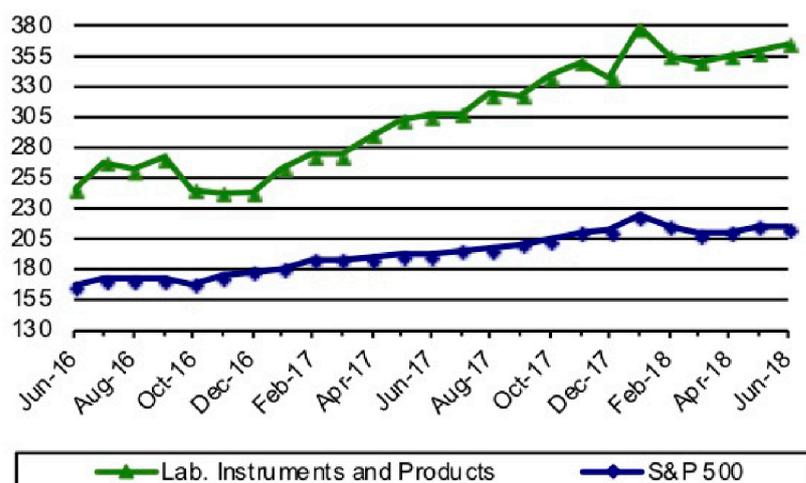
Adelaide, Australia 5/30/18; Adelaide, Australia 6/14/18—RHS, which develops single-cell genomics technology for IVF embryo screening, has been sold to PerkinElmer for the previously announced purchase of price AUD 0.28 (\$0.22 at AUD 1.27 = \$1) per share in cash, or approximately AUD 25.2 million (\$19.8 million) (see [IBO 2/28/18](#)). The sale follows RHS shareholder approval. The company’s shares were delisted from the Australian Securities Exchange, effective May 30.

RHS’ 2017 revenues increased 176.5% to AUD 210,548 (\$161,960 at AUD 1.30 = \$1), with an operating loss from continuing operations of AUD 2.0 million (\$1.5 million.) (For RHS’s 2017 financial results, see [Bottom Line](#).) Applications of the company’s technology include preimplantation genetic testing and liquid biopsies.

IBO Stock Indexes Survive Market's Bumpy Ride

It was a rollercoaster ride for US stock markets this month in response to the Trump administration’s vacillating policy and statements on trade, and China and Europe’s responses. In other economic news, on June 27, the Commerce Department released its third estimates for first quarter GDP growth, lowering it to 2.0% from 2.2%. In addition, for the second time this year, the US Federal Reserve raised interest rates on June 13 from 1.75% to 2%, the highest since 2008. Two more increases are expected this year. Despite the market’s volatility, all three indexes ended the month nearly flat, with the S&P 500 and NASDAQ on the upside, rising 0.5% and 0.9%, respectively, and the Dow Jones Industrial Average down 0.6%. For the year, NASDAQ is the clear frontrunner, up 8.8%.

IBO Laboratory Instruments and Products Stock Index vs. S&P 500



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Laboratory Instruments and Products Stock Index

The *Index* advanced 1.9% in June to 365.35, but is up 8.3% year to date. Twelve of the 20 companies in the *Index* finished in positive territory, led by **Pacific Biosciences**, which was up over 40%. The only other company to gain double digits was **Kewaunee Scientific**, up 11.3%. The *Index's* fastest decliner was **Quanterix**, which fell 22.0%. For the year, **NanoString Technologies** and **Harvard Bioscience** continue to lead, up 62.1% and 83.1% respectively.

Company	Date Rep.	Fiscal Quarter	2018 Adj. EPS	Analyst Consensus	Vs. Estimate	YOY Growth	2017 Adj. EPS
Laboratory Instruments and Products Stock Index							
ENZ	11-Jun	Q3	(\$0.06)	(\$0.02)	↓ -\$0.04	50.0%	(\$0.04)
KEQU	26-Jun	Q4	\$0.52	NA	NA	2.0%	\$0.51
KEQU	26-Jun	FYE	\$1.87	NA	NA	12.7%	\$1.66

[Click to enlarge](#)

Kewaunee Scientific shares gained this month on strong fourth quarter fiscal year results. On June 26, Kewaunee Scientific reported an over 12% increase in EPS to \$1.87, including the unfavorable impact of US tax reform, as sales rose nearly 15% (see [Bottom Line](#)), led by international growth. Quarterly EPS also benefited from strong sales, rising 2.0%.

Also reporting financial results this month was the second biggest decliner among *Index* companies. **Enzo Biochem** plunged 20.2% in June. The company missed analysts' estimates on June 11, as fiscal third quarter EPS loss declined to \$0.02, and sales fell (see [Bottom Line](#)). For the month, shares were down over 20%.

In ratings news, on June 17, Deutsche Bank downgraded **Bio-Techne** from a "buy" rating to "hold," with a \$165 target price.

Diversified Instrumentation Stock Index

The *Index* fell 5.8% in June. Only 2 of the *Index*'s 8 companies did not decline. The first company to post a gain in share price was **Corning**, rising 1.3%. **Roper Technologies** was flat, and the fastest decliner was **Xylem**. For the year to date, two companies, **Corning** and **Illinois Tool Works**, have suffered double-digit declines.

International

In Asia Pacific, major indexes finished the month down, due to international trade concerns and the weak yuan. The Shanghai SE Composite Index fell 7.4%, Hong Kong's Hang Seng declined 5.0% and South Korea's KOSPI Index was down 4.6%. The Shanghai Composite has declined 13.9% year to date.

Three Asian Pacific companies in the **IBO** stock tables posted gains in June. **Shimadzu** recorded the largest jump, up 11.5%. In contrast, **Precision System Science** dropped 16.4% and is down 26.0% for the year.

Most major European indexes were also down, but remained relatively stable. The UK's FTSE100 declined only 0.8%, while Germany's DAX Index dropped 3.3%. Sweden's OMX Stockholm 30 inched down 0.7%.

The fastest risers among UK stocks in the **IBO** stock table were **Abcam** and **Oxford Instruments**, both climbing more than 9% this month. Two companies, **Horizon Discovery** and **Spectris**, posted declines. On June 12, Oxford Instruments released its fiscal year results, reporting a profit before tax from continuing operations, compared to a loss a year ago. EPS rose 35.7% to £0.56 (\$0.78). The company also announced a dividend increase of 2.3% to £0.13 (\$0.18), payable on October 18.

Also on June 12, **Halma** released its fiscal 2017 results. Adjusted EPS rose 12.6% to £0.45 (\$0.63). The company raised its final dividend, payable on August 15, to £0.90 (\$1.25) from £0.84 (\$1.17).

Among the 5 European stocks in the **IBO** Stock Table, 3 recorded gains. **Biotage** led all gainers, up 9.1%, while **Merck KGaA** and **Sartorius** declined. For the year, Sartorius is the fastest riser, having gained 50.5%.

Company: Exchange	Market Value (US M)	52 Week Range		Price 6/29/18	Change 1 Month	Change YTD	P/E (ttm)	EPS (ttm)
		Low (\$)	High (\$)					
Laboratory Instruments and Products								
Agilent Technologies: n	\$19,786	58.22	75.00	\$61.84	-0.1%	-7.7%	24	2.57
Becton, Dickinson and Company: n	\$64,011	191.53	248.39	\$239.56	8.1%	11.9%	24	9.99
Bio-Rad Laboratories: n	\$7,127	208.95	304.36	\$288.54	0.5%	20.9%	69	4.16
Bio-Techne: o	\$5,559	112.33	166.81	\$147.95	-1.6%	14.2%	35	4.22
Bruker: o	\$4,658	26.98	36.53	\$29.04	-4.1%	-15.4%	23	1.27
Enzo Biochem: n	\$202	4.97	12.04	\$5.19	-20.2%	-36.3%	NM	-0.11
Fluidigm: o	\$174	2.52	8.38	\$5.96	7.0%	1.2%	NM	-0.80
Harvard Bioscience: o	\$192	2.35	6.15	\$5.35	21.6%	62.1%	38	0.14
Illumina: o	\$41,056	167.98	293.15	\$279.29	2.5%	27.8%	58	4.82
Kewaunee Scientific: o	\$98	24.00	38.80	\$35.95	11.3%	24.0%	16	2.27
Luminex: o	\$1,313	18.62	31.17	\$29.53	4.3%	49.9%	32	0.93
Mettler-Toledo: n	\$14,693	540.24	697.26	\$578.63	5.1%	-6.6%	32	17.99
MTS Systems: o	\$939	42.00	57.50	\$52.65	0.5%	-2.0%	28	1.86
NanoString Technologies: o	\$352	5.87	16.83	\$13.68	6.1%	83.1%	NM	-1.74
Pacific Biosciences: o	\$468	2.02	5.70	\$3.55	40.3%	34.5%	NM	-0.83
PerkinElmer: n	\$8,102	62.43	84.49	\$73.23	-1.5%	0.2%	24	3.00
QIAGEN: o	\$8,192	30.20	37.61	\$36.16	-0.4%	16.9%	28	1.31
Quanterix: o	\$418	13.53	24.81	\$14.36	-22.0%	-26.5%	NM	-8.30
Thermo Fisher Scientific: n	\$83,337	170.07	226.44	\$207.14	-0.5%	9.1%	21	9.90
Waters: n	\$15,166	171.32	220.20	\$193.59	0.5%	0.2%	25	7.63
Diversified Laboratory								
AMETEK: n	\$16,711	60.34	79.32	\$72.16	-1.2%	-0.4%	26	2.79
Corning: o	\$22,843	26.11	35.10	\$27.51	1.3%	-14.0%	17	1.65
Danaher: n	\$68,935	78.97	104.82	\$98.68	-0.6%	6.3%	24	4.17
Honeywell	\$107,595	132.69	165.13	\$144.05	-2.6%	-6.1%	20	7.35
Illinois Tool Works: n	\$46,932	135.07	179.07	\$138.54	-3.6%	-17.0%	20	6.97
Roper Technologies: n	\$28,463	226.81	292.97	\$275.91	0.0%	6.5%	28	9.91
Teledyne Technologies: n	\$7,119	125.38	214.32	\$199.06	-1.2%	9.9%	27	7.42
Xylem: n	\$12,123	54.08	79.83	\$67.38	-4.3%	-1.2%	27	2.51
Laboratory Instruments and Products				365.35	1.9%	8.3%	32	
Diversified Laboratory				256.07	-1.7%	-5.8%	23	
Dow Jones Industrial Average				24,271.41	-0.6%	-1.8%		
S&P 500				2,718.37	0.5%	1.7%		
NASDAQ Composite				7,510.30	0.9%	8.8%		
Region	Market Value	52 Week Range		Price	Change	Change	P/E	EPS
Company	(Local M)	Low (L)	High (L)	6/29/18	1 Month	YTD	(ttm)	(ttm)
Pacific Shares								
GL Sciences: t	¥15,733	1,264	2,345	¥1,406	-15.0%	-34.4%	10	¥144.19
Hitachi High-Technologies: t	¥622,585	3,710	5,680	¥4,520	-9.0%	-4.8%	16	¥283.56
HORIBA: t	¥329,608	6,170	8,290	¥7,750	-14.5%	14.1%	21	¥361.68
JEOL: t	¥111,499	488	1,006	¥1,141	0.5%	78.6%	160	¥7.14
Precision System Science: os	¥11,281	476	1,011	¥489	-16.4%	-26.0%	NA	¥26.32
Shimadzu: t	¥991,835	1,944	3,145	¥3,350	11.5%	30.8%	38	¥87.56
Techcomp: hk	HKD 1,085	1.55	5.20	HKD 3.94	1.3%	120.1%	51	HKD 0.01
European Shares (London)								
Abcam: l	£2,735	9.41	13.77	£13.34	9.8%	26.4%	27	£0.49
Halma: l	£5,201	10.64	14.70	£13.70	1.5%	8.7%	41	£0.34
Horizon Discovery: l	£231	1.28	2.98	£1.65	-1.2%	-31.3%	NA	-£0.14
Oxford Instruments: l	£574	6.76	11.74	£10.00	9.1%	17.5%	NA	-£0.44
Scientific Digital Imaging: l	£37	0.20	0.45	£0.42	5.1%	68.5%	28	£0.02
Spectris: l	#VALUE!	22.21	29.57	£26.10	-6.5%	4.9%	98	£0.27
European Shares (Other)								
Biotage: st	SEK 7,429	52.25	115.00	SEK 114.80	9.1%	36.7%	63	SEK 1.83
Datacolor: s	CHF 151,236	730.50	900.00	CHF 900.00	7.1%	7.1%	22	CHF 40.18
Merck KGaA: g	€ 10,719	75.26	105.86	€ 82.94	-5.0%	-7.6%	22	€ 3.84
Sartorius: g	€ 4,249	68.14	134.50	€ 113.50	-0.4%	50.5%	58	€ 1.95
Tecan: s	CHF 2,832	172.70	243.80	CHF 241.00	3.4%	18.9%	50	CHF 4.85

The IBO Stock Indexes are weighted by market capitalization. The Indexes' averages for the financial ratios presented are also weighted statistically to reflect the relative sizes of the constituent companies. Laboratory Instruments and Products Index: 12/30/11 = 100. Diversified Laboratory Index: 12/30/11 = 100. Exchanges: n = NYSE; o = NASDAQ; t = Tokyo; hk = Hong Kong; l = London; g = Germany; s = Switzerland; st = Sweden; no = Nordic Market; os = Osaka Securities. N/A = not available; NM = not meaningful. [Click to enlarge](#)

Tip-Enhanced Raman Spectroscopy (TERS)

Raman spectroscopy remains one of the most vibrant areas of molecular spectroscopy, and the technology has continued to advance with a number of specialized tools. One of the more intriguing possibilities with Raman is tip-enhanced Raman spectroscopy (TERS), which blends together the benefits of both Raman spectroscopy and high spatial-resolution microscopy. In brief, TERS involves combining AFM with a special AFM tip that results in an enhanced Raman signal, making analysis much more practical, as Raman is often bedeviled by low signal strength.

In traditional Raman spectroscopy, when incident laser light scatters from the sample, a small fraction of the scattered light will have a different wavelength, an effect known as Raman scattering, which occurs because rotational and/or vibrational modes of the sample molecules are excited by the incident light. This shift in the wavelength can be used to identify molecules since their rotational and vibrational modes are specific to a particular molecular structure. This allows composition to be determined as the Raman spectra are compared to libraries of known compounds.

Because only some of the incident light undergoes Raman scattering, the resulting signal tends to be weak. However, a certain (somewhat poorly understood) effect can be used to enhance the Raman signal by many orders of magnitude, making analysis less challenging. When sample molecules are in contact with specially prepared metal substrates or nanoengineered surfaces, the Raman signal is greatly strengthened. This surface enhanced Raman spectroscopy (SERS) can then be turned upside-down in TERS. Rather than resting the sample on a prepared substrate, the AFM tip can be prepared with a suitable surface for enhancing the Raman effect. When the tip is brought close to the surface of the sample, the same enhanced Raman signal results.

TERS instruments are generally combined Raman-AFM microscopes, although it is also possible to carry out the technique with a scanning tunneling microscope (STM), which is more suitable for conductive samples. The optical/Raman microscope can be used for locating the precise spot on the sample to be analyzed, and then the AFM is used to position the TERS probe at that spot, so that the spectroscopic analysis can be performed. TERS can have a spatial resolution of a few tens of nanometers, much better than the traditional diffraction limit for light microscopes, and the TERS tip can be scanned across the sample to build up an entire Raman image of the sample.

Applications tend to be highly research oriented, with academia being the principal customer type. TERS can be used to measure all sorts of materials, and is commonly used with new materials like graphene and carbon nanotubes. Polymers and semiconductor materials are also frequently analyzed by TERS. Although somewhat less common, life science applications are also definitely possible, such as studying cell membranes or other protein or cell structures.

Since the base of TERS is AFM and Raman microscopy, the vendors in this market are typically those that specialize in scanning probe and Raman technology. Foremost among them are Bruker, HORIBA and WITec. The component that really enables TERS analysis is the specialized AFM tip with the appropriate coating to enhance the Raman response. These tips cost a few hundred dollars each, and are supplied by both the microscopy vendors and also some firms that specialize in AFM consumables. Other significant vendors in the TERS market include Nanonics, NT-MDT, ostec and ScanSens.

TERS at a Glance

Leading Suppliers:

- Bruker
- HORIBA
- WITec

Largest Markets:

- Academia
- Semiconductors
- Polymers

Instrument Cost:

- \$250,000–\$750,000
-

Agriculture

According to the latest *Agricultural Outlook* report from the OECD, which provides a forecast for 2007 to 2016, growth in food demand is expected to significantly slow after strong production levels in 2016. In 2016, production for meat, dairy products and fish was the highest in history, while oilseeds, biodiesel and cotton recovered their prices. Agricultural markets are heavily dependent on worldwide factors, such as global GDP growth and the price of crude oil, and in 2016, global GDP growth was 2.9%, the lowest since 2009, while crude oil prices increased at the end of 2016. This combination resulted in price decreases in the 2016 global agricultural market.

Over the last 10 years, the growth in food demand was primarily led by China, as rising meat and fish demand resulted in feed consumption increasing almost 6% each year. Growth was also propelled by the international biofuel market, in which feedstock inputs use (i.e., goods and materials) increased by approximately 8%. However, demand is starting to stabilize in many countries for such inputs. For example, although energy prices are on track to increase, demand for biofuel feedstocks such as maize and sugarcane for ethanol, and vegetable oil for biodiesel will increase sluggishly, except in developing countries.

Worldwide demand for cereals is predicted to be flat, with the only growth coming from developing countries. Demand for meat will similarly be flat. Dairy products demand is expected to increase, due to changed attitudes, towards dairy fat and less-processed foods. As a result of projected population increases in India and Sub-Saharan Africa, these two regions are forecast to drive the majority of global demand for agricultural markets, with China continuing its contribution at a lesser level.

Source: [OECD](#)

Pharmaceuticals

Leading pharmaceutical companies have developed new medications that purportedly shrink tumors through the targeting of an uncommon genetic anomaly called TRK fusion, in which two genes combine to stimulate the production of proteins that fuel cancer growth. TRK fusions are found in many cancers, both adult and pediatric, including brain, breast, lung, pancreatic and thyroid, and affect between 1,500 and 5,000 patients each year. However, therapeutics targeting these rare TRK fusions require advanced analyses that are available solely at academic medical centers. This provides a large opportunity for growth for the targeted therapies market, but also makes it difficult to find patients for clinical trials. To identify a patient that may be a suitable candidate for TRK fusion-targeted medications, hundreds of people may need to have their DNA assessed with costs hovering around multiple thousands of dollars per person.

Leading pharmaceutical companies like Bayer plan to lobby medical societies, such as the National Comprehensive Cancer Network, to develop guidelines instructing doctors to specifically test for TRK fusions in patients with rare cancers.

Source: [Bloomberg](#)

R&D

Despite some significant increases in R&D funding for science agencies in FY17, official federal R&D expenditures figures from the White House Office of Management and Budget (OMB) are more than \$20 billion less than prior to

2017. This is largely due to a newly refined definition of R&D and R&D categories by the OMB, which has narrowed the terms of what R&D is. The change was largely brought upon a 2015 report from the OECD, which is the global organization that establishes standards for calculating R&D. The “D” has historically stood for experimental development, and the change in definition more unambiguously excludes pre-production development.

Pre-production development is defined as “non-experimental work on a product or system before it goes into full production, including activities such as tooling and development of production facilities.” Experimental development is still included in the definition, and is described as “creative and systematic work, drawing on knowledge gained from research and practical experience, which is directed at producing new products or processes or improving existing products or processes.” Therefore, experimental development still includes technology demonstrations, which is when a technology system is unveiled and demonstrated for the first time, and feedback R&D following the demonstration.

The main agency affected by this change in definition of R&D is the Department of Defense, for which the result was a decline of more than \$20 billion from the agency’s R&D total. NASA’s R&D totals were cut by approximately \$2.7 billion in FY17. The change is expected to improve the comparability of US R&D data with other member countries in the OECD, which all follow this definition of R&D.

Source: [American Association for the Advancement of Science](#)

China

In the latest set of measures put forth by President Xi Jinping’s anti-corruption initiative, the Chinese government introduced at the end of May a new set of regulations to improve research quality in the country. Over the past 20 years, the government has attempted to restructure the scientific research system to weed out fraudulent publications and enhance the quality of its science with little to no success; however, the new set of regulations is much stricter and are expected to be more effective.

A key deterrent for Chinese researchers is the blacklist that the Chinese government will compile of “predatory journals” that the government deems as low quality and set up solely for profit. If a researcher publishes in one of these blacklisted journals, they will receive a warning and will not be credited for the publication when they apply for grants and jobs. An even worse situation for researchers is if they use government grants to pay for the publication fees in these journals, which is a common practice.

In most countries, including China, institutions are usually responsible for investigating any allegations against its own researchers, which has thus far proved to be largely ineffective, as institutions generally prefer not to tarnish their reputations. With this new set of regulations, however, China is appointing the federal science ministry to investigate scientific misconduct. Not only is the government assigning investigations to another government body, but additionally, any institutions that attempt to protect scientists engaging in misconduct may be punished through lost funding.

Source: [Nature](#)

Central Europe

In a survey of over 329 companies from 9 Central European countries (Croatia, the Czech Republic, Estonia, Hungary, Lithuania, Poland, Romania, Slovakia and Slovenia), data indicated that while companies plan to increase R&D funding in the coming years, overall R&D expenditures across the region are below the EU average. Roughly 52% of survey respondents plan to increase R&D expenditures through funding under the EU 2014-2020 budget, with 67% planning to bolster R&D expenditures specifically within the next 3-5 years, a jump of 10 percentage points. Other factors encouraging greater R&D spending include public support and an improved availability of expert researchers, cited by 63% and 62% of respondents, respectively.

One of the most serious issues in the current R&D system cited by respondents was a lack of tax clarity in regards to subsidy assessments or which R&D projects meet the requirements for tax deductions. In contrast, the least serious issue cited by respondents is keeping track of R&D tax deductions and subsidies costs separately.

Data showed that most companies in Central Europe are more likely to use R&D grants as opposed to tax incentives, with 46% indicating they use them commonly. This may be due to the fact that startup companies can utilize R&D grants even while they are operating at a loss. Collaboration was also a strategy indicated by most companies, with 76% of respondents stating that had partnerships with third parties for their R&D projects. Over 50% of companies that did not collaborate with third parties had their own R&D centers or had access to R&D facilities of another company they were affiliated with.

Source: [Deloitte](#)

EU

Based on results from the latest European Innovation Scoreboard, the innovation performance of EU member countries has grown 5.8 percentage points since 2010. Notably, there has yet to be any convergence between EU countries with lower innovation rates and those with higher rates.

Innovation leaders include member states that have an innovation performance rate that is 20% higher than the rest of the EU. On the most recent Scoreboard, the leaders are Denmark, Finland, Luxembourg, the Netherlands, Sweden and the UK. Austria, Belgium, France, Germany, Ireland and Slovenia are strong innovators, which are defined as EU member countries with an innovation performance between 90% and 120% of the EU average. Moderate innovators perform between 50% and 90% of the EU average, and this group is represented by Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia and Spain. Lastly, modest innovators perform below 50% of the EU average, and include Bulgaria and Romania. Data indicate that performance levels are geographical, with all innovation leader countries in the northern and western parts of Europe, while moderate and modest innovator countries are mostly in the southern and eastern regions of the continent.

Eighteen member states' innovation performance levels increased between 2010 and 2017, while 10 member states' levels dropped. Lithuania experienced the largest increase of 20.1 percentage points, with the Netherlands and Malta following behind with respective growth of 15.9 and 15.2 percentage points. In contrast, Romania's innovation performance dropped 14.0 percentage points, while Cyprus and Estonia's levels dropped 9.2 and 3.2 percentage points, respectively.

Source: [European Commission](#)

Broad-based Companies

Company Announcements

Hach announced in May a three-year partnership establishing Hach as a primary supplier of water analysis solutions, specifically process analyzers, samplers and panel solutions, for **Veolia's** water operations. As part of this agreement, Veolia and Hach entered into a technical partnership, which will work to adapt and validate Hach's software tools and solutions for use by Veolia. This premium partnership includes Hach's Claros Instrument, Data and Process Management offerings.

In June, **BD** named John A. DeFord as executive vice president and CTO. Since the completion of BD's acquisition of medical technology firm **C. R. Bard**, he has served as senior vice president of R&D for the Interventional Segment at BD.

Thermo Fisher Scientific officially opened in June its US Precision Medicine Science Center in Cambridge,

Massachusetts. The Center offers access to advanced omics technologies and expertise to help collaborators develop analytical workflows that generate precise molecular profiles of patients. This includes developing standard protocols that enable them to compress R&D timelines and quickly progress from biomarker discovery to assay development. In 2017, Thermo Fisher opened its Precision Medicine Science Center in Guangzhou, China (see [IBO 10/15/17](#)).

Expanding in house to optimize logistic operations, **Agilent Technologies** announced in June that its Tennessee-based Agilent Regional Logistics Center for the Americas will function as the company's primary American distribution center. Agilent has added approximately 110 employees to its local team.

In June, **Agilent Technologies** opened a 20,000 ft² (1,858 m²) logistics hub in Shanghai, China, designed to enable faster delivery of parts, supplies, and consumables to laboratories in the country. It is the first of five forward stocking locations being established to improve delivery to customers throughout the country.

In June, **Pace Analytical** and surplus asset management company **EquipNet** announced a strategic partnership. The partnership ties in lab relocation services with an option for clients to see return on invests for surplus laboratory instruments, as well as a data security option for instruments supported by technology hardware, and an eco friendly sustainable process for residual lab equipment disposition.

Bruker named Gerald N. Herman as CFO as June. He joined Bruker in 2016 as vice president and corporate controller, and was appointed as Interim CFO in March.

SiliCycle, which develops silica-based and specialty products for chromatography, analytical and organic chemistry, announced in June a \$15 million, 21,000 ft² (1,951 m²) expansion of its existing plant, creating 50 positions. The company plans to double revenues by 2020.

In fiscal 2017, sales for **Halma's** Environmental & Analysis sector grew 18.3% to £259.4 million (\$345.9 million), including 3% constant currency growth and 3% growth from acquisitions, to represent 24% of company revenues (see [IBO 6/15/18](#)). Adjusted operating profit for the sector grew 32.0% to £55.0 million (\$73.3 million). The sector's Photonics, Water and Environmental Monitoring business segments all showed strong sales growth. On an organic basis, by region, US sales grew 16% to make up 43% of sector revenue, Asia Pacific sales rose 24% to make up 22%, UK sales grew 17% to represent 22% and European sales rose 5% to make up 12%. Sales to Other countries fell 10% to make up 6%.

In June, **HORIBA Scientific** moved to a new 32,000 ft² (2,973 m²), 200-person office, engineering, manufacturing, laboratory and cleanroom space, approximately doubling the previous facility's size, in Piscataway, New Jersey. The facility includes over 6,400 ft² (595m²) of new labs grouped into four application areas: earth science, life science, materials science and industrial science. The OEM facility is now located in the same building.

The [Budapest Business Journal](#) reported in June that **FOSS** plans to open a HUF 2 million (\$7 million) R&D center in Pécs, by the end of 2019. The center will create 88 positions and house 120 employees by the end of 2020. The center assisted by a HUF 773 million (\$3 million) government grant.

Sequencing

Company Announcements

In May, **Agilent Technologies** announced in its quarterly conference call that it expects to spend \$15 million in the second half of this fiscal year, and \$35 million in both fiscal 2018 and fiscal 2020 on its sequencer development work with **Lasergen** (see [IBO 4/15/18](#)).

In June, the **Wellcome Sanger Institute** and **Pacific Biosciences** announced the results of a collaboration to sequence more than three thousand of the world's most dangerous bacteria, which are part of the National Collection of Type Cultures.

Zymo Research and **CosmosID** partnered in June to combine their respective microbiomics portfolio and

microbiome database to identify bacterial constituents of microbial communities, as well as microbial kingdoms such as fungi.

In June, **Lexogen** and **Bluebee** announced a collaboration to implement Lexogen's QuantSeq Unique Molecular Identifiers (UMI) data analysis pipeline on the Bluebee genomics analysis platform.

The [*Milwaukee Journal Sentinel*](#) reported in June that **Roche** plans to close its facility in Madison, Wisconsin, following the launch of a new target enrichment product late next year, which will supplant the products currently manufactured at the facility. All of the location's 79 people are expected to be laid off by June 2020.

In June, **Phase Genomics** received a two-year, \$1.5 million Phase II Small Business Innovation Research grant from the **National Institute of Allergy and Infectious Diseases**. The grant will be utilized to develop an affordable, high-throughput HiC kit and computational analysis platform to accelerate microbiome research and discovery.

Product Introductions

In May, **Hamilton Bonaduz** launched the ID NGS-V STARlet solutions for post-PCR sample preparation steps of the ForenSeq DNA Signature Prep Kit from **VeroGen**. Up to 96 samples can be processed without any user intervention. Five panels have been validated: the Precision ID Identity Panel, Precision ID Ancestry Panel, Precision ID mtDNA Whole Genome Panel, Precision ID mtDNA Control Region Panel and Precision ID GlobalFiler NGS STR Panel v2.

MediSapiens released in May the cloud-based Genius, a genomics data management and querying platform for working with population-scale genomic resources in real time without the need to invest heavily on IT infrastructure.

In June, **Databricks** introduced the Databricks Unified Analytics Platform for Genomics, a single platform for genomic data processing, tertiary analytics and AI.

Pacific Biosciences debuted in June the Microbial Multiplexing Kit. Multiplexing can be achieved by incorporating a unique barcode for each microbe into the SMRTbell adapters after shearing genomic DNA using a streamlined library construction process.

In June, **10x Genomics** launched its Single Cell Mouse Immune Profiling Solution, providing the ability to simultaneously and deeply characterize single-cell gene expression and paired receptor sequences of T- and B-cells in mouse models of disease.

New England Biolabs released in June the NEB Next Single Cell/Low Input RNA Library Prep Kit for **Illumina** sequencers. The Kit incorporates a template switching protocol and the Ultra II FS enzymatic DNA fragmentation technology for enzymatic cDNA fragmentation, end repair and dA-tailing reactions in a single enzyme mix. The company is also offering a reagents-only module for cDNA synthesis and amplification.

In June, **Oxford Gene Technology** expanded its SureSeq myPanel NGS Custom Cancer Panel content to cover 120 fully optimized cancer-related genes.

Illumina launched in June two new consumables for its NovaSeq 6000 Sequencing System: the S4 200 Cycle Kit enables customers to extend their research across more applications including single-cell and exome sequencing; and the S Prime (SP) Flow Cell, designed for smaller run sizes and/or applications that require lower sequencing output. That kit will be available in 100 and 300 cycle configurations, with an output of 250G (300 cycle).

In June, **Thermo Fisher Scientific** debuted the Ion AmpliSeq HD technology for library preparation. The company stated that it provides clinical researchers for the first time with the flexibility to custom design gene panels without sacrificing the ultra-high sensitivity required to find low-frequency variants in cell-free DNA (cfDNA) and highly heterogeneous solid tumor samples. The AmpliSeq HD enables custom design flexibility for SNVs, small insertions/deletions (indels), fusions and CNV detection with a limit of detection as low as ≤ 0.1 percent in blood samples. The heightened sensitivity is enabled with proprietary molecular tags, and dual barcoding of the fragments of interest.

Thermo Fisher Scientific introduced in June the dual barcode indexing-based OncoPrint TCR Beta-SR Assay for immuno-oncology research, designed to characterize T-cell clonality in the tumor microenvironment. OncoPrint TCR

Beta-SR Assay is designed to specifically interrogate the CDR3 region of the beta chain of the T-cell receptor, a region that is responsible for antigen recognition and important in uniquely identifying T-cell clones.

Twist Bioscience launched in June the expansion of its NGS solutions product line to include the high-throughput Twist Human Core Exome Kit, a library preparation and target enrichment kit, with the ability to run up to 96 samples simultaneously. Twist Bioscience believes it is the only company to offer double-stranded DNA probes within a comprehensive target enrichment kit used for exome and targeted sequencing.

In June, **QIAGEN** introduced customizable QIAact target enrichment panels for analysis of more than 13 hereditary disease groups for its GeneReader NGS System. The solutions integrate QIAGEN's QCI analysis and interpretation solutions, in particular the HGMD Human Gene Mutation Database.

Sales and Orders of Note

In June, **Fabric Genomics** announced the addition of 10 new commercial partners: the **Centre for Proteomic and Genomic Research** in South Africa; **King Fahad Medical City** in Saudi Arabia, its first customer in Middle East; **Sheffield Diagnostic Genetics Service** in England; **Children's Hospital of Eastern Ontario-Research Institute** and the **University of Calgary's Department of Medical Genetics**, both in Canada; **Landspítali**, the **National University Hospital of Iceland**; the **Kennedy Center (Clinical Genetics Clinic)** in Denmark; and the **National Center for Global Health and Medicine** and **a2 sigma**, both in Japan.

In June, **UPMC** and the **University of Pittsburgh** announced the establishment of the **UPMC Genome Center**, calling it the largest and only CLIA-certified, high-throughput whole-genome sequencing center in the state of Pennsylvania. The center boasts five **Illumina** NovaSeq 6000 Systems, along with liquid handling robots for automated sample preparation and processing.

MS & LC/MS

Company Announcements

Earlier this year, **Plasmion** announced a distribution agreement with **Axel Semrau** for its SICRIT ambient ionization source, which decouples the ionization from the sample delivery. It can be combined with GC or HPLC.

In June, **Thermo Fisher Scientific** announced a collaboration with LC company **Evosep** to develop and promote robust, high-throughput workflows for clinical proteomics. The collaboration will be centered around work at the Boston-based Thermo Scientific Precision Medicine Science Center.

Shimadzu announced in June a comarketing agreement with **Protein Metrics** to combine their respective Q-TOF technology and Byos software for automated biotherapeutic characterization workflows.

908 Devices announced in June expanded compatibility of its ZipChip separation platform to include **Thermo Fisher Scientific's** Fusion Lumos and TSQ MS product lines, and the **SCIEX** Triple Quad and QTRAP series instruments.

In June, **Microsaic** entered into a distribution agreement with **Omicron Research**, which will distribute Microsaic's 4500 MiD MS detector in the UK. Omicron is also a distributor of **CAMAG** thin layer chromatography products.

Microsaic announced in June a exclusive distribution agreement with **Amedis** for Slovakia.

Product Introductions

In April, **JPT Peptide Technologies** released the Human Proteome Peptide Catalog, an online resource for validated reference peptides in MS-based proteomics. It provides access to over 400,000 light and heavy proteotypic

peptides.

In June, **908 Devices** launched extended-life chips and a Native Antibody Assay Kit as part of their ZipChip consumables line. Extended-life ZipChips allow up to 250 samples per chip, compressing a typical 5-day process into less than 24 hours, according to the company.

Advion introduced in June the TAMI software suite for the expression Compact Mass Spectrometer (CMS). Developed by **Aviv Analytica**, the software provides elemental formulae from mass spectra.

In June, **Thermo Fisher Scientific** released new Thermo Scientific ChromaCon flush solutions and UHPLC-MS ultrapure solvents (acetonitrile, methanol, water and IPA). The products include the LC-MS Instrument Flush Solution and LC-MS Biologics Flush Solution.

Shimadzu launched in June the AuraSolution, SampleStation and QC Reporter software packages for the MALDI-8020 linear benchtop system for simplified analysis and visualization of imaging data.

Laboratory Products

Lab Equipment and Consumables

Company News

Mettler-Toledo and **SOTAX** announced in April a marketing and sales partnership for dissolution testing. The companies will integrate their respective V7 Excellence spectrophotometer and SOTAX Xtend Dissolution Line.

Baker Ruskinn, a manufacturer and marketer of anaerobic and physiological oxygen workstations for use in life sciences research, stem cell biology and microbiology applications, entered into a partnership with **I&L Biosystems** for UK distribution, effective April 1.

In May, **Thermo Fisher Scientific** announced an exclusive agreement to distribute **Phononics'** Evolve products, which are based on compressor-free, solid state refrigeration technology, for the life science and health care markets. The companies previously collaborated on the Thermo Scientific TSX 505 Series high-performance undercounter lab refrigerators.

SP Industries in May named James Schmidt as senior vice president of Sales for the company's SP Scientific equipment division. Most recently Mr. Schmidt served as the head of Pharma/Biotech Sales, North America, for **MilliporeSigma**,

In May, **BroadOak Capital Partners** announced a partnership in which **Astero** will acquire the former assets and all related asset rights of **MedCision** from BroadOak. In conjunction with the acquisition, Astero will receive growth capital investment from BroadOak. Astero Bio is spearheaded by former critical members of the MedCision senior management team.

In June, **Gilson** announced partnerships with three new distributors for Brazil to sell its manual liquid handling products: **BioResearch do Brasil**, **Sinapse Biotecnologia** and **Pensabio**. Gilson has distributed its products in Brazil since 1992.

For the fiscal half year ending May 31, revenue for **Porvair's** newly created Laboratory operating segment rose 20.8% to £18.5 million (\$25.2 million) in constant currency (see [Bottom Line](#)). Organic revenue declined 5.5% to £13.0 million (\$17.7 million). Acquisitions contributed £5.6 million (\$7.6 million). The company disclosed it paid £2.7 million (\$3.7 million) to acquire **Rohasys** (see [IBO 12/15/17](#)).

Product Introductions

In February, **Cole-Parmer** released the TELOS MicroPlate plates, which is optimized for the sample processing and extraction of small-volume biological fluids. The TELOS MicroPlate plates are available in 5 mg and 10 mg sorbent masses. The 5 mg plate allows elution volumes of 50 µL.

In June, **Eppendorf** introduced the Protein LoBind Conical Tubes to minimize the risk of non-specific protein and peptide samples sticking to the walls of the tubes.

Pharma Test launched in June the PTWS 1420, a new 14+2 station dissolution testing instrument, ideal for comparative studies such as biowaiver tests.

In June, **Uniqsis** introduces the FlowLab Plus, a versatile flow chemistry system built around the Uniqsis Binary Pump dual-channel reagent delivery system. The system is configured to run both manual and automated flow chemistry reactions.

Lab Automation

Company Announcements

Brooks Life Sciences and **Cleveland Clinic** announced in May plans to create a 21,000 ft² (1,951 m²) biorepository in Cleveland's Fairfax neighborhood to enhance researchers' study of human tissue samples and advance personalized medicine for an array of conditions, including cancer, heart disease and epilepsy. The building is expected to be completed in summer 2019.

In May, **Hamilton Robotics** partnered with **Intra Globus Biosystems** for India. Integrated Gulf Biosystems is a subsidiary of the company that has been collaborating with Hamilton for more than 10 years in the Middle East.

Hamilton Storage GmbH announced in June that it has relocated all operations to an industrial park in Domat/Ems, Switzerland. Other Hamilton affiliate entities will follow. The 161,458 ft² (15,000 m²) building includes an automated parts warehouse and customized production area for large compound-storage systems.

In June, **Andrew Alliance** raised \$14 million, closing a Series C funding round. Investors include **Tecan** and **Waters**.

Product Introductions

Thermo Fisher Scientific introduced in June the new Thermo Scientific TriPlus RSH AutoSampler and Liquid Handling System with Robotic Tool Change for a wide range of sample processing needs. The system has been integrated with 50,000 analytical instruments.

Electrochemistry

Product Introductions

In April, **Seal Analytical** released the new AQ270 entry-level Discrete Analyzer, developed to meet the needs of a smaller laboratory with a limited budget.

TOYO launched in May the LT1000 Ion Impurity Measurement System, calling it the first laboratory instrument able to characterize and quantify both organic and inorganic ion impurity in liquid-based substances. The instrument can be used to not only test critical LCD components and subcomponents but also OLED ones relied upon by the display industry. It offers measurements in the ppt range and conducts a complete measurement cycle in less than a second.

In May, **Metrohm** introduced a fully automated solution for the determination of Total Acid Number (TAN) and Total Base Number (TBN) in up to 112 samples. This solution is based on the OMNIS Sample Robot.

Reported Financial Results IBO June 15, 2018

\$ in Millions USD	Period	Ended	Sales	Chg.	Op. Prof.	Chg.	Net Prof.	Chg.
Enzo Biochem	Q3	30-Apr	\$25.6	-5.4%	(\$2.8)	-980.3%	(\$3.0)	-4147.9%
Other Currencies (in Millions)								
Halma	FYE	31-Mar	£1,076.2	11.9%	£181.3	8.5%	£154.2	18.9%
Halma (Environmental & Analysis)	FYE	31-Mar	£259.4	18.4%	£47.7	35.9%	NA	NA
Oxford Instruments	FYE	31-Mar	£296.9	-1.1%	£38.4	NM	£65.5	NM
Oxford Instruments (Materials & Characterization)	FYE	31-Mar	£118.1	11.7%	£20.1	64.8%	NA	NA
Oxford Instruments (Research & Discovery)	FYE	31-Mar	£112.1	-10.5%	£13.8	0.0%	NA	NA
Oxford Instruments (Service & Healthcare)	FYE	31-Mar	£66.8	-3.6%	£12.6	5.0%	NA	NA

NA = not available, NM = not material

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Reported Financial Results

\$ USD in Millions	Period	Ended	Sales	Chg.	Op. Prof.	Chg.	Net Prof.	Chg.
Bionano Genomics	FYE	31-Mar	\$1.8	2.8%	(\$4.3)	29.9%	(\$3.8)	32.3%
Kewaunee Scientific	Q4	30-Apr	\$44.5	28.7%	\$2.4	34.8%	\$1.5	6.8%
Kewaunee Scientific	FYE	30-Apr	\$158.1	14.1%	\$9.1	38.9%	\$5.4	16.1%
Other Currencies in Millions								
RHS	FYE	31-Dec	AUD 0.2	176.5%	-AUD 2.0	-9.7%	-AUD 2.0	-9.7%
DKK-TOA	FYE	31-Mar	¥15,605	8.0%	¥1,704	24.8%	¥1,230	0.3%
Oxford Nanopore	FYE	31-Dec	£13.8	204.4%	-£65.9	-1.4%	-£56.5	4.3%
Porvair	H1	31-May	£60.0	7.1%	£5.6	7.7%	£4.9	0.0%
Porvair (Laboratory)	H1	31-May	£19.0	19.1%	£2.9	6.3%	NA	NA

NA = not available, NM = not material

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